

Impact of Digital Media on User Perceptions

What correlations between media activity and voter demographics in Pennsylvania impacted voter behavior in the 2024 Presidential Election?

MIDN 1/C Gavin Buchanan, USN
Cyber Sciences Department
United States Naval Academy
Annapolis, United States
m250690@usna.edu

MIDN 1/C Cameron Colavito, USN
Cyber Sciences Department
United States Naval Academy
Annapolis, United States
m251062@usna.edu

MIDN 1/C Jewel Amber Maigne,
USN
Cyber Sciences Department
United States Naval Academy
Annapolis, United States
m253936@usna.edu

MIDN 1/C Benjamin Miller, USN
Cyber Sciences Department
United States Naval Academy
Annapolis, United States
m254374@usna.edu

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Abstract—Individual media consumption and activity has provided new insights into voting behavior, making it a top priority for political campaigns and private businesses. This research paper explores potential correlations between American media users’ online behavior and key voter demographics in Pennsylvania. The study examines a range of data points including Google trend searches, statistics related to broadband internet access, and campaign spending information to contextualize the election results and voter demographics at the county level. Pennsylvania was a key battleground state for the 2024 election and surprised the country as it deviated from predictions that it would contribute its electoral votes towards the Harris campaign. By analyzing media activity and election data, this Capstone aims to articulate correlations between key voter demographics and trends in online behavior, framing a new perspective on voter behavior in Pennsylvania leading up to the 2024 election. This paper uses statistics from the 2024 election to demonstrate the relationship between key voter information and their activity online and in the polls, which can lead to predictions about generating support, and eventual success, in a politician’s campaign.

Key Words—Digital Media, Voter Demographics, Pennsylvania Election, 2024 Presidential Election, Voter Behavior

I. INTRODUCTION

Media, defined as “the internet, newspapers, magazines, television, etc., considered as a group [1],” plays an active role in how citizens navigate modern society. Particularly, in a political context, the media has five main objectives when it comes to how citizens navigate elections: to provide information, grant or deny a candidate credentials, develop candidate images, frame issues, and set election agendas [2]. Providing information includes both *reporting* and *editorializing* political topics [3], including candidate details, issue stances, personal and political histories, key election issues, and events [2]. Granting or denying candidates’ credentials is achieved when the media promotes or demotes candidates in ways that give reason to show how candidates may be eligible or ineligible for office. Developing candidate images is the use of specific words by the media in order to paint candidates in positive or negative ways that affect the public’s view of them. Framing, occurring when the media portrays issues in specific ways to “emphasize certain considerations above others when evaluating that issue [4],” affects the ways the public can arrive at different positions within politics. Setting election agendas is done by presenting issues in a way that builds up public exposure and effectively provides a ranking of issues most important to the election for voter consideration.

These functions are used to influence the voting population and, with further consideration to the popularity and dependency of media amongst American voters, it can even be said that these functions make the media a voting institution in itself. This brings into question: how exactly does media influence American voters when it comes to politics, and more so, their vote in elections?

II. LITERATURE REVIEW

There are multiple themes that commonly appear when analyzing media's influence, including source influence and exposure, "fake news," American media attitudes, polarization, and social media bots and Artificial Intelligence.

A. Source Influence and Exposure

In regard to source influence and exposure, multiple questions arise when describing media's ability to influence: what types of media act to pursue influence? Under what circumstances? Over what issues? Also, who is driving this pursuit, and what motives are they acting under [5]? Overall, these questions lead to an even greater debate: what are the effects to come as a result of media influence? With this in mind, it is natural to ask how, if there are effects that come with being influenced by the media, can they be directly measured or controlled based on an individual's quantitative exposure to media itself? By understanding the ways media can influence individuals and acknowledging the relationship between an individual and their media exposure, people may better recognize and comprehend the possible impacts of media exposure.

In the digital age, there are also greater considerations as to how different social media platforms can serve distinct political purposes. For example, research done on the structures and social features of specific social media platforms showed that strong ideologies seen on Snapchat, WhatsApp, and Reddit were a result of the platforms encouraging "echo chambers" with their spaces created for users to share content and communicate publicly, while Facebook's "general purpose" design and closed network organization is suggestive of its users to be more avoidant of political discussion [6]. Overall, understanding how different social media platforms may portray the American political climate is beneficial to understanding how media can overall shape political perception and behavior, while

portraying issues and candidates in ways that are supported by their structure.

B. "Fake News"

"Fake news" also contributes to understanding the ways in which media can influence. The spread of "fake news," or news that is intentionally and verifiably false, and published or shared with the intention to mislead others [7], can sway voter opinions and force the public to undermine legitimate news while threatening democratic processes by distorting public discourse [7]. While the motive for spreading "fake news" may include revenue generation, the impact is largely unknown at this time [8]. In addressing the existence of "fake news" within media, the way that individuals can be influenced by it may be better understood as the viral nature of social media can make it easy to spread disinformation, misconstruing key issues and allowing for echo chambers to reinforce strict partisanship [9].

C. American Media Attitudes

American media attitudes contribute to how effective, or ineffective, media influence can be. In this day and age, a large percentage of the American public believes not only that media is biased, but particularly, that it is biased against their own viewpoints as individuals—this is known as the "hostile media phenomenon [10]." Four trends have been found within the news environment that could partially explain this negative perception of media: news media has become increasingly competitive and decentralized, reporting styles have changed with news becoming "softer" and increasingly negative, news from traditional media outlets is being less consumed than before, and public regard towards news media has declined [11]. An understanding of the American media attitude, especially in a time of modernizing technology, can help articulate why certain correlations between individuals and their use of influential media may seem more reasonable than others.

D. Polarization

Polarization, similar to source influence and exposure, is relevant in understanding how media achieves its influence as the type of media it is presented on and the surrounding perceptions of such media can determine media influence's effectiveness. Polarization, in addition to emotional engagement, is particularly amplified on social media, and has led social media to empower and instigate political

instability [12]. Polarization has also been encouraged through echo chambers and social media algorithms [12], and has exacerbated media bias and partisanship in distorting electoral decision-making [13]. Acknowledging polarization's presence in media and understanding how it encourages media influence helps articulate the extent of polarization's effects to voter trends and behaviors.

E. Social Media Bots and Artificial Intelligence

Social media bots and Artificial Intelligence (A.I.) pose potential pitfalls when it comes to understanding media influence on American voter beliefs and behaviors. Social media bots, defined as "automated software agents designed to mimic or impersonate humans [14]," bring additional problems to the browsing habits of users, who frequently click on the most available links or posts and fail to seek contradictory information when reading news [15]. While the spread of misinformation by media bots is being combated by fact-checking sites [15], bot behavior can also be recognized by high numbers of hashtags and user references [16]. A.I. in particular poses two additional problems towards democracy. The first is rights-based harm, involving the use of A.I. to violate the rights of individuals, groups, or collectives by intentionally limiting their participation in democratic processes [17]. The second is systemic harm, which utilizes A.I.'s technology to progress polarization, spread mass misinformation, conduct real-time surveillance, and degrade traditional media and information sources [17]. By elaborating on both the use and effects of social media bots and A.I., it can be seen that there are specific algorithms to consider as "beyond" human control, and this information may help clarify what the effects of algorithms are to influence political beliefs.

III. HISTORY

The evolution of media has played a pivotal role in shaping politics throughout the United States, particularly in how information is distributed to citizens. While the spread of information has changed drastically, humans have always found ways to communicate information and narratives. The first weekly newspaper to employ the printing press emerged in 1609, and by 1641, a newspaper was being printed in almost every country in Europe. By the 19th century, telegraphs and newspapers became essential tools for political information sharing. The telegraph facilitated near-instantaneous communication over long distances, revolutionizing news reporting and leading to the popularity and

importance of journalism via newspapers [18]. According to the U.S. National Archives, "through the constant changes in American party politics, newspapers remained the preeminent medium of communicating complex thoughts in the 19th century [19]." In the U.S., newspapers often served as instruments of political influence, with many being owned by political organizations or private businesses. James Gordon Bennett Sr.'s *The New York Herald*, founded in 1835, was a turning point in American journalism, introducing a more accessible, informational style that broadened the appeal of newspapers to a wider audience [19]. This era also saw the emergence of the "penny press," which made news more affordable and accessible, increasing its influence on the general public, and thus, the American voter.

As the media landscape continued to evolve, newspapers played a crucial role for the public's engagement with political campaigns, which would have a major impact on politics before, during, and after the Civil War. The Lincoln-Douglas debates were heavily covered by major news companies. Through the increased production of newspapers, the telegraph, and expanding railroad networks, the most topical updates from debates could be relayed from the stenographers at the debate site to the typesetters in the printing offices within a matter of hours, allowing for citizens to engage with content faster than ever [20]. However, with the Civil War's end in April 1865, as well as the Thirteenth Amendment abolishing slavery, newspaper companies in the post-war U.S. were heavily entrenched in four years of partisan divides [20].

The 20th century ushered in a new era with the rise of television, which, like newspapers, fundamentally changed the way the public engaged with and consumed political content. The history of the television can be traced back to the late 19th century; however, the first transatlantic television transmission wasn't achieved until 1928 through the Baird Television Development Company [21]. Through the 19th century, candidates for American Presidency gave 'stump speeches'; however, starting in the 1930s, the U.S. had begun shifting to broadcast. Full scale commercial television broadcasting began during and after World War Two, as the number of American homes with television increased exponentially [22]. By the late 1940s, television had become a powerful medium for reaching large audiences in real time, and by 1955, half of all U.S. households had one black and white television set, allowing voters to access political content with newfound ease.

Dwight D. Eisenhower was the first American president to use television for election and success, and in 1960 the first presidential debate between John F. Kennedy and Richard Nixon aired [22]. For the first time, citizens' perspectives were shifted due to the debate's televised nature, influencing public perception of the candidates based on substance and presentation. By 1960, it was estimated that around 90% of American families owned a television. Rather than just focusing on viewpoints, voters interpreted Kennedy as confident, while they perceived Nixon as gaunt and exhausted, leading to Kennedy's success at the polls. The nature of television allowed for immediate, passive interaction with the candidates, thus making television a central tool in political campaigns. From the comfort of their homes, American voters could now take in political content, thus drastically altering campaign and debate techniques. Politicians started using glamorous techniques to craft self-images and slogans to resonate with the television audiences, and this has largely remained true through the present.

The advent of the Internet in the late 20th century further transformed political communication and voter engagement. The Internet was considered to be invented in 1983 when the United States Department of Defense's Advanced Research Projects Agency Network, or ARPANET, adopted the TCP/IP standard, which allowed computers to connect with each other. As the infrastructure of the web began to expand with Tim Berners-Lee's introduction of the World Wide Web in 1991, more users would learn about and utilize the eased accessibility to political information. In 1995, CNN would create their website, known as CNN Interactive. NBC would follow suit alongside Microsoft in 1996 with their website MSNBC. Many television networks were soon to follow CNN and NBC to create online platforms for users, allowing them to interact on their own time and agenda. Additionally, both platforms laid the foundation for sharing information, and would provide a basis for the creation of social networking sites. The first introduction of social media can be seen with Classmates.com being founded in 1995, followed shortly thereafter with the first true social networking site, Six Degrees, in 1997 [24]. These websites allowed individuals to connect and share information in unprecedented ways. While both of these sites couldn't generate enough revenue to be successful, other companies including Friendster and MySpace quickly followed suit, allowing family members, friends, and acquaintances to connect online, share information, and debate issues. All of these sites

would eventually be supplanted by Facebook, which has become a key player in modern political communication.

The Internet remains a powerful tool for user-driven political communication, where exposure, activity, and engagement can influence just as much as political messages can. From print to television to the Internet, each innovation has dramatically influenced the political environment and thus, how voters access political information.

IV. BACKGROUND & METHODOLOGY

As media continues to change in form, speed, and outreach, there has been a significant question posed as to how this affects user thoughts, ideas, and behaviors. By understanding how media activity can relate to behavior, users may better understand how their use of media can influence their political views and, specifically, how that relationship affected their voting behavior in the 2024 presidential election.

RESEARCH QUESTION. What correlations between media activity and voter demographics in Pennsylvania impacted voter behavior in the 2024 presidential election?

RESEARCH TOPIC. The objective of this Capstone is to analyze media activity and election data from Pennsylvania in order to specify correlations between Pennsylvania's voter demographics, media activity, and voter behavior in the 2024 presidential election. These correlations are used as a means to understand if, and how, Pennsylvania users' voter demographics and media activity influenced their voting behavior.

APPROACH. The project achieves its objective by observing and analyzing correlations between media activity and election data, to include election results and Pennsylvania's voter demographics. Data collected and used for correlation analysis is categorized as either media activity or election data. Once data is collected, properly categorized as either media activity or election data, and placed into ranked datasets inclusive of tied ranks, Spearman's rank-order correlation is applied in order to determine significant trends.

DECISION ON PENNSYLVANIA. When looking at Pennsylvania's presidential candidate polls between August 1st and October 19th, U.S. Vice President Harris was predicted to win the state of Pennsylvania by a varying but small margin, ranging from 0.1% to 2.1% [30], until former U.S. President Donald Trump

gained the lead with a range of 0.1% to 0.7% from October 20th to November 3rd. Harris then reclaimed the lead with a 0.2% margin on November 4th, just the day before the election. This prediction from Pennsylvania's polls was proven incorrect, with Trump winning Pennsylvania by a 1.7% margin [31]. In addition to this, there are other several interesting aspects of Pennsylvania as a case study for this research. First, a total of \$1.2 billion was spent in Pennsylvania for both GOP and Democratic campaign ads [32], and second, there were speculation that the Amish vote was mobilized to heavily influence Pennsylvania's outcome [33], which we found interesting as it is commonly known that due to their lifestyles, Amish peoples' interaction with technology is limited. In essence, the outcome of Pennsylvania's vote and the unexplored varying factors of media in its projected vote made Pennsylvania a good model for exploring correlations between media exposure and voter behavior.

DATA COLLECTION. All data collected for this research was open-source. The two types of data collected were categorized as either media activity or election data.

The first set of data collected, for media activity, included Google Trends search data presented by AP News [34], which broke down the search trend history of each county in Pennsylvania, categorized them into general search terms—for example, the categorical search term of “economy” includes searches for “economic growth” and “GDP”—and ranked each county against all others in Pennsylvania based on each search term's search frequency by week. The specific data collected was inclusive of data between the weeks of August 11th and November 10th, under the search terms “unemployment,” “minimum wage,” “inflation,” “economy,” and “health care.” Due to the nature of this open-source dataset only being presented as the ranks of each county by week for each search term, all other data collected is also ranked, inclusive of tied ranks, for the purpose of normalization.

The second set of data, collected for media activity, included the percentages of broadband Internet access of all counties in Pennsylvania, presented by HDPulse [35]. The data presented by HDPulse was ultimately sourced from the 2018-2022 Census Bureau and the 2018-2022 American Community Survey, and is inclusive of all races, to include Hispanic/Latino demographics, of both sexes male and female, and of all ages. For this specific set of data, though it may be better characterized as

access to online media, it was categorized as media activity for the purpose of conveniently organizing the data.

The third set of data, collected for media activity, included operating expenditures from political committees as reported to the Federal Election Commission (FEC) during the 2023-2024 election cycle [36]. Data was filtered based on several criteria, including a) Pennsylvania as the state of purchase, b) expense categorized as “Advertising,” c) explicitly or relatedly described as directed or social-media advertising (as this would be closely associated with broadband access), and d) purchase was made by a committee directly affiliated with a candidate [36].

The fourth set of data, collected for election results, was provided by AP News [37], and included the total vote count and vote percentages for Presidential Candidate former U.S. President Donald Trump of the Republican Party and Presidential Candidate U.S. Vice President Kamala Harris of the Democratic Party. Total vote counts and vote percentages were separated by county.

The fifth set of data, collected for election results, included voter demographics from a variety of sources and was separated by county. Data on the total U.S. citizen population in Pennsylvania was provided by Stanford Data Commons [38]. Total registered voters, the number of registered voters by party affiliation, age, and party changes were provided by the Pennsylvania Department of State [39]. Median salary, average education level, and unemployment levels [40] were presented by HDPulse.

DATA RANKING. To properly apply Spearman's rank-order correlation, all values were ranked within their respective dataset using a tied-ranking system.

Tied ranks occur when two or more data values equal one another, and thus, receive the average of the two ranks that they would have received if not of equal value. For example, take the following list: {1, 2, 3, 3, 5}. Since two data values equal 3, they would both receive the rank of 3.5.

In addition to implementing tied ranks, all datasets are ranked by their highest to lowest values, regardless of the dataset topic.

SPEARMAN'S RANK-ORDER CORRELATION. Spearman's rank-order correlation is the nonparametric version of the Pearson product-moment correlation and is used to determine the strength and direction of the

monotonic relationship between two variable rankings, signified by the coefficient ρ or r_s [25].

The coefficient represents this correlation by ranging from +1 to -1, with a ρ value of +1 indicating a perfect positive correlation, a ρ value of 0 indicating no correlation, and a ρ value of -1 indicating a perfect negative correlation [25].

Spearman's rank-order correlation is defined by two equations [26], with its coefficient equation written as

$$\rho = 1 - \frac{6\sum d_i^2}{n(n^2-1)} \quad (1)$$

and its correction factor written as

$$cf = \frac{m(m^2-1)}{12} \quad (2)$$

which is used for ties in variable rankings. In eq. (1), d_i denotes the difference between a paired ranking X and ranking Y and n denotes the total number of rankings in the dataset. In eq. (2), m denotes the number of rankings involved in a singular tie for either rankings X or Y. When calculating the final value of ρ , all cf values will be summed and added to ρ .

As Spearman's rank-order correlation involves calculating a correlation between ranks rather than raw values, this makes the correlations less sensitive to outliers and can effectively be used to determine the degree of agreement between different sets of rankings. Tied ranks also helps normalize the influence of duplicate values in order to maintain the integrity of calculations [27].

We calculated the Spearman's rank-order correlation coefficient across multiple collected datasets. Fig. 1 portrays the datasets compared, supplemented by all of the Spearman's rank-order correlation coefficients found in their respect:

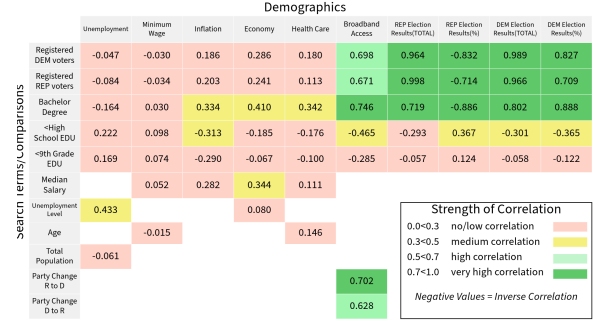


Fig 1. All dataset comparisons made, inclusive of their respective Spearman's Rank-Order Correlation Coefficients.

For the purpose of organizing the Spearman's rank-order correlation coefficients, specific ranges of possible coefficient values were classified by the following criteria:

TABLE I
SPEARMAN'S RANK-ORDER CORRELATION CLASSIFICATIONS

Classification	Value Range for ρ
No correlation	$0.0 \leq \rho < \pm 0.1$
Low correlation	$\pm 0.1 \leq \rho < \pm 0.3$
Medium correlation	$\pm 0.3 \leq \rho < \pm 0.5$
High correlation	$\pm 0.5 \leq \rho < \pm 0.7$
Very high correlation	$\pm 0.7 \leq \rho < \pm 1.1$

DATA NORMALIZATION. By using data normalization, the consistency of data increases and makes it easier to search, group, and analyze data with relative confidence [28]. It also facilitates logical storage and retrieval.

Two normalization forms were applied in this research. The first was First Normal Form (1NF), which ensured that each table cell within a dataset contained a single value and that each record was unique [28]. The second was Second Normal Form (2NF), which required data to meet all 1NF criteria and ensured that all non-key attributes were fully functional dependent on the primary key [29]. In this case, the primary key for all datasets were Pennsylvania's counties.

V. DATA AND RESULTS

Salience, meaning "the extent to which people cognitively and behaviorally engage with a

political issue [42],” can be used to understand the relationship between voter demographics and voting behavior. As it can be used to refer to an individual or group’s perceived importance of an issue and, in response, their attention to it, it becomes applicable to how voters, parties, campaigns, and other political actors use it to set their issue agendas.

In the modern age, stimuli that may fuel salience on certain political issues becomes easily accessible, and may become increasingly prevalent to setting issue agendas based on that individual or group’s use of media. Voter demographics also add to the stimuli of salience [43]. As voters are less able to control their demographics in comparison to their exposure and use of media, both media activity and voter demographics are important to consider when questioning what issues are important to voters.

Due to media activity and voter demographics having influence on the issue salience of voters, the hypotheses developed for this research directly compare collected data from media activity and voter demographics. The goal of such hypotheses is to see if there is a correlation between demographics and voter interest in a topic, and to articulate how media activity could have served as the medium in which people explored their interests and thus, impacted their voter behavior.

As media activity data collected for this research includes county search rank data for the search terms “unemployment,” “minimum wage,” “inflation,” “economy,” and “healthcare” by week and county percentages for access to broadband Internet, each search term and the percentages for access to broadband Internet have at least one individual hypothesis to characterize their dataset comparisons.

1. Unemployment Levels v. Search Term “Unemployment”

Hypothesis: There will be a positive medium or high correlation between unemployment percentages and county-level search trends about “unemployment.”

Spearman’s Rank-Order Correlation Coefficient: 0.4333

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.4333, there was a medium correlation between unemployment percentages and county-level search trends about “unemployment.” The positive value of the coefficient denotes a positive monotonic relationship between county

unemployment levels and county popularity for the search term “unemployment.”

2. Household Median Salaries v. Search Term “Minimum Wage”

Hypothesis: There will be a negative medium or high correlation between household median salaries and county-level search trends about “minimum wage.”

Spearman’s Rank-Order Correlation Coefficient: 0.0518

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.0518, there was no correlation between county household median salaries and county popularity for the search term “minimum wage.”

3. Household Median Salaries v. Search Term “Inflation”

Hypothesis: There will be a negative medium or high correlation between household median salaries and county-level search trends about “inflation.”

Spearman’s Rank-Order Correlation Coefficient: 0.2819

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.2819, there was a low, positive correlation between county household median salaries and county popularity for the search term “inflation.”

4. Household Median Salaries v. Search Term “Economy”

Hypothesis: There will be a negative medium or high correlation between household median salaries and county-level search trends about “economy.”

Spearman’s Rank-Order Correlation Coefficient: 0.3435

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.3435, there was a medium, positive correlation between household median salaries and county-level search trends about “economy.” This finding opposes the implications of the hypothesis in which counties with lower household median salaries tended to have more people making online searches about the topic of “economy” than counties with higher household median salaries.

5. Unemployment Levels v. Search Term “Economy”

Hypothesis: There will be a negative medium or high correlation between unemployment levels and county-level search trends about “economy.”

Spearman’s Rank-Order Correlation Coefficient: 0.0799

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.0799, there was no correlation between county unemployment levels and county popularity for the search term “economy.”

6. Age v. Search Term “Health Care”

Hypothesis: There will be a positive medium or high correlation between age and county-level search trends about “health care.”

(Average) Spearman’s Rank-Order Correlation Coefficient: 0.1457

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.1457, there was no correlation between county age and county popularity for the search term “health care.”

7. Registered Voters (Democratic) v. Access to Broadband Internet

Hypothesis: There will be a positive medium or high correlation between voter registration by party affiliation to the Democratic Party and access to broadband Internet.

Spearman’s Rank-Order Correlation Coefficient: 0.6981

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.6981, there was a high, positive correlation between voter registration by party affiliation to the Democratic Party and access to broadband Internet. The positive value of the coefficient denotes a positive monotonic relationship between party affiliation to the Democratic Party and county access to broadband Internet.

8. Registered Voters (Republican) v. Access to Broadband Internet

Hypothesis: There will be a negative medium or high correlation between voter registration by party affiliation to the Republican Party and access to broadband Internet.

Spearman’s Rank-Order Correlation Coefficient: 0.6711

Conclusion: With a Spearman’s rank-order correlation coefficient of 0.6711, there was a high correlation between voter registration by party affiliation to the Republican Party and access to broadband Internet. The positive value of the coefficient denotes a positive monotonic relationship between party affiliation to the Republican Party and county access to broadband Internet. This opposes the implications of the hypothesis in which counties with a lower percentage in access to broadband Internet had a greater correlation with voters registering as a Republican voter than counties with a higher percentage in access to broadband Internet.

Federal Election Commission (FEC) Findings

Analysis of FEC operating expenditure data proved difficult due to each respective purchase being associated with a committee rather than a specific candidate, with many committees being unaffiliated with any one candidate. Regardless, our analysis produced a list of several hundred purchases and a list of roughly a dozen candidates that had spent extensively on this strategy. The sources of this advertising come from a variety of sources, primarily social media sites and a select group of targeted-advertising companies. The resultant purchases list shows more right-leaning candidates investing heavily in targeted advertisements than their left-leaning counterparts. Additionally, these right-leaning candidates were more likely to win their respective races than their counterparts across the aisle.

Below are the five highest-spending candidates identified through this method. They illustrate the above points, that spending heavily on targeted and social media advertising appears to benefit Republican candidates more so than similar spending by Democratic candidates (their FEC Candidate Identification # is in [brackets]).

- BRESNAHAN, ROB (R) [H4PA08124]: Spent \$1,766,153.6 (of a total budget of \$3,670,454.76) on “Media Buys” from Smart Media Group. Won U.S. House race for Pennsylvania’s 8th Congressional District, defeating incumbent Matt Cartwright 50.7% to 49.1%.
- FITZPATRICK, BRIAN (R) [H6PA08277]: Spent \$650,432.66 of a total budget of \$3,318,623.95 on targeted ads through Flexpoint Media, Smart Media Group, Red

Maverick Media Advertising, and Targeted Victory Advertising. Won Pennsylvania's 1st Congressional District 56.2% to 43.4%.

- DZIADOS, CHRISTOPHER RYAN (D) [H4PA14106]: Spent \$38,650.92 of a total budget of \$271,465.01 on targeted ads through Facebook and Fifth Influence Digital Media Advertising. Lost race for Pennsylvania's 14th Congressional District, 33.4% to 66.5%
- WOMER, ZACH (D) [H4PA15152]: Spent \$21,532.71 (of a total budget of \$132,751.98) on targeted digital advertisements, almost entirely on Facebook and X. Lost U.S. House race for Pennsylvania's 15th Congressional District. Earned 28.5% of the vote vs. Republican Glenn Thomson's 71.3%
- THOMPSON, GLENN (R) [H8PA05071]: Spent \$11,228.24 (of a total budget of \$1,428,868.30) on targeted advertisements-through a variety of companies, including Schesing Communications, Hemlock Digital Strategies, and Marlin Group Advertising. Won race for Pennsylvania's 15th Congressional District 71.3% to 28.5%

We posit that this is due to Democratic candidates believing that they would reach more of their potential voters through traditional media strategies in high-density areas. In effect, because broadband access was so limited in certain counties, we believe that the targeted nature of these advertisements was the most cost-effective way for Republican candidates to reach their intended audience, thus leading to their success [44].

Future research can shed important light on how this played out among committees that were not affiliated with any particular candidate, and how their purchases may have shaped the electoral map results.

VI. CONCLUSION

This research helps to characterize the American media diet and its effects on voter behavior, especially as it is becoming more Internet-based. We reach our conclusion by analyzing quantifiable media activity, in parallel to voter demographics and election data, to identify possible correlations that had the most effect on the 2024 presidential election, as seen through an in-depth analysis of the results.

With media serving as a voting institution that provides political news and campaign information to American voters, informing the public of political news that serves as stimuli to their issue salience is important so that they may develop issue agendas that are in parallel, or at least closely related, to what they value as individuals. It is also important that they are informed of the positions of each candidate in regard to their issue agendas, as it is vital to ensure that each citizen votes for the candidate whom they believe to be most closely representative of their interests and ideals in government. Our research identifies how media activity is closely correlated with the eventual results of an election, indicating media approaches that best represent the interests and agendas of voters. By understanding how media activity can correlate to voter behavior, people may be better equipped to navigate media amongst their concerns as voters, candidates can better utilize the evolving American media diet to better understand their voters and what information they desire from them, and the political climate can continue evolve as media does.

1. Though they can be directly related to voter demographics, search trends did not completely characterize the impact of voter demographics on voter behavior. On the other hand, access to broadband Internet had a greater, more tangible impact on voter behavior overall.

The intention of this research was to investigate how media activity and voter demographics, when made out to be dependent on one another, impacted voter behavior in the 2024 presidential election. Though, when calculating the Spearman's rank-order correlation coefficients to affirm or deny the suspected hypotheses, many of the hypotheses were denied because many dataset comparisons came out to have no correlation whatsoever. Out of the six hypotheses that were directly related to a search term, only two had a medium correlation in accordance with aforementioned classifications. Especially considering that the search term hypotheses were intentionally designed to characterize the most logical relationships between the search term and its relatable demographic, there was unfortunately little breakthrough with understanding how search trends were a medium for voter interests, and in turn, relate voter interests from demographics to voter behavior.

In contrast though, there were unexpected findings that came from comparisons made with data related to access to broadband Internet. Unlike the comparisons made with search term data, the access

to broadband Internet data had greater correlations that resulted in tangible voter behavior. These correlations include the data showing positive, high correlations between the number of registered voters (of both the Democratic and Republican party) and access to broadband Internet, positive, high correlations between party change registrations and access to broadband Internet, and that Republican candidates were more likely to win their respective races when they invested in targeted advertisements for voters via the FEC data.

What these findings may imply is that, while media may have the ability to serve voters as a tool to help them develop their issue agendas and, in turn, allow voters to vote for candidates that properly represent their views, search trends alone cannot completely encapsulate what voter interests are, even when related to voter demographics.

Instead, it could be implied that having access to broadband Internet in general promotes greater voter behavior overall. While this may still leave questions as to if, and how, there are correlations between media activity and voter behavior, this research is satisfied with being able to differentiate the impact of specific media practices, like searching issue topics, versus the impact of accessibility to media onto voters.

2. Voter demographics may only be good indicators of voter issue agendas when issues are projected to directly affect the voter, rather than be foundationally-related.

When developing the hypotheses to be in accordance with our research question, it was important for each hypothesis to be reasonable in their comparison of data and characteristic of what voters may be realistically concerned about based on their demographics, exclusive of hypotheses regarding access to broadband Internet as a county's access to broadband Internet does not have a direct correlation to a demographic. Thus, the comparisons made using the application of Spearman's rank-order correlation included:

- County unemployment levels versus county ranks for the search term "unemployment"
- Household median salaries versus county ranks for the search term "minimum wage"
- Household median salaries versus county ranks for the search term "inflation"
- Household median salaries versus county ranks for the search term "economy"

- County unemployment levels versus county ranks for the search term "economy"
- County age groups versus county ranks for the search term "health care"

With the limited open-source data available, it can be seen that these comparisons were intentionally made to best characterize predictable voter behavior based on what voters would most be affected by, so that such predictable behavior could either be affirmed or denied.

After applying Spearman's rank-order correlation to the comparable datasets, only two comparisons had medium correlations, both of which were positive and characterized by a nearly monotonic relationship: county unemployment levels versus county ranks for the search term "unemployment" and household median salaries versus county ranks for the search term "economy." All other previously mentioned comparisons had either no correlation or a positive, low correlation.

To further investigate if these correlations affected voter behavior, county election results have been paired with the counties that ranked in the top three and bottom three for the demographics that returned a medium correlation, which were unemployment and household median salary.

Unemployment Levels

TABLE II
TOP 3 COUNTIES FOR UNEMPLOYMENT LEVELS

County	Unemployment Level (%)	County Rank	Election Result (Party)	Election Result (%)
Cameroon	9.3	1	GOP	74.5
Philadelphia	8.4	2	DEM	78.8
Pike	7.3	3	GOP	61.6

TABLE III
BOTTOM 3 COUNTIES FOR UNEMPLOYMENT LEVELS

County	Unemployment Level (%)	County Rank	Election Result (Party)	Election Result (%)
Snyder	2.3	66.5	GOP	73.2
Susquehanna	2.3	66.5	GOP	71.9
Montour	2.6	64	GOP	60.0

Household Median Salaries

TABLE IV
TOP 3 COUNTIES FOR HOUSEHOLD MEDIAN SALARY

County	Household Median Salary	County Rank	Election Result (Party)	Election Result (%)
Chester	118,574	1	DEM	56.7
Bucks	107,836	2	GOP	49.5*
Montgomery	107,441	3	DEM	60.9

*Bucks County was evenly split between the GOP and DEM vote percentage-wise, with the GOP vote winning the county by 291 votes.

TABLE V
BOTTOM 3 COUNTIES FOR HOUSEHOLD MEDIAN SALARY

County	Household Median Salary	County Rank	Election Result (Party)	Election Result (%)
Cameron	46,186	67	GOP	74.5
Forest	46,188	66	GOP	71.8
Cambria	54,221	65	GOP	69.5

When looking at the election results for counties that ranked in the top three and bottom three for Pennsylvania's unemployment, it can be seen that all except Philadelphia voted an overwhelming majority for former U.S. President Donald Trump of the Republican Party. To best understand the reasoning behind these election results and how voter demographics may have influenced voter issue agendas, it is known that a popular topic within Trump's election campaign was American job creation and retainment [45] in multiple facets of his campaign, to include his proposals for transportation, the environment, and defense, with the promotion of domestic jobs being the forefront of his overall proposed economic policy.

For the election results of counties that ranked top three and bottom three for Pennsylvania's household median salary, the counties that ranked in the top three either voted for Harris or lost the Democratic vote by a slim margin of a few hundred votes, while the counties which ranked bottom three voted an overwhelming majority for Trump. Looking at the top three counties, their vote may be explained by Harris's proposed economic policy of multiple tax

credits, to include an expanded child tax credit from the American Rescue Plan Act (ARPA) and \$25,000 tax credit for first-time homebuyers [46], which would reduce tax burdens on middle-class families while providing possible opportunities for greater financial stability. On the other hand, the vote of the bottom three counties may be explained by Trump's proposal to make the 2017 Tax Cuts and Jobs Act (TCJA) permanent [47], which reduced standard tax rates and could overall reduce tax burdens for low-income families [48].

3. There was a positive, high correlation between total registered Democratic voters and access to broadband Internet, and a positive, high correlation between total registered Republican voters and access to broadband Internet.

When comparing datasets between registered voters and access to broadband Internet, the Spearman's rank-order correlation coefficients for both Democratic voters and Republican voters when compared to access to broadband Internet data were positive and high-value. The Spearman's rank-order correlation coefficient found for total registered Democratic voters and access to broadband internet was calculated to be a 0.6981, categorizing it as a positive, high correlation and characterizing the comparison as a monotonic relationship. Similarly, the Spearman's rank-order correlation coefficient found for total registered Republican voters and access to broadband internet was calculated to be a 0.6711, categorizing it as a positive, high correlation and characterizing the comparison as a monotonic relationship.

To investigate if these correlations impacted voter behavior, county election results for the counties that ranked top three and bottom three for number of registered voters, for both Democratic voters and Republican voters, were collected for comparison against the Spearman's rank-order correlation coefficients found.

Registered Democratic Voters

TABLE VI
TOP 3 COUNTIES FOR TOTAL REGISTERED DEMOCRATIC VOTERS

County	Total Registered Voters (DEM)	County Rank	Election Result (Party)	Election Result (%)
Philadelphia	808,522	1	DEM	78.8

Allegheny	526,268	2	DEM	59.7
Montgomery	311,238	3	DEM	60.9

TABLE VII
BOTTOM 3 COUNTIES FOR TOTAL REGISTERED DEMOCRATIC VOTERS

County	Total Registered Voters (DEM)	County Rank	Election Result (Party)	Election Result (%)
Cameron	729	67	GOP	74.5
Forest	829	66	GOP	71.8
Sullivan	1,147	65	GOP	73.1

Registered Republican Voters

TABLE VIII
TOP 3 COUNTIES FOR TOTAL REGISTERED REPUBLICAN VOTERS

County	Total Registered Voters (GOP)	County Rank	Election Result (Party)	Election Result (%)
Allegheny	274,157	1	DEM	59.7
Montgomery	214,798	2	DEM	60.9
Bucks	206,709	3	GOP	49.5*

*Bucks County was evenly split between the GOP and DEM vote percentage-wise, with the GOP vote winning the county by 291 votes.

TABLE IX
BOTTOM 3 COUNTIES FOR TOTAL REGISTERED REPUBLICAN VOTERS

County	Total Registered Voters (GOP)	County Rank	Election Result (Party)	Election Result (%)
Cameron	1,907	67	GOP	74.5
Forest	2,053	66	GOP	71.8
Sullivan	2,872	65	GOP	73.1

Access to Broadband Internet

TABLE X
TOP 3 COUNTIES FOR PERCENTAGE OF ACCESS TO BROADBAND INTERNET

County	Access to Broadband and Internet (%)	County Rank	Election Result (Party)	Election Result (%)
Bucks	93.0	2.5	GOP	49.5*
Chester	93.0	2.5	DEM	56.7
Montgomery	93.0	2.5	DEM	60.9

*Bucks County was evenly split between the GOP and DEM vote percentage-wise, with the GOP vote winning the county by 291 votes.

TABLE XI
BOTTOM 3 COUNTIES FOR PERCENTAGE OF ACCESS TO BROADBAND INTERNET

County	Access to Broadband and Internet (%)	County Rank	Election Result (Party)	Election Result (%)
Forest	67.0	67	GOP	71.8
Union	77.0	66	GOP	61.2
Cambria	78.0	64.5	GOP	69.5

While there may be external factors to the relationship between registered voters and percentage of access to broadband Internet, like the county's ratio of their number of registered voters, regardless of party, with access to broadband Internet, it is worth noting that the counties that ranked top three and bottom three for total registered voters across both parties ranked similarly in their ranks for access to broadband Internet, with Philadelphia County being the outlier and ranking 30th in access to broadband Internet. To illustrate this fact, Bucks County and Montgomery County both ranked 2.5th, Allegheny County ranked 8th, Cameron County and Sullivan County both ranked 64.5th, and Forest County ranked 67th in access to broadband Internet.

Considering the Spearman's rank-order correlation coefficients of these comparisons being characteristic of positive, high correlations with monotonic relationships, what this may imply is that counties with a higher percentage of access to broadband Internet tended to have more registered

voters, regardless of party, than counties with a lower percentage of access to broadband Internet. While this may be characteristic of population sizes within counties, this may also have implications towards county cultures in which local citizens may experience greater encouragement to register as voters, as supplemented by greater access to broadband Internet.

In addition to the findings from the hypotheses outlined in this research, there were additional, outstanding findings that came from comparisons made outside those that were made to affirm or deny the hypotheses. While these comparisons were made with the same datasets from the original data collection, they do not serve the purpose of affirming or denying any of the hypotheses. Instead, they were made to explore any considerations that were not originally outlined in the development of hypotheses in order to find any significant correlations.

4. There was a positive, medium correlation between an average education level of Bachelor's Degree or higher and an interest in the search terms "inflation," "economy," and "health care," while there is a negative, low or no correlation between an average education level of high school or less, inclusive of ninth grade or less, and an interest in the search terms "inflation," "economy," and "health care."

When comparing datasets between county average education levels of Bachelor's Degree or higher and search rank data for the search terms "inflation," "economy," and "health care," all of the respective Spearman's rank-order correlation coefficients were calculated to be between the value of 0.3344 and 0.409, categorizing all three coefficients as positive, medium correlations and characterizing their comparisons as monotonic relationships. But, when comparing datasets between county average education levels of less than high school and less than ninth grade with search rank data for the search terms "inflation," "economy," and "health care," a majority of all of the respective Spearman's rank-order correlation coefficients were almost the complete opposite from those calculated with the same search rank data in counties with an average education level of a Bachelor's Degree or higher. Instead, these coefficients were calculated to be between the values of -0.3127 and -0.0671, categorizing all six coefficients as negative, low correlations or not correlations at all, leaving comparisons with low, no correlations to be characterized as nonmonotonic.

The exact Spearman's rank-order correlation coefficients are provided below:

Average Education: Bachelor's Degree or Higher v. Search Term "Inflation": 0.3344

Average Education: Bachelor's Degree or Higher v. Search Term "Economy": 0.4099

Average Education: Bachelor's Degree or Higher v. Search Term "Health Care": 0.3419

Average Education: Less Than High School v. Search Term "Inflation": -0.3127

Average Education: Less Than High School v. Search Term "Economy": -0.1847

Average Education: Less Than High School v. Search Term "Health Care": -0.1759

Average Education: Less Than Ninth Grade v. Search Term "Inflation": -0.2904

Average Education: Less Than Ninth Grade v. Search Term "Economy": -0.0672

Average Education: Less Than Ninth Grade v. Search Term "Inflation": -0.998

To investigate if these correlations impacted voter behavior, county election results for the counties that ranked top three and bottom three for all three education demographics were collected for comparison against the Spearman's rank-order correlation coefficients found.

Average Education: Bachelor's Degree or Higher

TABLE XII
TOP 3 COUNTIES FOR PERCENTAGE OF CITIZENS WITH BACHELOR'S DEGREE OR HIGHER AS HIGHEST EDUCATION RECEIVED

County	Bachelor's Degree or Higher (%)	County Rank	Election Result (Party)	Election Result (%)
Chester	56.1	1	DEM	56.7
Montgomery	51.4	2	DEM	60.9
Centre	46.2	3	DEM	50.9

TABLE XIII
BOTTOM 3 COUNTIES FOR PERCENTAGE OF CITIZENS WITH

BACHELOR'S DEGREE OR HIGHER AS HIGHEST EDUCATION RECEIVED

County	Bachelor's Degree or Higher (%)	County Rank	Election Result (Party)	Election Result (%)
Cameron	10.9	67	GOP	74.5
Forest	11.16	66	GOP	71.8
Mifflin	13.2	65	GOP	77.9

Average Education: Less than High School

TABLE XIV
TOP 3 COUNTIES FOR PERCENTAGE OF CITIZENS WITH LESS THAN HIGH SCHOOL AS HIGHEST EDUCATION RECEIVED

County	Less than High School (%)	County Rank	Election Result (Party)	Election Result (%)
Juniata	17.0	1	GOP	80.3
Mifflin	15.2	2	GOP	77.9
Snyder	15.1	3	GOP	73.2

TABLE XV
BOTTOM 3 COUNTIES FOR PERCENTAGE OF CITIZENS WITH LESS THAN HIGH SCHOOL AS HIGHEST EDUCATION RECEIVED

County	Less than High School (%)	County Rank	Election Result (Party)	Election Result (%)
Butler	4.3	67	GOP	65.7
Westmoreland	4.7	66	GOP	63.9
Allegheny	4.8	65	DEM	59.7

Average Education: Less than Ninth Grade

TABLE XLII
TOP 3 COUNTIES FOR PERCENTAGE OF CITIZENS WITH LESS THAN NINTH GRADE AS HIGHEST EDUCATION RECEIVED

County	Less than Ninth Grade (%)	County Rank	Election Result (Party)	Election Result (%)
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Lancaster	6.4	1	GOP	57.5
Snyder	6.3	2	GOP	73.2
Juniata	5.6	3	GOP	80.3

TABLE XVI
BOTTOM 3 COUNTIES FOR PERCENTAGE OF CITIZENS WITH LESS THAN NINTH GRADE AS HIGHEST EDUCATION RECEIVED

County	Less than Ninth Grade (%)	County Rank	Election Result (Party)	Election Result (%)
Butler	1.1	66.5	GOP	65.7
Sullivan	1.1	66.5	GOP	73.1
Westmoreland	1.3	64.5*	GOP	63.9

*Westmoreland County was exactly tied with Wyoming County, with a 1.1 percentage of citizens with less than ninth grade as their highest education received.

When looking at these election results for counties that ranked in the top three and bottom three for Pennsylvania's average education levels of Bachelor's degree or higher, less than high school, and less than ninth grade, it can be that all but four of the observed counties voted for Trump, well over their respective majority thresholds. The four counties that did not vote for Trump included the counties that ranked in the top three of counties with an average education level of a Bachelor's Degree or higher, and a county that ranked third to last of counties with an average education level of less than high school.

Although it is difficult to attribute these correlations to an exact reasoning due to the interdependence of education on other social factors that were not collected in this research, like public funding, access to educational resources, and differing county curriculums, the Spearman's rank-order correlation coefficients that were calculated from these comparisons may simply imply that counties with a higher average education level of a Bachelor's degree or higher tended to have more people making online searches about the topics of "inflation," "economy," and "health care" than counties with a lower average education level of a Bachelor's degree or higher. In turn, with regard to the comparisons that had low or no correlations, it could not be implied that counties with a higher average education level of less than high school, inclusive of less than ninth grade, tended to have less

people making online searches about the topics of “inflation,” “economy,” and “health care” than counties with a lower average education level of less than high school, inclusive of less than ninth grade.

5. There was a positive, high correlation between an average education level of Bachelor’s Degree or Higher and access to broadband Internet, and a negative, medium correlation between an average education level of high school or less and access to broadband Internet.

In comparing county average education levels of Bachelor’s Degree or higher and county-level percentages of access to broadband Internet, the Spearman’s rank-order correlation coefficient was calculated to be a 0.7463, categorizing it as a positive, high correlation and characterizing the comparison as a monotonic relationship. In contrast, in comparing county average education levels of less than high school and county-level percentages of access to broadband Internet, the Spearman’s rank-order correlation coefficient was calculated to be a -0.4651, categorizing it as a negative, medium correlation and characterizing the comparison as a nonmonotonic relationship.

To investigate if these correlations impacted voter behavior, county election results for the counties that ranked in the top three and bottom three for average education levels of Bachelor’s Degree or higher and average education levels of less than high school were referenced from previous findings and used for comparison against the Spearman’s rank-order correlation coefficients found.

In alignment with the last finding discussed, when looking at the election results for counties that ranked in the top three and bottom three for average education levels of Bachelor’s Degree or higher and average education levels of less than high school, the only four counties that voted for Harris were the three counties that ranked in the top three of average education levels of Bachelor’s Degree or higher, and one county that ranked in the bottom three for average education levels of less than high school. All other counties voted for Trump.

As education is closely intertwined with many external factors, it is difficult to imply that this factor alone is an indicator of voter behavior and voting preference. But, with the Spearman’s rank-order correlation coefficients that were calculated, what may be implied is that counties with a higher average education level of a Bachelor’s degree or higher tended to have greater access to

broadband Internet than counties with a lower average education level of a Bachelor’s degree or higher, and that counties with a higher average education level of less than high school tended to have less access to broadband Internet than counties with a lower average education level of less than high school.

Future proposals to investigate the correlations between average education level and access to broadband Internet could include the campaign mediums used by both major parties of the presidential election outside of digital media, or the average accessibility to campaign information and political news beyond the voting population’s media exposure. These proposals may be supplemental to understanding voter behavior outside of user behavior on media and campaign strategies that are less modernized and outside technological platforms.

6. There was a positive, very high correlation to Republican to Democratic party change registrations and access to broadband Internet, and a positive high correlation to party change registrations and access to broadband Internet.

When comparing party changes and access to broadband Internet, the Spearman’s rank-order correlation coefficients for both Republican to Democratic changes and Democratic to Republican changes when compared to access to broadband Internet data were positive and high-value. The Spearman’s rank-order correlation coefficient found for Republican to Democratic party change registrations and access to broadband Internet was calculated to be a 0.7016, categorizing it as a positive, very high correlation and characterizing the comparison as a monotonic relationship. Similarly, the Spearman’s rank-order correlation coefficient found for Democratic to Republican party change registrations and access to broadband Internet was calculated to be a 0.6281, categorizing it as a positive, very high correlation and characterizing the comparison as a monotonic relationship.

To investigate if these correlations impacted voter behavior, county election results for the counties that ranked top three and bottom three for party change registrations, for both Republican to Democratic and Democratic to Republican, were collected for comparison against the Spearman’s rank-order correlation coefficients found.

Party Changes (GOP to DEM)

TABLE XLIV
TOP 3 COUNTIES FOR TOTAL PARTY CHANGE REGISTRATIONS
(REPUBLICAN TO DEMOCRATIC)

County	Party Change s	County Rank	Election Result (Party)	Election Result (%)
Philadelphia	18,030	1	DEM	78.8
Allegheny	10,779	2	DEM	59.7
Montgomery	7,743	3	DEM	60.9

TABLE XVII
BOTTOM 3 COUNTIES FOR TOTAL PARTY CHANGE REGISTRATIONS (REPUBLICAN TO DEMOCRATIC)

County	Party Change s	County Rank	Election Result (Party)	Election Result (%)
Forest	16	67	GOP	71.8
Cameron	29	66	GOP	74.5
Sullivan	33	65	GOP	73.1

Party Changes (DEM to GOP)

TABLE XVIII
TOP 3 COUNTIES FOR TOTAL PARTY CHANGE REGISTRATIONS
(DEMOCRATIC TO REPUBLICAN)

County	Party Change s	County Rank	Election Result (Party)	Election Result (%)
Philadelphia	26,088	1	DEM	78.8
Allegheny	19,776	2	DEM	59.7
Bucks	11,123	3	GOP	49.5

*Bucks County was evenly split between the GOP and DEM vote percentage-wise, with the GOP vote winning the county by 291 votes.

TABLE XIX
BOTTOM 3 COUNTIES FOR TOTAL PARTY CHANGE REGISTRATIONS (DEMOCRATIC TO REPUBLICAN)

County	Party Change s	County Rank	Election Result (Party)	Election Result (%)
Forest	123	67	GOP	71.8
Sullivan	133	66	GOP	73.1
Cameron	137	65	GOP	74.5

While a direct impact on the outcome of county votes cannot be characterized by the number of party changes due to its indirect relationship to the election outcome, as well as external factors like population size and the unexpressed ratio of party changes to registered voters in each county, it is worthy noting that the counties that ranked top three and bottom three for total party change registrations, also ranked fairly similarly in their ranks for access to broadband Internet, with Philadelphia County being the outlier and ranking 30th in access to broadband Internet. To illustrate this fact, Bucks County and Montgomery County both ranked 2.5th, Allegheny County ranked 8th, Cameron County and Sullivan County both ranked 64.5th, and Forest County ranked 67th in access to broadband Internet.

What this may imply, with positive, high correlations and monotonic relationships to characterize the Spearman's rank-order correlation coefficients of these comparisons, is that counties with a higher percentage of access to broadband Internet, regardless of which party changes took place, tended to have more party change registrations than counties with a lower percentage of access to broadband Internet. While this may be characteristic of population sizes within counties, this may also have implications towards county cultures in which voters may experience more access to media stimuli that encourages a party change due to greater access to broadband Internet.

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Appendix:

All data collected and Python figures made for this research can be found on GitHub: <https://github.com/idmupcapstone2025/Impact-of-Digital-Media-on-User-Perception>.