“Extra Extra! Hear all About it!”:
Comparing Shares, Likes, and Comments (Responses) to Posts on Facebook (FB) Public Media Pages

Jaleesa Stringfellow

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Rutgers University
Abstract

Social media is today’s established platform of expression and communication. With more people online, we must explore the effects of daily usage. Television media covering “fake news” on Facebook (FB) exposes a shift in how we receive and transfer current events. Online social media provides information that news networks relay back to the public. Today, with news becoming more of an online phenomenon, fact-checking is more important than ever before. So, do many people read and spread the news on social media? In our study, we will explore the relationships between response behavior (sharing, liking, and commenting on a post) and types of Facebook public pages. Using API Facebook developer software, we pull a week’s worth of activity from FB public pages. For our data comparisons, we picked a conservative news source, Fox News, a liberal news source, CNN, and a neutral source, TMZ. We found a significant difference in the number of likes and comments depending on the type of Facebook page. Fox News had more comments and likes on average. None of the public pages had significant sharing responses due to types of pages. A survey of typical Facebook usage reflects the API data collection. Our results suggest that Facebook news pages do have more traffic than non-news public pages. The concern of “fake news” stories on Facebook may have some validity.

Keywords: Social media; Facebook; Data Mining; Political; News; Media effects; Online Commutation; Behavior; Sociocultural; Coding; Cyberbalkanization
Comparing shares, likes, and comments on Facebook Public Media Pages

In the 2016 US election, the news media accused online social media of spreading "fake news," and caused the polling results. For the first time, broadcasting news covered a story about social media news. Is it possible that social media has become a primary news outlet source? In our study, we explore how often posts are shared, commented on, or liked on FB news pages. If people get their news from social media, like Facebook, then fact-checking and verifying sources are crucial for responsible journalism and reliable information. Research on the spread of news on social media is relatively new and needs more analysis to see if “fake news” is a real concern for society.

Before we question people’s activity on social media, we must first explore the impact and social dynamics of online activity in general. One study suggests that social capital or social bonding occurs more offline than online, but more social bridging or outer group interaction occurs online (Williams, 2007). Williams (2007) confirmed the Nie hypothesis that there is a negative correlation between online usage and offline social capital. He also explored segregated groups online and increased aggression between the different groups, or cyber balkanization theory. However, the results found no significant data in favor of this theory. If more divisions exchange ideas online, maybe the relationship of outer group bridging extends to news content on social media like Facebook, our study explores this concept.

In Greenwood, Sorenson, and Warner’s (2016) experiment, participants did not quickly change opinions on highly emotional topics, racial issues, police militarization, and payday lending. While there was no significant persuasion effect, due to relevance and controversy of emotion, participants’ comments (like the ones on Facebook) decrease the stronger effect of an emotional issue (in this case, political comedy). However, the non-persuasion could be because
of a humor factor (Greenwood et al., 2016). The relationship between different types of News sources compared to neutral sources requires further investigation.

Flaxman, Goel, and Rao (2016) observed news consumption online. The study collected data from 500,000 online users who regularly reads the news. The researchers concluded that ideological isolation, or to separate ideas and beliefs into groups, read articles and news skewed toward their views. The participants conversed in an echo chamber; online users who voted republican or democrat frequented politically similar websites and searched inquiries (ex: pro-choice Google search versus pro-life). While the study is not an experiment, it demonstrates a strong correlation between political affiliation and segregated news consumption online (Flaxman et al., 2016). Our study wants to focus on news consumption on social media, as most official news publications have a public page on Facebook.

Jacobson, Johnson, and Myung (2015) studied the use of hyperlinks and discussions on Facebook news media pages. Using O’Reilly and Maddow pages, the study discovered that 41.98% of FB comments on these pages were not about news. From NodeXL software network analysis, both conservative O’Reilly page and liberal Maddow page was equally likely to share links that skewed toward political affiliation. The researchers confirmed the “echo chamber” theory of social media members talking to and sharing like-minded ideas. Even though there were 2.2% standard links between conservative and liberal Facebook users on these two pages, the links are verifiable and reliable sources like the Huffington Post (Jacobson et al., 2016). Although news sites were politically skewed, sharing links can increase information reliability. We observe sharing responses to see how often sharing occurs on FB news pages.

Caldarelli, Scala, Quattrociocchi, Vicario, and Zollo (2017) explored group polarization (echo chambers) and found most people talked to similar minded people and shared agreeing
information instead of argumentative information. The study followed one million Facebook UK users who posted about Brexit. Caldarelli et al. found two distinct groups forming on opposite sides of the debate, for and opposed, and the content in the chamber reflected similar values and opinions. Each group exhibit a distinct emotional response. The researchers took topics and analyzed the emotional comments which are different in both sets. There is a strong relationship between emotional response and polarization. While our study measures responses to Facebook posts, this study gives us insight into the kinds of responses made on our CNN and Fox News pages.

Another study used an online database to see how prevalent fake news in the 2016 election. Most people used other news sources than Facebook (Allcott & Gentzkow, 2017). American Facebook users in total significantly recalled and believed fake news stories, observed in an online placebo group, and confirmed through fact-checking websites. Facebook users did not share Fake news as often as the media sources claimed, 87.6% of Americans went directly to an official news website, and 57.2% watched the news on television (Allcott & Gentzkow, 2017). Our study compares general news and non-news (not broadcasted as news) sharing on Facebook public pages.

Müller, Schneiders, and Schäfer (2016) take the opposite point of view of Facebook as a primary news source. Surveys on Facebook in Germany, Austria, and Switzerland found the moderate use of Facebook news feeds as a substitute for other news sources. The results suggested that news information on Facebook is a replacement for other new sources. Individuals who used FB as a primary news source had the lower drive for cognition input, meaning respondents did not see a need to verify news feeds via fact-checking (Müller et al., 2016). To
understand the relationship between Facebook news and users’ responses requires more research.

Collecting data from Facebook using API graphing was also used as a study presented at the 6th IEEE conference that analyzes spam (malicious online activity) on social media (Agrawal & Kaushal, 2016). Researchers extracted posts from entertainment website FB public page Indian-forum.co and nonprofit FB public page Wikipedia, compared string similarity indexes (Jaccard, Dice, Ochiai, overlap, string matching) and calculated precision FB posts and website URL similarities. The rate for FB posts and comments over indian-forum.com (29.88 %) and Wikipedia (58.04%), which means spam or content unrelated to websites spread on FB public pages (Agrawal & Kaushal, 2016). So how readily do Facebook users comment, like, or share public page contents like Wikipedia and Indian-forum on social media? Our research investigates this question.

Our study will expand Survey data collection using Facebook API graphing to collect data from three different Facebook pages, Fox News, CNN News, and TMZ, as a control group. What is the relationship between different types of pages and responses, comments, likes, and shares? We hypothesize that FB news pages have more reactions on average compared to neural FB pages. Also, CNN posts have the most shares, likes, and comments on average, and Fox News posts have more reactions on average than TMZ posts. We found no significant difference in average responses to liberal and conservative news.

**$H_1$:**

1. There is a (relationship) difference in the number of post responses (shares/likes/comments) and types of pages.
Comparing Reactions on Facebook Public Media Pages

2. Liberal CNN FB average post responses > Conservative Fox New Facebook page average post responses
3. average post responses on news pages > average post responses non-news FB pages

\(H_{null}\):
1. There is no relationship between # of shared/liked/posted and types of pages
2. Liberal CNN FB average post responses £ Conservative Fox New Facebook page average post responses
3. average post responses news pages £ average post responses non-news FB pages

Our independent variable(s) are: Types of Facebook Pages: Fox, CNN and TMZ and our dependent: Fox, CNN and TMZ Facebook public pages’ average number of shares, likes, and posts taken three times a day, in one hour time span (9:00am - 10:00am; 12:00pm - 1:00pm; 9:00pm -10:00pm eastern standard time).

Methods

Participants

Facebook users who have visited, liked commented, and shared posts on Facebook’s Fox News, CNN and TMZ public pages. 36 respondents complete online survey for demographics and FB usage (Female N = 28, Male N= 15; age M = 36.86, min 21 years old, max = 70). No personal data was collected; anonymous Facebook users followed survey monkey link, https://www.surveymonkey.com/r/NVTKR59. The respondents were mostly from a personal Facebook friends pool. One of the questions (please list all the countries you have visited or lived in the last three months), we removed three responses because the question was invasive and irrelevant.
Materials and Procedure

Participants went to surveymonkey.com to complete our Facebook survey. This survey collected responses on Facebook habits, demographics, and usage. For the rest of the data gathering, we used Facebook developer API software and JSON code language to collect publicly available data from Fox News, CNN, and TMZ public pages. Python3 in Textmate application to run scripts for data collection. Data collection steps are open-sourced on GitHub, https://github.com/lance2600/research_graphs/blob/master/research.py providing step by step instructions. After data mining, we imported files to excel spreadsheets and then to SPSS statistics software tool to run the analysis.

To give enough time for response, we kept the survey open for a month. The respondents answered five demographic questions (e.g., age, gender, political affiliation) and then seven questions about their online and Facebook usage (i.e., How do you view or access Facebook). After 36 responses, we ran an analysis of the answers on surveymonkey’s page. We exported the bar graphs to pdf document.

After these initial steps, we can collect data. Via JSON coding, we selected dates Mar 25-31 week at 9:00 - 10:00 am, 12:00-1:00pm, and 9:00-10:00pm eastern standard time. We do this too decreases data collection bias. The posts are then picked randomly within each time frame and the number of shares, comments, and likes collected from Fox News, CNN, TMZ. Subcategories include dates and the number of posts. We imported the excel file into SPSS for descriptive statistics, Multivariant MANOVA, and error analysis. Again, we retained no personal information from Facebook users. We conducted a small trial run on 3/30/2017 to test the efficiency of the code using averaged Raw Message data and parsing into likes, shares, and comments for each page CNN, FOX, and TMZ.
Results

Our study observed CNN, TMZ, and Fox News public Facebook pages for one week starting from 3/25/17 to 3/31/17, in three one hour intervals per day, at 9:00 - 10:00 am, 12:00-1:00pm, and 9:00-10:00pm eastern standard time. We collected a total CNN posts, N=44, Fox News, N= 50, and TMZ, N=55. The largest average number of comments (M = 2132.40, S.D. = 2797.142) and likes (M = 9210.92 S.D. = 15620.524) for the week was Fox News (see figure 1). followed by CNN comments (M = 1912.75, SD = 3080.509) and likes (M = 4353.66, S.D. = 8144.844). TMZ has the lowest average comments and likes (M = 238.31, S.D. = 371.766; M = 1183.65, S.D. = 1391.919). For shares, CNN had the most on average (M = 1952.55, S = 4201.895) compared to Fox News (M = 1502.80; S.D. = 2021.471) (see Table 1).

The Multivariate one-way MANOVA, revealed a significant difference in comments, likes and shares based on sources ($F (6, 288) = 6.532, p < .0005$, Wilk's $\Lambda = 0.450$, partial $\eta^2 = .33$). After running univariate ANONA, we found that type of source has a statistically significant effect on comment and likes ($F (2,146) = 10.277, p<.0005$, partial $\eta^2 = .123$; $F (2, 146) = 8.326; p<0005$, partial $\eta^2 = .102$). Conversely, type of source as no significant effect on Facebook shares ($F (2, 146) = 1.810; p = .167$).

Post Hoc Test, Turkey HSD, shows that mean scores for comments were significantly different for CNN and TMZ ($p<.002$), TMZ, and Fox News ($p<.000$), but not for CNN and Fox News ($p = .893$). There was a significant difference between likes for TMZ and Fox News posts ($p<.000$), but not for CNN and Fox News ($p = .055$) and CNN and TMZ ($p = .270$). Results also
shown no significant difference between average shares and sources CNN-Fox News, CNN-TMZ, TMZ-Fox News (p = .747; p = .151; p = .457).

Demographics and usage of average Facebook users (Female N = 28, Male N = 15; age M = 36.86, min 21 years old, max = 70); the majority of respondents (N = 36) use Facebook to stay connected with family and friends. Most respondents are married (N = 25), 11 are single, and four are in a relationship. Political affiliations of respondents in our survey were mostly democratic/liberal (N = 20) and nonaffiliated (N = 15), and only a few conservative/republican (N = 3) and independent (N = 2). 87.18% of individuals use smartphones to access Facebook, and 75% log onto Facebook three or more times a day (see Figure 5). Most respondents also don’t often share other Facebook users’ activities (38.46% slightly often, 33.33% not at all often) or comment on them (43.59% not at all often).

It seems most users in our survey like (passive engagement) more than they comment and share (active engagement) on Facebook. As for interest in news and outlets for obtaining information. Three respondents did not read the news, 28 read the news regularly, and 7 read news some of the time. Respondents used a variety of sources (N = 19) to obtain news information, 12 individuals read news solely online, and five respondents found their news sources on tv/podcast/misl and not online.

Discussion

Our findings suggest that Facebook users comment more on news content than neutral content, celebrity gossip in our case. One possible explanation for these findings is the increase usages and accessibility of FB (see Figure 5). The more people access FB, the more likely it is they will visit public pages. More access, combined with our current social climate, has perhaps made the news the latest source of gossip.
From March 25th through March 31st, *Fox News* public page had the most responses overall but not significantly negated our initial hypothesis. The conservative page *Fox News* and the liberal page *CNN* had not significantly difference in responses. It is possible that both liberal and conservative equally use their sources, respectively, and so less likely to debate. Further analysis is needed to verify this effect. If we confirm this hypothesis, it agrees with the echo chamber effect, segregation instead of open media theory, which would have a considerable difference in responses (Jacobson, Johnson & Myung, 2015). Our study had does not support social *bridging* (Williams, 2007).

It is interesting to note that, on average, Facebook users tending to like posts more in the morning and comment on posts more at night. Additionally, *CNN* likes to decrease throughout the day, and *Fox News* Likes increase (see figure 3). One possible explanation is the work and school habits of daily Facebook users. It is easier to like posts than to post a comment on them. In the morning, before work or school begins, we use the less thought process to scroll and like a post; after work or school, people have more attention on reserve for commenting. This phenomenon needs further analysis.

How else do are our findings connect to current research? Allcott & Gentzkow (2017) results indicated that, more often, people reviewed the news of the 2016 election on sources other than social media. Our survey indicates that, while a lot of Facebook users stay updated on current events, social media is not the sole source for news content, as found in Allcott’s et al. research. Those who do use social media are more likely to respond to posts on the news public pages. According to Jacobson, Johnson & Myung (2015), online users who visit one type of political public page share more links that represent their political opinion. The links do not overlap with opposing political sites. The study also revealed that people repeatedly used a
limited source of information (Jacobson et al., 2016). We did not account for one user commenting or liking posts multiple times; thus data needs reevaluation to accommodate this extraneous variable (Research Methods, 2017).

We found no significance in sharing content for neither Fox News, CNN, or TMZ. One possible reason is the echo chamber phenomena; most Facebook users seem unlikely to share content, even in bipartisan discussions on news pages. Also, Müller, Schneiders, and Schäfer’s (2016) results concluded that news post on FB induces a feeling of being informed and reduces the need to search for confirming information, this might explain to us why our study found no significance in FB sharing news articles. Flaxman, Goel & Rao's (2016) study shows only 1 in 300 links on FB relates to news articles, which also confirms the lack of news sharing on FB. The limitations of this study stem from the possible internal validity of the results, data mining, is an observational study and so cannot explain causation. We need experimentation to investigate further. Coding using API

We outsourced JSON to Python 3 conversion, so replication relies heavily on updates confounds. The data was taken in eastern standard time, which will skew results to show more of the eastern than western coast. We also did not control for repeat data (likes, shares, and comments from the same user); this decreases our confidence we are studying communication from different users.

Our study observes communication behavior on social media. Since the type of page influences many responses, we can use the type of pages to explore what kind and frequency of responses (negative or positive) occur on these pages. We can then test applications for marketing research like the factors that influence the increase in activity for FB public pages. We can also use Facebook API software to collect further data and analysis of possible future online
experiments. As our results show, Facebook users do show a pattern of their online activity, and news pages are essential for FB users' responses.

Possible experiments can include an online created FB page (using API developer) to explore what kind of activity in a public page influences response. For example, a fake news public page and an establish news page for comparison. We can monitor posts for reactions and communication worldwide. Since our research and other current findings lean more toward the echo chamber, we can explore what factors increase open exchange and stops these filter bubbles we willingly join. Since this is a new type of platform for experimentation, more research in this area can open our participant pool worldwide and in real-time.
Keywords: Social media; Facebook; Data Mining; Political; News; Media effects; Online Commutation; Behavior; Sociocultural; Coding; Cyberbalkanization
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References


Table 1.

*Descriptive Statistics*

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<th>Source</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<tr>
<td><strong>Comments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNN</td>
<td>1912.75</td>
<td>3080.509</td>
<td>44</td>
</tr>
<tr>
<td>Fox News</td>
<td>2132.40</td>
<td>2797.142</td>
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</tr>
<tr>
<td>TMZ</td>
<td>238.31</td>
<td>371.766</td>
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<tr>
<td>Total</td>
<td>1368.38</td>
<td>2481.490</td>
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</tr>
<tr>
<td><strong>Likes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNN</td>
<td>4353.66</td>
<td>8144.844</td>
<td>44</td>
</tr>
<tr>
<td>Fox News</td>
<td>9210.92</td>
<td>15620.524</td>
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</tr>
<tr>
<td>TMZ</td>
<td>1183.65</td>
<td>1391.919</td>
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<tr>
<td>Total</td>
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<td>10595.145</td>
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</tr>
<tr>
<td><strong>Shares</strong></td>
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<tr>
<td>CNN</td>
<td>1952.55</td>
<td>4201.895</td>
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</tr>
<tr>
<td>Fox News</td>
<td>1502.80</td>
<td>2021.471</td>
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<tr>
<td>TMZ</td>
<td>822.84</td>
<td>2512.465</td>
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</tr>
<tr>
<td>Total</td>
<td>1384.62</td>
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</table>

*Note.* Standard total mean of likes, shares and comments taken for one hour (morning, after & night) every day from 3/25/17 to 3/31/17.
Figure 1. sources vs. total number of reactions (likes/comments/shares) combined likes/shares/comment (reactions) total means to CNN, Fox News & TMZ public page posts for the week 3/25/17-3/31/17.
Figure 2. Average Comments on Posts from CNN, FOX, TMZ public Facebook pages (3/25-3/31/2017)
Figure 3. Average Likes on Posts from CNN, FOX, TMZ public Facebook pages (3/25-3/31/2017)
Figure 4. The graph illustrates the inconclusive findings of sharing behavior on Facebook public pages CNN, Fox, TMZ.

![Average Number of Shares Graph](image-url)
Figure 5. Survey graph of daily Facebook usage.

**In a typical day, how often do you use Facebook?**

Answered: 40  Skipped: 3

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>7.50%</td>
</tr>
<tr>
<td>Once a Day</td>
<td>17.50%</td>
</tr>
<tr>
<td>Twice a Day</td>
<td>0.00%</td>
</tr>
<tr>
<td>3 or more Times a Day</td>
<td>75.00%</td>
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Total: 40