March 2019

The Silencing Power of Algorithms: How the Facebook News Feed Algorithm Manipulates Users' Perceptions of Opinion Climates

Callie Jessica Morgan
Portland State University

The Silencing Power of Algorithms: How the Facebook News Feed Algorithm Manipulates Users' Perceptions of Opinion Climates

Callie Morgan
University Honors College
Portland State University
Advisor: Dr. Erin Spottswood

Abstract

This extended literature review investigates how the architecture and features of the Facebook Newsfeed algorithm, *EdgeRank*, can inhibit and facilitate the expression of political opinions. This paper will investigate how Elisabeth Noelle-Neumann's theory on public opinion, Spiral of Silence, can be used to assess the Facebook news feed as a political opinion source that actively shapes users' perceptions of minority and majority opinion climates. The feedback loops created by the algorithm's criteria influences users' decisions to self-censor or express their political opinions with interpersonal connections and unfamiliar connections on the site.

Keywords: *Spiral of Silence Theory, machine-learning algorithms, feedback loops, Facebook News Feed, political communication, online political communication, social networking sites*

Introduction

The 2016 U.S General Election made Facebook a battleground for political opinion superiority. I witnessed coworkers, families and friends being made into rivals, engaging in a battle of witty language, colorful insults and fact-checking over which news was not fake and which candidate would provide the best and worst paths for the United States. During this time, I did what many other users did, used the features of Facebook to make my news feed into an echo chamber for myself by unfriending, unfollowing users and blocking articles from websites that did not align with my political beliefs. As someone who has a distaste for conflict, I avoided commenting, sharing, liking or posting any political content on Facebook for fear of being socially isolated or being textually threatened for my political beliefs.

While the internet provides a wealth of information, news and music, Facebook founder Mark Zuckerberg claims the social media site and application Facebook was founded as a place to strengthen interpersonal ties (Clifford, 2018). Facebook was not intended to become a data business or a news source. However, Facebook is a business worth over $500 billion and has become the primary news source for 45% of its American users (Clifford, 2018; Shearer & Gottfried, 2017). Facebook is increasingly becoming a news source and rather than a site for maintaining interpersonal connections. News sources act as gatekeepers of information. The Facebook news feed uses a gatekeeper in the form of a machine-learning algorithm to rank user posts and opinion information.

A computer algorithm is a stable list of guidelines that describe how a task should be performed by a computer (Brogan, 2016). The Facebook news feed uses a *machine learning algorithm,* a powerful and efficient type of algorithm, in which the guidelines rewrite itself as it runs, rather than following a stable list (Brogan, 2016). The EdgeRank algorithm, the machine-learning algorithm that controls the Facebook news feed feature, is designed to create a tailored

experience for each Facebook user using its three ranking criteria, recency, affinity and edge weight (Newman, 2011). Elisabeth Noelle-Neumann, a German social scientist who authored the theory of public opinion, *Spiral of Silence Theory*, in 1974, argues that the media projects a singular view of perceivable majority public opinion for consumers. This theory claims *mass media* creates public opinion because they create the social pressure that drives cheerful acceptance, passive acceptance or the silence of individuals (Noelle-Neumann, 1974). The theory claims that everyone has a sixth sense that gauges public opinion climate against their private opinions at all times, which impacts an individual's decision to voice their opinions or silence themselves in face-to-face settings. I am arguing that the unique construction of a Facebook user's news feed, by the EdgeRank algorithm, creates multiple realms of perceivable political public opinion for its users, which affects users' willingness to share their opinions, not only online, but offline as well.

Spiral of Silence Theory was intended to explain why some feel less willing to share their political opinions in face-to-face contexts (Matthes, Knoll & von Sikorski, 2018; Noelle-Neumann, 1974). Studies have shown that people are more confident in sharing their political opinions in face-to-face contexts when their opinions are in line with national public opinion, whether they are in the minority or majority opinion status, they perceive control over reactions to their opinion expression and the relationship to the person they are communicating with is close (Abril & Rojas, 2018; Neubaum & Kramer, 2018).

However, Spiral of Silence has recently been used to study online political communication on Facebook (Dongyoung & Geidner, 2016; Liu, Rui & Cui, 2017; Gearhart & Zhang, 2015; Gearhart & Zhang, 2018; Kim, 2016; Neubaum & Krämer, 2017; Neubaum & Krämer, 2017). Facebook is a widely studied social media in general communication

scholarship. Communication research on this social media site often examine communication between users on the site and how the features of Facebook are used to meet social means. Political communication research on Facebook uses Spiral of Silence as a frame to study how the site is used for online and offline political organization, political expression and communicative action (Casteltrione, 2016; Chan, 2016; Chan, 2018; Kushin & Kitchener, 2009; McKeever, McKeever, Holton & Li, 2016).

However, large gaps remain in Spiral of Silence research on Facebook for how political expression on the site is related to the processes of the news feed algorithm. The two studies I found on the Facebook news feed algorithm discussed how user perceptions of how the algorithm functions impacts users' experiences of using the site for sharing personal content, not necessarily for sharing political views (Bucher, 2017; Rader & Gray, 2015). The news feed provides a customized selection of political opinion information for each user. The news feed is worthy of investigation by Spiral of Silence because the limited display of opinion information, and users' knowledge of the algorithm's processes, may affect users' perceptions of public opinion climates and their willingness to share their opinions in online and offline settings.

Methods

To investigate the Facebook news feed as a political opinion source that impacts opinion-sharing behavior, I will use an extended review of the literature. My literature review intends to answer whether the unique construction of a Facebook user's newsfeed creates a perception of public opinion that affects the user's willingness to voice their political opinions with others on Facebook.

The articles used to answer this question are sourced from peer-reviewed mass media and political communication journals. I used the *Google Scholar* and *Communication and Mass*

Media Complete databases to select my scholarly articles. The paper will primarily address the aspects of Noelle-Neumann's Spiral of Silence Theory that relate to studying the news feed as an opinion realm. The definition of the type of algorithm being used for the news feed, and its mechanics, will be addressed in the context inducing silencing effects. The exact mechanics and code used in the newsfeed algorithm are kept confidential from the public and communication research on its effects on users are currently very limited.

Due to the limits in scholarly research on the news feed algorithm, I will incorporate current non-scholarly articles I found by searching Google (using the keywords "How the Facebook news feed algorithm works") to provide insight into the main ranking criteria the algorithm uses to craft data for the news feed. Scholarly articles will be used to address how users' perceptions of how the algorithms functions impact user experience using Facebook. The paper will begin with a definition of terms and discussion of general spiral of silence research on Facebook. The start of the literature review will discuss the importance of machine learning algorithms and how they influence users' experiences using the Facebook news feed. The subsequent section will address how feedback loops and social groundlessness created by the news feed influence posting, sharing and reacting behavior on the site. The analysis of the literature will conclude with a section on the circumstances that prompt a user to share their political opinions on Facebook.

Spiral of Silence Theory

Elisabeth Noelle-Neumann proposed her theory of public opinion, Spiral of Silence, in 1974. According to the theory, public opinion is the culmination of social conventions, customs, norms and situations, and political questions, which prompt a large amount of people agreeing or disagreeing with a debated topic of public interest. Public opinion, also known as the majority opinion, is "the opinion which can be voiced in public without fear of sanctions and upon which

action in public can be based" (Noelle-Neumann, 1974). Public opinion, sanction and actual punishment are intrinsically linked to the decision for one to voice their opinions (Noelle-Neumann, 1974). The quasi-statistical organ is a sense everyone has that gauges public opinion through observing their social environment, assessing the distribution and strength of opinions and the relevance and how successful some opinions may be over others (Noelle-Neumann, 1974). This sixth sense determines whether an individual considers themselves in the majority or minority opinion group and, therefore, decides whether or not to express their opinion.

Majority opinion (public opinion) is the point of view on a publicly debated issue that is presented most frequently in public. Majority opinion is what confronts an individual more "frequently and confidently" and dominates, and people will adapt their views to this one more (Noelle-Neumann, 1974). Public opinion compels compliance of attitude and threatens dissenters with social isolation, which defeats them. These "dissenters" are ones that hold minority opinions, which are heard "less and less" and are considered on the "downgrade" (Noelle-Neumann, 1974).

Noelle-Neumann (1974) argues that if public opinion is created from the social interaction of multiple individuals, an individual would prioritize not isolating themselves over expressing their opinion. According to this claim, if a man who is a supporter of President Trump's immigration policy overhears a large group of his coworkers in the breakroom expressing disdain over the immigration policy, he will choose to not express his true opinion to his coworkers. This is because they he has gauged that the majority opinion climate in their office is against the immigration policy and expressing his true opinion, that he is for the immigration policy, may threaten the likeability he has with his new coworkers. He has decided

that maintaining friendly relationships with his coworkers is more important to his well-being than his social responsibility to express his true opinion.

Liu, Rui and Cui (2017) investigated expression of people's true political opinions on Facebook when faced with the threat of social isolation. The researchers argue that Spiral of Silence research on Facebook should consider damages to online ideal identity presentation as a sanction in political opinion expression on the site (Liu, Rui & Cui, 2017). Rather than causing people to silence themselves as predicted, the participants' self-presentational concern in Liu et al. (2017) was positively related to their willingness to express opinions on Facebook. The researchers claim that the more concerned a participant was about what others think of them, the more willing they were to post because they felt sharing their true opinion could earn them respect and enhance their public image.

Spiral of Silence theory suggests individuals consider the sanctions, threats of punishments or rewards, of sharing their personal opinions with others, especially a minority opinion. In a German study on sanctions in online versus offline environments, participants were more willing to express a minority opinion in offline than in online settings (Neubaum & Kramer, 2018). The researchers argue that participants feel safer expressing their opinions behind their computers, because they anticipate and have knowledge on how to react to being insulted for their opinions online. Neubaum and Kramer (2018) assert that it is not the anonymity of online interactions, but the mediated nature of interaction makes personal and more aggressive attacks happen and it is a sanction people are more equipped to handle than the nonverbal signals and signs of confusion of expressing opinions in face-to-face contexts (Neubaum & Kramer, 2018). Participants' confidence to share their opinions is related to how the medium affords them control over their expressed opinion. This finding may suggest that online communication

platforms, like Facebook, can overcome spiral of silence effects for its users because people are more equipped to handle aggressive online flaming than nonverbal signs of disagreement when expressing their opinions.

A minority opinion can become majority if minority group members perceive their views will become popular in the future, prompting them to voice their opinions (Noelle-Neumann, 1974). A study by Gearhart and Zhang (2018) investigated willingness to speak out on four controversial issues on Facebook, with each participant considering their projection of the future popular opinion. When discussing gay marriage, only under hostile conditions, future opinion congruency was positively associated with posting truthful opinions on Facebook (Gearhart & Zhang, 2018). Gearheart and Zhang's (2018) finding is consistent with Spiral of Silence theory's argument that when people perceive their opinion will be the future opinion of the nation (i.e., consistent with the majority opinion), they will be inclined to speak out more, even in online settings.

According to the theory, those who perceive themselves to hold minority opinions sacrifice their personal duty to battle for their opinions because they want to avoid being socially isolated by the ruling majority opinion-holders (Noelle-Neumann, 1974). The "spiral of silence" phenomenon is the tendency to for the majority to continue voicing their opinion and for minority opinion holders to remain silent, which cycles and reinforces one opinion as being considered the majority opinion by the media (Noelle-Neumann, 1974). The Facebook news feed may create spiral of silence effects by establishing majority political opinions, on the basis that these opinions receive the most reactions, shares and comments, and these opinions cycle as the majority because they are promoted to the tops of the newsfeeds (become the most visible opinions).

Literature Review

The Facebook Algorithm

To understand how the Facebook news feed curates an opinion realm, one needs to understand how the news feed generates its content, which is through a computer algorithm. The more content produced by friends, liked pages, trending news and advertisements give the Facebook news feed an overwhelming amount of personalized content to realistically display on the news feed in its entirety. This is why the machine-learning algorithm, EdgeRank, is used to display content on the news feed based on three criteria: recency, affinity and edge weight (Newman, 2011).

Recency indicates that everything displayed by the news feed appears in chronological order, so the newest content appears at the top of the newsfeed (Newman, 2011). Affinity is the increased visibility of content on the news feed from a particular user or page, based on affiliative behavior (commenting, clicking, liking or sharing a user's posts, demographic information, and internet searches for the user) (Newman, 2011; Weise, 2017). Facebook tracks all this affiliative data to also show product and political advertisements on the news feed (Weise, 2017). Edgeweight is the least personal ranking criteria because it promotes any posts that involve visuals and links (Newman, 2011).

The news feed has two design goals accomplished by its algorithm criteria: show content at the right time so no one misses content important to them and to encourage the most interaction between users (Rader & Gray, 2015). Recency and affinity ensure no user misses important content while edgeweight encourages interaction by moving videos, photos and links

to the top of the newsfeed (Newman, 2011). The edge weight factor can influence majority and minority opinion perceptions by acting as a gatekeeper that demotes any non-trending, (minority) opinion content to the bottom of the news feed.

Algorithms are efficient for displaying relevant information but are not always accurate in predicting user preferences. Bucher (2017) investigated how algorithms can affect people and how, in turn, people can affect algorithms. The researcher claims the robotic nature of the algorithm is incapable of understanding human emotions and actual user preferences, causing much offense to its users. Inappropriate responses made by the algorithm are the reason machine learning algorithms, like the Facebook news feed, need to be fine-tuned by human input in order to work accurately and efficiently (Brogan, 2016). It is not lines of code that act as the sole gatekeeper to opinion information on Facebook; human intervention by Facebook employees is needed to alter how the news feed determines majority opinion content on Facebook.

Awareness of The Facebook Algorithm

Some Facebook users are aware of a level of manipulation taking place in their newsfeeds that changes their feelings towards using the social media site. Bucher (2017) interviewed 25 different Facebook users on what they believe the Facebook newsfeed algorithm does and how it influences their feelings towards using Facebook. The majority of participants in Bucher (2017) admitted to changing the content they post, based on the content they believe the algorithm favors to get maximum reach for their posts. The study did not focus on how the algorithm affects participants' willingness to post political content; the study's focus was on participants' reactions to how the algorithm's processes categorizes their identities. However,

one participant in Bucher (2017) claimed her political posts were being hidden because she believed the algorithm to be biased in promoting anything that will get the most likes, comments and shares, or is considered "trending" (Bucher, 2017). This user may not be getting attention to her political posts due to having Facebook friends with heterogeneous political opinions, not having people on her friends list that are passionate about the same issues, or simply for not posting enough for her opinions to make it to the top of her friends' newsfeeds (due to attribution criteria).

Thorson (2014) found participants who make political posts were all very aware that their political posts are less popular among their Facebook friends and used their knowledge of which media that is promoted and manipulating the who can see their posts to boost their posts' reach. Rader & Gray (2015) found that 48% of their participants were aware of the Facebook algorithm's impact on their news feed curation. In contrast, 62.5% of participants in the study by Eslami et al (2015) were *unaware* of the algorithm's effect on their news feed content and 22% of those participants believed the news feed displayed *all* their friends' content. 28% of unaware responses asserted that manual action, via "blocking", "unsubscribing", "removing" posts, grants the user *absolute* control over their news feed (Eslami et al., 2015).

However, other studies have found that there are users who seem less aware or confident about the algorithm's processes. Eslami et al. (2015) found that the more active the participant was on Facebook, the more understanding they had built of the algorithm. This suggests that the users who are the most aware of the algorithm may be more successful at mitigating silencing

effects than those who use Facebook less. In both their studies, Eslami et al. (2015) and Rader and Gray (2015) found participants who were unaware of the Facebook news feed algorithm made assumptions about the strength of the relationship they had with other users in their friends list. Ignorance of how the algorithm influences the news feed experience may also lead to inaccurate inferences about opinion climate, based on opinion information shown by the algorithm.

Feedback Loops in the News Feed Cause Social Groundlessness

Critics of machine-learning algorithms complain this type of coding make our worlds smaller, as they make social media a more passive consumption experience by presenting what we *want* to see through its ranking system, and this system creates a feedback loop (Brogan, 2016; Rader & Gray, 2015). A feedback loop is created when the outputs of a process become the inputs to the same process (Rader & Gray, 2015). The feedback loop caused by the news feed algorithm creates a spiral of similar opinion information because the consumers of content are also the creators of content. When posting all topics of content on Facebook, including political content, Facebook consumers learn about what content gains the most attention on Facebook through observing the algorithm's ranking criteria and will create content that follows similar guidelines (Bucher, 2017; Rader & Gray, 2015).

The feedback loop can create Spiral of Silence effects by continuously promoting content that the algorithm criteria favors to the top of the news feed, which establishes a perception of majority opinion for users. Meanwhile, anything that does not meet the algorithm's criteria may

become less visible and be associated with minority opinion. The feedback loop causes minority opinion content to slip farther and farther down the news feed to the point of obscurity.

Through interviewing active and inactive Facebook political posters, Thorson (2014) provided insight into how Facebook's technological features, the newsfeed algorithm, the opinion expression features (like, reactions, shares, comments) and privacy features, seem to create "social groundlessness", or ambiguous social normatives for discussing politics on the site. Thorson (2014) argues that the features of the Facebook newsfeed create a shared schema of how to interact in the social setting of Facebook, which shapes political discussion on the site by determining what kinds of content are acceptable and shared within Facebook. Some examples of Facebook creating a shared schema for appropriately discussing politics include appearing politically neutral, using filtering features so only likeminded friends could view a user's political posts and a user presenting political posts with humor to their Facebook friends to gain the most attention to their political opinions (Thorson, 2014). Political posters in the study worried about posting their political opinions because their Facebook friends may expose them for having a lack of knowledge on the topic. This group asserted political posts give insight into their sense of self to their Facebook friends, making them vulnerable to attacks on their identity and being ostracized. A large group of respondents felt Facebook to be "too public" of a platform for general and interpersonal political discussion, which is why many found it important to appear politically neutral on the site (Thorson, 2014).

Qualities of a Facebook Political Opinion Poster

Communication research on Spiral of Silence has tested how perceived anonymity factors in online opinion expression. Recent studies have found that when participants feel anonymous on the internet, they are more likely to share their opinions because they are protected from

possible social consequences, physical harm or damages to their identity (Liu et al., 2017; Meyer,& Carey, 2015; Neubaum & Kramer, 2018; Porten-Chee & Eilders, 2015). However, commenters of Facebook articles that appear on the news feed do not enjoy the same luxuries of anonymity. Facebook users who comment, share or react to articles that appear on their newsfeed (are available for any Facebook user to view) have their real names on display with direct links to their profile and as much information to unknown users as their privacy settings allows. This prompts the question of what circumstances make a Facebook user more likely to post a comment, share or react to a political article when anonymity no longer protects them from, not only the judgement of family and friends, but from complete strangers.

Numerous studies have addressed how the environment of the comments section on an online article could drive sharing and silencing behavior. Studying online commenting behavior is important because online political participation shapes the climate of public opinion and willingness to discuss politics with others face-to-face. In a study by Soffer and Gordini (2018), opinion expression via user comment had a positive correlation with opinion expression in public settings. Neubaum and Krämer (2017) found that the sheer presence of comments on an article silenced participants and made them believe the comments were representative of public opinion on a national level.

Furthermore, Neubaum and Krämer (2017) note that the more negative comments on an article, the more negative inferences participants attributed to be the opinion of *Facebook users* only. Yun, Park & Lee (2016) found that the presence of disagreeable online user comments was not the sole influencer of whether someone considered themselves as holding a a minority opinion; Their results yielded that an article from a disagreeable political media source, combined with an agreeable comments section, made participants less likely to comment on the

article. The congruency of the article's comments, as well as the congruency of the article itself, may encourage more political participation because it indicates support from likeminded users, consistent with Noelle-Neumann's (1974) claim and the findings of Wang et al. (2016) and Kim (2016).

The disagreeable or agreeable nature of a comments section and an article may not be enough to encourage commenting on political articles on Facebook. Pang et al. (2016) assert that the civility of a comments section discussion affects, not only Facebook users' willingness to express political opinions, but their level of opinion expression. Pang et al. (2016) showed their Singaporean participants the same article on a Facebook news feed about a contentious issue in their country but manipulated the civility and opinion congruence of the comments section in each condition. For participants considered to have a higher fear of social isolation, the congruency of the opinion climate did not factor into whether they would "like" the article, as long as the comments were civil. However, if the opinion climate was uncivil but congruent, participants were less likely to "like" the post. Most of the participants who considered themselves in the minority were shown a disagreeable comments section and minority opinion holders were more likely to comment on the article than the majority opinion holders (Yun et al., 2016). To be willing to comment on the article, participants required a low fear of social isolation and be shown a comments section with a congruent opinion climate. As for the other type of opinion expression on Facebook, there was no significant relationship between sharing the article, comment environment and a participant's fear of social isolation (Pang et al., 2016).

According to Noelle-Neumann's (1974) studies on opinion-sharing behavior, willingness to speak out is related to age, sex, occupation, income and residence. She claims a young, middle or upper-class male is the most likely to voice their true opinion in public (Noelle-Neumann,

1974). The findings of Meyer and Carey (2015) support Noelle-Neumann's claim about males being most likely to share their opinions in the setting of public online news comments sections. The study investigated 992 adults who had mainly left-leaning political views. The female participants were more likely to be lurkers, those who observe comments sections more than they participate, than the male participants. However, male and female participants were equally more likely to comment on an article when the article's point-of-view, and most commenters' points-of-view, differed from their own. This finding suggests gender and economic status may not factor as heavily in online opinion expression; online opinion expression may be related to passion for the topic.

Noelle-Neumann (1974) claims that the most salient and contentious issues are the best to investigate for Spiral of Silence effects because the extensive media coverage on them makes more opinions available for the public to consider. Soffer and Gordini (2018) argue that political expression in both online comments sections and in offline settings depends on the issue presented. Their study measured Spiral of Silence effects in online and face-to-face settings across three current contentious issues among Israelis: defense against Iran, natural gas policy and surrogacy. Their study found that the higher the fear of social isolation, the less likely participants were willing to express their opinion, only with the Iran topic.

Porten-Chee and Eilders (2015) claim that the more confident a user is in their ability to use social networking sites (SNS), the more likely they are to express their opinions on the site. If applied to a SNS like Facebook, this finding would support that the more someone uses Facebook, the more likely they are to participate in online political discussion and contribute to formation of public opinion. Gearhart and Zhang (2015) also support a link between social networking use and participation in online political discussion. The researchers found that the

more participants used an SNS the more likely they were to like political posts, post positive comments and respond to disagreeable posts on that SNS (Gearhart and Zhang, 2015). The more someone uses Facebook for politics the more likely they are to share their political opinions on the site and contribute to the climate of public opinion.

A user may be more willing to engage in opinion expression based on the amount of Facebook friends they have. In a nationwide study about Spiral of Silence processes on Facebook, the more political posts participants saw from their friends on their news feeds, the more likely they were to post positive comments on shared content, in support of their friends' opinions (Gearhart & Zhang, 2018). Hampton et al. (2017) examined the connection between political opinions perceived from Twitter and Facebook with the willingness to share political opinions in *offline* settings. The more Facebook followers a participant had made them more willing to disclose political opinions in the workplace (Hampton et al., 2017). Being more willing to share political opinions with coworkers differs from sharing political opinions with family because it is assumed there is an increased fear of social isolation from disagreeing with people we do not share strong ties with. Having a larger network of followers on Facebook may make users fear social isolation less because they perceive there are more users available to support their opinions, which may make people more willing to share their opinions in the workplace.

However, some studies have found that the more online connections one has, the greater the silencing effects. Through using a computer simulation called agent-based modeling, Dongyoung and Geidner (2015) found their participants *feared* social isolation more and felt *less* inclined to voice their political opinions in offline settings, the larger their Facebook friends list became. The most likely reason the data from this study has results that contradict the results of

Hampton et al. (2017) is because real participants were not used. The study simulated personality characteristics and predicted network size based on those characteristics. More research may be necessary to investigate whether specific personality characteristics make Facebook users view a larger friends list to mean more support or less support for their political opinions.

The key to opinion expression on Facebook may not be the amount of Facebook friends one has but how many of those friends share opinions similar to the user. Spiral of Silence theory asserts that the congruent opinion climates promote opinion expression while incongruent opinion climates promote silence (Noelle-Neumann, 1974). Participants in Fox and Warber (2015) and Rader and Gray (2015) admitted to customizing the visibility of their political posts to gain more positive attention to their posts, as well as protect possible damages to their identities.

Political posters on Facebook may feel more inclined to share their political opinions because they can overcome spiral of silence effects by limiting sources displayed by the news feed that contradict their political views and customize it to display sources that align with their political views. Heavy consumption of partisan sources has been linked to a perceived increase in support for, and the sharing of, minority opinions (Dvir-Gvirsman, Garrett & Tsfati, 2018; Kim, 2016; Wang, Hmielowski, Hutchens & Beam, 2017). Consuming congruent opinion material reinforces existing attitudes, perception of opinion climate and willingness to share opinions (Dvir-Gvirsman, Garrett & Tsfati, 2018).

Dvir-Gvirsman, Garrett and Tsfati (2018) found a significant positive relationship between between exposure to congruent partisan media, the perception of a supportive opinion climate for their views and an increased offline political participation. Wang (2017) found that for both liberal and conservative participants who consumed partisan media, there was a

relationship between conflict avoidance, an increased perception of support and willingness to share their opinions online. Kim (2016) noted the findings of their Facebook study support the same notion that the ability to use selective exposure on Facebook makes people more willing to participate in politics. The results of these studies indicate that partisan media consumption can encourage political participation on Facebook because there is a perception of increased support for a user's opinions, which can make minority opinions more salient in the climate of public opinion.

Communicative action, the willingness to share and advocate for an issue on social media through commenting on and sharing articles, is said by McKeever et al. (2016) to be the most important factor in forming inaccurate perceptions about what the majority versus what the minority opinions are. This is because only the most passionate and informed people feel inclined to share their opinions. The study by McKeever et al. (2016) found that the participants who support child vaccinations were less inclined to engage in communicative action about the issue, while those who disagreed with childhood vaccination were more motivated to share and comment their opinion because they felt more informed and passionate about the issue.

The use of politically partisan Facebook groups would seem to foster opinion expression on the news feed by creating homogeneous opinion environments. However, Kushin and Kitchener (2009) found this was not always true. The researchers examined the comments sections of 10 public active anti and pro-torture Facebook groups. Even though these groups were explicitly labeled as being for or against torture, 27% of members across all groups actively opposed their group's stance (Kushin & Kitchener, 2009). This study shows that Facebook groups do not always foster homogenous opinions; Facebook groups do not prevent users from experiencing opposing viewpoints. This study supports the notion that people use the internet to

seek out likeminded people, but do not silence themselves when they are exposed to non-likeminded people.

Conclusion

Elisabeth Noelle-Neumann's theory of public opinion, Spiral of Silence, asserts that print and televised media produces a singular perceivable view of public opinion on a variety of salient topics. In modern times, the internet has fragmented media sources, producing multiple sources for partisan news and minority viewpoints. This theory has been applied by Communication scholars to studying political opinion-sharing behavior online news sites and social media. Spiral of Silence has been used as a framework for studying how Facebook is used for organizing political movements, facilitating political discussion with friends and family and opinion-sharing behavior between users.

Facebook has expanded from being a hub for family and friends to an interactive media source that serves as a gatekeeper of public opinion. What Spiral of Silence research on the social media Facebook currently lacks is assessing how architecture of the site itself, the newsfeed algorithm and its technological features, affect users' perceptions of political opinion climates. The Facebook News Feed determines majority opinions and minority opinions on the basis of its ranking criteria. Current research supports a plausible link between the way the news feed displays opinion information, how a user perceives opinion climates and their confidence in contributing to the climate of public opinion in online and offline settings.

References

Abril, E. P., & Rojas, H. (2018). Silencing political opinions: An assessment of the influence of geopolitical contexts in Colombia. *Communication Research, 45*(1), 55-82. doi:10.1177/0093650215616455

Brogan, J. (2016, February 2). What's the deal with algorithms? Your 101 guide to the computer codes that are shaping the ways we live. *Slate*. Retrieved from: http://www.slate.com/articles/technology/future_tense/2016/02/what_is_an_algorithm_an_explainer.html

Bucher, T. (2017). The algorithmic imaginary: exploring the ordinary affects of Facebook algorithms. *Information, Communication & Society, 20*(1), 30-44. doi: 10.1080/1369118X.2016.1154086

Casteltrione, I. (2016). Facebook and political participation: Virtuous circle and participation intermediaries. *Interactions: Studies In Communication & Culture, 7*(2), 177-196. doi:10.1386/iscc.7.2.177_1

Chan, M. (2018). Reluctance to talk about politics in face-to face and Facebook settings: Examining the impact of fear of isolation, willingness to self censor and peer network characteristics, *Mass Communication and Society, 21*(1), 1-23. doi: 10.1080/15205436.2017.1358819

Chan, M. (2016). Social network sites and political engagement: Exploring the impact of Facebook connections and uses on political protest and participation. *Mass Communication and Society, 19*(4), 430-451. doi: 10.1080/15205436.2016.1161803

Chun, J. W., & Lee, M. J. (2017). When does individuals' willingness to speak out increase on

social media? Perceived social support and perceived power/control. *Computers In Human Behavior, 74*(1), 120-129. doi:10.1016/j.chb.2017.04.010

Clifford, C. (2018, January 18). How Mark Zuckerberg came up with the idea for Facebook. *CNBC*. Retrieved from: https://www.cnbc.com/2018/01/17/why-mark-zuckerberg-started-facebook.html

Dongyoung, S., & Geidner, N. (2016). Collective Dynamics of the Spiral of Silence: The Role of Ego-Network Size. *International Journal Of Public Opinion Research*, *28*(1), 25-45. doi:10.1093/ijpor/edv005

Dvir-Gvirsman, S., Garrett, R. K., & Tsfati, Y. (2018). Why do partisan audiences participate? Perceived public opinion as the mediating mechanism. *Communication Research*, *45*(1), 112-136. doi:10.1177/0093650215593145

Eslami, M., Rickman, A., Vaccaro, K., Aleyasen, A., Vuong, A., Karahalios, K., Hamilton, K., &

Sandvig, C. (2015). "I always assumed that I wasn't really that close to [her]": Reasoning about invisible algorithms in the news feed. *Proceedings of the 33rd Annual SIGCHI Conference on Human Factors in Computing Systems,*153–162. doi:10.1145/2702123.2702556

Fox, J., & Warber, K. M. (2015). Queer identity management and political self-expression on social networking sites: A co-cultural approach to the Spiral of Silence. *Journal Of Communication*, *65*(1), 79-100. doi:10.1111/jcom.12137

Gearhart, S. & Zhang, W. (2018). Same spiral, different day? Testing the Spiral of Silence across issue types. *Communication Research, 45*(1), 34-54. doi: 10.1177/009365021561645

Gearhart, S., & Zhang, W. (2015). 'Was it something I said?' 'No, it was something you

posted!' A study of the Spiral of Silence theory in social media contexts. *Cyberpsychology, Behavior & Social Networking*, *18*(4), 208-213. doi:10.1089/cyber.2014.0443

Hampton, K. N., Shin, I., & Lu, W. (2017). Social media and political discussion: when online presence silences offline conversation. *Information, Communication & Society*, *20*(7), 1090-1107. doi:10.1080/1369118X.2016.1218526

Huge, M. E., & Glynn, C. J. (2013). Hesitation blues: Does minority opinion status lead to delayed responses? *Communication Research, 40*(3), 287-307. doi:10.1177/0093650211435505

Kim, M. (2016). Facebook's Spiral of Silence and participation: The role of political expression on Facebook and partisan strength in political participation. *Cyberpsychology, Behavior & Social Networking*, *19*(12), 696-702. doi:10.1089/cyber.2016.0137

Kushin, M. J., & Kitchener, K. (2009). Getting political on social network sites: Exploring online political discourse on Facebook. *First Monday*, *14*(11), 1. doi: http://dx.doi.org/10.5210/fm.v14i11.2645

Lee, N. Y., & Kim, Y. (2014). The Spiral of Silence and journalists' outspokenness on Twitter. *Asian Journal Of Communication*, *24*(3), 262-278. doi:10.1080/01292986.2014.885536

Liu, Y., Rui, J. R., & Cui, X. (2017). Are people willing to share their political opinions on Facebook? Exploring roles of self-presentational concern in spiral of silence. *Computers In Human Behavior*, *76*(1), 294-302. doi:10.1016/j.chb.2017.07.029

Louis, W. R., Duck, J. M., Terry, D. J., & Lalonde, R. N. (2010). Speaking out on immigration

policy in Australia: Identity threat and the interplay of own opinion and public opinion. *Journal Of Social Issues*, *66*(4), 653-672. doi:10.1111/j.1540-4560.2010.01669.x

Matthes, J., Knoll, J., & von Sikorski, C. (2018). The "Spiral of Silence" revisited: A meta-analysis on the relationship between perceptions of opinion support and political opinion expression. *Communication Research*, *45*(1), 3-33. doi:10.1177/0093650217745429

McKeever, B. W., McKeever, R., Holton, A. E., & Li, J. (2016). Silent majority: Childhood vaccinations and antecedents to communicative action. *Mass Communication & Society*, *19*(4), 476-498. doi:10.1080/15205436.2016.1148172

Meyer, H. K., & Carey, M. C. (2015). Men more likely to post online newspaper comments. *Newspaper Research Journal*, *36*(4), 469-481. doi:10.1177/0739532915618417

Neubaum, G., & Krämer, N. C. (2017). Monitoring the Opinion of the Crowd: Psychological Mechanisms Underlying Public Opinion Perceptions on Social Media. *Media Psychology*, *20*(3), 502-531. doi:10.1080/15213269.2016.1211539

Neubaum, G. & Krämer, N. C. (2017). Opinion Climates in Social Media: Blending Mass and Interpersonal Communication. *Human Communication Research*, *43*(4), 464-476. doi: 10.1111/hcre.12118

Neubaum, G., & Krämer, N. C. (2018). What do we fear? Expected sanctions for expressing minority opinions in offline and online communication. *Communication Research*, *45*(2), 139-164. doi:10.1177/0093650215623837

Noelle-Neumann, E. (1974). The spiral of silence a theory of public opinion. *Journal of Communication*, *24*(2), 43-51. doi: 10.1111/j.1460-2466.1974.tb00367.x

Newman, K. (2011, August 16). The ultimate guide to the Facebook Edgerank algorithm.

Econsultancy. Retrieved from: https://econsultancy.com/blog/7885-the-ultimate-guide-to-the-facebook-edgerank-algorithm

Pang, N., Ho, S. S., Zhang, A. M., Ko, J. S., Low, W., & Tan, K. S. (2016). Can Spiral of Silence and civility predict click speech on Facebook?. *Computers In Human Behavior*, *64*(1), 898-905. doi:10.1016/j.chb.2016.07.066

Porten-Chee, P. & Eilders, C. (2015). Spiral of Silence online: How online communication affects opinion climate perception and opinion expression regarding the climate change debate. *Studies in Communication Sciences*, *15*(1), 143–150. doi: https://doi.org/10.1016/j.scoms.2015.03.002

Rader, E., & Gray, R. (2015). Understanding user beliefs about algorithmic curation in the Facebook news feed. *CHI'15 Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 173–182. doi: 10.1145/2702123.2702174

Shearer, E. & Gottfried, J. (2017, September, 7). News use across social media platforms 2017. *Pew Research Center*. Retrieved from: http://www.journalism.org/2017/09/07/news-use-across-social-media-platforms-2017/

Soffer, O., & Gordoni, G. (2018). Opinion expression via user comments on news websites: Analysis through the perspective of the spiral of silence. *Information, Communication & Society*, *21*(3), 388-403. doi:10.1080/1369118X.2017.1281991

Stoycheff, E. (2016). Under Surveillance. *Journalism & Mass Communication Quarterly*, *93*(2), 296-311. doi:10.1177/1077699016630255

Thorson, K. (2014). Facing an uncertain reception: Young citizens and political interaction on Facebook. *Information, Communication & Society*, *17*(2), 203-216.

Wang, M. Y., Hmielowski, J. D., Hutchens, M. J., & Beam, M. A. (2017). Extending the Spiral

of Silence: Partisan media, perceived support, and sharing opinions online. *Journal Of Information Technology & Politics*, *14*(3), 248-262. doi:10.1080/19331681.2017.1338980

Yang, X. L. (2016). Will the Spiral of Silence spin on social networking sites? An experiment on opinion climate, fear of isolation and outspokenness. *China Media Research*, *12*(1), 79-87.

Yun, G. W., Park, S., & Lee, S. (2016). Inside the spiral: Hostile media, minority perception, and willingness to speak out on a weblog. *Computers In Human Behavior*, *62*(1), 236-243. doi:10.1016/j.chb.2016.03.086

Weise, E. (2018, March 11). Here's how Russian manipulators were able to target Facebook users. *USA Today*. Retrieved from: https://www.usatoday.com/story/tech/2018/05/10/how-russia-targeted-facebook-ads-disrupt-elections/596665002/