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Throughout this paper, the reader will be presented with the role of algorithms in social division, exploring echo chambers and filter bubbles as well as the role social media itself plays in division. The case study presented will exemplify echo chambers in the 21st century and show that a way forward for society to overcome the echo chamber issues is desperately needed.

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MASTER OF MILITARY STUDIES

THE ROLE OF ALGORITHMS IN POLARIZATION

SUBMITTED IN PARTIAL FULFILLMENT
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MASTER OF MILITARY STUDIES

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EXECUTIVE SUMMARY

Title: The Role of Algorithms in Polarization

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Thesis: Algorithms, created by technological companies, have helped to further an intellectual isolation perpetuated by echo chambers, filter bubbles, and selective exposure.

Discussion: Social media has become mainstream and companies such as Facebook and Twitter have become household names. It is rare, in 2021, to know of anyone inside the United States that does not have or use social media to at least a small degree. Much of the daily experience of life takes place online and social media companies have created ways to enhance a user's experience. By focusing a user towards things that he or she may be interested in based on historical "likes" or the amount of time spent perusing a specific article, biased content is generated specific to each user and presented all based on what the platform's proprietary algorithm thinks the user wants to see while simultaneously connecting that person to other like-minded individuals in essence creating online "filter bubbles and echo chambers". As society continues to imprint itself to the digital world, spending countless hours per day online, the algorithms created by technological companies have found a way to continue the social bubbles previously encountered in person. In doing so, pockets of society have effectively isolated themselves intellectually from other sources of people and information.

Conclusion: Throughout this paper, the reader will be presented with the role of algorithms in social division, exploring echo chambers and filter bubbles as well as the role social media itself plays in division. The case study presented will exemplify echo chambers in the 21st century and show that a way forward for society to overcome the echo chamber issues is desperately needed.

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PREFACE AND ACKNOWLEDGMENTS

The subject selected for this thesis was of interest to me because of its growing presence in the lives of most Americans, and the lives of much of the world's population. Social media touches more people and has connected more human beings today than anything has ever before. Gaining a fundamental understanding of how social media companies work and what they do with the data they collect on each individual user is fascinating. What I found to be even more fascinating is the data they use generates individual and unique experiences to each user but, as the algorithm gets to know the user better, it isolates the user from outside interests, ideas, and opinions. This is not much different than the social bubbles most people find themselves in within their real life but before social media companies created the algorithms, a person would be at least given the option to look at different sources of information. The isolation that is perpetuated by social media creates a polarizing problem, one that very well may continue to grow as society gets more digitized.

I owe an enormous debt of gratitude to my advisors, Dr. Craig Hayden and Dr. Claire Metelits, both of which have been an enormous help shaping my thoughts and opinions not only on echo chambers and algorithms, but in contentious politics within the Gray Scholar's Program. Without the insight and mentorship they provided through countless hours of Google Meets and in person discussions, which were certainly more difficult during COVID-19 restrictions, I would likely not have completed this thesis as succinct and aptly as it turned out. I would also like to thank Col Tom Gordon, LtCol Jeremy Thompson, and Dr. Matthew Flynn for their mentorship throughout my time at Command and Staff College. I have been humbled by their depth of knowledge and true professionalism.

Introduction

Human beings have inherently grouped together in some fashion since the dawn of time. These groups, tribes, communities, and social constructs all have an interdependence wherein the members rely on each other for a multitude of different things, one could think of Maslow's "Hierarchy of Needs" in this instance. They grow together, create bonds, share ideas, and support each other when they need to. The smaller the community, the closer knit they are, and the more likely they are to believe in one another which can inherently lead to a social group isolation, insulating individuals within a group to outsider groups and messages. People who never experience ideas outside of their "bubble," may never get to see a different point of view or a differing opinion than the predominant one in their group. This is the basis of a filter bubble and echo chamber, which this paper delves in and discusses how these paradigms have found their way online into the digital world. What this paper further examines is the algorithms that technological companies, also referred to as social media companies, have created help spur division and polarization. What this paper argues is that algorithms, created by technological companies, have helped to further an intellectual isolation perpetuated by echo chambers, filter bubbles, and selective exposure. The solutions presented could very well help to overcome some of these issues which have spread to the digital world.

Literature Review

News has historically been presented to consumers in many different forms, from the newsstand selling papers, Walter Cronkite discussing matters of importance on the Columbia Broadcasting System (CBS) News, to today's glut of options across the internet and other media

formats.¹ Getting news is no longer as easy as turning on the television to your local station and being presented the news from trusted and reliable sources, or by reading the credible morning paper such as *The Washington Post* or *The New York Times*. Consumers may likely contend that news in today's mass communication environment is easier to come by since there are now hundreds of ways to get news, but the choices that consumers make pointing them to what news they consume is leading to increasingly one-sided media consumption centered on three related concepts: selective exposure, echo chambers, and filter bubbles. This in of itself makes getting reliable and trustworthy news problematic.

Selective exposure refers to systematic bias in audience composition² stemming from a tendency for individuals to select information that is congruent with prior attitudes³ or that comes from like-minded sources.⁴ Academic research refers to such preferences, whether for attitude-confirming information or for friendly sources, as congeniality bias.⁵ Selective exposure to congenial political information is sometimes analyzed as partisan selective exposure.⁶ In the current environment for example, the stereotypical news consumers engaging in selective exposure would be conservative Republicans who only watch Fox News or liberal Democrats who are dedicated to MSNBC. Selective exposure theory relies on the assumption that one will continue to seek out information on an issue even after an individual has taken a stance on it. The

¹ Sanne Kruijemeier, Sophie Lecheler, and Ming M Boyer, "Learning from News on Different Media Platforms: An Eye-Tracking Experiment," November 22, 2017, <https://www.tandfonline.com/doi/full/10.1080/10584609.2017.1388310>.

² David O. Sears, and Jonathan L. Freedman. 1967. "Selective exposure to information: A critical review." *Public Opinion Quarterly* 31 (2): 194–213.

³ Joseph T. Klapper. "The effects of mass communication." (1960).

⁴ Shanto Iyengar, and Kyu S. Hahn. 2009. "Red media, blue media: Evidence of ideological selectivity in media use." *Journal of Communication* 59 (1): 19–39.

⁵ William Hart, Dolores Albarracín, Alice H. Eagly, Inge Brechan, Matthew J. Lindberg, and Lisa Merrill. 2009. "Feeling validated versus being correct: A meta-analysis of selective exposure to information." *Psychological Bulletin* 135 (4): 555–588.

⁶ Natalie Jomini Stroud. 2008. "Media use and political predispositions: Revisiting the concept of selective exposure." *Political Behavior* 30 (3): 341–366.

position that a person has taken will be influenced by various factors that are reinforced during the decision-making process.⁷

Critiques of “echo chambers” or “information cocoons” go further, however, in suggesting not only that people overwhelmingly select into media and information flows that confirm their pre-existing biases but that these habits can reinforce people’s views, exacerbating extremism. Cass Sunstein, legal scholar and author, argues that the opportunity for personalization online, the “Daily Me”⁸, has reduced exposure to competing views and accelerated the polarization of news consumers’ political attitudes.⁹ This view has grown only more prevalent as media options have expanded and technology has increased our accessibility to media. Concerns about ideological self-segregation have accompanied the expansion of cable television¹⁰ widespread adoption of broadband internet¹¹ and most recently the rise of social media.¹² Research on echo chambers examines whether these technological advances enhance the tendency to selectively expose oneself to voices that please and comfort and whether they have further fragmented the electorate.

A variant of this argument focuses on online intermediaries such as Google and Facebook that seek to tailor individual users’ experiences based on their personal characteristics, location,

⁷ Larry E. Sullivan, ed. (2009). "Selective Exposure". The SAGE Glossary of the Social and Behavioral Sciences. SAGE Publications. p. 465.

⁸ Nicholas Negroponte. 1995. Being digital. Vintage.

⁹ Cass R. Sunstein. Republic.com. Princeton University Press, 2001; Sunstein, Cass R. Republic.com 2.0. Princeton University Press, 2009; Sunstein, Cass R. “#Republic : Divided Democracy in the Age of Social Media.” Princeton University Press, 2009.

¹⁰ Markus Prior. 2007. Post-broadcast democracy: How media choice increases inequality in political involvement and polarizes elections. Cambridge University Press; Jamieson, Kathleen Hall, and Joseph N. Cappella. Echo chamber: Rush Limbaugh and the conservative media establishment. Oxford University Press, 2008.

¹¹ Garrett R. Kelly. 2009a. “Echo chambers online?: Politically motivated selective exposure among Internet news users.” Journal of Computer- Mediated Communication 14 (2): 265–285; Hindman, Matthew. 2008. The myth of digital democracy. Princeton University Press.

¹² Eytan Bakshy, Solomon Messing, and Lada A. Adamic. 2015. “Exposure to ideologically diverse news and opinion on Facebook.” Science 348 (6239): 1130–1132; Flaxman, Seth R., Sharad Goel, and Justin M. Rao. 2016. “Filter Bubbles, Echo Chambers, and Online News Consumption.” Public Opinion Quarterly 80 (Special issue): 298–320.

browsing histories, or social networks.¹³ These personalization features generate search results and news feeds that differ in ways that are invisible to the user.¹⁴ Although these features may be aimed at increasing the relevance of information to which individuals are exposed, they may also create filter bubbles that reduce encounters with challenging information.¹⁵ Although these social media features tend to be user friendly over time, critics argue that algorithmic personalization may result in increasingly eccentric perceptions of the world around us, amplifying confirmation bias and undermining our aspirations to consume a broad range of information.

While academic research has identified how selective exposure, echo chambers, and filter bubbles could likely pose a problem to democracy, commentators and other public figures have gone further, often oversimplifying these phenomena and describing sweeping effects that are not supported by the data. For instance, an editorial at *The Independent* declared after the 2016 election that “Social media echo chambers gifted Donald Trump the presidency,”¹⁶ while a Wired article claimed, “Your Filter Bubble is Destroying Democracy.”¹⁷ Similarly, *Scientific American* reflected on “A Nation Divided by Social Media” following Trump’s inauguration.¹⁸ Even President Obama repeatedly bemoaned “balkanized” media, echo chambers, and the alternative realities liberals and conservatives now supposedly inhabit.¹⁹

¹³ Engin Bozdag. 2013. “Bias in algorithmic filtering and personalization.” *Ethics and Information Technology* 15 (3): 209–227.

¹⁴ Zuiderveen Borgesius, Frederik J., Damian Trilling, Judith Moeller, et al. 2016. “Should we worry about filter bubbles?” *Journal on Internet Regulation* 5 (1).

¹⁵ Eli Pariser. *The filter bubble: What the Internet is hiding from you*. Penguin UK, 2011.

¹⁶ Christopher Hooton. 2016. “Social media echo chambers gifted Donald Trump the presidency.” *The Independent*, November 10, 2016. Downloaded from <http://www.independent.co.uk/voices/donald-trump-president-social-media-echo-chamber-hypernormalisation-a.html>.

¹⁷Mostafa M El-Bermawy. 2016. “Your Filter Bubble is Destroying Democracy.” *Wired*, November 18, 2016. Downloaded from <https://www.wired.com/2016/11/filter-bubble-destroying-democracy/>.

¹⁸ Krystal D’Costa. 2017. “A Nation Divided by Social Media.” *Scientific American*, January 31, 2017. Downloaded from <https://blogs.scientificamerican.com/anthropology-in-practice/a-nation-divided-by-social-media/>.

¹⁹ Ted Johnson. 2010. “President Obama Takes on the Media.” *Variety*, May 1, 2010. Downloaded from <http://variety.com/2010/biz/opinion/president-obama-takes-on-the-media-39308/>; Nakamura, David. 2016. “Media critic Obama is worried that ‘balkanized’ media is feeding partisanship.” *Washington Post*, March 27, 2016. Downloaded from <https://www.washingtonpost.com/politics/media-critic-obama-is-worried-that-balkanized-media->

What most of the literature shows is that echo chambers, filter bubbles, and selective exposure exists but at depths that have yet to be fully explored. How technology is changing and enhancing or detracting from historical social constructs has yet to be entirely understood; what is known is that as society continues to move online and use platforms that employ algorithms designed to enhance a user's experience, the algorithms themselves must at least be considered a factor and placed within the discussion of social and cognitive psychology.

The Role of Algorithms in Social Division

In order to understand the role played by social media in social division, it is important to understand the echo chamber and filter bubble concepts. Understanding how social media platforms such as Facebook or Twitter rely on algorithms created by social media companies to enhance online experience for the user is also fundamental to the central thesis of this paper. The next section describes the background and central arguments to this paper and elaborates on how social media algorithms amplify and drive users toward content that skews to a particular perspective, at the expense of a more balanced diet of news and information.

Echo chambers and filter bubbles

According to the PEW Research Center, 72 percent of Americans get digital news primarily from a mobile device, and people now prefer online news sources to print sources by a two-to-one ratio.²⁰ In today's digital world, often, users are given a multitude of different news sources from which to pull. No longer is the local paper the primary news source for a majority

are-feeding-parti2016/03/27/8c72b408-f1e3-11e5-89c3-a647fcce95e0story.html; Hatmaker, Taylor. 2017. "In farewell speech, Obama urges Americans to step outside online 'bubbles'." TechCrunch, January 10, 2017. Downloaded from <https://techcrunch.com/2017/01/10/obama-farewell-address/>.

²⁰ Katerina Eva Matsa and Kristine Lu, "10 Facts about the Changing Digital News Landscape," Pew Research Center, 14 September 2016, <https://www.pewresearch.org/fact-tank/2016/09/14/facts-about-the-changing-digital-news-landscape/>.

of Americans. The source of the news, however, is based upon the perceived credibility that the user assigns to it. As social media becomes more prevalent in the lives of everyone that it touches, “individuals tend to expose themselves to information and ideas they agree with more often”²¹ which can often create unique problems for one sided news consumption. Social media encourages and amplifies these social tendencies toward *homophily*.

The idea of homophily can be likened to the saying of “birds of a feather flock together.” “Homophily within social media creates an aura of expertise and trustworthiness where those factors would not normally exist”²² which then provides source credibility for the user. When users share content within networks of like-minded individuals, they tend to grant source credibility to the shared messages or information. Along the lines of social networking and propaganda, people are more willing to believe the things that fit into their worldview. Once source credibility is established, there is a tendency to accept that source as an expert on other issues as well, even if the issue is unrelated to the area of originally perceived expertise.²³ This illusion creates the conditions for what is referred to as an echo chamber.

Echo chambers occur when people with the same interests or views interact primarily within their group. They seek and share information that both conforms to the norms of their group and tends to reinforce existing beliefs without encountering opposing views, potentially resulting in an unintended exercise in confirmation bias.²⁴ That social psychology has long shown this tendency to

²¹ Iyengar, Shanto, and Kyu S. Hahn. "Red media, blue media: Evidence of ideological selectivity in media use." *Journal of communication* 59, no. 1 (2009): 19-39; Lawrence, Eric, John Sides, and Henry Farrell. "Self-segregation or deliberation? Blog readership, participation, and polarization in American politics." *Perspectives on Politics* 8, no. 1 (2010): 141-157.

²² Gueorgi Kossinets and Duncan J. Watts, “Origins of Homophily in an Evolving Social Network,” *American Journal of Sociology* 115, no. 2 (2009): pp. 405-450, <https://doi.org/10.1086/599247>.

²³ Garth Jowett, and Victoria O'Donnell. 1992. *Propaganda and persuasion*. Newbury Park, Calif: Sage Publications. 300.

²⁴ Kathleen Jamieson, & Jameson Cappella. (2008). *Echo Chamber: Rush Limbaugh and the Conservative Media establishment*. London: Oxford UP.

associate with like-minded others is common cross-culturally.²⁵ However, there is new fear that the current media system is helping people enter echo chambers more easily than ever before.

Psychological and social psychological research in the 1950s found that people tend to avoid dissonance and gravitate towards agreement.²⁶ Echo chambers are related to concepts such as groupthink and selective exposure theory.²⁷ On social media, studies identify echo chambers as a consequence of homophily; the tendency to form social ties with similar others.²⁸ There are two observed ways that the Internet and related technologies might support the development of echo chambers: allowing individuals to make choices that reinforce existing preferences and algorithmic filter bubbles. These two affordances of the technology reinforce each other. The filter bubble argument suggests algorithmic filtering, which personalizes content presented on social media use and through previous use of search engines, could exacerbate the tendency for people to select media and content which reinforce their existing preferences.²⁹ Homophily, coupled with algorithmic filtering, only tends to exacerbate the issues that are seen with echo chambers and filter bubbles.

A *filter bubble* is a term established by Eli Pariser, an internet activist who believes that online algorithms used by Facebook and other websites are pushing us toward isolation.³⁰ Filter bubbles are driven by algorithms. Algorithms are functions of social media platforms that employ methods to collect a user's digital experience, ranging from location, search history, and previous online actions that push people to see information that the algorithm presumes the user would like to see. Essentially, the algorithms are designed to construct the online experience, which often leads to

²⁵ Carl Sunstein. (2009). *Republic. Com 2.0*. New York, NY: Princeton UP.

²⁶ Leon Festinger. (1957). *A theory of cognitive dissonance*. New York, NY: Row, Peterson.

²⁷ Janis Irving. (1982). *Groupthink* (2nd edn). Boston, MA: Houghton, Mifflin; Klapper, Joseph. (1960). *The effects of mass communication*. New York: Free Press.

²⁸ Miller McPherson, Smith-Lovin, Lynn., & Cook, James. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415–444. doi: 10.1146/annurev.soc.27.1.415

²⁹ Eli Pariser. (2011). *The Filter Bubble: What the internet is hiding from you*. New York, NY: Penguin Press.

³⁰ Ibid.

one-sided or narrowly constrained information that reflect the preferences of the social media user. Algorithms are increasingly pushing us towards like-minded individuals, pushing groupthink and allowing an easier dissemination of unreliable media. Pariser warns that algorithms used in search platforms like Google and Facebook social circles “closes us off to new ideas, subjects, and important information.”³¹ Individuals are probably unaware that their user data and their previous online actions is contributing to the results they receive in their web browser. Few recognize that social media algorithms collect private information in ways that have serious social and political consequences. The fact that data collected by popular social media platforms drive algorithmically determined content means that users need to understand how social media works before they decide to use it.

The polarizing aspects of echo chambers and filter bubbles are found to be evident in social media conversations as well as the documented low diversity aspects in online news consumption. These observations have two common features: network segregation (the splitting of the social network in two or more disconnected or poorly connected groups) and opinion polarization (the high homogeneity of opinions within such groups). Figure 1 shows what an information diffusion network with those two features looks like.

³¹ Ibid.

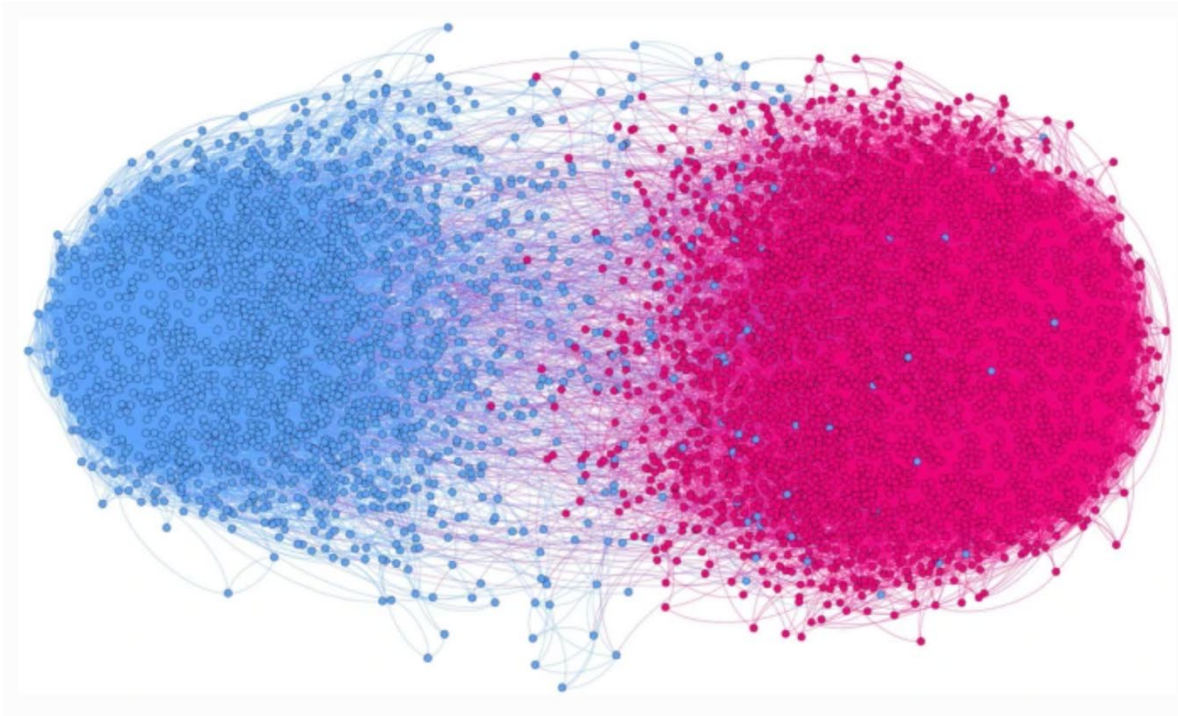


Figure 1: A polarized and segregated network on Twitter. Social influence and unfollowing accelerate the emergence of echo chambers. 2020.

<https://link.springer.com/article/10.1007/s42001-020-00084-7>

How Social Media Works and Presents Information to Users

Social Media is defined as “websites and applications that enable users to create and share content or to participate in social networking.”³² Although it is a relatively new form of media communication, social media has branched into a diverse range of platforms throughout its 30-year history. Social media has taken on various forms online but each of those activities can be largely put into several different bins such as blogs, business networks, collaborative projects, enterprise social networking, forums, microblogs, photo sharing, products/services review, social bookmarking, social gaming, social networks, video sharing, and virtual worlds.

Users experience social media in several different and distinct ways. What is likely helpful is to think of the users experience as a honeycomb construct whereby seven functional areas act

³² *Oxford Languages Online Dictionary*, s.v. “Social Media,” accessed Jan 21, 2021. <https://languages.oup.com/google-dictionary-en/>

as building blocks, which are neither mutually exclusive, nor do they all have to be present in social media activity.³³ J.H. Kietzmann et al. propose such a framework to describe how social media works to connect, cultivate, and sustain communities online. The *identity* functional block represents the extent to which users reveal their identities in a social media setting. This can include disclosing information such as name, age, gender, profession, location, and also information that portrays users in certain ways.³⁴ The *conversations* block of the framework represents the extent to which users communicate with other users in a social media setting. Many social media sites are designed primarily to facilitate conversations among individuals and groups.

Sharing represents the extent to which users exchange, distribute, and receive content, and likely, where algorithms have a larger effect.³⁵ The term ‘social’ implies that exchanges between people are crucial.³⁶ The *framework* building block presence represents the extent to which users can know if other users are accessible. It includes knowing where others are, in the virtual world and/or in the real world, and whether they are available.³⁷ The *relationships* block represents the extent to which users can be related to other users.³⁸ The term “relate’ is a loosely used, meaning more than two or more users have some form of association that leads them to converse, share objects of sociality, meet up, or simply just list each other as a friend or fan. *Reputation* is the extent to which users can identify the standing of others, including themselves, in a social media setting.³⁹ The groups functional block represents the extent to which users can form communities

³³ Jan H. Kietzmann, Kristopher Hermkens, Ian P. McCarthy, and Bruno S. Silvestre. “Social Media? Get Serious! Understanding the Functional Building Blocks of Social Media.” Business Insider. Kelley School of Business, February 5, 2011. <https://www.sciencedirect.com/science/article/abs/pii/S0007681311000061>.

³⁴ Ibid.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Ibid.

³⁸ Ibid.

³⁹ Ibid.

and subcommunities.⁴⁰ The more ‘social’ a network becomes, the bigger the group of friends, followers, and contacts. Figure 2 outlines the honeycomb construct.

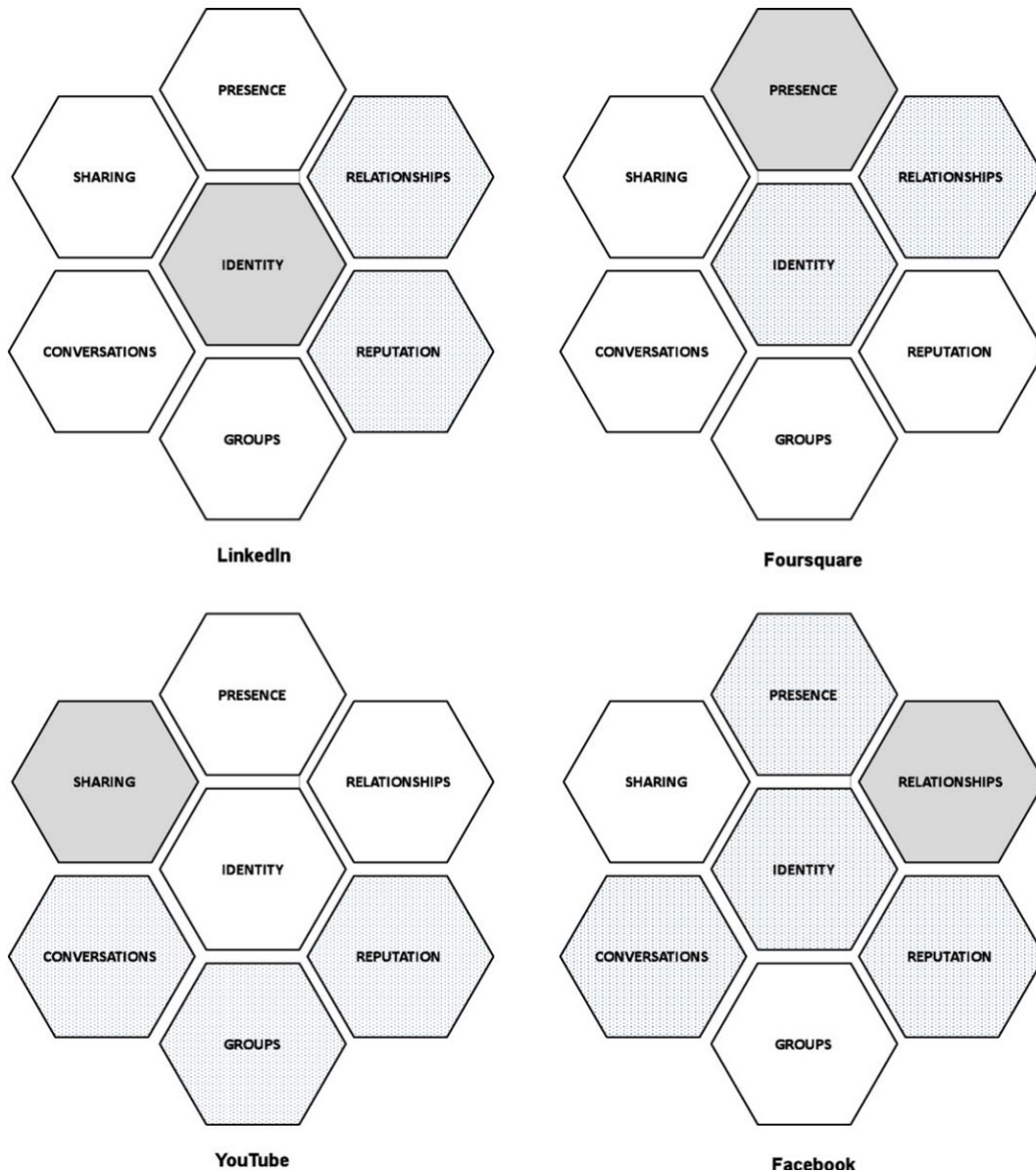


Figure 2: Contrasting the functionalities of different social media sites. Social Media? Get Serious! 2011. <https://www.sciencedirect.com/science/article/abs/pii/S0007681311000061>

How all of this is presented to the user is of utmost importance to the online effect of the echo chamber and filter bubble theory. As was presented in figure 2, each social media platform

⁴⁰ Ibid.

focuses on different parts of the honeycomb to present information to a user. Two of the most prolific platforms in use today, Facebook and Twitter, are discussed next in depth to gain a deeper understanding of how users interact on those platforms.

An important factor, however, is that social media platforms consider themselves technology companies and not media companies. It is an important distinction because social media platforms and their outputs (e.g. Facebook News Feed) are not held to the same standards that media companies, like CNN and Fox News, are subjected to. “Technology companies invent cars that drive themselves, satellites that can identify a license plate from miles away, phones that can guide us through traffic jams, and machines that see inside our bodies. That's what tech companies do.”⁴¹ Social media platforms, unlike other technological innovations, serve profoundly communicative functions. They were created to bring people together, to promote a common interest, and to share ideas. Much of what is seen on social media today is user generated content and as such, the platforms that host this data are not held liable under the same rules and laws that govern media organizations.

Facebook

Facebook’s founder, Mark Zuckerberg, created the Facebook social media platform out of the desire to connect students to each other while at Harvard University. The company itself has an early history that is problematic at best. In 2003, Zuckerberg launched the website at Harvard University as Facemash, an online tool designed for students to determine the attractiveness of other students at Harvard. In doing so, Zuckerberg violated a Harvard University policy where he had taken advantage of university resources in posting information and pictures of the student body online without consent of the individuals, and the site was shut

⁴¹ David Dodson, “To Hold Facebook Accountable, Stop Calling It a Tech Company,” CNN Perspectives - Facebook Regulation (CNN, December 15, 2018), <https://www.cnn.com/2018/12/15/perspectives/facebook-regulation-tech-company/index.html>.

down after two days.⁴² The early success of Facemash however, was evident. 450 people had voted 22,000 times in its two days of existence, prompting Zuckerberg to develop a new platform for Harvard students. “Students who signed up for the service could post photographs of themselves and personal information about their lives, such as their class schedules and clubs they belonged to.”⁴³ The social network TheFacebook.com launched in February 2004 ushering in an era of unprecedented digital interconnectedness.

Facebook “has done something no other organization in human history has been able to do: provide instantaneous communication between over 2 billion people. It is not just about communication, either. Facebook has allowed people to form groups, communities, play games and start businesses.”⁴⁴ But Facebook builds community in such a way as to better target advertising. “Facebook runs ads based on the information it has collected about you, the user. And it has used the premise of “technology” to shift our attention so it, as well as other companies such as Google, can operate under a different set of rules than all the other media companies that run ads. By clinging to its definition of being a technology company, Facebook and other social media companies enjoy protections under the Communications Decency Act that immunize them from being held liable for hate and other objectionable speech, libel and falsehoods in news stories and advertising that media companies do not.”⁴⁵ Facebook is still doing some of the things that Facemash was originally shut down for, and it continues to hide behind the protections given to it as a tech company. Content that is shared on Facebook would

⁴² Alex Horton, “Channeling ‘The Social Network,’ Lawmaker Grills Zuckerberg on His Notorious Beginnings,” The Washington Post (WP Company, April 8, 2019), <https://www.washingtonpost.com/news/the-switch/wp/2018/04/11/channeling-the-social-network-lawmaker-grills-zuckerberg-on-his-notorious-beginnings/>.

⁴³ Encyclopedia Britannica Online, s.v. “Facebook,” accessed Jan 21, 2021. <https://www.britannica.com/topic/Facebook>

⁴⁴ Jeff Parsons, “Facebook at 15: Five Ways the Social Network Has Helped Society,” Metro (Metro.co.uk, February 4, 2019), <https://metro.co.uk/2019/02/04/facebook-15-five-ways-social-network-helped-society-8433915/>.

⁴⁵ David Dodson, “To Hold Facebook Accountable, Stop Calling It a Tech Company,” CNN Perspectives - Facebook Regulation (CNN, December 15, 2018), <https://www.cnn.com/2018/12/15/perspectives/facebook-regulation-tech-company/index.html>.

not be allowed in the United States under contemporary media content regulations. “When nearly half of Americans get their news from Facebook, its newsfeed should be subjected to the same standards of fairness, decency and accuracy as newspapers, television and other media outlets” but due to protections evident in the Section 230 of the Communications Decency Act, Facebook’s standards are their own.⁴⁶

Twitter

The idea and premise behind Twitter is fairly simple and relatively straightforward, “to give everyone the power to create and share ideas and information instantly without barriers.”⁴⁷ Since its creation in 2006 and launch in 2007, the 140 character Tweet revolution has ushered in an era of online collaboration, networking, and instant message style feeds geared towards their overall mission statement of sharing ideas. One of the more interesting aspects of their mission statement, however, is the mention of “creating” since Twitter does not directly provide any tools for the generation of ideas or information. What Twitter does seem to do is provide an instrument and platform for anyone who has created an account to instantaneously speak their mind and broadcast it without barriers for everyone to see, of which there are several examples of this very context that is easily attainable by perusing any stream of Tweets. Twitter also promises lofty goals in how it will maintain its mission statement, “Our business and revenue will always follow that mission in ways that improve – and do not detract from – a free and global conversation.”⁴⁸

A potential upside to the use of Twitter has been its ability to rapidly spread information. In the 2009 Iranian Presidential Elections for example, “tweets of de facto journalists showed the

⁴⁶ Ibid.

⁴⁷ “Twitter Investor's FAQ,” Twitter, Inc. - Contact - FAQ (Twitter, Inc.), accessed January 20, 2021, <https://investor.twitterinc.com/contact/faq/>.

⁴⁸ “Twitter Investor's FAQ,” Twitter, Inc. - Contact - FAQ (Twitter, Inc.), accessed January 20, 2021, <https://investor.twitterinc.com/contact/faq/>.

potential of nontraditional media to circumvent government censorship.”⁴⁹ Although the tweets did not directly affect the election results, the tweets themselves proved that there were ways for suppressed people to discuss issues openly, online and away from government restrictions and without algorithms hindering their ability to network. On the downside, more recently Twitter has shown that it also has the ability to rapidly spread disinformation, likely perpetuated by algorithms.

Algorithms

Social media companies have long looked for ways to generate additional revenue. What they have created is way to commodify and profit from data gathered from users of their platform. One description of this market for personal data is termed surveillance capitalism, which describes the economy around targeted advertisements. Dr. Shoshana Zuboff of Harvard University defines surveillance capitalism as:

“the unilateral claiming of private human experience as free raw material for translation into behavioral data. These data [sets] are then computed and packaged as prediction products and sold into behavioral futures markets — business customers with a commercial interest in knowing what we will do now, soon, and later. It was Google that first learned how to capture surplus behavioral data, more than what they needed for services, and used it to compute prediction products that they could sell to their business customers, in this case advertisers.”⁵⁰

Social media sites, like Facebook and Twitter, immediately saw the benefits of Google’s “surplus behavioral data” and created their own proprietary algorithm sets to analyze words, phrases, or hashtags that a user is searching which on the surface, created surveillance capitalism. Underneath that, the byproduct of the algorithms they created enables the spread of propaganda, driven by trending narratives pushed out by anyone in the social network.

⁴⁹ Encyclopedia Britannica Online, s.v. “Twitter,” accessed Jan 21, 2021. <https://www.britannica.com/topic/Twitter>

⁵⁰ John Laidler, “Harvard Professor Says Surveillance Capitalism Is Undermining Democracy,” *Harvard Gazette* (Harvard Gazette, March 4, 2019), <https://news.harvard.edu/gazette/story/2019/03/harvard-professor-says-surveillance-capitalism-is-undermining-democracy/>.

This creates real risk for exploitation by foreign actors who can operate in an open and free society like that of the United States, where targeted content can be driven to key demographics to shape opinion and in some cases, increase polarization. Malign cyber actors can create bots or other cyber mechanisms to push out their propaganda and exploit the ability for narratives to trend in social media. “Using existing online networks in conjunction with automatic “bot” accounts, foreign agents can insert propaganda into a social media platform, create a trend, and rapidly disseminate a message faster and cheaper than through any other medium.”⁵¹ This is also the premise behind the polarizing factors of echo chambers and filter bubbles as they are presented online. Foreign agents can quickly and easily disseminate propaganda and messages of their choosing once they have infiltrated an echo chamber. Surveillance capitalism does not just describe how tech companies monetize social media data, it also describes key vulnerabilities created by how tech companies drive content to particular communities for ad revenue.

Topics that trend have the ability to spread information to nearly anyone with an account on that social media platform. Within Twitter when a person tweets, that tweet can be viewed by anyone who follows that person, or anyone who searches for that topic using Twitter’s search tool since all of what you see on Twitter is about sharing ideas and information freely, assuming the algorithm directs such content to a particular audience. Users who follow each other may not necessarily be friends in the colloquial sense but could be someone like-minded such as a fellow micro-blogger, journalist, or activist. Twitter also makes it possible to repost someone else’s tweet which then broadcasts it to an entirely new audience. Users on Twitter also use a hashtag which is attached to their tweet which helps to categorize their post.

⁵¹ Sitaram Asur, Bernardo A. Huberman, Gabor Szabo, and Chunyan Wang, “Trends in Social Media: Persistence and Decay” (unpublished manuscript, submitted to Cornell University Library, 7 February 2011), 1, <https://arxiv.org/abs/1102.1402?context=physics>.

Using the hashtag, anyone with an account has the ability to quickly lookup tweets using the same hashtag, pushing a trend or topic to go viral. Facebook similarly can push a topic or trend to go viral, spreading information across different communities of interest. However, Facebook continues to operate behind the premise of bringing friends and families together. Facebook’s “newsfeed” uses its proprietary algorithms to push information that the algorithm thinks a user wants to receive, incentivizing it to trend which can make people more prone to see disinformation, especially if that disinformation is designed to be shared. “When nearly half of Americans get their news from Facebook, its newsfeed should be subjected to the same standards of fairness, decency and accuracy as newspapers, television and other media outlets.”⁵² Facebook delivers content, tailored by its algorithms, to like-minded audiences. It represents, in effect, a media company that may subject to previously regulatory standards that govern other forms of broadcast media. To illustrate the potential negative impacts of how social media echo chambers can amplify disinformation in way that has negative social effects, the following section provides a short case study of how the anti-vax movement is supported by social media.

Case Study

Anti-Vaccinators

The Centers for Disease Control (CDC) has stated that the United States currently has the safest vaccine supply in its history and has went on to say that the nation’s long-standing vaccine safety system ensures that vaccines are as safe as possible. Vaccine Safety is a vital part of the nation’s response to the COVID-19 pandemic as it has been to many of the other public health

⁵² David Dodson, “To Hold Facebook Accountable, Stop Calling It a Tech Company,” CNN Perspectives - Facebook Regulation (CNN, December 15, 2018), <https://www.cnn.com/2018/12/15/perspectives/facebook-regulation-tech-company/index.html>.

concerns in the past. As vaccines are developed and become available, the public's knowledge of their safety, both initially and during extended use, is an important part of a successful national vaccination effort.⁵³ Without public knowledge, doubt can spread, leading to the spread of perceptions that vaccines are not safe. Many who are on the fence about vaccination are worried about the potential consequences of vaccines; they have heard stories about children having severe immunologic reactions or dangerously high fevers after their shots; they are enticed by anecdotes about children who were vaccinated one day and severely impaired the next.⁵⁴ Yet where do these "stories" that question vaccine safety come from? What further perpetuates the divide is of course the echo chambers in social media.

Vaccine hesitancy is a decision-making process that is dependent on trust in healthcare providers and mainstream medicine, among other variables.⁵⁵ However, through the combination of homophily and the convenience of social media, individuals who have anti-vaccine beliefs can consume information that adheres to their system of beliefs and ignore dissenting information.⁵⁶ Anti-vax communities are sustained by a self-reinforcing stream of content that justifies their position and affirms their sense of identity as concerned parents and citizens. And this content is shared among the community, adding to its source credibility.

Despite having been disproved multiple times, perhaps the most popular anti-vaccine theory is that the mumps-measles-rubella (MMR) vaccine causes autism.⁵⁷ Even though campaigns are underway and have existed for a few years to dispel the disinformation about the

⁵³ "Vaccine Information and Safety Studies," Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, April 26, 2021), <https://www.cdc.gov/vaccinesafety/index.html>.

⁵⁴ Rachel Alter and Tonay Flattum-Riemers, "Breaking Down the Anti-Vaccine Echo Chamber," State of the Planet, May 10, 2019, <https://news.climate.columbia.edu/2019/05/08/breaking-vaccine-echo-chamber/>.

⁵⁵ Infectious Disease Advisor, "Social Medicine: The Effect of Social Media on the Anti-Vaccine Movement," Infectious Disease Advisor, February 18, 2019, <https://www.infectiousdiseaseadvisor.com/home/topics/prevention/social-medicine-the-effect-of-social-media-on-the-anti-vaccine-movement/>.

⁵⁶ Ibid.

⁵⁷ Ibid

MMR vaccine, the information campaigns do not seem to be effective. Conspiracy theories have become endemic among anti-vaccination groups and have been compounded in recent years by decreased trust in the institutions that manufacture or distribute vaccines.⁵⁸

Echo chambers and filter bubbles have been found to further energize the anti-vaccine movement.⁵⁹ A 2017 study analyzed the interaction of 2.6 million Facebook users over 7 years and 5 months.⁶⁰ The study's authors found that the consumption of content about vaccines is dominated by the echo chamber effect, and polarization increased over the years.⁶¹ Online users selected information adhering to their belief systems, tended to ignore dissenting information, and joined polarized groups that reinforced their shared narrative.⁶²

What the cited 2017 study showed was that social media is fertile ground for anti-vaccinators and can also be for those with opposing views. What the study did not delve in to was ways in which the barriers could be reduced or removed altogether. People need and want to feel empowered, social media does that, but it is also finding ways to spur divide and cut people off from seeing another side to a story when homophily and echo chambers continue to be present. People will continue to rely on social media to get information and the amount of misinformation found on these sites is only going to increase. The resulting social divide between anti-vaxxers and those supporting public health institutions can no longer continue to grow. But what is the solution? Should the algorithms that direct information and content on social media be regulated? Some of the initiatives proposed below could help to fix those issues.

⁵⁸ Ibid.

⁵⁹ Ibid.

⁶⁰ Ana Lucía Schmidt et al., "Polarization of the Vaccination Debate on Facebook," *Vaccine* (Elsevier, May 26, 2018), <https://www.sciencedirect.com/science/article/pii/S0264410X18306601>.

⁶¹ Ibid.

⁶² Ibid.

A Way Forward

Social Media Regulation and Governance

The current regulations and laws that govern social media are dated and lack specificity which led to the creation of unregulated algorithms and is the root cause of the issues and concerns discussed in the previous sections. A lack of regulation on social media has led to negative impacts. The United States needs regulation on social media and the ongoing debates centered around Section 230 of the Communications Decency Act of 1996 could help to finally do that.⁶³ The United States, requires updated legislation that would clarify how social media corporations are responsible for the media content they carry. The United States needs clear and concise regulation that would limit the impact of echo chambers and filter bubbles enhanced by social media, which would likely decrease the polarizing effects those two theories have displayed. Regulating the algorithms and their outputs, such as through Section 230 reform, could be a huge step forward.

Social Media literacy initiatives

The previous section called for a supply side solution to the problem. However, what is the demand for information on social media? A large part of the problem is that the general public is largely uneducated about the risks of manipulation and disinformation on social media. A user will hear or read about fake news, but unless it is coming from their trust circle, within their established network, they likely just downplay it as fake news about fake news. General users do not understand how to differentiate between truth and opinion, and that is an issue.

⁶³ Ashely Johnson and Daniel Castro, "Proposals to Reform Section 230," Proposals to Reform Section 230 (Information Technology and Innovation Foundation, February 22, 2021), <https://itif.org/publications/2021/02/22/proposals-reform-section-230>.

One approach would be to attempt to stop the flow of disinformation, or “fake news.” “Fake news spreads six times faster than true news. According to researchers, this is because fake news grabs our attention more than authentic information: fake news items usually have a higher emotional content and contain unexpected information which inevitably means that they will be shared and reposted more often.”⁶⁴ As a result of exposure to content that has characteristics that can drive sharing, fake news can spread more easily, which is in turn amplified by algorithms. According to the Center for Humane Technology:

Reading a fake news item even once increases the chances of a reader judging that it is true when they next encounter it, even when the news item has been labeled as suspect by fact-checkers or is counter to the reader’s own political standpoint. The damage done by fake news items in the past continues to reverberate today, as exemplified in the case study and by evidence of Russian trolls and bots infiltrating online social platforms. Psychological mechanisms such as these, twinned with the speed at which fake news travels, highlight our vulnerability demonstrating how we can easily be manipulated by anyone planting fakes news or using bots to spread their own viewpoints.⁶⁵

One possible solution is to promote media literacy programs. Such educational programs can help individuals learn to question the information they receive on the internet, whether it be from a friend or from someone you follow. One potential example is the Learn to Discern program:

Learn to Discerns curriculum builds communities' resilience to state-sponsored disinformation, inoculates communities against public health misinformation, promotes inclusive communities by empowering its members to recognize and reject divisive narratives and hate speech, improves young people’s ability to navigate increasingly polluted online spaces, and enables leaders to shape decisions based on facts and quality information.⁶⁶

⁶⁴ Soroush Vosoughi, Deb Roy, and Sinan Aral, “The Spread of True and False News Online,” *Science* (American Association for the Advancement of Science, March 9, 2018), <https://science.sciencemag.org/content/359/6380/1146.full>.

⁶⁵ “Ledger of Harms,” *Ledger of Harms* (Center for Humane Technology, April 5, 2021), <https://ledger.humanetech.com/#making-sense>; Gordon Pennycook, Tyrone Cannon, and David G. Rand, “Prior Exposure Increases Perceived Accuracy of Fake News,” *SSRN*, April 25, 2017, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2958246.

⁶⁶ “Learn to Discern (L2D) - Media Literacy Training,” *IREX*, accessed May 7, 2021, <https://www.irex.org/project/learn-discern-l2d-media-literacy-training>.

As social media literacy initiatives take hold, educating more of the public, the more demand for credibility and trust on the internet will grow, ideally diminishing the corrosive effects of selective exposure and filter bubbles. We should no longer be “more concerned with status, popularity, and establishing a trusted “friends” circle, than with maintaining the truth.”⁶⁷ Remaining aware that malicious actors, of all types, are always trying to advance their agenda can help to stop disinformation before it even begins.⁶⁸ Social media literacy initiatives must be given a chance to thrive.

Conclusion

Throughout this paper, the reader has been presented with the role that echo chambers, filter bubbles, and selective exposure theories play in society. These concepts have existed likely since the dawn of time, but what is making them more harmful, more prevalent, and more impactful is the way in which society interacts online. The online and internetworked society that everyone has come to enjoy also has its drawbacks, as social networking companies are exposed for building algorithms that perpetuate a social divide and continue to create polarization. The sensationalism that fake news and disinformation sells, helps to maintain their business models and with a lack of social media literacy and Internet governance through Section 230 reforms, social media companies will continue to feed into groups like the anti-vaccinators that believe fiction over fact. What the reader has been presented is that algorithms, created by technological companies, have helped to further an intellectual isolation perpetuated by echo chambers, filter

⁶⁷ Michela Del Vicario et al., “The Spreading of Misinformation Online,” PNAS (National Academy of Sciences, January 19, 2016), <https://www.pnas.org/content/113/3/554/>.

⁶⁸ Whitney Phillips, “The Oxygen of Amplification,” Data & Society (Data & Society Research Institute, May 22, 2018), <https://datasociety.net/output/oxygen-of-amplification>.

bubbles, and selective exposure. Ultimately, more research is needed to further quantify just how far apart a polarized society is online and to see if there is a tipping point where reform will be forced. Without social media reform and taking social media literacy initiatives seriously, polarization and intellectual isolation will likely continue to grow.

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