

Spiral of Silence in an Algorithm-Driven Social Media Content Environment: Conceptual Framework and Research Propositions

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Hyuk Jun Cheong¹, Sufyan M. Baksh² and Ilwoo Ju³

¹ Graduate School of Global Communication and Language, Akita International University, JAPAN

² Department of Communication & Media, The University of Scranton, U.S.A.

³ Brian Lamb School of Communication, Purdue University, U.S.A.

Abstract: The aim of this conceptual study is to explore the major tenets of the spiral of silence theory (i.e., fear of isolation, willingness to speak out, quasi-statistical sense) within social media environments, where users are predominantly shown content that aligns with their views and interests. In this environment of algorithmic-suggested content, the researchers offer several propositions as to how the spiral of silence tenets operate relative to the perceived anonymity, tie strengths, and the postings suggested by programmed algorithms used by social media platforms. New research directions on spiral of silence theory, social media communication, and opinion polarization are also discussed. Finally, implications for researchers, policymakers, and social media practitioners are addressed.

Keywords: spiral of silence, algorithm-driven content, social media communication, CMC, opinion polarization, conceptual paper

Introduction

Research in journalism and mass communication has frequently adopted Noelle-Neumann's (1974; 1993) spiral of silence theory (SoS) as a conceptual foundation. According to researchers, the theory is "one of the most influential recent theories of public opinion formation" (Kennamer, 1990, p. 393). SoS describes how individuals perceive, react to, and shape public opinion. The central theme of the theory is that societies threaten those who deviate from the perceived majority opinion with isolation. The fear of isolation encourages the perceived minority opinion holders to silence themselves. Therefore, Noelle-Neumann viewed public opinion as a form of social control.

The original conception of the theory aimed to explain an individual's desire to express or withhold opinions in face-to-face (FtF) communication contexts (Gearhart & Zhang, 2014). The theory has later expanded to embrace the public opinion formation mechanisms in the mass

Address for Correspondence: Sufyan M. Baksh, email: [sufyan.baksh\[at\]scranton.edu](mailto:sufyan.baksh[at]scranton.edu)

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media contexts, and research has generally found that the theory also applies to mass media communications, as people use mass media news to monitor the public opinion climate, which influences their fear of social isolation and willingness to speak out (Noelle-Neumann, 1981; 1993). Simply put, the theory suggests that individuals' subjective judgment of whether their views on public issues fall in the majority's opinion exerts considerable influence on fear of isolation and their willingness to speak out.

However, scholars agree that SoS seems to have reached its maturity stage in the context of mass media and suggest the theory needs re-evaluation in the rapidly evolving media environment (Liu & Fahmy, 2011). Many studies have examined SoS in connection with various digital news media platforms. For instance, McDevitt, Kioussis, and Wahl-Jorgensen (2003) conducted the first online spiral of silence study that explored minority opinion holders' communication styles in online chat rooms versus offline face-to-face (FtF) communications. Following this study, several researchers have revisited the spiral of silence in a wider context of computer-mediated communications (e.g., Askay, 2015; Chan, 2018; Chen, 2018; Fox & Holt, 2018; Gearhart & Zhang, 2018; Liu & Fahmy, 2011; Matthes, Knoll, & von Sikorski, 2018; Neubaum & Krämer, 2018; Tsfati, Stroud, & Chotiner, 2014; Yun & Park, 2011).

Many studies conducted in recent years have attempted to test the applicability of SoS to digital platforms, revealing mixed results. Not all researchers share the optimistic view of social media as a public sphere that increases the users' willingness to express an opinion that enhances democracy (Hakobyan, 2020). Social media differ from mass media and FtF communications in connectivity logic, the determining algorithms subject to confirmation bias and pluralistic ignorance, and a news consumption culture (Gearhart & Zhang, 2015). Furthermore, research has shown a decreased usefulness of SoS in the social media context where users may not experience fear of social isolation even when their opinions are against the majority view and vocal minorities may freely express the unpopular view (Chaudhry & Gruzd, 2019). Thus, this questions the explanatory power of SoS in the social media context; therefore, it is important to revisit the major tenets of SoS in this context. Yet, little research has addressed SoS regarding social media algorithms, even though it is generally presumed to affect the formation of public opinion. To this end, the current conceptual study addresses the gap in the literature and sheds new light on SoS in the social media communication algorithm contexts to propose new research directions.

Spiral of Silence theory and algorithmic social media content

SoS explains the public opinion formation process using three major theoretical tenets: *a quasi-statistical sense, fear of isolation, and willingness to speak out*. The theory claims that people conceal their opinions (i.e., *willingness to speak out*) when they perceive that their views on public issues are incongruent with the (perceived) prevailing opinions because they fear social isolation from their communities and social networks that surround them (i.e., *fear of isolation*). In this process, people employ *a quasi-statistical sense* to recognize the opinion climate on public issues, even without accessing polls, or continually gauge the climate relative to public issues through interpersonal and mass media information (Askay, 2015; Noelle-Neumann, 1974; 1993). As a result, most opinions are likely to become increasingly dominant over time, while minority opinions become increasingly silent, the so-called *spiral of silence* (Matthes et al., 2018).

Our current study focuses on how the spiral of silence operates in social media contexts that provide algorithmic content suggestions that differ from FtF and mass media communications. People monitor social media content about public issues and share opinions with others on their social media networks (Chen, 2018; Gearhart & Zhang, 2015). Based on

the literature on social media SoS, people may be hesitant to voice their opinions when they perceive their views to fall in the minority, and their use of a quasi-statistical sense in speaking out may be critical (Gearhart & Zhang, 2014). Unlike SoS in the mass media context, people's evaluation of the opinion climates will interact with the automated content suggestion mechanisms in a social media environment.

The current study expands the scope of the digital spiral of silence literature by addressing how social media's automated content suggestions lead people to express or withhold their opinions and reinforce their pre-existing opinions beyond their perception of the opinion climates. We applied the major SoS tenets to discuss possible scenarios of public opinion-shaping processes. Unlike mass media, social media news is redistributed through automated algorithms, not directly by human gatekeepers, such as journalists or editors (Pariser, 2011). Therefore, algorithmic content suggestions determine the locus of control of news content distribution even if social media users' prior behavioral history (e.g., cookies, browsing footprint) and other personal factors (e.g., interests, interaction with other users) initiate the algorithmic content suggestions. This process may, over time, result in a consistent opinion environment on an individual's social media by continuously echoing her/his opinions based on behavioral tracking (Fox & Holt, 2018). Today, news sources on public issues include mass media and social media's algorithmic content suggestions. The automated system presents similar and relevant content over time because it assumes social media users might be interested in and more likely to read such content. Taken together, a different theoretical lens beyond the scheme used in mass media research is warranted.

To address this timely agenda, we reviewed the spiral of silence research, updated it in the context of social media algorithmic content suggestions, and suggested conceptual propositions to guide future research in journalism and mass communication in relevant fields. The research is organized into several topics. (1) We review relevant digital media literature and summarize the key aspects. (2) We review research on the online spiral of silence within the context of social media. (3) We present several research propositions on *fear of isolation*, *willingness to speak out*, and *quasi-statistical sense* of SoS. (4) We expand our discussion to address an intriguing public opinion phenomenon, *opinion reinforcement*, by tapping into social media's algorithmic content suggestions relative to the major tenets of SoS.

Social media as sources of news

Social media refer to “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of user-generated content” (Kaplan & Haenlein, 2010, p. 61). Social media have become mainstream means of social networking, entertaining, content sharing (Godwin, 2008; Kaplan & Haenlein, 2010), and gathering news information (Mitra, 2017). Approximately 68 percent of U.S. adults used social media to get news at least occasionally, and 20 percent frequently used social media to get news in 2018 (Matsa & Shearer, 2018). It is worth noting that social media surpassed print newspapers as a source of news for the first time in 2017 (Shearer, 2018).

Among U.S. adults who obtained news from social media in 2018, 43 percent received the news via Facebook, 21 percent received the news via YouTube, and 12 percent received the news via Twitter (Matsa & Shearer, 2018). Examining social media as a source of public opinion-shaping is critical because the information and knowledge gained from social media platforms influence users' opinions of and attitudes toward social issues.

Social Media as Computer-Mediated Communication

Key features of general computer-mediated (digital media, interchangeably) communication should be discussed first to build a useful foundation for exploring social media. Social media fall in the broader digital media category. Specifically, social media communication shares common characteristics with general digital media and differs from FtF communications in several ways (McKenna & Bargh, 2000). First, social interactions give the interacting participants greater control over the timings of interactions (Abrams, 2003; McKenna & Bargh, 2000). Individuals can take as much time as they want to create their messages, and it is up to them to decide the timing of the message posting. Second, message receivers can choose when to interact with the messages delivered via social media. The literature suggests that one of the salient features of digital media communication is that the participants who interact online are more likely to have unbiased or less biased interactions because it is more difficult to identify one's ethnic or racial background (Okdie & Guadagno, 2008).

Third, as with digital media, physical proximity is not a barrier in social media. As long as individuals have mobile devices and Internet connections, they can communicate regardless of geographic placements or constraints (McKenna & Bargh, 2000). The reduced importance of physical proximity allows individuals to build and maintain social networks globally. Overall, 3.48 billion people were active on social media in 2019, accounting for about 45% of the global population (Kemp, 2019). This also explains why social networks, such as Facebook, Twitter, and WhatsApp, have seamless global brand images and provide consistent brand utilities to users and advertisers globally.

Finally, social media provides participants with relatively more anonymous communication environments (McKenna & Bargh, 2000; Qian & Scott, 2007) because people can post on the web using pseudonyms or online usernames. Users can choose the level of anonymity they prefer when creating online profiles or posting on various social networks. Some popular social networking websites, such as Instagram and Twitter, allow users to write postings without revealing their real names. In addition, a significant number of accounts on almost all social media are being created under fake names (Allcott & Gentzkow, 2017; Kelly, 2012).

Social Media and Algorithmic Content Suggestions

While social media share similarities with general digital media, differences in algorithmic content suggestions are notable. Above all, the manifestation of *fear of isolation* is distinct between social networks with weak ties and those with strong ties. While some level of anonymity may generally reduce fear of isolation and enhance willingness to speak out in the context of weaker ties (e.g., discussion boards or comment pages), social networks with stronger ties will impose social pressure on users, which will enhance fear of isolation and reduce willingness to speak out. This suggests that generalizing the role of anonymity across all social media types may lead to an inaccurate understanding. For instance, the weak tie social media may offer some anonymity, whereas the strong tie social media may show attenuated anonymity and therefore show the spiral of silence pattern similar or stronger compared to that of the traditional mass media because the strong ties are based on social relationships offline that are equivalent to FtF relationships. We believe that the content suggestions based on the weak ties will allow people to express their opinions more freely, while suggestions based on the strong ties will make people hesitant to express their opinions due to fear of isolation.

In addition, the direction of the spiral may change according to content suggestion algorithms, turning in an opposite direction at some point. When people's quasi-statistical sense

of the majority opinion is based on mass media news, such as television and newspapers, the mass audience is more likely to advocate an issue that receives the most media coverage. In contrast, social media's algorithmic content suggestions can intensify a quasi-statistical sense of a minority's opinion based on fewer strong ties rather than many weak ties.

Most social media have similar content suggestion algorithms even if they constantly alter them. The criteria include the level of engagement that page and post have received, the performance of each post among users who have already viewed it, and the frequency with which users interact with the post, among others (Agrawal, 2016). Social media algorithms aim to show users relevant content beyond views and reach. Given this, it is speculated that users are more likely to be exposed to content from strong ties compared to weak ties. Hence, the algorithmic content suggestions will influence people's perception of opinion climates (Woolley & Howard, 2016). This opens a possibility that when an individual's social media contains a minority's opinion from strong ties, the opinion spiral will change the direction. Behavior-based algorithmic content suggestions continuously re-circulate similar and relevant content to a certain group.

Increased Anonymity of Social Media and Its Influences on Fear of Isolation

Spiral of silence posits that individuals tend to hide perceived minority opinions on various subjects because they fear isolation from their social relationships (Noelle-Neumann, 1974; 1993). Motivation research explains that people fear isolation because they have an intrinsic *need for affiliation*, i.e., one's "need to be with people" (McClelland, 1987). The *need for affiliation* is one of the reasons why people participate in activities like online chatting (Zinkhan, Kwak, Morrison, & Peters, 2003) and building websites (Zinkhan, Conchar, Gupta, & Geissler, 1999). The use of social media enables people to communicate with one another and have a social presence, thereby satisfying their *needs for affiliation, love, and belonging*. People use social media to strengthen and maintain offline social networks and expand their social networks by building new relationships online.

However, research has found that relationships built on the Internet may not be as robust as relationships and friendships built offline, which are often a part of extended social networks (Mesch & Talmud, 2006). Relationships tend to be weaker when one's online social networks consist more of 'translocal' or 'transnational' social networks and less of 'core' social networks (Kraemer, 2014); 'translocal' or 'transnational' online relations can be easily abandoned by deleting social media accounts or blocking online 'friends.'

Social media provide individuals with more anonymous environments to communicate compared to FtF communications (McKenna & Bargh, 2000; Qian & Scott, 2007). Since social ties online are weaker compared to traditional offline social networks (Kraemer, 2014; Mesch & Talmud, 2006), people will be less concerned about the *fear of social isolation* in an online environment compared to the offline contexts (Gearhart & Zhang, 2018; McKenna & Bargh, 2000; Shim & Oh, 2018). Perceptions of anonymity have been correlated with open expression in the online context (Fox & Holt, 2018; Suler, 2004). This suggests that the anonymous nature of social media may reduce fear of isolation and enhance willingness to speak out on public issues. We discuss this in more detail in the following section.

The Reduced Fear of Isolation Online and Willingness to Speak Out

People are less likely to express their opinions when they believe their views on a public issue are incongruent with the perceived majority's opinions because they fear isolation from their

communities and social groups (Glynn & Huges, 2014). This SoS tenet posits that the degree of *willingness to speak out* decreases when the *fear of isolation* increases in various digital communication platforms. When individuals hold views on a public issue that are incongruent with the perceived majority opinions, their *willingness to speak out* on that issue decreases (e.g., Askay, 2015; Liu & Fahmy, 2011; McDevitt et al., 2003; Neubaum & Krämer, 2018; Yun & Park, 2011).

Each social media platform may lead the users to experience different levels of *fear of isolation* and exhibit different degrees of *willingness to speak out* (Godwin, 2008; Kaplan & Haenlein, 2010). Each social media platform entails different communication purposes. For example, YouTube allows users to share video content, Wikipedia permits editors to build knowledge collaboratively, and Facebook helps users build and maintain social networks. In addition, users of Novni.com, an application designed to help users release stress by writing on the Web anonymously, may experience very low levels of *fear of isolation* when using the platform due to the inherent anonymity, and thus people may be more *willing to speak out* even when their views reflect those of the minority. On the other hand, users of Facebook may experience relatively higher levels of *fear of isolation* and thus may be less *willing to speak out*. People use Facebook to maintain their offline social networks and post content easily linked to its poster/author (Chan, 2018; Hampton, Goulet, Rainie, & Purcell, 2011). Literature finds that when users of Facebook are exposed to politically incongruent messages on the platform, they are less likely to express their opinions (Kim, 2016). In addition, this reluctance also extends to “click speech,” which refers to ‘liking,’ ‘commenting,’ or ‘sharing’ the posts (Pang et al., 2016, p. 898). People may remain silent on some forms of social media, such as YouTube, LinkedIn, and Twitter, because of the lack of anonymity afforded on these platforms. Many sites require users to provide usernames, contact information, and in some cases, profile photographs (Hampton, Shin, & Lu, 2017).

Some social media platforms, like Instagram and Twitter, offer users “verified accounts,” making anonymity even more difficult to achieve. The degree of *willingness to speak out* may also differ for synchronous social media (e.g., online chatting, web conferencing). When individuals are engaged in synchronous social media, they are more inclined to censor/moderate their opinions (McDevitt et al., 2003). McDevitt et al. (2003) called this phenomenon ‘spiral of moderated opinion expression’ and argued that individuals moderate their opinions regardless of their perceived climate of opinions because people tend to ‘self-limit’ themselves when expressing opinions to avoid offending or hurting others’ feelings (Steen-Johnsen & Enjolras, 2016). Interestingly, a ‘spiral of moderated opinion expression’ was found even when they were informed that they were majority opinion holders (McDevitt et al., 2003). Based on the prior discussion, we developed three propositions. Two propositions pertain to the general social media context in terms of the major constructs of SoS and anonymity, while the third addresses social ties. We believe researchers can choose to operationalize the strength of social ties by either manipulation or measurement:

P1. As perceived anonymity increases, individuals’ perceived fear of isolation on social media decreases.

P2. As perceived fear of isolation on social media decreases, individuals’ willingness to speak out increases.

P3. (a) Perceived anonymity is higher, (b) fear of isolation is greater, and (c) willingness to speak out is lower on social media with strong ties than social media with weak ties.

Social Media's Suggested Contents and a Quasi-Statistical Sense

SoS postulates that individuals continually gauge opinion climates in and around their environments to stay informed about public issues. They do so directly by observing others and indirectly by consuming mass media. The theory posits that people have an intrinsic capability of evaluating the prevailing opinions, a so-called *quasi-statistical sense* (Noelle-Neumann, 1974; 1993). However, researchers have questioned whether one's *quasi-statistical sense* can accurately reflect opinion climates in all situations (Abril & Rojas, 2018).

Several studies have identified factors that may influence one's *quasi-statistical sense* (e.g., Fields & Schuman, 1976; Kennamer, 1990; Neuwirth, 2000; Shamir & Shamir, 1997; Taylor, 1982). This stream of research shows that people's quasi-statistical sense could be biased and distorted due to various information sources. First, people tend to value the opinions of their close social groups (such as local communities) rather than distant social groups (Lin & Salwen, 1997; Neuwirth, 2000). Therefore, individuals may not accurately evaluate the majority opinion on public issues. This may be evident when the majority members of smaller social groups exhibit opinions that are different from or contrary to the opinions supported by the majority members of a bigger community.

Second, the "pluralistic ignorance" research notes that one's perceived climate of opinion may not follow the direction of the actual public opinion (Fields & Schuman, 1976; Shamir & Shamir, 1997; Taylor, 1982). The main reason for such discrepancy is that humans are intrinsically not "perfectly adequate information processors" and may be exposed to numerous "error-prone messages from the environment" (Shamir & Shamir, 1997, p. 229). In this process, information that is not representative of the public opinion could deteriorate the biased judgment. Social media that provide information from similar or like-minded networks may exacerbate this biased information processing. This is more observable when only a few members of one's social group express opinions on a given social issue, as chances of pluralistic ignorance (i.e., "erroneous cognitive beliefs shared by two or more individuals about the ideas, feelings, and actions of others," O'Gorman, 1986, p. 333) would be greater (Fields & Schuman, 1976; Tannenbaum, 1966). A situation could occur in which many people assume incorrectly that most others accept a norm, even though they may privately reject it or doubt it.

Third, when news media pay more attention only to some social issues, individuals may perceive the public opinion on a social issue not covered in the media incorrectly because of the lack the opportunities to learn about the opinions of others on that particular social issue (Neuwirth, 2000). Social media users who repeatedly exposed to opinions promoted by the media might adjust their views on a public issue (Goffman, 1974; Scheufele, 1999). When people make decisions, they are likely to use more readily available information rather than search for information using more cumbersome methods (O'Guinn, Allen, Close Scheinbaum, & Semenik, 2018).

Social media use programmed algorithms to show postings with similar content to users with similar interests (Hampton et al., 2017). For example, Facebook displays political information from Facebook "friends" who may have similar perspectives (Bakshy, Messing, & Adamic, 2015), Twitter places relevant tweets in one's feed based on the users' interaction history (Warner, 2018), and YouTube displays videos based on topic relevance, a user's watch history, and channel subscriptions (YouTube Creators, 2017). In sum, social media's algorithmic content suggestions influence a quasi-statistical sense of public opinion climate, unlike the mass media context. Given this, it is worth noting how social media's content re-distribution mechanisms reinforce individuals' opinions.

Social Media's Algorithmic Content Suggestions and Opinion Reinforcement

We discussed the major constructs and tenets of SoS in the context of social media, focusing on how the theory applies in the era of algorithmic content suggestion. Social media involve different mechanisms in forming public opinion compared to traditional mass media; therefore, it is important to re-evaluate the major premises of SoS. The social media algorithms suggest relevant content based on users' prior online behavior history and communication with like-minded individuals on their social networks; therefore, the suggested content may reinforce a public opinion.

News searching or sharing may lead to content suggestions that redistribute relevant information to individuals' online social networks (Wang, Hmielowski, Hutchens, & Beam, 2017), reinforcing their existing viewpoints. Researchers have emphasized the value of people's social networks relative to the spiral of silence process (Moy & Hussain, 2014). People exposed to opinions congruent with their views are likely to perceive that their opinions are aligned with those of the majority.

Media theorists claim that people seek information compatible with their own opinions while avoiding or rejecting other opinions (Chaffee & Miyo, 1983). Based on this, the algorithm-based content may reinforce individuals' pre-existing opinions. Social media users may believe that the suggested content reflects the majority's opinion on the public issues, as content automation dictates a quasi-statistical sense of a public opinion climate. A notable aspect of this process is what we coin as *an agent of control* of content exposure. While prior reinforcement theory explains that people selectively and purposefully choose preferred information depending on their pre-existing opinions in the mass media context (Hart et al., 2009), the center of information control has shifted to the automated algorithms on social media. The control agent of content exposure is more external in social media rather than internal.

Given this, opinions may be formed by combining the existing opinions and reinforcing algorithm-based content on social media. Several drivers of this process should be mentioned. First, individuals like to build relations with like-minded people with similar beliefs, values, and worldviews on various social issues (Himmelboim, McCreery, & Smith, 2013; Sunstein, 2008). Individuals tend to feel comfortable in "opinion silos" (Hampton et al., 2017). Therefore, information from their social networks may affect their social judgment. Second, it has been assumed that individuals choose to follow partisan media, which deliver information congruent with their stances on social issues (Dvir-Gvirsman, Garrett, & Tsfati, 2018; Tsfati et al., 2014). People try to find information that supports and corresponds with their predisposed ideas to reduce cognitive dissonance (a mental discomfort an individual experiences when having two opposing ideas) and reaffirm their existing predispositions (e.g., Festinger, 1957). They feel comfortable when their current views on a certain issue are congruent with their past views on that issue. According to Samuelson and Zeckhauser (1988), people tend to choose a status quo alternative (i.e., "doing nothing or maintaining one's current or previous decision") when making certain decisions (i.e., *status quo bias*, p. 7). These theoretical premises seem to work today, especially since social media's algorithm-based suggestions are already aligned with their views because they are based on their prior behavioral history. This applies to partisan media as well. Finally, when the subject of the social issue is personally relevant to an individual, that individual may choose a side and consolidate his/her views to benefit his/her self-interests (DiMaggio, Evans, & Bryson, 1996; Hart, Feldman, Leiserowitz, & Maibach, 2015). Compared to the mass media information determined by journalistic gatekeepers, social media information comes from individuals' networks. Such information may be more personally relevant and socially close. The influence of public opinion has shifted from elite journalists to social networks that are more likely to reinforce one's opinion.

According to Sunstein (2006), “if someone agrees with you, ... this imposes a lot of pressure on people with inconsistent with the group’s consensus” (p. 68). The suggested algorithm-based content on social media may serve as social support. Social media users will look for more information to confirm their views and obtain social approval, a phenomenon called *confirmation bias* (Mercier & Landemore, 2012). While information from different opinion holders is less likely to influence social media users’ quasi-statistical sense of the majority’s opinion, repeated exposure to social media’s suggested content based on prior consumption behavior shapes the users’ quasi-statistical sense of the majority opinion. While spiral of silence theory addresses the traditional mass media’s social control of public opinion, the new media technology presents diversified media effects through the reinforcement process rather than central social control.

In short, social media play a vital role in fueling and reaffirming opinion reinforcement. Social media platforms use sophisticated algorithms to personalize the experience of users, which leads to opinion reinforcement. For example, Google’s personalized search feature and Facebook’s algorithms applied to users’ news feeds promote preferred content while eliminating less preferred information, further strengthening opinion reinforcement, which is known as the “filter bubble” (Flaxman, Goel, & Rao, 2016; Pariser, 2011). This selective sharing and exposure to one’s preferred information among like-minded individuals may overemphasize biased information while downplaying or even rejecting counterarguments (Chan & Fu, 2017). Previous research has found a positive relationship between online reinforcement and the frequency of information shared between like-minded people (Conover et al., 2021; Gruzd & Roy, 2014), called “echo chambers” (Bakshy et al., 2015; Flaxman et al., 2016).

Based on the literature review, it is evident that social media reinforce opinions. Research has found that individuals use social media to validate their predispositions and communicate those opinions with like-minded individuals in their social networks (Tsfati et al., 2014). However, the knowledge of the relationship between social media content suggestions and the degree of opinion reinforcement is limited.

We conceive that reinforcement may occur through the mechanisms of a quasi-statistical sense, fear of isolation, and willingness to speak out. Reproduced algorithm-based content suggestions on social media may lead users to perceive that their opinions on social issues reflect the majority’s opinion through a quasi-statistical sense mechanism, which will diminish fear of isolation, as users are selectively exposed to similar opinions through the *filter bubble*. The reduced fear of isolation may increase the users’ willingness to speak out on social media. Over time, this circular process reinforces their opinions through the *echo chambers* mechanism. Long-term exposure to supportive content may lead people to hold rigid perspectives. Research shows that supportive information is associated with a biased perception of the opinion climate (Tsfati et al., 2014). People may overestimate social support for their views (Dvir-Gvirsmann, 2015). This also suggests that among the like-minded individuals on social media (e.g., strong ties), the homogeneity of public opinion will be stronger than among different groups of people (e.g., weak ties). Based on the literature and our conceptualization, we proposed the following propositions:

P4. Social media’s algorithmic content suggestions enhance users’ quasi-statistical sense of their own opinions reflecting the majority’s opinions, reduce fear of isolation, and increase willingness to speak out on social media. That is, with the increased use of social media, (a) users increasingly perceive their own opinions as the majority’s opinions, (b) perceived fear of isolation decreases, and (c) willingness to speak out on public issues on social media will increase.

Discussion

The spiral of silence theory is one of the seminal works in journalism and mass communication scholarship. Katz (1983) noted that the theory integrates public opinion theory and mass communication research, two disconnected fields (as cited in Kenamer, 1990, p. 395). The current study re-examined Noelle-Neumann's (1974; 1993) spiral of silence theory in the context of social media. Critics point out that the theory in its original form may have little predictive power in the emerging media landscape (Metzger, 2009). Prior studies on the theory in digital communication contexts have underexplored the algorithmic content suggestion mechanism. This study extends the scope of the spiral of silence theory by re-conceptualizing its major constructs and tenets in relation to social media's algorithmic content suggestions. In addition, we add to the literature by discussing how content automation can result in opinion reinforcement through the SoS constructs.

With the rapid growth of social media, we have witnessed a change in the way people consume and communicate information with each other at a societal level. Social media are omnipresent today, and their effects are undeniable. It is imperative to understand the formation of public opinion on social media as a rising source of news information in the contemporary media environment. Bialik (2018) found that 14 percent of Americans admitted to changing their mind about an issue because of something they saw on social media. The current study is focused on providing conceptual guidance to researchers, policymakers, and practitioners by integrating relevant literature and suggesting new propositions for the major constructs of SoS in the changing media landscape.

Due to the expanding role of social media in everyday lives, culture, and communication discourse, it is important to re-direct this seemingly strong power for the betterment of society. Social media could use algorithms to provide users with socially uncontrolled information and suggestions. The literature suggests that individuals continually evaluate public opinion on social media because they fear isolation (Neubaum & Krämer, 2017). Combined with the fact that people change their minds based on their exposure to views on social media (Bialik, 2018), reduced *fear of isolation* can encourage more diversified discussions to alleviate opinion control between the majority and minority opinions in society.

However, social media content automation is a double-edged sword. Since algorithmic mechanisms govern the message flow, news media and journalists need to be mindful and present supporting and opposing reactions to their news stories on their social media. Social media content users should also be alert that social media select information to be relevant and engaging based on consumers' prior media use behavior. While it provides tailored content, it could deprive users of an opportunity to consider various opinions in society. The abovementioned propositions provide important directions for future research on one of the most important theories of mediated communication (i.e., SoS), as the theory needs to evolve to account for the emerging and changing media landscape. The amalgamation of human communication with technological advances, like artificial intelligence (AI) and content management algorithms, has created an entirely new field of research in mediated communications. This conceptual paper suggests several important propositions researchers can test empirically. We did not recommend specific approaches to operationalize the major constructs in each proposition, as we believe the tasks cannot be generalized across each research context, purpose, and media platform. We suggest that researchers consider applying the current paper's conceptual propositions to their research. While the conceptual constructs in our paper provide guidance, individual researchers can operationalize these concepts based on their unique research goals.

Additionally, this paper expands the scope of SoS by discussing its relationship with opinion reinforcement in the context of the three major constructs of the theory. Opinion

reinforcement can be both the predictor and outcome of content automation as users choose content based on their preferences, which fuels the process of relevant content redistribution on social media. However, we do not position opinion reinforcement as an automatic outcome of the spiral of silence. The process of algorithmic content suggestions leads to reinforcement through reduced fear of isolation, increased quasi-statistical sense, and enhanced willingness to speak out. However, we discussed social ties as a potential moderator of the predictions.

Finally, as with other mass media theories, SoS has also been criticized for its lack of explanations of individuals' characteristics and the movement in the spiral over time. Various methodological approaches can address such limitations. Revisiting SoS sheds new light on our understanding of public opinion shaping. More empirical research is warranted to address our and various other intriguing propositions.

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