Why we find little evidence of digital fragmentation, but should not stop researching it
Mahrt, Merja

Why we find little evidence of digital fragmentation, but should not stop researching it

Merja Mahrt

Heinrich-Heine-Universität Düsseldorf

Zusammenfassung

Während Massenmedien üblicherweise integratives Potenzial zugeschrieben wird, wird dem Internet eher eine schädliche Wirkung auf den gesellschaftlichen Zusammenhalt unterstellt. Entsprechende Metaphern zu „Filterblasen" und „Echokammern" haben inzwischen auch in den öffentlichen Diskurs Einzug gehalten. Studien, die entsprechende Wirkungen einer digitalen Fragmentierung nachweisen, sind allerdings bisher eher selten. Der empirische Forschungsstand stützt Befürchtungen zu einem deutlichen Verlust an gesellschaftlichem Zusammenhalt durch das Internet somit nicht. Allerdings gibt es bei Extremgruppen am politischen Rand Anzeichen für digitale Fragmentierung. Angesichts des heterogenen Forschungsstands systematisiert der Beitrag theoretische Annahmen und empirische Befunde und argumentiert, dass die Erfassung digitaler Fragmentierung und ihrer Wirkungen weiter notwendig ist.

Keywords: Integration, Fragmentierung, Polarisierung, Filterblase, Echokammer

Summary

While mass media are generally ascribed integrative potential, scholars assume negative effects on social cohesion for the Internet. Respective metaphors such as "filter bubbles" and "echo chambers" have meanwhile found their way into public discourse. However, empirical research that documents detrimental effects of digital fragmentation remains the exception. The state of research thus does not support fears about a stark loss of social cohesion due to the Internet. Yet there are groups on the fringe of the political spectrum that appear to be digitally fragmented. Given these heterogeneous results, the article systematizes theoretical assumptions and empirical findings and argues that it remains necessary to assess the extent and effects of digital fragmentation.

Keywords: integration, fragmentation, polarization, filter bubble, echo chamber

Introduction

Why do we keep discussing filter bubbles, echo chambers, and similar concepts? Kelly Garrett, associate professor at the Ohio State University, asked this question in reaction to a sessionon on digital fragmentation at the 2017 meeting of the International Communication Association. As other already existing research, the presentations, including my own, had shown little evidence of digital fragmentation, prompting Garrett's somewhat provocative question. Two years later, filter bubbles and echo chambers are still present in public discourse as well as academic literature. Some conclude that we should abandon these terms, because they are ill-defined in the first place and hardly supported by empirical results (Bruns, 2019). Others underline their earlier warnings of online echo chambers (Sunstein, 2018). We are apparently not through with the discussion yet, and I want to argue that this is for just cause. In this review, I will address the thin evidence for digital fragmentation effects, but highlight their relevance even if digital fragmentation appears not to be a dominant pattern affecting all parts of a given society. The present article is therefore not only an (albeit belated) answer to Garrett's question, but additionally attempts to systematize the types of research undertaken on digital fragmentation. This should not only explain the so-far meager evidence of fragmentation effects, but also outline avenues for future research.

Integrative media effects and digital fragmentation

Before I come to echo chambers and filter bubbles specifically, a brief overview of why and how these concepts are investigated is important. Digital fragmentation, under whatever catchy name, is discussed with regard to the role that media play for the integration of individuals and societies. McQuail (2005) summarizes that traditional mass media have long been considered as ambivalent forces in increasing or de-creasing social cohesion: Media can bring large audiences together and create or support solidarity, but such a "centripetal effect" (p. 90) can also lead to uniformity and social control if it is overdone. One the other hand, diversification of media can have "centrifugal effects" whose positive outcomes can be liberation and mobility (p. 90). A more pessimistic view of such effects focuses instead on individual isolation in a fragmented society and the loss of norms.

Accordingly, research into integrative and disintegrative media effects has a long and multifaceted tradition. And changes in the media system have brought about discussions and research on a loss of (positive) integrative effects before the current debate about digital media. Potential negative effects of audience fragmentation were reviewed in depth in many countries following the introduction of multichannel television in the 1980s and 1990s (e.g., Hasebrink, 1997; E. Katz, 1996; W. A. Katz, 1982; Youn, 1994). This discussion, however, pales in comparison to the one that began shortly afterwards and was concerned with digital media and the Internet.

Webster (2014) lists a number of metaphors that different authors have coined to describe a potential digital fragmentation, starting in the second half of the 1990s: "*gated communities*, *sphericules*, *silos*, *echo chambers*, *cyber-Balkans*, *red media–blue media*, or *filter bubbles*" (p. 19; original emphasis). The respective writers see different reasons for a loss of integration due to the Internet, digital media, and their use (a more extensive discussion is provided in Mahrt, 2019). In short, these have to do with a) the much larger offering of online content compared to traditional media. This b) allows users to be much more selective when choosing media or specific content. They could therefore use more or exclusively content that is in line with their interests or worldviews and might avoid other topics or opinions. In the same vein, they may prefer to connect online with people who share their interests and opinions, a tendency called homophily (Goel, Mason, & Watts, 2010). Combined, the quasi infinite amount of online content options as well as people's tendency to prefer like-minded messages and people lead to the creation of echo chambers (Sunstein, 2018). Such behavior could c) be reinforced by the technical structures of digital platforms, whose algorithms are often programmed to offer users similar content to what they have previously used. So if a platform learns, through cookies or because a user signed in, that this person has a preference for one type of content, matching offerings may be displayed more prominently as suggestions for further use. This forms the basis of the filter bubble hypothesis (Pariser, 2011).

Digital fragmentation may therefore take different shapes and be driven by a combination of factors. There is no consensus about what the term means or at what point a significant, let alone socially detrimental level of fragmentation is reached. Fragmentation can

refer to the proliferation of content, a more selective and homophilic usage behavior, as well as customization through algorithms. The focus in this article, however, will be on *effects* that fragmented media use through these different avenues may have on individuals or societies.

All of the metaphorical terms for digital fragmentation hold strong reservations about the effects of the increase in content options, the potential for selectivity, and the curation of content through customizing algorithms. Positive integrative media functions, for example sharing an agenda of the most relevant issues a society faces (a well-established centripetal media effect; McCombs & Reynolds, 2009), could be diminished if traditional outlets are increasingly replaced by digital offerings. That the amount of available content has risen and accessing different types of content has become easier with the Internet is undeniable. Likewise, the popularity of online content is clearly unevenly distributed, with only few items being used by a large audience and popularity quickly dropping. Online audiences are thus spread out across a very large number of outlets (Anderson, 2006; Webster, 2014). Yet these developments in online offerings and use have not led to clear-cut findings about harmful effects for the integration of societies, as Garrett pointed out with his question. There are, however, different reasons for this, as research into actual fragmentizing effects of digital media show.

Research on the integrative effect of digital media

Studies into the effect of a larger digital media offering, more selective online media use, and algorithmic customization examine different aspects of the issue and employ different methods. This partly explains the heterogeneous state of the field and some of the rather small effects that scholars have found. In the following, I will discuss the pertinent research on actual *effects* of digital fragmentation grouped by the dimensions they consider, as either dependent or independent variables.

Conversations

As mentioned above, that people talk about topics from the media can have integrative effects through agenda setting. But also more generally, conversations with other people about media or their content are a social activity, which is assumed to help bring people together (Friedland, 2001; Vlasic, 2004). Interpersonal communication has thus been used as an indicator of integrative media effects before, yet with mixed results. When more television channels become available, for example, this does not strongly affect the frequency of TV-related conversations (Handel, 2000), and viewers' perception of the medium as helpful for interpersonal communication may even increase (Holtz-Bacha & Peiser, 1999).

It is therefore hardly surprising that studies on the effect of the Internet through conversations as a dependent variable do not find strong effects either. Comparing different points in times when Internet penetration was low, intermediate, and high, respectively, does not reveal large differences in the frequency with which people talk about media (Gehrau, 2019; Gehrau & Goertz, 2010). Even when many people use the Internet throughout the day via smartphones, they still regularly engage with others in conversations, despite the diversity of accessible online content and possibilities for individual selection.

Other studies have looked at outcomes of conversations rather than their mere occurrence. The number of issues people find important as well as the level of overlap between these agendas have been considered. But again, there are only slight differences over time while the digital media offering grew larger and increasingly complemented or even replaced other forms of media use. Slightly more topics are named by respondents as important issues (Gehrau, 2013; Haas & Brosius, 2013; Lee, 2009), but there is still a high level of overlap between individual agendas (Gehrau, 2013, 2019).

The limited results when looking for digital fragmentation effects via conversations and agendas may have different reasons (Mahrt, 2019). A central limitation of most studies is that they consider the relationship between digital media and the respective dependent variables very roughly. They investigate the number of issues respondents name on the aggregate level and relate it, e.g., to the penetration rate of the Internet or smartphones at different points in time. However, the penetration rate of the Internet in a society in general may be only slightly related to the number of conversations people have with others or the kinds of issues they see as important. Individual differences in digital media use or received content are not taken into account in the cited studies, which look at aggregated phenomena across time instead.

Use of social network sites (SNS), its antecedents, and effects

A second important field of research investigates potential fragmentizing effects within social network sites. These are highly popular among Internet users in many countries, help to distribute content from a vast array of sources, and can be potentially customized in two ways: SNS users typically follow, subscribe to, or otherwise connect with other accounts so that their own timeline or newsfeed within the platform is individually curated in accordance with their choices. In addition, platforms select and rank which postings from others to display to each user and in which order. How SNS use affects, for example, the agenda-setting function of media is therefore analyzed in a number of studies.

Two such studies (Mahrt, 2019; Wells & Thorson, 2017) use knowledge about current political events as an indicator of potentially integrative or fragmentizing effects, while SNS use serves as an independent variable. However, the knowledge about current events among Facebook users is not affected by how many news-related posts appear in someone's timeline, how many contacts ("friends") they have on Facebook, or whether or not they customize their timeline to fit personal preferences. Instead, the by-far largest effects on knowledge about current affairs comes back to gender (men enjoying higher knowledge) and a high interest in news (Wells & Thorson, 2017). Similarly, a study on how many recent news items media users recognize reveals political interest as well as general media use, especially that of printed newspapers, as important predictors (Mahrt, 2019). These studies thus confirm that long-standing findings on news use still hold true in the online era, but do not show relevant effects of SNS use—at least not while people continue to use many other media as well.

Other studies focus less on individual characteristics and general media use of SNS users, but investigate the effects of a more or less homophilic network of contacts on such platforms. The users' choices about whom to "friend" on Facebook determine to a considerable degree what they see in their newsfeed (Bakshy, Messing, & Adamic, 2015), and scholars have analyzed whether SNS tend to diversify or limit with what news users come into contact and what consequences this yields. Baek, Jeong, and Rhee (2015) find a fragmentizing effect of SNS use: The relatively homogenous contact networks within SNS increase users' skepticism against election polls that

do not match their own opinion. This could be an illustration of the echo chamber metaphor: predominantly seeing an echo of one's own opinion online, due to being surrounded by like-minded contacts that insulate against opinion-challenging information.

On the other hand, Kim and colleagues (Kim, 2011; Kim, Hsu, & Gil de Zúñiga, 2013; Lee, Choi, Kim, & Kim, 2014) find that contact networks on SNS tend to be heterogeneous, which increases the diversity of perceived issues. SNS use could therefore result in less fragmentation, because it should create more overlap between the content that different users view. Their agenda could thus be broadened beyond their personal interests (see also Fletcher & Nielsen, 2018).

In sum, the role of SNS in digital fragmentation appears to be complex, and many factors regarding users' characteristics, preferences, and usage behavior need to be taken into account to properly assess their effect. A study on Facebook by Stark, Magin, and Jürgens (2017) takes on exactly this endeavor. It considers, among others, characteristics of users (e.g., political interest and personality traits), news media use including, but also beyond SNS, and the size and structure of contact networks on Facebook. The scholars investigate how issue and opinion perception, but also the propensity to express one's own opinion are affected by individual traits, media use, and SNS-related behavior. The results turn out very nuanced: Some aspects of Facebook use are related to some of the dependent variables. Use of Facebook overall, for instance, does not make a difference for the number of current issues people find important (p. 136). However, using Facebook specifically for information (alongside other news sources) increases users' perception of being well-informed. At the same time, this perception is strongly affected by political interest, personality traits (such as duty to keep informed and personality strength), age, and gender as well (p. 143). The authors stress that simply looking at frequency of Facebook use overestimates the platform's impact on issue perception and other potential outcomes and that many other factors need to be considered in conjunction with SNS usage. These results also confirm long-standing findings about the importance of political interest and general orientation towards information for news use. SNS can be employed to access news as well, of course, if the users choose to do so. The study thus serves as a reminder that SNS are, in a sense, just an information source like others. It also shows that? SNS use is connected in complex

ways to users' characteristics as well as their everyday information routines overall. This limits the possibility of discovering strong fragmentizing effects through studying Facebook use alone.

Polarization, a special case of fragmentation

In the US-American context, fragmentation between the two major political camps, Republicans and Democrats, is of special interest to research. This is not exclusive to digital media and their use, as "red media" (Republican-leaning) and "blue media" (Democrat-leaning) exist in other sectors of the media system as well (Hollander, 2008; Iyengar & Hahn, 2009). This type of fragmentation is often discussed under the term polarization, and scholars investigate how the Internet affects cleavages between partisan groups. (The current review focuses on the discussion of polarization due to digital media in the field of media and communication. The concept is used in different ways in other disciplines as well. For this broader discussion, see Bramson et al., 2017, as well as Rau and Stier, 2019.)

Tewksbury and Riles (2015) find that high Internet use slightly increases differences in opinions between people leaning toward one of the two major parties. The authors stress, however, that the effect is only slight and that many other factors influence people's attitudes in a much more clear-cut way. This appears to be in line with results from research summarized in the previous section that revealed the relatively small contribution of SNS use to fragmentizing effects.

Other studies investigating polarization take into account the role of algorithmic customization, and thus the idea of filter bubbles (Pariser, 2011). Guess (2018) investigates news items people used digitally, which could potentially be fragmentized by their interests as well as algorithms that propose individually tailored selections of available content. He finds that the media choices of partisans of both parties as well as those of independents largely overlap. Only few users with strong party identification show a clear-cut preference for ideologically slanted news.

Similar findings are observed in an analysis of which media and political accounts Twitter users subscribe to ("follow") as a function of their own political orientation (Eady, Nagler, Guess, Zilinsky, & Tucker, 2019). Overlap is again the predominant pattern, with many Twitter users, especially conservatives, even following a considerable number of media that oppose their own political orientation.

What follows from such opinion-challenging digital media use, however, is not investigated in this broad analysis of Twitter users. Experimental research shows that repeatedly exposing people to attitude-inconsistent tweets may lead to reactance, as Republican-leaning participants hold more conservative views over time (Bail et al., 2018). Simply observing the amount of cross-cutting media exposure is therefore not an appropriate test of fragmentation *effects*.

Discussion and avenues for future research

The brief overview presented above shows that the literature on digital fragmentation has many strands. Different methodological approaches are adopted, with differing and sometimes contradictory results, and even definitions of fragmentation (or polarization) may diverge. A number of scholars have therefore concluded that fears about digital fragmentation are exaggerated or, at least currently, unwarranted (e.g., Bruns, 2019; Garrett, 2017; Guess, 2018; Riles, Pilny, & Tewksbury, 2018; Webster & Ksiazek, 2012). People still talk to one another, many use SNS in a way that brings them into contact with a wider, rather than narrower range of content and people, and political partisanship does mostly not lead to highly fragmented use of digital media. Additionally, studies show that political interest is still a major factor in explaining how much people learn about current issues. Not only those with high interest still use other news sources, such as newspapers or television, and do not solely rely on SNS for information about current events.

A simple metaphor such as "filter bubble" or "echo chamber" can hardly capture all of these different aspects. As Webster (2014, p. 2) states, "most writers want to tell a memorable story," and a catchy name for a concept (and matching book title) may help to achieve this goal. The discussion about digital fragmentation would benefit greatly from a calmer and more serene examination of the actual evidence and the *different* mechanisms of fragmentation potentially at work.

If one wants to investigate fragmentation as a social phenomenon, this should not be limited to just digital media use, let alone one digital platform. It also seems advisable to consider the characteristics of users in more detail, especially their interest in politics and overall media use about current affairs. This makes the

study much more complex, and given the limited effects of digital media or SNS use in analyses that consider at least a few of these variables (e.g., Mahrt, 2019; Stark et al., 2017), it does not seem to be a way to find clear-cut evidence for the existence of fragmentation *effects*.

There is, however, one area in fragmentation research that deserves more attention. A few studies show that people at the fringe of the political spectrum may indeed have a preference for opinion-affirming online content and avoid cross-cutting exposure (Eady et al., 2019; Guess, 2018). These hyperpartisan groups are small—but radical groups may still be important, especially if they find like-minded individuals beyond a mere handful. They may, for example, actively choose to only see what confirms their worldviews, not shy away from using and sharing half-truths, and become more entrenched in their convictions over time. For such groups or their individual members, digital media offer much better opportunities for these types of behaviors than traditional media environments. Thus, digital fragmentation may not be a dominant phenomenon that describes the entire population's media use (Bruns, 2019). Instead, groups on the margins may decide more or less consciously to uncouple from the mainstream of society. Understanding such behavior and the role of content (providers), individual motivations, group behavior, as well as incentives from platforms to use more likeminded or even more radical content appears to be of high importance to more fully grasp digital fragmentation.

Obviously, this goes far beyond the study of simply "liked" pages on Facebook or follower networks on Twitter, for example. The fragmentation (or polarization) of such groups is a social, rather than simply a digital or communicative phenomenon and therefore needs to be studied as such (Bruns, 2019). The contribution of communication research should be to consider media content, media use, and media effects as embedded in wider social contexts. We may not find much evidence of filter bubbles or echo chambers overall, but I hope that the current analysis of the state of research illustrates why it remains necessary to continue investigating the extent and the effects of digital fragmentation.

References

Anderson, C. (2006). *The long tail. Why the future of business is selling less of mor*e. New York, NY: Hyperion.

Baek, Y. M., Jeong, I., & Rhee, J. W. (2015). Political homophily on social network sites and users' poll skepticism. *Asian Journal of Communication*, *25*(3), 271-287. doi:10.1080/01292986.2014.955861

Bail, C. A., Argyle, L. P., Brown, T. W., Bumpus, J. P., Chen, H., Hunzaker, M. B. F., . . . Volfovsky, A. (2018). Exposure to opposing views on social media can increase political polarization. *Proceedings of the National Academy of Sciences*, *115*(37), 9216-9221. doi:10.1073/pnas.1804840115

Bakshy, E., Messing, S., & Adamic, L. (2015). Exposure to ideologically diverse news and opinion on Facebook. *Science*. doi:10.1126/science.aaa1160

Bramson, A., Grim, P., Singer, D. J., Berger, W. J., Sack, G., Fisher, S., . . . Holman, B. (2017). Understanding polarization: Meanings, measures, and model evaluation. *Philosophy of Science*, *84*(1), 115-159. doi:10.1086/688938

Bruns, A. (2019). *Are filter bubbles real?* Cambridge, UK: Polity.

Eady, G., Nagler, J., Guess, A., Zilinsky, J., & Tucker, J. A. (2019). How many people live in political bubbles on social media? Evidence from linked survey and Twitter data. *Sage Open*, *9*(1), 1-25. doi:10.1177/2158244019832705

Fletcher, R., & Nielsen, R. K. (2018). Are people incidentally exposed to news on social media? A comparative analysis. *New Media & Society*, *20*(7), 2450-2468. doi:10.1177/1461444817724170

Friedland, L. A. (2001). Communication, community, and democracy: Toward a theory of the communicatively integrated community. *Communication Research*, *28*(4), 358-391. doi:10.1177/009365001028004002

Garrett, R. K. (2017). The "echo chamber" distraction: Disinformation campaigns are the problem, not audience fragmentation. *Journal of Applied Research in Memory and Cognition*, *6*(4), 370-376. doi:10.1016/j.jarmac.2017.09.011

Gehrau, V. (2013). Issue diversity in the internetage. Changes in nominal issue diversity in Germany between 1994 and 2005. *Studies in Communication /*

Media, *2*(1), 129-142. Retrieved from http://www.scm.nomos.de/fileadmin/scm/doc/SCM_13_01_04.pdf

Gehrau, V. (2019). Gespräche über Medien in Zeiten von Mobilkommunikation und sozialen Onlinenetzen. Eine Analyse von Befragungsdaten aus den Jahren 2015, 2016 und 2017 im Vergleich zu 1996/97 und 2007 [Conversations about media in times of mobile communication and social networking sites. Comparing survey data from 2015, 2016, and 2017 to 1996/97 and 2007]. *Publizistik*, *64*(1), 37-58. doi:10.1007/s11616-018-00465-z

Gehrau, V., & Goertz, L. (2010). Gespräche über Medien unter veränderten medialen Bedingungen [Conversations about media in a changing media environment]. *Publizistik*, *55*(2), 153-172. doi:10.1007/s11616-010-0082-5

Goel, S., Mason, W., & Watts, D. J. (2010). Real and perceived attitude agreement in social networks. *Journal of Personality & Social Psychology*, *99*(4), 611-621. doi:10.1037/a0020697

Guess, A. M. (2018). (Almost) everything in moderation: New evidence on Americans' online media diets. Retrieved from https://webspace.princeton.edu/users/aguess/Guess_OnlineMediaDiets.pdf

Haas, A., & Brosius, H.-B. (2013). Fragmentierung der Publikumsagenda im Zeitverlauf? [Fragmentation of the public agenda over time?]. In K. Imhof, R. Blum, H. Bonfadelli, & O. Jarren (Eds.), *Stratifizierte und segmentierte Öffentlichkeit* (pp. 187-202). Wiesbaden, Germany: VS Verlag.

Handel, U. (2000). *Die Fragmentierung des Medienpublikums* [The fragmentation of the media audience]. Wiesbaden, Germany: Westdeutscher Verlag.

Hasebrink, U. (1997). „Ich bin viele Zielgruppen." Anmerkungen zur Debatte um die Fragmentierung des Publikums aus kommunikationswissenschaftlicher Sicht ["I am many target groups." Comments on the debate about audience fragmentation from a communication scientist's point of view]. In H. Scherer & H.-B. Brosius (Eds.), *Zielgruppen, Publikumssegmente, Nutzergruppen: Beiträge aus der Rezeptionsforschung* (pp. 262-280). Munich, Germany: R. Fischer.

Hollander, B. A. (2008). Tuning out or tuning elsewhere? Partisanship, polarization, and media fragmentation from 1998 to 2006. *Journalism & Mass Communication Quarterly*, *85*(1), 23-40. doi:10.1177/107769900808500103

Holtz-Bacha, C., & Peiser, W. (1999). Verlieren die Massenmedien ihre Integrationsfunktion? Eine empirische Analyse zu den Folgen der Fragmentierung des Medienpublikums [Are the mass media losing their integrative function? An empirical analysis of the effects of audience fragmentation]. In U. Hasebrink & P. Rössler (Eds.), *Publikumsbindungen. Medienrezeption zwischen Individualisierung und Integration* (pp. 41-53). Munich, Germany: R. Fischer.

Iyengar, S., & Hahn, K. S. (2009). Red media, blue media: Evidence of ideological selectivity in media use. *Journal of Communication*, *59*(1), 19-39. doi:10.1111/j.1460-2466.2008.01402.x

Katz, E. (1996). And deliver us from segmentation. *The Annals of the American Academy of Political and Social Science*, *546*(1), 22-33. doi:10.1177/0002716296546001003

Katz, W. A. (1982). TV viewer fragmentation from cable TV. *Journal of Advertising Research*, *22*(6), 27-30.

Kim, Y. (2011). The contribution of social network sites to exposure to political difference: The relationships among SNSs, online political messaging, and exposure to cross-cutting perspectives. *Computers in Human Behavior*, *27*(2), 971-977. doi:10.1016/j.chb.2010.12.001

Kim, Y., Hsu, S.-H., & Gil de Zúñiga, H. (2013). Influence of social media use on discussion network heterogeneity and civic engagement: The moderating role of personality traits. *Journal of Communication*, *63*(3), 498-516. doi:10.1111/jcom.12034

Lee, J. K. (2009). *Incidental exposure to news: Limiting fragmentation in the new media environment* (Doctoral dissertation). Retrieved from http://repositories.lib.utexas.edu/bitstream/handle/2152/6686/leej54127.pdf?sequence=2

Lee, J. K., Choi, J., Kim, C., & Kim, Y. (2014). Social media, network heterogeneity, and opinion polarization. *Journal of Communication*, *64*(4), 702-722. doi:10.1111/jcom.12077

Mahrt, M. (2019). *Beyond filter bubbles and echo chambers: The integrative potential of the Internet.* Berlin, Germany: Digital Communication Research.

McCombs, M., & Reynolds, A. (2009). How the news shapes our civic agenda. In J. Bryant & M. B. Oliver (Eds.), *Media effects. Advances in theory and research* (3rd ed., pp. 1-16). New York, NY: Routledge.

McQuail, D. (2005). *McQuail's mass communication theory* (5th ed.). London, UK: Sage.

Pariser, E. (2011). *The filter bubble: What the Internet is hiding from you*. London, UK: Penguin.

Rau, J. P., & Stier, S. (2019). Die Echokammer-Hypothese: Fragmentierung der Öffentlichkeit und politische Polarisierung durch digitale Medien? [Fragmentation of the public sphere and political polarization through digital media?] *Zeitschrift für Vergleichende Politikwissenschaft*, *13*(3), 399-417. doi:10. 1007/s12286-019-00429-1

Riles, J. M., Pilny, A., & Tewksbury, D. (2018). Media fragmentation in the context of bounded social networks: How far can it go? *New Media & Society*, *20*(4), 1415-1432. doi:10.1177/1461444817696242

Stark, B., Magin, M., & Jürgens, P. (2017). *Ganz meine Meinung? Informationsintermediäre und Meinungsbildung – Eine Mehrmethodenstudie am Beispiel von Facebook* [My point of view exactly? Information intermediaries and opinion formation—A multi-method analysis of Facebook]. Düsseldorf, Germany: Landesanstalt für Medien Nordrhein-Westfalen.

Sunstein, C. R. (2018). *#republic. Divided democracy in the age of social media*. Princeton, NJ: Princeton University Press.

Tewksbury, D., & Riles, J. M. (2015). Polarization as a function of citizen predispositions and exposure to news on the Internet. *Journal of Broadcasting & Electronic Media*, *59*(3), 381-398. doi:10.1080/08838151.2015.1054996

Vlasic, A. (2004). *Die Integrationsfunktion der Massenmedien. Begriffsgeschichte, Modelle, Operationalisierung* [The integrative function of the media. History of the concept, models, operationalization]. Wiesbaden, Germany: VS Verlag.

Webster, J. G. (2014). *The marketplace of attention.* Cambridge, MA: MIT Press.

Webster, J. G., & Ksiazek, T. B. (2012). The dynamics of audience fragmentation: Public attention in an age of digital media. *Journal of Communication*, *62*(1), 39-56. doi:10.1111/j.1460-2466.2011.01616.x

Wells, C., & Thorson, K. (2017). Combining big data and survey techniques to model effects of political content flows in Facebook. *Social Science Computer Review*, *35*(1), 33-52. doi:10.1177/0894439315609528

Youn, S.-M. (1994). Program type preference and program choice in a multichannel situation. *Journal of Broadcasting & Electronic Media*, *38*(4), 465-475. doi:10.1080/08838159409364279