University of Bern

Faculty of Business, Economics and Social Sciences

Institute of Communication and Media Studies

Political polarisation on social media in different national contexts

Inaugural Dissertation

in fulfilment of the requirements for the degree of Doctor rerum socialium at the Faculty of Business, Economics and Social Science of the University of Bern

submitted by

Aleksandra Urman

March 2020

Supervisor: Prof. Dr. Silke Adam, University of Bern

Supervisor: Prof. Dr. Peter Van Aelst, University of Antwerp

The faculty accepted this work as dissertation on 14.05.2020 at the request of the two advisors Prof. Dr. Silke Adam and Prof. Dr. Peter Van Aelst, without wishing to take a position on the view presented therein.

Acknowledgements

Abstract

The present dissertation examines the phenomenon of political polarisation on social media. Specifically, the dissertation addresses the question of how the intensity of polarisation and the ideological lines along which it occurs might vary between different national contexts. First, it explores the differences in the intensity of political polarisation on Twitter in 16 democratic countries (Article 1). Second, it examines the ideological lines along which polarisation occurs in two non-Western contexts, specifically among Russian (Article 2) and Ukrainian (Article 3) users of Vkontakte – a social media platform popular among users from post-Soviet states. The dissertation demonstrates that the levels of political polarisation differ dramatically between countries. In democracies, polarisation tends to be lowest in multi-party systems with proportional electoral rules (e.g., Sweden), and the highest in pluralist two-party systems (e.g., United States). It also shows that, in non-democratic non-Western contexts, polarisation does not necessarily run along the left–right spectrum or party system lines. In authoritarian regimes or those with less stable party systems, polarisation runs along the lines of other issues that are more politically relevant in a given context. In Russia, polarisation manifests itself along pro-regime vs anti-regimes lines, whereas in Ukraine, polarisation happens around geopolitical issues. Polarisation on social media thus tends to reflect existing political cleavages and their intensity, in line with the theory of political parallelism. The major implication of this dissertation in the context of research into polarisation on social media is that findings on the topic from single-country studies that come from Western democratic contexts should be interpreted with caution, as they are not necessarily generalisable. To make generalisable inferences about the relationship between social media and political polarisation, more comparative studies are needed, as well as studies that take into account platform affordances and the causal mechanisms that might drive polarisation.

Table of Contents

Introduction

The rapid development of the Internet and social networking sites (SNS) at the end of the 20th and the beginning of the 21st centuries has made the world more interconnected than ever before. These new technologies were meant to help people get in touch with each other and foster mutual understanding between them. As the creator of the World Wide Web, Tim Berners-Lee, said in one of his interviews in the early 2000s, 'The original idea of the web was that it should be a collaborative space where you can communicate through sharing information. The idea was that by writing something together, and as people worked on it, they could iron out misunderstanding' (BBC News, 2003). However, the Internet is not necessarily used in the ways its founding fathers idealistically imagined it would be (Curran et al., 2012). In the last decades, researchers have argued that the Internet and online platforms can not only help people connect with each other, but also facilitate the spread of conspiracy theories and biases and increase societal polarisation (Allcott & Gentzkow, 2017; Bail et al., 2018; Lee et al., 2018; Müller & Schwarz, 2018).

This dissertation primarily deals with the issue of polarisation on social media. Polarisation can refer either to a state or to a process. 'Polarisation as a state refers to the extent to which opinions on an issue are opposed in relation to some theoretical maximum. Polarisation as a process refers to the increase in such opposition over time' (DiMaggio et al., 1996). In this dissertation, I focus primarily on polarisation as a state. Another important term that needs to be defined is fragmentation, which is a division 'into a variety of groups … that takes place along ideological lines' (Bright, 2018). Hence, the main difference between polarisation and fragmentation, if both are understood as a state rather than a process, is the number of groups into which a society or a larger group is divided. Polarisation is division into two groups with opposite opinions, while fragmentation is a division into multiple opinions that are not necessarily in direct opposition to one another and are not mutually exclusive.

In political communication, the problem of polarisation and/or fragmentation is frequently discussed in connection with phenomena such as selective exposure and echo chambering, as both

can lead to increased polarisation (Quattrociocchi et al., 2016; Stroud, 2010). Selective exposure is people's tendency to tune into information and news that aligns with their existing (political) attitudes (Prior, 2002). The term *echo chambering* refers to situations in which people are surrounded by information that is in line with their views, thus amplifying partisan opinions; this phenomenon can be facilitated by selective exposure as well as homophily – people's tendency to surround themselves with others who are similar to them in certain characteristics, e.g., holding similar beliefs (Garimella et al., 2018; Sunstein, 2001).

Research on selective exposure and the cognitive and psychological mechanisms behind it has been around for a long time. For instance, Festinger (1957) argued within the framework of his cognitive dissonance theory that, when people are presented with counter-attitudinal information, they experience a cognitive dissonance and thus process new information less fluently. One way to avoid dissonance is, Festinger suggested, to engage in selective exposure. Cognitive dissonance is now widely recognised as one of the main drivers of selective exposure (Stroud, 2011), and the phenomenon has been well-researched since 1957 – when Festinger mentioned it in relation to his theory – in numerous studies that prove that people tend to select information that aligns with their views and avoid information that is in opposition to their beliefs (e.g., Frey, 1986; Hart et al., 2009; Smith et al., 2008). A more recent study relying on data about users' browsing behaviour has confirmed that people tend to prefer content that is congruent with their beliefs, but, overall, users' information diets tend to be ideologically diverse (Dvir-Gvirsman et al., 2014).

In recent years, the phenomenon has gained new prominence, particularly among communication scholars, due to the changes in the information environment. Since the advent of online media – and social media in particular – people have been presented with an abundance of information to choose from. In scholarly terms, people are currently living in a high-choice media environment in which political polarisation and fragmentation is of particular concern, since 'changes in the political information environment have created opportunity structures for selective exposure based on political attitudes and beliefs' (Van Aelst et al., 2017).

Social media is especially often discussed in the context of concerns about polarisation and fragmentation. There are two reasons why SNSs are relevant in this regard: first, they provide users with an abundance of content to choose from, including content created by other users, and second, algorithmic curation of news feeds can affect what content users see, presenting them with information similar to what they engaged with before (Berman & Katona, 2016). Despite the abundance of research on the topic, the evidence on the issue is still inconclusive. Some research argues that SNSs increase polarisation, since high-choice environments created by social media and curation algorithms strengthen the effects of selective exposure, leading to echo chambering and increased partisanship (Bail et al., 2018; Conover et al., 2012; Garimella et al., 2018; Grömping, 2014; Gruzd & Roy, 2014; Hindman, 2009; Levendusky, 2013; Quattrociocchi et al., 2016). Others have provided evidence that SNSs can decrease polarisation, as people on these platforms are exposed to cross-cutting news because a) they are embedded in ideologically diverse networks, if one takes into account both their strong and weak ties (Barberá, 2014); b) social media algorithms 'feed' them more cross-cutting content than they would see if they selected the information to tune into themselves, thus alleviating the effects of selective exposure (Bakshy et al., 2015); c) social media users most often navigate to a few well-known outlets with diverse audiences rather than to the less-known highly partisan ones (Nelson & Webster, 2017); and d) polarisation is manifested only when highly politicised issues are taken into account (Barberá et al., 2015). Thus, although polarisation on social media is a seemingly well-researched phenomenon, there is still no academic consensus around it.

The main argument of this dissertation is that the levels of polarisation on social media and the lines along which people are polarised vary greatly from one (political) context to another. In this sense, polarisation on social media is in accordance with the idea of the political parallelism – that media systems reflect (national) political divisions (Hallin & Mancini, 2004).

I suggest that contextual differences are the key to answering the question of why previous studies on polarisation on social media have found very different results. The absolute majority of the

studies that found evidence of strong political polarisation on social media along left–right lines were conducted in the US context (Bail et al., 2018; Conover et al., 2012; Garimella et al., 2018; Hindman, 2009; Levendusky, 2013; Quattrociocchi et al., 2016), with two notable exceptions: a study that examined the Canadian context (Gruzd & Roy, 2014) and a study that focused on Thai political groups on Facebook (Grömping, 2014). Hence, the majority of studies have examined the case of a two-party system that is itself extremely polarised along left–right lines (Bateman et al., 2017; Iyengar et al., 2019; Poole, 2008).

Another point common to the studies that found evidence of polarisation on SNSs is that they focused on the political Facebook- and Twitter-spheres (e.g. accounts and groups of politicians, parties or their active supporters and political discussions that people consciously decide to follow or engage in; incidental exposure, such as through algorithmic curation, was not taken into account). The studies that did not find strong evidence of polarisation on SNSs, in contrast, took into account less politicised users and topics and not just political partisans or highly politically engaged users, as in those studies that found polarisation on social media (Barberá et al., 2015; Nelson & Webster, 2017), and examined incidental exposure to political information through algorithmic recommendations (Bakshy et al., 2015).

It seems that political polarisation in previous studies was observed only among highly politicised users. The results of such studies are not generalisable to the overall population of SNS users in a given country. I suggest that this limitation can be overcome in further studies by relying on samples of randomly selected social media users rather than those engaged in political discussion or following politicised sources. Examples of specific research designs relying on such sampling are given in Articles 2 and 3 in this dissertation. Another problem with the existing body of research on polarisation on social media is that most of the evidence collected, with few exceptions, comes from the very politically polarised context of the United States; there are almost no studies that look at the problem from a comparative perspective. The two exceptions are Barberá (2014), who found that social media usage can decrease polarisation because users are typically embedded in

ideologically diverse networks, with the level of diversity being slightly higher among German and Spanish users than US ones, and Bright (2018), whose analysis of Twitter exchanges among users from 26 countries found that groups that are closer to each other on the ideological spectrum are more likely to interact than those further apart. None of the existing studies, to my knowledge, examined polarisation on platforms other than Facebook and Twitter. Finally, all of the aforementioned studies measured polarisation either within the ideological context of the left–right spectrum or along political party lines. Even though this approach might work well for established liberal democracies with relatively stable party systems, I suggest it would not work as well in contexts in which the main societal cleavages occur along different lines. As I illustrate below, examples of such contexts include authoritarian regimes, those in transition, and/or those profoundly affected by bigger geopolitical cleavages.

This dissertation aims to partially fill the research gap by looking at political polarisation from a comparative perspective (Article 1), in non-Western contexts (Articles 1, 2 and 3), and among randomly selected users of a non-Western platform (Articles 2 and 3). The general research question of this dissertation is

Does polarisation on social media substantially vary across national contexts in terms of intensity and the ideological lines along which it occurs?

All the articles that comprise this dissertation rely on a network-analytic audience duplication approach (Ksiazek, 2011) to measure polarisation of social media users that has been successfully employed by other studies for similar purposes (e.g., Fletcher et al., 2019; Mukerjee et al., 2018; Webster & Ksiazek, 2012). It allows measurement of audience polarisation using aggregated observations about the patterns of selective exposure among audiences as a proxy. The approach, in contrast to other methods of measuring selective exposure, allows inferences to be made about the patterns on the population level (Clay et al., 2013), making it especially relevant for the questions explored in this dissertation. However, the interpretation of results depends on the operationalisation of the ideological positions of the information sources, which, for certain studies,

might be disadvantageous, since the results are highly dependent on the researchers' interpretations (Clay et al., 2013). However, given that this dissertation explores not just the variance in the levels of polarisation, but also the differences in the ideological lines along which these phenomena occur in different national contexts, this flexibility of the audience duplication approach makes it particularly useful.

Below, I briefly outline the content of each of the three articles included in this dissertation, then discuss the implications of the findings as well as the limitations of the dissertation.

Short Summary of the Three Articles That Comprise the Dissertation

The first article, entitled 'Context Matters: Political Polarization on Twitter from a Comparative Perspective', examined polarisation among the audiences (in this case, followers) of the accounts of political parties in 16 democratic countries. In this study, I did not rely on random sampling, but on a sample of politically engaged users, as their polarisation tends to be more pronounced (Barberá, 2014).

In the study, I constructed audience duplication graphs using the audience duplication approach (Ksiazek, 2011), based on the data about the Twitter followers of each political party represented in the country's parliament. Then, according to the graphs' topologies, the political Twitter-spheres of the countries included in the study were classified as perfectly integrated, integrated, mixed, polarised, and perfectly polarised. This procedure was followed by an exploratory analysis of the results that suggested that polarisation is highest in two-party systems with plurality electoral rules (e.g., the United States) and lowest in multi-party systems with proportional voting (e.g., Sweden).

The second article is entitled 'News Consumption of Russian Vkontakte Users: Polarisation and News Avoidance'. This study examined the patterns of news consumption of Russian users of Vkontakte, which is the most popular social media platform in Russia and certain post-Soviet countries. The analysis was based on a randomly selected sample of 55,344 profiles of Vkontakte users whose online self-reported place of residence is Russia. The analysis was performed using a

combination of network-analytic techniques – specifically, audience duplication (see above) and community detection using the Louvain method (Blondel et al., 2008).

The study showed that the majority of Vkontakte users do not subscribe to news sources, thus demonstrating that social media users are divided into a politically apathetic majority and a news-interested minority that is polarised along political lines. However, the polarisation does not occur along the left–right spectrum, as in the United States and some other Western democracies, but along the pro-government vs anti-government lines. In this article, the inductive approach to the definition of the ideological stances of media outlets was used. Instead of relying on a pre-defined ideological scale (i.e., the left–right spectrum), I first established whether the users in the sample can be divided into distinct groups by applying network-analytic techniques to the data regarding their subscription patterns. Then, after qualitatively assessing the resources that are characteristic of the media consumption of each group, I established the ideological lines along which polarisation occurs.

The third article that is a part of this dissertation is entitled 'There Can Be Only One Truth: Ideological Segregation and Online News Communities in Ukraine', which examined political polarisation among Ukrainian users of Vkontakte who subscribe to different online news pages. The analysis was based on a randomly selected sample of 50,702 users whose self-reported place of residence is Ukraine (including Crimea).

We used an audience duplication approach and community detection (similar to Article 2) to examine the patterns of the users' news consumption and to identify whether there is evidence of political polarisation among the users. We found that the users tend to be polarised along pro-Russian vs pro-Ukrainian/pro-European lines. For the analysis, we used the same approach to establish the ideological lines of polarisation as in Article 2. In addition, we manually coded the most popular pages in our sample in order to 1) separate news communities from the rest (i.e. entertainment pages) and 2) determine the ideological orientation (pro-Russian partisanship, pro-Ukrainian/pro-European partisanship or neutral) of each news page. The latter was necessary to

allow a regression analysis to be performed to determine the factors that predict subscription to partisan pro-Russian and pro-Ukrainian/pro-European media pages.

We found that the most important factors are one's declared region of residence (e.g., Western Ukraine or Eastern Ukraine) and self-reported language abilities (e.g., Ukrainian/Russian/both). We also found that, despite the low number of partisan news pages relative to the communities of other types in the sample, the share of Ukrainian users subscribing to them is disproportionately high, meaning that these few communities attract substantial attention. Furthermore, the audiences of these communities showed minimal overlap, thereby indicating that they can encourage the formation of isolated ideological cliques – or 'echo chambers'.

Implications and Limitations

The three articles that constitute this dissertation demonstrate that both the levels of polarisation and the lines along which that polarisation occurs vary dramatically from one country to another. The findings show that, in democracies, the intensity of left–right polarisation on SNSs varies greatly and the variation can be at least partially attributed to the differences in national political systems. Two-party pluralist systems tend to have the highest levels of polarisation among Twitter users, while the multi-party ones with proportional electoral rules tend to be the least polarised.

With regard to the ideological lines along which polarisation occurs, in non-Western non-democratic contexts, the left–right spectrum or party systems might be of less relevance than pro-government vs anti-government stances, ongoing geopolitical and internal conflicts, or religious or linguistic differences. For instance, in authoritarian states such as Russia (Schenkkan, 2018), politically interested users can be divided into pro-government vs anti-government groups, and in Ukraine – a country transitioning to democracy (Schenkkan, 2018) – the population is strongly polarised along lines marked by current internal political and geopolitical cleavages, intensified by the conflict with Russian armed forces and Russia-backed separatists in the east of Ukraine. In this case, linguistic and regional differences that are associated with the different sides of the conflict are also correlated with the partisanship manifested on SNSs. Hence, in all of the cases examined in

this dissertation, existing political divisions are reflected on social media, in line with the ideas of political parallelism (Hallin & Mancini, 2004).

A group of researchers who examined polarisation in 12 democratic countries – not among social media users but among offline and online news audiences – demonstrated that polarisation in the examined countries is highest in the United States and, in Europe, is higher on average in pluralist countries than in those with proportional voting (Fletcher et al., 2019). That study did not deal with SNSs, and its selection of countries was slightly different than that in Article 1 of this dissertation, but the findings point in the same direction as those in Article 1. This suggests that social media audiences are polarised in the same ways as news audiences and societies in general, providing another argument in support of the idea that social media, just like other media, reflects the political sphere of a given country.

Since polarisation on social media reflects existing political divisions, studying polarisation – or other political phenomena – on SNSs has to take the national political context into account. More comparative studies are needed to better understand the phenomenon. Single-country studies can provide valuable information about the levels and lines of polarisation in a given national context, but researchers should be careful when interpreting their results and refrain from generalising the effects observed in a given country to social media overall.

Polarisation on social media has mostly been studied in the context of the United States (Bail et al., 2018; Bakshy et. al, 2015; Conover et al., 2012; Garimella et al., 2018; Hindman, 2009; Levendusky, 2013; Quattrociocchi et al., 2016) – a highly politically polarised society. Given that, it is no wonder that previous studies have found evidence of extreme polarisation of Twitter and Facebook audiences. The findings of this dissertation suggest that one should interpret the results of US-focused single-country studies with caution. Even if one finds evidence of selective exposure and echo chambering on SNSs in the US context, the observed phenomena might be driven by national social and political mechanisms rather than by the nature and algorithms of social media

platforms. The present study demonstrates that not all countries experience the same level of polarisation on social media as the United States.

To be able to state whether social media drives polarisation, comparative studies that also examine the causal aspects of this problem are necessary. One of the limitations of the present dissertation is that it does not analyse causal mechanisms. Based on the findings, one can argue that polarisation varies across countries and that the variation is at least partially associated with political differences. However, one cannot make any conclusions about the role of SNSs. The question of whether social media exacerbates societal polarisation or alleviates it is still open. Further comparative research on the causal aspects of the issue is necessary to answer it.

This dissertation has also demonstrated that, in non-democratic contexts, polarisation can occur along lines other than the left–right spectrum. Hence, one has to be careful when analysing polarisation in such contexts and especially when including them as cases in comparative studies. Since nations have different polarising issues, it is not always possible to make direct comparisons between them. When studying non-Western, non-democratic contexts, it is futile to apply the same measures as one applies to Western democracies. New measures – designed with attention to national contexts – must be used to avoid biased and inaccurate results. For example, if one were to measure polarisation in Russia or Ukraine by relying on the measures traditionally used in US-focused studies, such as by looking at partisanship along the left–right spectrum or at party partisanship, one would likely find that the levels of polarisation in those countries are low. However, as this dissertation shows, that is not the case, as the left–right division is not a polarising issue in those countries and the party systems do not reflect the most pronounced cleavages. In the case of Russia, for instance, there is no officially registered party that would reflect the anti-regime position. In the case of Ukraine, the existing parties also do not necessarily fully reflect the ideological divisions, and party partisanship is not very strong – for instance, the *Servant of the People* party that won the parliamentary elections by a landslide in the summer of 2019 was created only months ahead of the election. If there were strong party partisanship, a new party would not be

able to attract so many votes from the citizens who used to vote for other parties in such a short period.

This raises the question of how researchers should operationalise and measure polarisation across countries. Since the phenomenon is very contextual, it is unlikely that a universal measure can be created. It is possible to measure polarisation or audience fragmentation across countries using the audience duplication approach (see Article 1 of this dissertation; Fletcher et. al., 2019). However, that is only possible when polarisation or fragmentation occur along the same ideological lines in all the cases included in a comparative study. When the lines of polarisation are different, the levels of polarisation inferred using the audience duplication approach are not necessarily comparable, since the interpretation of the results in studies that use this methodology is very sensitive to the operationalisation of the ideological stances of the information sources (Clay et al., 2013). I suggest that the problem of creating a cross-country generalisable measure of polarisation and fragmentation is a matter for further academic debate. More comparative studies might help answer the question of whether or not the levels of polarisation measured with a focus on different issues can be directly compared across countries, but, for now, it remains open.

Finally, this dissertation has looked at polarisation on a non-Western platform. All of the previous studies on polarisation on SNSs have focused on Facebook and Twitter. The studies conducted within this dissertation prove that the methods used for the analysis of polarisation and fragmentation of news media audiences and Western platforms' audiences – in this case, network-based audience duplication analysis (Fletcher et al., 2019; Ksiazek, 2011; Mukerjee et al., 2018; Webster & Ksiazek, 2012) – can be successfully applied to other platforms as well. This suggests that studies on other platforms are not just necessary, but can also be quite easily implemented using existing techniques. Besides, conducting studies on such platforms might be easier than on Facebook and Twitter due to data availability – in the context of Western platforms, academics are stepping into what can be called a 'post-API age' (Freelon, 2018), with the platforms making their

APIs increasingly restrictive or completely shutting them down. Less popular non-Western platforms remain, for now, more open in this respect.

Though this dissertation looked at polarisation on a non-Western platform on which this issue has not been examined before, one of the limitations is that the dissertation does not include comparative analysis between the non-Western platform and one of the better studied Western ones. It might be that polarisation is manifested differently on them. As noted above, polarisation on SNSs tends to be reflective of existing political conflicts, but the intensity and accuracy of this reflection might be different. In non-Western contexts in which different – foreign and national – social media with similar architectures coexist, the levels of politicisation of the platforms – the share of politically engaged users and/or political discussions on a given platform – can vary greatly. For instance, in Russia, Western platforms (e.g., Facebook and Twitter) have traditionally been more politicised than national ones (e.g., Vkontakte) and used by more politically engaged audiences (Gainous et al., 2018). Hence, it might be that the intensity of polarisation varies greatly not just across countries, but also across platforms, especially given that, even in the United States, no evidence of polarisation has been found when less politicised audiences are analysed (Barberá et al., 2015).

The contextual differences between platforms are especially relevant if one takes into account platform affordances (Bucher & Helmond, 2018) – things that SNSs allow one to do by virtue of their architecture. It might be that the platform affordances on one social media site can drive polarisation while those on another decrease it. I suggest that cross-platform comparative research that considers the causal mechanisms that might be driving polarisation is needed to address this question, but, until then, it would be difficult to make a case that social media drives polarisation. SNSs, just like countries, are different, and it would be wrong to make general statements about the influence of social media on polarisation until there is evidence that all – or at least the most popular – platforms function similarly in relation to the issue and have the same effects on polarisation.

Bibliography

Allcott, H., & Gentzkow, M. (2017). Social media and fake news in the 2016 election. *Journal of Economic Perspectives*, *31*(2), 211–236. https://doi.org/10.1257/jep.31.2.211

Bail, C. A., Argyle, L. P., Brown, T. W., Bumpus, J. P., Chen, H., Hunzaker, M. B. F., Lee, J., Mann, M., Merhout, F., & Volfovsky, A. (2018). Exposure to opposing views on social media can increase political polarization. *Proceedings of the National Academy of Sciences*, 201804840. https://doi.org/10.1073/pnas.1804840115

Bakshy, E., Messing, S., & Adamic, L. A. (2015). Exposure to ideologically diverse news and opinion on Facebook. *Science, 348*(6239), 1130–1132. https://doi.org/10.1126/science.aaa1160

Barberá, P. (2014). *How social media reduces mass political polarization. Evidence from Germany, Spain, and the US* [Conference submission]. Center for Data Science, New York University. http://pablobarbera.com/static/barbera_polarization_APSA.pdf

Barberá, P., Jost, J. T., Nagler, J., Tucker, J. A., & Bonneau, R. (2015). Tweeting from Left to Right: Is online political communication more than an echo chamber? *Psychological Science*, *26*(10), 1531–1542. https://doi.org/10.1177/0956797615594620

Bateman, D. A., Clinton, J. D., & Lapinski, J. S. (2017). A house divided? Roll calls, polarization, and policy differences in the U.S. House, 1877–2011. *American Journal of Political Science*, *61*(3), 698–714. https://doi.org/10.1111/ajps.12281

BBC News. (2003, December 31). *Web's inventor gets a knighthood*. http://news.bbc.co.uk/2/hi/technology/3357073.stm

Berman, R., & Katona, Z. (2016). *The impact of curation algorithms on social network content quality and structure* (No. 16–08; Working Papers). NET Institute. https://ideas.repec.org/p/net/wpaper/1608.html

Blondel, V. D., Guillaume, J.-L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of

    communities in large networks. *Journal of Statistical Mechanics: Theory and Experiment,*

    2008(10), P10008. https://doi.org/10.1088/1742-5468/2008/10/P10008

Bright, J. (2018). Explaining the emergence of political fragmentation on social media: The role of

    ideology and extremism. *Journal of Computer-Mediated Communication, 23*(1), 17–33.

    https://doi.org/10.1093/jcmc/zmx002

Bucher, T., & Helmond, A. (2018). The affordances of social media platforms. In Burgess, J., Poell,

    T., & Marwick, A. (Eds.), *The SAGE Handbook of Social Media* (pp. 233–253). New York,

    NY: Sage Publications.

Clay, R., Barber, J. M., & Shook, N. J. (2013). Techniques for measuring selective exposure: A

    critical review. *Communication Methods and Measures, 7*(3–4), 147–171.

    https://doi.org/10.1080/19312458.2013.813925

Conover, M. D., Gonçalves, B., Flammini, A., & Menczer, F. (2012). Partisan asymmetries in online

    political activity. *EPJ Data Science, 1*(1). https://doi.org/10.1140/epjds6

Curran, J., Fenton, N., & Freedman, D. (2012). *Misunderstanding the Internet*. Abingdon, UK:

    Routledge.

DiMaggio, P., Evans, J., & Bryson, B. (1996). Have Americans' social attitudes become more

    polarized? *American Journal of Sociology, 102*(3), 690–755.

Dvir-Gvirsman, S., Tsfati, Y., & Menchen-Trevino, E. (2014). The extent and nature of ideological

    selective exposure online: Combining survey responses with actual web log data from the

    2013 Israeli Elections. *New Media & Society, 18*(5).

    https://doi.org/10.1177/1461444814549041

Festinger, L. (1957). *A theory of cognitive dissonance*. Palo Alto, CA: Stanford University Press.

Fletcher, R., Cornia, A., & Nielsen, R. K. (2019). How polarized are online and offline news

    audiences? A comparative analysis of twelve countries. *The International Journal of*

    Press/Politics, 25(2), 1940161219892768. https://doi.org/10.1177/1940161219892768

Freelon, D. (2018). Computational research in the post-API age. *Political Communication*, *35*(4),

665–668. https://doi.org/10.1080/10584609.2018.1477506

Frey, D. (1986). Recent research on selective exposure to information. In L. Berkowitz (Ed.),

Advances in Experimental Social Psychology (Vol. 19, pp. 41–80). Cambridge, MA:

Academic Press. https://doi.org/10.1016/S0065-2601(08)60212-9

Gainous, J., Wagner, K. M., & Ziegler, C. E. (2018). Digital media and political opposition in

authoritarian systems: Russia's 2011 and 2016 Duma elections. *Democratization*, *25*(2),

209–226. https://doi.org/10.1080/13510347.2017.1315566

Garimella, K., Morales, G. D. F., Gionis, A., & Mathioudakis, M. (2018). Political discourse on

social media: Echo chambers, gatekeepers, and the price of bipartisanship. In *Proceedings of

the 2018 World Wide Web Conference* (pp. 913–922). Geneva, Switzerland: International

World Wide Web Conferences Steering Committee.

https://doi.org/10.1145/3178876.3186139

Grömping, M. (2014). 'Echo Chambers': Partisan Facebook groups during the 2014 Thai election.

Asia Pacific Media Educator, *24*(1), 39–59. https://doi.org/10.1177/1326365X14539185

Gruzd, A., & Roy, J. (2014). Investigating political polarization on Twitter: A Canadian perspective.

Policy & Internet, *6*(1), 28–45. https://doi.org/10.1002/1944-2866.POI354

Hallin, D. C., & Mancini, P. (2004). *Comparing media systems three models of media and politics*.

Cambridge, UK: Cambridge University Press. http://site.ebrary.com/id/10131635

Hart, W., Albarracín, D., Eagly, A. H., Brechan, I., Lindberg, M. J., & Merrill, L. (2009). Feeling

validated versus being correct: A meta-analysis of selective exposure to information.

Psychological Bulletin, *135*(4), 555–588. https://doi.org/10.1037/a0015701

Hindman, M. (2009). *The Myth of Digital Democracy*. Princeton, NJ: Princeton University Press.

https://www.jstor.org/stable/j.ctt7scb3

Iyengar, S., Lelkes, Y., Levendusky, M., Malhotra, N., & Westwood, S. J. (2019). The origins and consequences of affective polarization in the United States. *Annual Review of Political Science, 22*(1), 129–146. https://doi.org/10.1146/annurev-polisci-051117-073034

Ksiazek, T. B. (2011). A network analytic approach to understanding cross-platform audience behavior. *Journal of Media Economics, 24*(4), 237–251. https://doi.org/10.1080/08997764.2011.626985

Lee, C., Shin, J., & Hong, A. (2018). Does social media use really make people politically polarized? Direct and indirect effects of social media use on political polarization in South Korea. *Telematics and Informatics, 35*(1), 245–254. https://doi.org/10.1016/j.tele.2017.11.005

Levendusky, M. S. (2013). Why do partisan media polarize viewers? *American Journal of Political Science, 57*(3), 611–623. https://doi.org/10.1111/ajps.12008

Mukerjee, S., Majó-Vázquez, S., & González-Bailón, S. (2018). Networks of audience overlap in the consumption of digital news. *Journal of Communication, 68*(1), 26–50. https://doi.org/10.1093/joc/jqx007

Müller, K., & Schwarz, C. (2018). *Fanning the flames of hate: Social media and hate crime* (SSRN Scholarly Paper ID 3082972). Social Science Research Network. https://papers.ssrn.com/abstract=3082972

Nelson, J. L., & Webster, J. G. (2017). The myth of partisan selective exposure: A portrait of the online political news audience. *Social Media + Society*, 2056305117729314. https://doi.org/10.1177/2056305117729314

Poole, K. T. (2008). The roots of the polarization of modern U.S. politics. *SSRN Electronic Journal, 28*(2). https://doi.org/10.2139/ssrn.1276025

Prior, M. (2002). Liberated viewers, polarized voters—The implications of increased media choice for democratic politics. *The Good Society*, *11*(3), 10–16. https://doi.org/10.1353/gso.2003.0016

Quattrociocchi, W., Scala, A., & Sunstein, C. R. (2016). Echo chambers on Facebook. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2795110

Schenkkan, N. (2018). *Nations in Transit 2018 | Confronting Illiberalism*. https://freedomhouse.org/sites/default/files/2020-02/FH_NationsInTransit_Web_PDF_FINAL_2018_03_16.pdf

Smith, S. M., Fabrigar, L. R., & Norris, M. E. (2008). Reflecting on six decades of selective exposure research: Progress, challenges, and opportunities. *Social and Personality Psychology Compass*, *2*(1), 464–493. https://doi.org/10.1111/j.1751-9004.2007.00060.x

Stroud, N. J. (2010). Polarization and partisan selective exposure. *Journal of Communication*, *60*(3), 556–576. https://doi.org/10.1111/j.1460-2466.2010.01497.x

Stroud, N. J. (2011). *Niche news: The politics of news choice*. Oxford, UK: Oxford University Press.

Sunstein, C. R. (2001). *Echo chambers: Bush v. Gore, impeachment, and beyond*. Princeton, NJ: Princeton University Press.

Van Aelst, P., Strömbäck, J., Aalberg, T., Esser, F., de Vreese, C., Matthes, J., Hopmann, D., Salgado, S., Hubé, N., Stępińska, A., Papathanassopoulos, S., Berganza, R., Legnante, G., Reinemann, C., Sheafer, T., & Stanyer, J. (2017). Political communication in a high-choice media environment: A challenge for democracy? *Annals of the International Communication Association*, *41*(1), 3–27. https://doi.org/10.1080/23808985.2017.1288551

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. https://doi.org/10.1111/j.1460-2466.2011.01616.x

Paper 1

Context matters: political polarization on Twitter from a comparative perspective

Context matters: political polarization on Twitter from a comparative perspective

Aleksandra Urman 🄳
University of Bern, Switzerland

Abstract
This article explores the issue of political polarization on social media. It shows that the intensity of polarization on Twitter varies greatly from one country to another. The analysis is performed using network-analytic audience duplication approach and is based on the data about the followers of the political parties' Twitter accounts in 16 democratic countries. Based on the topology of the audience duplication graphs, the political Twitterspheres of the countries are classified as perfectly integrated, integrated, mixed, polarized and perfectly polarized. Explorative analysis shows that polarization is the highest in two-party systems with plurality electoral rules and the lowest in multi-party systems with proportional voting. The findings help explain the discrepancies in the results of previous studies into polarization on social media. The results of the study indicate that extrapolation of the findings from single-case studies on the topic is impossible in most cases, suggesting that more comparative studies on the matter are necessary to better understand the subject and get generalizable results.

Keywords
audience duplication, comparative analysis, network analysis, political polarization, social media, Twitter

The sweeping development of the Internet and other technologies, including the emergence of social networking sites (SNS), in the last decades, has led to a drastic increase in the amount of information available to an average person and made the world more interconnected than ever before. However, there is strong evidence that the technologies

Corresponding author:
Aleksandra Urman, Institute of Communication and Media Studies, University of Bern, Fabrikstrasse 8, 3012 Bern, Switzerland.
Email: aleksandra.urman@ikmb.unibe.ch

that were meant to connect and educate people can, on the contrary, increase polarization in the society, facilitate the spread of conspiracy theories and fake news, and even incite violent hate crimes (Allcott and Gentzkow, 2017; Bail et al., 2018; Lee et al., 2018; Müller and Schwarz, 2018). Still, other researchers suggest that social media can, in fact, reduce polarization in society and the effects of partisanship with regard to the news consumption (Barberá, 2014; Messing and Westwood, 2014). Hence, the evidence on the polarizing nature of social media is contradictory.

In this article, I suggest that the contradictions in the previous findings on polarization on SNS can be explained by the differences in local contexts. In particular, I suggest that the levels of polarization on social media differ from country to country, depending, among other, on the overall levels of polarization in different societies.

The hypothesis of this study, thus, is that the intensity of political partisanship on SNS varies significantly in different countries.

To test this hypothesis, I conducted a comparative analysis of the political Twitterspheres of 16 countries (the full list is in Table 1) using a network-based audience duplication approach (Ksiazek, 2011; Webster and Ksiazek, 2012). Based on the topology of the graphs representing the levels of audience duplication of the official Twitter accounts of political parties in each country, I established the intensity of polarization in political Twitterspheres in different countries. Then, I accordingly divided the examined countries into five categories: perfectly integrated, integrated, mixed, polarized and perfectly polarized. This study adds up to the growing body of literature on the relationship between social media and politics and strives to bridge the gap between the contradictory findings on the relationship between social media and political polarization.

Polarization and social media

Scholars have shown that social media usage can lead to increased polarization in societies by reinforcing partisan political attitudes (Conover et al., 2012; Gruzd and Roy, 2014; Hong and Kim, 2016; Levendusky, 2013; Shin and Thorson, 2017; Sunstein, 2017; Tucker et al., 2018). There is an extensive body of research on the individual-level behavioural characteristics that can contribute to the increased partisanship and, as a consequence, polarization (see Colleoni et al., 2014, for the research overview). They include selective exposure – people's tendency to pick news sources and information that align with their views (Prior, 2002) – and homophily – people's tendency to surround themselves with individuals who are similar to them in several characteristics such as gender, socio-economic status and political orientations (McPherson et al., 2001). Selective exposure and homophily in turn can prompt echo chambering – situations when users' beliefs are amplified as they are continuously exposed to the information that goes in line with their views and thus reinforces them (Garimella et al., 2018; Sunstein, 2001). Scholars demonstrate that social media users frequently form such ideologically segregated communities (see Bail et al., 2018; Conover et al., 2012; Garimella et al., 2018; Grömping, 2014; Hindman, 2009; Levendusky, 2013; Quattrociocchi et al., 2016), and through these can become more partisan and polarized (Gruzd and Roy, 2014).

Table 1. Countries included in the analysis, sorted by the democracy index score.

Country	Electoral system (parliamentary elections)	Party system (multi-party vs two-party)	Democracy index score, 2017	Number of unique users in the sample	% of the total population
Sweden	Proportional	Multi	9.39	243,473	2.4
Denmark	Proportional	Multi	9.22	94,333	1.6
Australia	Plurality	Two	9.09	243,338	0.98
Switzerland	Proportional	Multi	9.03	49,818	0.59
Germany	Proportional	Multi	8.61	836,718	0.97
United Kingdom	Plurality	Two	8.53	1,271,674	1.9
Austria	Proportional	Multi	8.42	119,037	1.4
Uruguay	Proportional	Two	8.12	101,815	2.9
Spain	Proportional	Multi	8.08	2,279,866	4.9
South Korea	Mixed: 253 seats plurality, 47 seats proportional	Two	8.00	349,918	0.67
United States	Plurality	Two	7.98	2,698,608	0.82
Italy	Mixed: 193 seats proportional, 116 seats plurality, 6 seats – a quota for Italians residing abroad	Multi	7.98	949,410	1.6
Japan	Mixed: 295 seats plurality, 180 seats proportional	Multi	7.88	397,159	0.31
Portugal	Proportional	Multi	7.84	65,365	0.63
France	Majoritarian (two rounds)	Multi	7.80	835,323	1.2
Jamaica	Plurality	Two	7.29	16,979	0.58

At the same time, there is a body of research showing that, based on the same individual-level mechanisms, social media can actually decrease users' partisanship and, consequently, polarization. This can happen when users are embedded in politically diverse networks and thus, through weak ties, exposed to ideologically diverse information (Barberá, 2014). Or due to the fact that social media algorithms 'feed' users more cross-cutting hard news and political information than they would see if they relied only on the sources they chose to follow themselves (Bakshy et al., 2015). In addition, Nelson and Webster (2017) challenge the perceived effects of SNS on polarization by showing that Facebook users navigate mostly to several well-known outlets, most of which comprise ideologically diverse audiences and share the audiences with each other as well as with smaller and more extreme media. Finally, there is evidence that in the United States, political polarization has increased the most among the demographic groups least likely to use SNS, suggesting that the effects of SNS on polarization are weaker than generally assumed (Boxell et al., 2017).

As Bright (2018) points out, the individual-level mechanisms outlined above do not explain the variation in polarization levels between different groups. For that, an examination of macro-level factors is necessary. This is, however, difficult since comparative studies on polarization on SNS are almost non-existent (Bright, 2018, is a notable

exception). Most of the research on the phenomena is focused on the United States (and exceptions such as Grömping, 2014, and Gruzd and Roy, 2014, are still single-country studies).

Concentration on the United States, especially on the politicized online communities, could affect the results of the studies, as the United States has a highly polarized two-party political system (Poole, 2008; Poole and Rosenthal, 1984). Elite polarization significantly alters the patterns of opinion formation, intensifying the influence of partisanship on one's opinions and decreasing the effects of substantive information (Druckman et al., 2013). Thus, the political context of the United States rather than the effects of social media itself can potentially explain the presence of echo chambers and strong political polarization on SNS in the United States found by some researchers.

This argument is supported by the fact that the studies conducted in the US context, which concluded that social media does not have polarizing effects, were considering users' social media and media consumption in general rather than focusing just on political content (Bakshy et al., 2015; Barberá, 2014; Nelson and Webster, 2017). The argument that the intensity of polarization on SNS depends on the political context is indirectly backed by the comparative study of the Twitter discussion activities of 115 political groups in 26 countries that showed the connection between the levels of fragmentation on social media and the distance between the political groups on the ideological scale (Bright, 2018).

I suggest that though social media itself might have effects on the strength of political polarization among users, the intensity of polarization among politically engaged users on the same social media platform varies in different political contexts, just like overall levels of societal and political polarization differ from one country to another. This variance, if present, can be explained by macro-level factors such as the differences in the characteristics of countries' political systems.

Hypothesis

The hypothesis tested in this study is that levels of political polarization on social media vary from country to country.

Besides simply testing the hypothesis, I aim to explore possible explanations behind the variance in the intensity of polarization. Of specific relevance is a possible connection between the level of polarization observed on SNS and the country's party system (multi-party vs two-party) and local electoral rules (majoritarian vs proportional).

The first aspect is of particular interest since, as noted above, the vast majority of the studies that explored the relationship between SNS and political polarization and found evidence that social media users are polarized focused on the United States. However, the United States presents just a single case, and if polarization on SNS is indeed contextual, the evidence from the United States cannot be universally generalizable. Second, the United States is a highly polarized two-party system which, even when taking into account only democratic countries, is not a very typical case, meaning that the US-based findings are of limited application to other countries if the polarization on SNS depends on the local political context. Exploration of the possible connection between party systems and polarization levels will allow making more informed conclusions about the

scope of applicability of the evidence from the United States to other countries, depending on local party systems.

Examination of the potential relationship between electoral systems and polarization on social media is motivated by the studies that have found evidence that majoritarian electoral systems tend to have higher degrees of polarization among voters than proportional ones, with the effect being most evident in systems with plurality electoral rule (Bernabel, 2015; Blais and Carty, 1991; Cincea, 2016).

Methodology

Case selection

For the present study, I selected 16 democratic (Democracy Index, 2017, democracy score is seven or above) countries with different electoral rules. The countries were selected in a way to make the sample geographically balanced (including the countries from East, West, global North and global South). Since this study aims to test whether polarization on SNS is contextual, it was necessary to select countries from different cultural contexts. At the same time, as I also seek to explore the potential connection between the levels of polarization on SNS and party systems and electoral rules, I decided to include only democratic countries in the sample. Otherwise, the variance in the polarization intensity could be attributed to other factors. The full list of the countries included in the study is in Table 1 below. It also shows the number of unique Twitter users in the sample for each country and the corresponding share of the total population of the country.

Out of the 16 countries included in the study, eight have a proportional electoral rule and another eight have majoritarian, plurality or mixed electoral systems. Since previous research suggests that overall polarization is lower in countries with proportional electoral rule (Bernabel, 2015; Blais and Carty, 1991; Cincea, 2016), I expect that to be reflected on social media data as well, and the countries with proportional systems to have the most integrated political Twitterspheres. Six countries in the sample have two-party systems and the remaining ten countries have multi-party systems. I will examine whether there are clear-cut differences in the levels of polarization observed for these two categories.

Data and method

The analysis relies on Twitter data collected in September–October 2018 using Twitter's REST API and R package 'twitteR' (Gentry, 2016). I downloaded the lists of the parliamentary parties' official accounts' followers for each of the 16 countries included in the study. In some instances, however, I omitted minor regional parties (e.g. The Social Democratic Party; Inuit Ataqatigiit; Republic; Nunatta Qitornai in the case of Denmark). The primary reason for that is that these parties are of relatively negligible political influence in general and have very few followers on Twitter, and some of them (e.g. Nunatta Qitornai) are separatist. Including them in the analysis would add a regional dimension that is not relevant for the present study, given that the real influence of the respective

political parties is marginal. Also, the fact that these parties target very specific and small shares of the electorate could significantly alter the results of the study due to the nature of the applied approach. They would not have significant audience overlaps with other parties because of their marginal presence in the online political sphere, and their inclusion would not help shed light on the levels of political polarization on SNS for a country in general. The full lists of parties that are included in the study for each country are found in the 'Results' section. There are notes on the cases where minor parties were omitted. I used official Twitter accounts of the parties in the analysis, where not specified otherwise.

In this study, I focus only on Twitter users who are subscribed to official accounts of political parties. This implies a significant selection bias. The sample includes highly politically engaged users and is not representative of the general population of the studied countries. However, for the present study, these data are relevant for two reasons. First, the aim is to examine political polarization on SNS, not in society overall. Twitter suits this purpose as, for users, it is an important platform for political expression and for getting news (Velasquez and Rojas, 2017). Second, in previous studies, polarization was found on Twitter only among politically engaged users, not the general population (Barberá, 2014). Thus, to detect political polarization at all and compare its levels in different countries, it is, in fact, necessary to look at politically engaged users, not at more general samples.

To analyse the collected data, I used the audience duplication approach (Ksiazek, 2011; Webster and Ksiazek, 2012). This network-analytic approach has been successfully applied to study the fragmentation and political polarization in media environments. This approach was used to explore patterns of polarization between the audiences of partisan news outlets (Ksiazek, 2016), to study audience fragmentation across media platforms (Fletcher and Nielsen, 2017) and to examine selective exposure and audience fragmentation among online news audiences (Mukerjee et al., 2018; Nelson and Webster, 2017).

Though audience duplication approach has not been used before to study polarization and audience fragmentation among the social media audiences of different political parties, I suggest it is applicable to the parties' official Twitter accounts as well, since they are in essence a form of new media. According to the audience duplication approach, media environments can be either fragmented or duplicated. The intensity of fragmentation/duplication is inferred from the level of audience overlap between each pair of media outlets in the environment. If many outlets share audiences, the environment is described as duplicated. Otherwise, it is fragmented. Strong fragmentation might indicate that the media environment is polarized (Ksiazek, 2011; Webster and Ksiazek, 2012).

In the present study, I treat official Twitter accounts of political parties as media outlets and their followers as audiences. The audience duplication approach is relevant in this case, as it allows to see how fragmented the Twitterspheres of politically engaged users are in different countries and infer the corresponding levels of polarization. The designed scale of polarization according to the strength of audience fragmentation is described in the end of this section.

I constructed audience duplication graphs for each of the 16 countries included in the analysis. In these graphs, each node represents an official Twitter account of a political party that has seats in the country's parliament. There is a connection between two nodes

if they have overlapping followers on Twitter. Certain overlapping, though, could occur by chance (Ksiazek, 2011). For the two nodes to have a connection, the level of overlapping audiences has to be beyond the 'by chance' threshold. It is determined by multiplying the shares of Twitter users in the general sample who follow each account. For instance, if party A is followed by 30% of users out of the total sample for the corresponding country and party B is followed by 20% of users, the expected 'by chance' audience overlap between them would be 6% (0.3×0.2). The A and B nodes in the resulting audience duplication graph will be connected only if the actual level of audience overlap between them is higher than 6% (the same approach to 'by chance' duplication was used by Fletcher and Nielsen, 2017; Ksiazek, 2011; Webster and Ksiazek, 2012). The edges in the resulting audience duplication graphs are weighted. The higher is the level of audience duplication between two nodes, the thicker is the edge that connects them. The resulting graphs were visualized using Gephi.

According to the topology of the resulting audience duplication graphs, I divided the countries' political Twitterspheres into five categories:

- Perfectly integrated – the graph is complete (each pair of nodes in the graph is connected).
- Integrated – the graph is connected but not complete (all nodes are connected to each other by paths, but not necessarily directly connected as in complete graphs).
- Mixed – the graph is disconnected, but the nodes representing major political parties are directly connected with each other; alternatively, the graph is connected, but the nodes representing major political parties are not connected with each other.
- Polarized – the graph is disconnected and the nodes representing major political parties are not directly connected with each other.
- Perfectly polarized – there are no connections between the nodes of the parties' audience duplication graph (all nodes are isolated).

Results

The results of the audience duplication analysis demonstrate that the levels of polarization vary from country to country, confirming the main hypothesis of the present study. Out of the total sample of 16 countries, based on the topology of audience duplication graphs, one can be described as perfectly integrated, three as integrated, three as mixed, six as polarized, and three as perfectly polarized. Below I present a more detailed overview of the results for each country. This section is divided into five subsections, one for each polarization category. The summary of the findings is in the end of the section.

Perfectly integrated

Only one country included in the present study is classified as having a perfectly integrated political Twittersphere. It is Denmark, which is a unitary state with a proportional rule and a multi-party system. The corresponding audience duplication graph is in Figure 1.
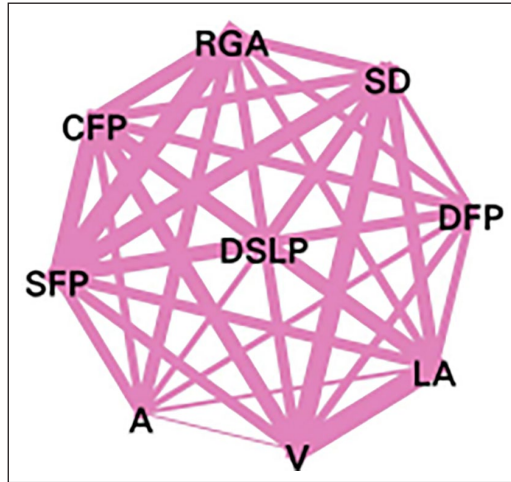
Figure 1. Audience duplication graph, Denmark.
SD: Social Democrats, 46 seats in the parliament (179 in total);[1] DFP: Danish People's Party, 37 seats; V: Venstre, 34 seats; RGA: Red-Green Alliance, 14 seats; LA: Liberal Alliance, 13 seats; A: Alternative, 10 seats; DSLP: Social Liberal Party, 8 seats; SFP: Socialist People's Party, 7 seats; CFP: Conservative People's Party, 6 seats.

The audience duplication graph in the Danish case is complete (each pair of nodes is connected). It means that the official Twitter accounts of all major political parties in Denmark share audiences with each other. The Twittersphere that comprises politically engaged users is thus perfectly integrated. It has to be noted, however, that the minor regional parties from Faroe Islands and Greenland (The Social Democratic Party; Inuit Ataqatigiit; Republic; Nunatta Qitornai) were not included in the analysis.

Integrated

Political Twitterspheres of three countries are integrated as corresponding audience duplication graphs are connected but not complete. The countries are Sweden, Switzerland and Germany. All of them have proportional electoral systems and are multi-party systems. Relevant audience duplication graphs are in Figures 2 to 5.

The graph that represents Sweden is almost complete as just one pair of nodes is not connected. The only two parties that do not share audiences on Twitter are Social Democrats and right-wing populist Sweden Democrats. Hence, Swedish political Twittersphere is almost perfectly integrated. Judging from the levels of audience duplication, Sweden Democrats, in fact, are well integrated into the Swedish political Twittersphere. This finding is counterintuitive since, on the political arena, all other parties, not just Social Democrats, refuse to cooperate with Sweden Democrats (Reuters, 2018). Politically engaged Swedish Twitter users, however, do not refrain from following Sweden Democrats, hinting that attitude to this party on the audience side might be different from that on the elite level.
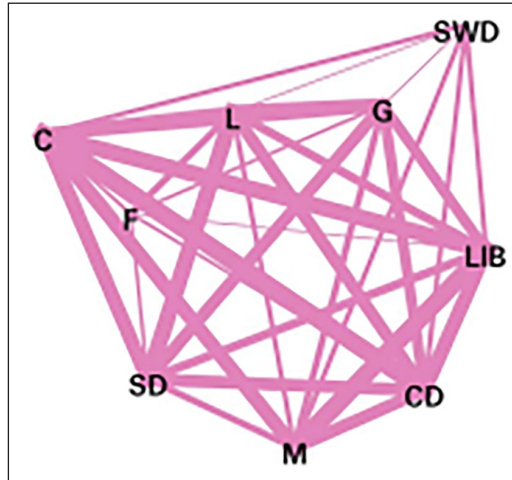
Figure 2. Audience duplication graph, Sweden.
SD: Swedish Social Democratic Party, 100 seats in the parliament (349 in total); M: Moderate Party, 70 seats; SWD: Sweden Democrats, 62 seats; C: Centre Party, 31 seats; L: Left Party, 28 seats; CD: Christian Democrats, 22 seats; LIB: Liberals, 20 seats; G: Green Party, 16 seats.
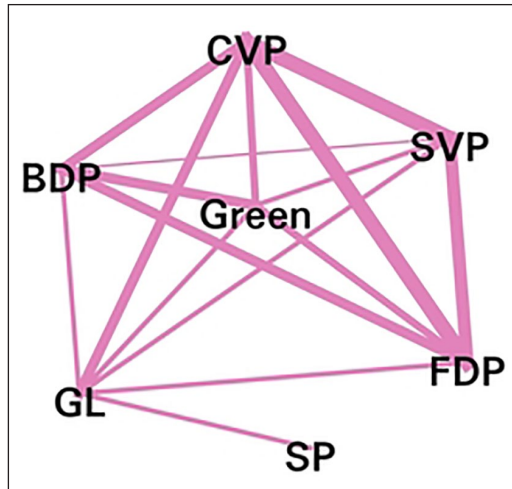
Figure 3. Audience duplication graph, Switzerland.
SVP: Swiss People's Party, 65 seats in the National Council (200 in total); SP: Social Democratic Party, 43 seats; FDP: FDP.The Liberals, 33 seats; CVP: Christian Democratic People's Party, 27 seats; Green: Green Party, 11 seats; BDP: Conservative Democratic Party, 7 seats; GL: Green Liberal Party, 7 seats.

Graphs representing Switzerland and Germany reveal less-integrated political Twitterspheres than that of Sweden. Each of them has a node that is almost isolated and has only one connection to the otherwise complete graph. In case of Switzerland, this
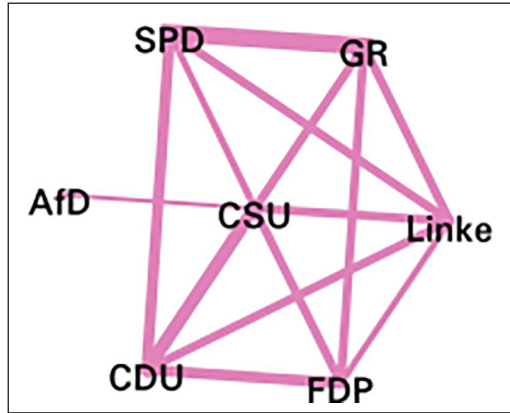
Figure 4. Audience duplication graph, Germany.
CDU: Christian Democratic Union, 200 seats in Bundestag (709 in total); SPD: Social Democratic Party, 153 seats; AfD: Alternative for Germany, 92 seats; FDP: Free Democratic Party, 80 seats; Linke: The Left, 69 seats; GR: The Greens, 67 seats; CSU: Christian Social Union in Bavaria, 46 seats.
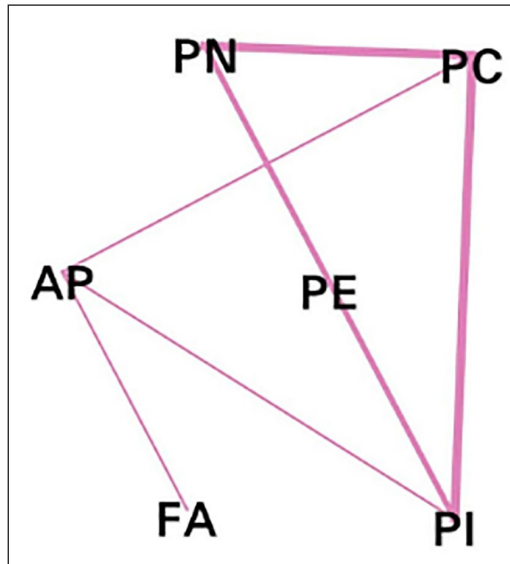
Figure 5. Audience duplication graph, Uruguay.
FA: Broad Front, 50 seats in the Chamber of Representatives (99 in total); PN: National Party, 32 seats; PC: Colorado (Coloured) Party, 13 seats; PI: Independent Party, 3 seats; AP: Popular Assembly, 1 seat.

node corresponds to Social Democratic party. In case of Germany, it is the far-right Alternative for Germany (AfD).

The topology of the German graph could be explained by two facts: (a) AfD is a relatively young party that has entered the German political arena only recently; (b) AfD has
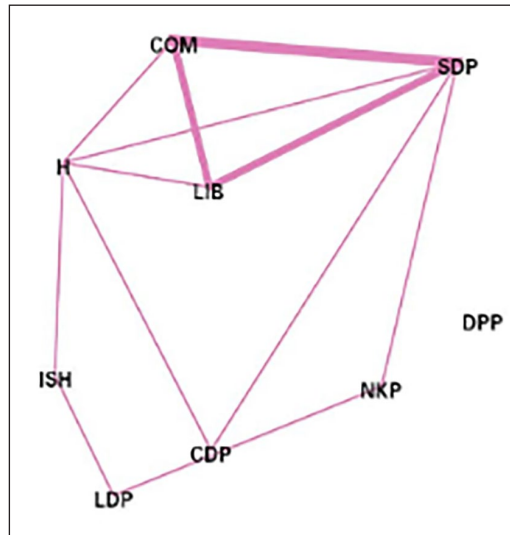
Figure 6. Audience duplication graph, Japan.
LDP: Liberal Democratic Party, 283 seats in the House of Representatives (465 in total); CDP: Constitutional Democratic Party, 55 seats; DPP: Democratic Party for the People, 39 seats; NKP: Komeito, 29 seats; COM: Japanese Communist Party, 12 seats; ISH: Japan Innovation Party (Ishin), 11 seats; SPD: Social Democratic Party, 2 seats; LIB: Liberal Party, 2 seats; H: Party of Hope, 2 seats.

extremely far-right rhetoric which is different from that of the other parties. Given that, in other countries, recently founded parties are well integrated (e.g. the Constitutional Democratic Party (CDP) of Japan), the second explanation is more plausible. Another argument in favour of the second explanation is that AfD shares audiences only with Christian Social Union in Bavaria (CSU), which is the closest to AfD in terms of ideology.

The Swiss case is not as straightforward. Social Democrats are in no way a marginal party in Switzerland. In fact, they are the second-largest one. Their rhetoric is not extreme, unlike that of AfD. The observed isolation of the Swiss Social Democrats is thus not very easy to explain, especially given that their only connection to the main network is through the marginal Green Liberal Party. Though Social Democrats support environmentalist policies, it is not clear why they share audiences only with centrist Green Liberals, but not with the more leftist and thus ideologically close Green party.

Mixed

Three countries fall in the 'mixed' category: Uruguay, Japan and Spain. Uruguay has a two-party system with proportional electoral rules. Japan has a mixed electoral system (see Table 1) and Spain has a proportional one, both are multi-party systems. The corresponding audience duplication graphs are in Figures 5 to 7. In cases of Japan and Spain, both graphs are disconnected (they have isolated nodes or several disconnected
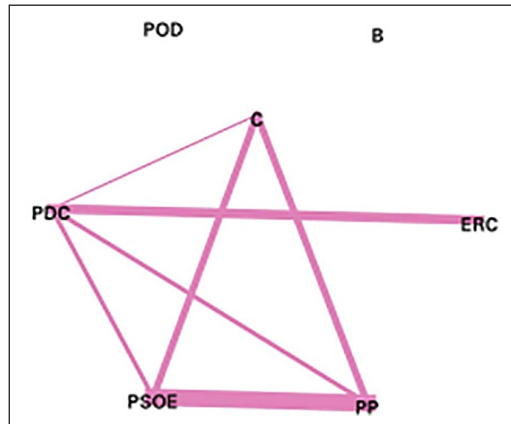
Figure 7. Audience duplication graph, Spain.
PP: People's Party, 104 seats in the Congress of Deputies (350 in total); PSOE: Spanish Socialist Workers'
Party, 84 seats; POD: Podemos, 67 seats; C: Ciudadanos, 32 seats; ERC: Republican Left of Catalonia, 9
seats; PDC: Catalan European Democratic Party, 8 seats. Minor regional parties such as the Basque Nation-
alist Party were not included in the analysis.

components), but these cases still cannot be classified as strictly polarized since the
nodes representing major political parties are connected to each other. In the case of
Uruguay, the Twittersphere is connected. However, the two major parties (Broad Front
and National Party) in this two-party system do not share a connection. Thus, this case
cannot be described as integrated.

The graph of audience duplication in Uruguayan political Twittersphere is connected;
hence, this case cannot be called polarized even though the two major parties do not
share a connection, hinting at overall polarization, given that Uruguay has a two-party
system. Furthermore, the largest party – Broad Front – has just one connection to the
others. It is through Popular Assembly – a minor party that was formed in 2006 through
splitting from Broad Front. Thus, the graph topology indicates that there is a certain
degree of polarization between the dominant Broad Front and other parties, and if not for
the connection through Popular Assembly, the Uruguayan political Twittersphere would
be classified as polarized.

The graph corresponding to the Japanese political Twittersphere is almost connected.
The only isolated node represents the Democratic Party for the People (DPP) that was
formed in 2018. The fact that the party is very new could account for its isolation. Still,
similarly to the case of German AfD, I suggest that is not the main explanation. For
instance, CDP is quite well integrated in the Twittersphere despite that, same as DPP, it
split from the oppositional Democratic party just half a year before DPP. Thus, I suggest
the reason behind the DPP's isolation is its ideological position. The party can be
described as centrist which makes it distant on the ideological scale from both, the more
leftist opposition represented by the most interconnected part of the graph and the right-
wing Liberal Democratic Party (LDP), Komeito, and Ishin. Also, even though the graph
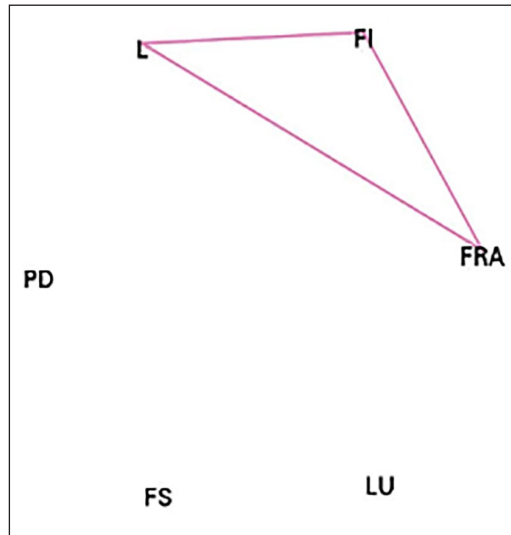
Figure 8. Audience duplication graph, Italy.
FS: The Five Star Movement, 227 seats in the Chamber of Deputies (465 in total); L: Lega Nord, 125 seats; PD: Democratic Party, 112 seats; FI: Forza Italia, 104 seats; FRA: Brothers of Italy, 32 seats; LU: Free and Equal, 14 seats. Minor regional parties were not included in the analysis.

is connected, a certain degree of ideological polarization is evident in the Japanese case: the ruling right-wing LDP has connections only to the rightist Komeito (in ruling coalition with LDP) and more radical right-wing Ishin.

In Spain, the two biggest parties – People's Party (PP) and Spanish Socialist Workers' Party (PSOE) – have a strong connection. Hence, the level of audience duplication between these two parties on Twitter is high. Given that PP is a centre-right party that at the time of data collection was in the opposition and PSOE is a centre-left party that was in the governing coalition, this indicates that overall Spanish political Twittersphere is not extremely polarized. But the third major party, the left-wing populist Podemos, is represented by an isolated node. The followers of Podemos are distant from the other part of the political Twittersphere, which includes not just PP and PSOE, but also the Catalan political parties of varying ideological orientations. The Spanish political Twittersphere is not fully integrated since Podemos is isolated, but it cannot be called truly polarized as well because all the other parties' official accounts have shared audiences, including the European Democratic Party of Catalonia that promotes the Catalonian independence.

Polarized

Six countries included in this study were classified as polarized: Italy (Figure 8), France (Figure 9), the UK (Figure 10), Australia (Figure 11), Portugal (Figure 12) and Austria (Figure 13). The graphs representing these countries' political Twitterspheres are disconnected, and the majority of direct connections are between the nodes representing ideologically similar parties.
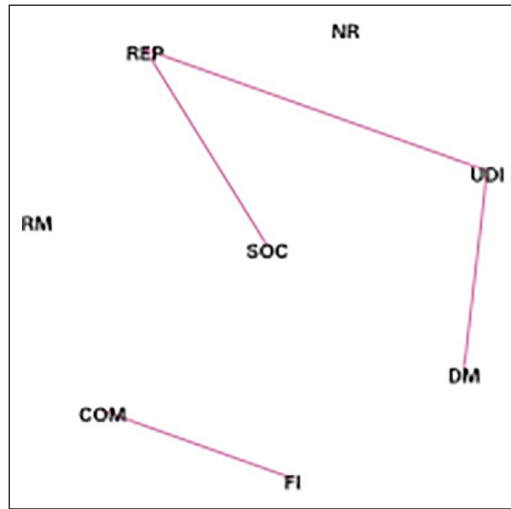
Figure 9. Audience duplication graph, France.
RM: La République En Marche, 311 seats in the National Assembly (577 in total); REP: The Republicans, 112 seats; DM: Democratic Movement, 42 seats; UDI: Union of Democrats and Independents, 32 seats; SOC: Socialist, 30 seats; FI: La France Insoumise, 17 seats; COM: French Communist Party, 10 seats; NR: National Rally (former National Front), 8 seats. Minor parties that have five seats or less were not included in the analysis.

Italian political Twittersphere reflects a case of polarization in a multi-party system. The only three parties that share audiences on Twitter are the three right-wing parties. Other parties stand on different ideological positions and, as the data suggest, their Twitter audiences do not overlap.

France is another example of a polarized political Twittersphere in a multi-party system. But while Italy has a mixed electoral system, France has a majoritarian one. Until the 2017 elections, there were two dominant parties in the French system, Socialists and Republicans. However, in, 2017, the party of Emmanuel Macron, La République En Marche (RM), won the elections, and the two traditional parties lost their leadership. Judging from the topology of the graph, this development could have added up to the polarization in the French political Twittersphere. The traditional majority parties share audiences with each other and with other parties except for the far-left ones. RM is represented by an isolated node, which might indicate that though it now has the majority in the National Assembly, there is a divide between this newly emerged political force and the traditional French political scene.

The graphs representing the British and the Australian Twitterspheres are very similar. In both cases, the major parties (Conservatives and Labour in the United Kingdom; Liberals and Labour in Australia) do not share audiences. However, they have connections to minor middle-ground parties – Liberal Democrats in the United Kingdom and National Party in Australia. The latter ones also share audiences with the local Green parties. The most plausible explanation of the similarities between the two graphs is that
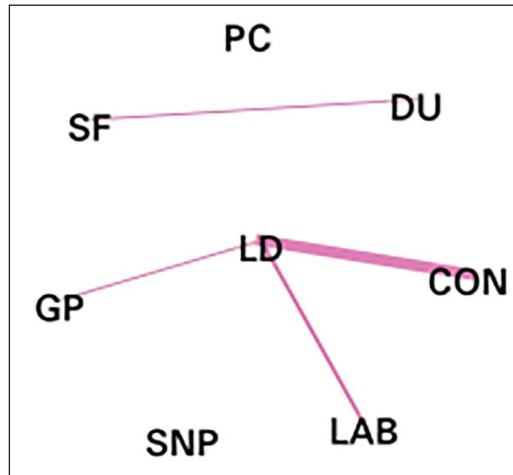
Figure 10. Audience duplication graph, the United Kingdom.
CON: Conservative Party, 316 seats in the House of Commons (650 in total); LAB: Labour Party, 257 seats; SNP: Scottish National Party, 35 seats; LD: Liberal Democrats, 12 seats; DU: Democratic Unionist Party, 9 seats; Sinn Fein, 7 seats; PC: Plaid Cymru, 4 seats; GP: Green Party, 1 seat.
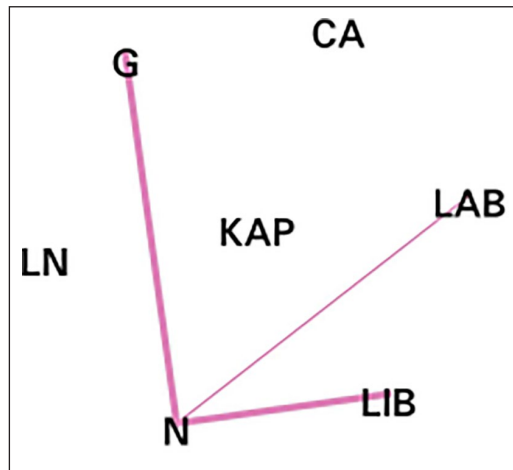
Figure 11. Audience duplication graph, Australia.
LAB: Labour Party, 69 seats in the House of Representatives (150 in total); LIB: Liberal Party, 59 seats; N: National Party, 16 seats; KAP: Katter's Australian, 1 seat; CA: Centre Alliance, 1 seat; G: Australian Greens, 1 seat.

the political systems of the two countries are very much alike. Both have plurality electoral rules and two major parties. The similarities are evident since Australia in a sense inherited its party system from the United Kingdom and follows the British model in this respect. The main difference between the two graphs is contextual. In the British case,
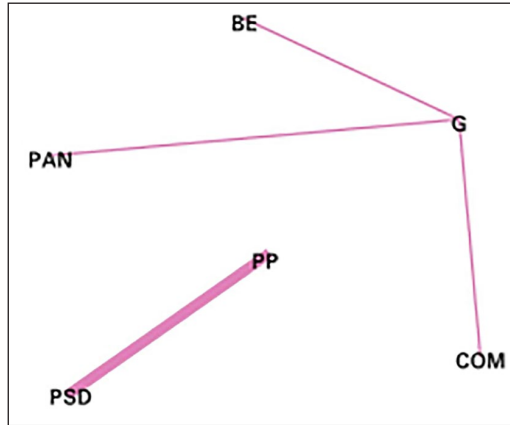
Figure 12. Audience duplication graph, Portugal.
PSD: Social Democratic Party, 89 seats in the Assembly of the Republic (230 in total); SOC: Socialist Party, 86 seats; BE: Left Bloc, 19 seats; PP: People's Party, 18 seats; COM: Communist Party, 15 seats; G: Greens, 2 seats; PAN: People-Animals-Nature, 1 seat.

there is one more connected component, representing two parties from Northern Ireland – a reflection of regional divisions and conflicts that are not present in Australia.

The countries already mentioned in this section have either mixed or majoritarian electoral systems, and countries with proportional electoral rules so far were classified as having either integrated or mixed political Twitterspheres. However, Portugal has a multi-party proportional system but still is clearly polarized along the political lines. There are two major parties (Social Democratic Party (PSD) and Socialist Party (SOC) on the graph) that share audiences neither with each other nor with the minor left-wing parties. I suggest that the high level of audience fragmentation in the Portuguese political Twittersphere can be explained by the presence of two strong parties with diverging ideological positions (PSD is centre-right while SOC is centre-left). As demonstrated by the British and Australian cases above and Jamaican, South Korean and the US cases below, countries that have two dominant parties tend to have polarized online political spheres.

Austria, similarly to Portugal, has a proportional electoral rule and a multi-party system. Still, its political Twittersphere is extremely polarized. Only the liberal NEOS – The New Austria and Liberal Forum shares audiences with the traditionally dominant People's Party and Social Democratic Party. Considering the ideological orientations of all the parties represented in the Austrian parliament, the only compelling explanation of the observed topology of the graph lies in the data. Unlike other countries and parties, the Freedom Party of Austria and Peter Pilz List do not have official Twitter accounts. Personal accounts of their leaders – Heinz-Christian Strache and Peter Pilz, respectively,– are used to communicate the parties' messages to the public. This discrepancy in the data might account for the fact that the nodes representing these two parties are isolated.
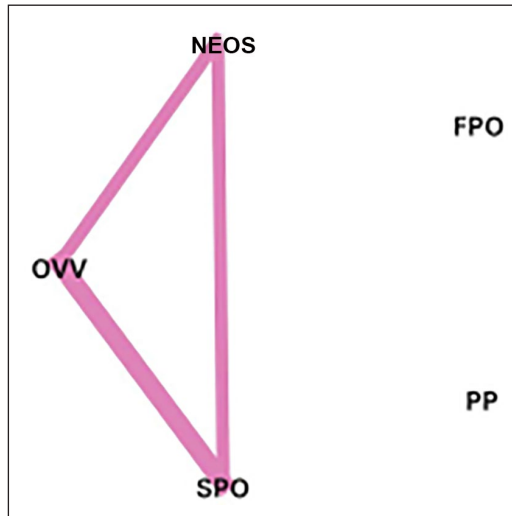
Figure 13. Audience duplication graph, Austria.
OVV: Austrian People's Party, 61 seats in the National Council (112 seats in total); SPO: Social Democratic Party, 52 seats; FPO: Freedom Party of Austria, 51 seats; NEOS – The New Austria and Liberal Forum, 10 seats; PP: Peter Pilz List, 7 seats. FPO and PP do not have official accounts; therefore, the accounts of their leaders, Heinz-Christian Strache and Peter Pilz, respectively, were used in the analysis instead.

Figure 14. Audience duplication graph, the United States.
GOP: The Republicans, 235 seats in the House of Representatives (435 in total); DEM: The Democrats, 193 seats. Seven seats are vacant.

Figure 15. Audience duplication graph, Jamaica.
JLP: Jamaica's National Party, 33 seats in the House of Representatives (63 in total); PNP: People's National Party, 30 seats.

Perfectly polarized

Three countries have perfectly polarized political Twitterspheres: the United States (Figure 14), Jamaica (Figure 15) and South Korea (Figure 16). The first two have plurality electoral rule and a two-party system. South Korea has a mixed electoral system and, though there are multiple parties in the parliament, de-facto the power is divided between the two major parties as the country's political system was very much affected by the United States. The case of South Korea is still outstanding since the country, unlike the other two perfectly polarized cases, has multiple parties in the parliament, not just the
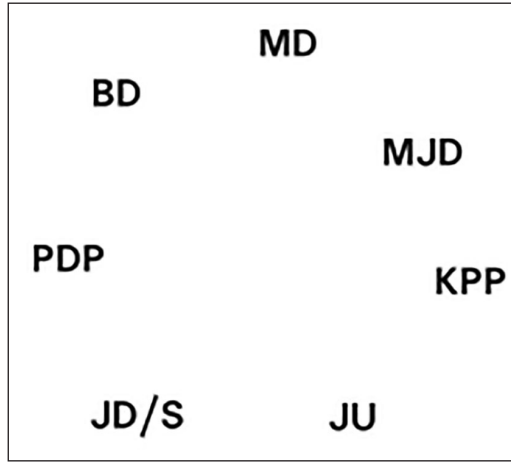
Figure 16. Audience duplication graph, South Korea.
MJD: Democratic Party, 129 seats in the National Assembly (300 in total); JD/S: Liberty Korea Party (former Saenuri), 112 seats; BD: Bareunmirae, 30 seats; PDP: Peace and Democracy, 14 seats; JU: Justice Party, 5 seats; MD: Minjung, 1 seat; KPP: Korean Patriots, 1 seat.

Table 2. Distribution of countries' political Twitterspheres by polarization categories.

Category	No. of countries	countries
Perfectly integrated	1	Denmark
Integrated	3	Sweden, Switzerland, Germany
Mixed	3	Uruguay, Japan, Spain
Polarized	6	Italy, France, United Kingdom, Australia, Portugal, Austria
Perfectly polarized	3	United States, Jamaica, South Korea

two dominant ones (similarly to the United Kingdom and Australia). Still, none of them share Twitter audiences. The reason behind this extreme polarization is not entirely apparent and is a potential subject for further analysis.

Summary

The levels of polarization in the political Twitterspheres of the 16 countries included in the present study vary significantly from country to country (see Table 2). Properties of the audience duplication graphs are in Table 3. The empirical data thus support the main hypothesis of the present study.

All countries that can be classified as having perfectly integrated or integrated political Twittersphere have proportional multi-party systems. On the contrary, two countries with proportional multi-party systems – Portugal and Austria – still fell in the 'polarized' category. Out of the three countries in the 'mixed' category, two have multi-party

Table 3. Characteristics of audience duplication graphs by country.

Country	No. of nodes	No. of edges	Density	No. of weakly connected components
Sweden	9	33	0.917	1
Denmark	9	36	1	1
Australia	7	3	0.143	4
Switzerland	7	16	0.762	1
Germany	7	16	0.762	1
United Kingdom	8	4	0.143	4
Austria	5	3	0.300	3
Uruguay	6	6	0.400	2
Spain	7	7	0.333	3
South Korea	7	0	0	7
United States	2	0	0	2
Italy	6	3	0.200	4
Japan	9	12	0.333	2
Portugal	6	4	0.267	2
France	8	4	0.143	4
Jamaica	2	0	0	2

systems (one proportional, one majoritarian) and one has a proportional two-party system.

The data thus suggest that countries with proportional multi-party systems have lower levels of polarization than countries with other systems. But since the study is based on a relatively small sample, it is not possible to make a definitive conclusion about the connection between electoral rules, party systems and polarization on SNS.

Discussion

This study has demonstrated that the levels of polarization among politically engaged Twitter users vary significantly from country to country. This finding can help explain the contradictions in the results of different studies that explored political polarization on social media. Since the intensity of polarization on Twitter is contextual, more comparative studies are necessary to infer the effects of social media platforms themselves on political polarization.

Findings on the matter from single-case studies have limited application since, as shown in this article, levels of polarization vary greatly. Among the factors that can potentially explain this variation are countries' electoral rules and party systems. As polarization on SNS is highly contextual, conclusions based on single-case studies cannot be extrapolated to other countries. For example, the present study shows that polarization in the US political Twittersphere is extreme and similar polarization intensity is found only in Jamaica and South Korea, one of which has a two-party system, and another one has a multi-party system that is nonetheless dominated by two antagonized

parties. This result suggests that findings on polarization and social media from the United States have limited generalizability, which is of utmost relevance since most research on the subject is in fact conducted in the US context. The findings of the present study thus indicate that previously made suggestions about the connection between social media and polarization should be put into context and, in some cases, reconsidered. It is not possible to generalize the majority of the findings on the matter since they are based on single-case studies.

The explorative analysis of the potential effects of party systems and electoral rules on polarization demonstrates that countries with two-party proportional systems exhibit relatively low levels of polarization on SNS, while the countries with two-party plurality systems appear to be the most polarized. I suggest that this hints at a connection between party systems and electoral rules and online polarization. Further analysis is necessary, though, to make a definitive conclusion about such connection and to assess which other factors might be predictors of polarization intensity on SNS. Results of such studies would allow to better understand the variations in the levels of polarization and to find out the conditions under which findings from one country can be extrapolated to another (e.g. if the two countries have similar electoral rules and party systems).

This study has significant limitations that are to be addressed in the future to get more comprehensive and generalizable results. First, it looked only at a particular group of Twitter users: those subscribed to the official accounts of political parties. Still, as noted in the 'Methodology' section, the high level of selection bias, in this case, is justified since politically engaged users are the ones among who polarization is most evident (Barberá, 2014). However, to broaden the scope of the analysis in the future, it would be relevant to include users subscribed to partisan media and politicians' accounts as well. That would allow getting a more comprehensive view of the political Twitterspheres of the countries in question. Second, the suggestions about the relationship between the electoral rules and polarization are based on the general overview of the levels of polarization in countries with different electoral systems. No statistical tests were conducted as the number of countries included in the sample was too small for a meaningful statistical analysis. In the future, this limitation is also to be addressed to get more robust results. Third, I did not control for the actual places of residence of the followers of different parties. It might be that there is a significant share of foreigners among the followers of the political parties in countries like the United States or the United Kingdom, which could be a potentially confounding factor with regard to the findings of this study. Finally, I looked only at the potential relationship between levels of polarization on SNS and electoral rules and party systems. I suggest, however, that more factors could explain the variations in the polarization intensity on SNS such as inequality, levels on trust in the government and/or media or polarization of the elites. Analysis of the relationship between polarization on social media and these and other factors in the future can help to distinguish the effects social media platforms themselves have on polarization levels from the influence of contextual factors.

Acknowledgements

ORCID iD

Aleksandra Urman 🆔 https://orcid.org/0000-0003-3332-9294

Note

1. Hereafter, the distributions of seats for all parties and countries as well as the descriptions of political situations are given as of September–October 2018, when the data were collected.

References

Allcott H and Gentzkow M (2017) Social media and fake news in the 2016 election. *Journal of Economic Perspectives* 31(2): 211–236.

Bail CA, Argyle LP, Brown TW, et al. (2018) Exposure to opposing views on social media can increase political polarization. *Proceedings of the National Academy of Sciences of the United States of America* 115: 9216–9221.

Bakshy E, Messing S and Adamic LA (2015) Exposure to ideologically diverse news and opinion on Facebook. *Science* 348(6239): 1130–1132.

Barberá P (2014) How social media reduces mass political polarization. Evidence from Germany, Spain, and the U.S. Working Paper. Available at: http://pablobarbera.com/static/barbera_polarization_APSA.pdf (accessed 11 September 2019).

Bernabel R (2015) Does the electoral rule matter for political polarization? The case of Brazilian legislative chambers. *Brazilian Political Science Review* 9(2): 81–108.

Blais A and Carty RK (1991) The psychological impact of electoral laws: measuring Duverger's Elusive factor. *British Journal of Political Science* 21(1): 79–83.

Boxell L, Gentzkow M and Shapiro JM (2017) Greater Internet use is not associated with faster growth in political polarization among US demographic groups. *Proceedings of the National Academy of Sciences of the United States of America* 114: 10612–10617.

Bright J (2018) Explaining the emergence of political fragmentation on social media: the role of ideology and extremism. *Journal of Computer-Mediated Communication* 23(1): 17–33.

Cincea E (2016) Proportionality or majoritarianism? In search of electoral equity. *Bajo Palabra*. Available at: https://revistas.uam.es/bajopalabra/article/view/3146 (accessed 17 October 2018).

Colleoni E, Rozza A and Arvidsson A (2014) Echo chamber or public sphere? Predicting political orientation and measuring political homophily in Twitter using big data: political homophily on Twitter. *Journal of Communication* 64(2): 317–332.

Conover MD, Gonçalves B, Flammini A, et al. (2012) Partisan asymmetries in online political activity. *EPJ Data Science* 1: 6.

Democracy Index (2017) Available at: https://www.eiu.com/public/topical_report.aspx?campaign id=DemocracyIndex2017 (accessed 21 April 2019).

Druckman JN, Peterson E and Slothuus R (2013) How elite partisan polarization affects public opinion formation. *American Political Science Review* 107(1): 57–79.

Fletcher R and Nielsen RK (2017) Are news audiences increasingly fragmented? A cross-national comparative analysis of cross-platform news audience fragmentation and duplication. *Journal of Communication* 67(4): 476–498.

Garimella K, Morales GDF, Gionis A, et al. (2018) *Political Discourse on Social Media: Echo Chambers, Gatekeepers, and the Price of Bipartisanship*. Available at: http://arxiv.org/abs/1801.01665 (accessed 1 October 2018).

Gentry J (2016) *R Based Twitter Client. Contribute to Geoffjentry/Twitter Development by Creating an Account on GitHub*. Available at: https://github.com/geoffjentry/twitteR (accessed 21 April 2019).

Grömping M (2014) 'Echo chambers': partisan Facebook groups during the 2014 Thai election. *Asia Pacific Media Educator* 24(1): 39–59.

Gruzd A and Roy J (2014) Investigating political polarization on Twitter: a Canadian perspective. *Policy & Internet* 6(1): 28–45.

Hindman M (2009) *The Myth of Digital Democracy*. Princeton, NJ: Princeton University Press. Available at: https://www.jstor.org/stable/j.ctt7scb3 (accessed 1 October 2018).

Hong S and Kim SH (2016) Political polarization on twitter: implications for the use of social media in digital governments. *Government Information Quarterly* 33(4): 777–782.

Ksiazek TB (2011) A network analytic approach to understanding cross-platform audience behavior. *Journal of Media Economics* 24(4): 237–251.

Ksiazek TB (2016) Partisan audience polarization: beyond selective exposure. *Atlantic Journal of Communication* 24(4): 216–227.

Lee C, Shin J and Hong A (2018) Does social media use really make people politically polarized? Direct and indirect effects of social media use on political polarization in South Korea. *Telematics and Informatics* 35(1): 245–254.

Levendusky MS (2013) Why do partisan media polarize viewers? *American Journal of Political Science* 57(3): 611–623.

McPherson M, Smith-Lovin L and Cook JM (2001) Birds of a feather: homophily in social networks. *Annual Review of Sociology* 27(1): 415–444.

Messing S and Westwood SJ (2014) Selective exposure in the age of social media: endorsements Trump Partisan source affiliation when selecting news online. *Communication Research* 41(8): 1042–1063.

Mukerjee S, Majó-Vázquez S and González-Bailón S (2018) Networks of audience overlap in the consumption of digital news. *Journal of Communication* 68(1): 26–50.

Müller K and Schwarz C (2018) *Fanning the flames of hate: social media and hate crime*. ID 3082972, SSRN Scholarly Paper, 21 May. Rochester, NY: Social Science Research Network. Available at: https://papers.ssrn.com/abstract=3082972 (accessed 28 September 2018).

Nelson JL and Webster JG (2017) The myth of partisan selective exposure: a portrait of the online political news audience. *Social Media + Society*. DOI: 10.1177/2056305117729314

Poole KT (2008) The roots of the polarization of modern U.S. politics. *SSRN Electronic Journal*. DOI: 10.2139/ssrn.1276025

Poole KT and Rosenthal H (1984) The polarization of American politics. *The Journal of Politics* 46(4): 1061–1079.

Prior M (2002) Liberated viewers, polarized voters–the implications of increased media choice for democratic politics. *The Good Society* 11(3): 10–16.

Quattrociocchi W, Scala A and Sunstein CR (2016) Echo chambers on Facebook. *SSRN Electronic Journal*. DOI: 10.2139/ssrn.2795110

Reuters (2018) Support for Sweden Dems slips ahead of Sept 9 election: poll, 22 August. Available at: https://www.reuters.com/article/us-sweden-election-poll/support-for-sweden-dems-slips-ahead-of-sept-9-election-poll-idUSKCN1L71K2 (accessed 22 October 2018).

Shin J and Thorson K (2017) Partisan selective sharing: the biased diffusion of fact-checking messages on social media. *Journal of Communication* 67(2): 233–255.

Sunstein CR (2001) *Echo Chambers: Bush V. Gore, Impeachment, and beyond*. Princeton, NJ: Princeton University Press.

Sunstein CR (2017) *#Republic: Divided Democracy in the Age of Social Media*. Princeton, NJ: Princeton University Press.

Tucker J, Guess A, Barbera P, et al. (2018) Social media, political polarization, and political disinformation: a review of the scientific literature. *SSRN Electronic Journal*. DOI: 10.2139/ssrn.3144139

Velasquez A and Rojas H (2017) Political expression on social media: the role of communication competence and expected outcomes. *Social Media + Society* 3(1): 205630511769652. DOI: 10.1177/2056305117696521

Webster JG and Ksiazek TB (2012) The dynamics of audience fragmentation: public attention in an age of digital media. *Journal of Communication* 62(1): 39–56.

Paper 2

News Consumption of Russian Vkontakte Users: Polarization and News Avoidance

Urman, A. (2019). News Consumption of Russian Vkontakte Users: Polarization and News Avoidance. *International Journal of Communication, 13*(0), 25. https://ijoc.org/index.php/ijoc/article/view/11161

News Consumption of Russian Vkontakte Users:
Polarization and News Avoidance

ALEKSANDRA URMAN[1]
University of Bern, Switzerland

This study explores the patterns of news consumption of Russian users of Vkontakte, the most popular social media platform in Russia, based on a sample of 55,344 users. The analysis is conducted via a combination of network analysis techniques. It demonstrates that the majority of Vkontakte users do not subscribe to news sources, demonstrating that there is a politically apathetic majority and news-interested minority. And news subscribers are polarized along political lines. There is a distinct group of users who subscribe to pro-opposition-leaning politicized sources more than other users do. This study builds on research on polarization, selective exposure, and the role of social media in authoritarian regimes. It provides new empirical evidence on the way that selective exposure and polarization manifest themselves on a non-Western platform in an authoritarian state.

Keywords: Russia, Vkontakte, news consumption, polarization, network analysis, social media, news avoidance

In recent years, researchers have extensively examined polarization on social media (social networking sites [SNS]) manifested in echo chambering and selective exposure. However, the findings are contradictory; some studies confirm the existence of echo chambers on SNS (e.g., Schmidt et al., 2017), whereas others disprove it (e.g., Goel, Mason, & Watts, 2010). One possible explanation is that the intensity of polarization is contextual, differing among platforms and countries. To date, most empirical research on the phenomena has been conducted on Twitter or Facebook in the context of the U.S. or other liberal democracies. In this article, I aim to partially fill the research gap by providing empirical evidence on selective exposure and polarization in news consumption among Russian users of Vkontakte (vk.com), a Russian online social media and social networking service based in Saint Petersburg that is the most popular SNS in Russia.

Besides expanding the research on polarization on social media beyond Western platforms and contexts, examining the news consumption in the Russian segment of Vkontakte sheds light on the perspectives and limitations of social media sites as news dissemination and political mobilization channels in a consolidated authoritarian regime. SNS can be helpful tools for protest mobilization in authoritarian regimes (Ruijgrok, 2017), but they can also be used by authoritarian governments to push forward their agenda and silence dissent (Gunitsky, 2015; Pearce & Kendzior, 2012; Tufekci, 2017).

In this study, I first present the state of research on polarization manifested in echo chambering and selective exposure, as well as on news dissemination through social media in authoritarian regimes. I also describe the role played by social media in the protest mobilization in Russia over the past decade. Next, I outline my research question and hypotheses. Finally, I conduct empirical analysis, applying network analysis techniques to the data on 55,344 Russian users of Vkontakte.

Selective Exposure and Polarization

The growth in the amount and the variety of available media in recent decades has made it easier for people to find news sources that are consistent with their attitudes (Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012). In these high-choice media environments, people tend to demonstrate partisan biases in consumption, choosing only media sites that align with their views (Bennett & Iyengar, 2008). The phenomenon in which people seek information that supports their existing beliefs and avoid information that contradicts them is called selective exposure (Stroud, 2008).

The psychological underpinnings of selective exposure are related to cognitive dissonance. When presented with information that is inconsistent with their beliefs, people feel uncomfortable (Festinger, 1957). To avoid unpleasant feelings, they try to expose themselves only to information that aligns with their values and attitudes (Klapper, 1960). Another psychological explanation for selective exposure is that people employ it as a strategy to reduce their cognitive efforts put into information processing (Smith, Fabrigar, & Norris, 2008). People's information-processing capacities are limited (Lang, 2000), and information that is consistent with their existing beliefs is easier to process (Edwards & Smith, 1996). Thus, selective exposure helps people save their mental resources and avoid cognitive overload. Empirical evidence confirms that selective exposure is present on social media platforms (An, Quercia, Cha, Gummadi, & Crowcroft, 2014; Grömping, 2014). Besides engaging in selective exposure, people demonstrate the tendency for homophily— that is, surrounding themselves with individuals who have characteristics similar to theirs, such as gender, socioeconomic status, moral values, and political orientations (McPherson, Smith-Lovin, & Cook, 2001).

Selective exposure and homophily in the online sphere might lead to the formation of the so-called echo chambers—communities of like-minded individuals where people are exposed to opinions and ideas consistent with their views—which in turn can increase polarization (e.g., Garimella, Morales, Gionis, & Mathioudakis, 2018; Grömping, 2014; Sunstein, 2001). A growing body of research, however, contests polarizing effects of echo chambering and selective exposure on social media, showing that SNS can diversify users' media diets and make them less polarized through incidental exposure to opposing opinions and increased access to media with different types of political stance (Barberá, 2015; Dubois & Blank, 2018; Flaxman, Goel, & Rao, 2016; Fletcher & Nielsen, 2018; Nelson & Webster, 2017). The scholarly debate on

the intensity of selective exposure and echo chambering and their potentially polarizing effects is thus ongoing. However, to date, research on these phenomena has focused on Twitter and Facebook in the context of Western liberal democracies, primarily the U.S. Nonetheless, the evidence from these contexts has limited generalizability. It does not apply to other platforms and to states with different political systems—for instance, authoritarian regimes. At the same time, understanding how information is consumed on social media in authoritarian states is of critical importance. The SNS in such countries play a crucial role in civic mobilization and circumvention of censorship by providing channels of news dissemination to the opposition and independent media. Because political systems in authoritarian countries are very different from those of liberal democracies, polarization on social media there, if manifested, is also likely to occur along different lines. Although research based on the data from U.S. finds evidence of left-wing versus right-wing polarization, in authoritarian regimes it is more likely to occur along the progovernment versus pro-opposition lines. Therefore, research on political polarization on SNS in different contexts and different platforms is pivotal for a better understanding of the phenomena in general.

Social Media Platforms as News Disseminators in Authoritarian Regimes

SNS and the Internet are positively correlated with the protest potential, especially in authoritarian regimes (Howard et al., 2011). Nonetheless, these channels are just tools—what really matters is the content spread through them. Ruijgrok (2017, p. 17) identifies four causal mechanisms that explain how the Internet, through increased access to information, leads to more protests in authoritarian regimes: (1) lowering the risk to the opposition in coordinating demonstrations, (2) changing citizens' attitudes by exposing them to alternative information, (3) removing information uncertainty among potential protestors, and (4) presenting users with videos and pictures, which can be especially powerful. Besides, social media helps activists circumvent the mainstream media "blackout" and attract public attention (Breuer, Landman, & Farquhar, 2015).

Though social media increases people's access to information and can have a mobilizing effect on citizens in authoritarian regimes, contemporary autocrats have learned how to use the new technologies in pursuit of their own interests. For instance, China and Russia practice what is referred to as networked authoritarianism; they leverage "ICTs [information and communication technologies] and media regulation to carefully control the expression of dissent in a way that gives the impression of limited freedom of expression without allowing dissent to gain traction" (Maréchal, 2017, p. 36). Autocratic regimes resort to censorship by disinformation—not by trying to block certain content, but rather by distracting citizens from it by flooding online public spheres with fake news and trivialities (Tufekci, 2017). They also compete with online dissent and try to undermine the credibility of the online media that presents accurate information (MacKinnon, 2011; Maréchal, 2017; Pearce & Kendzior, 2012).

Research on censorship in authoritarian regimes shows that the aim of propaganda is not only indoctrination but also a signal to the public that the state is strong enough, thus discouraging citizens from revolting (Huang, 2015) and convincing them that the autocrat is sufficiently competent to govern (Guriev & Treisman, 2015).

Previous research on the role of social media in authoritarian regimes, as outlined above, suggests the following: (1) Social media is a powerful tool for disseminating information and circumventing censorship; (2) SNS have political mobilization potential because access to the political information provided by social media can lead to the mobilization of users who were exposed to such information; and (3) autocratic governments aim to censor social media to curb mobilization potential, not to stop the spread of information per se.

Examining the consumption of political content—including hard news—in authoritarian states is necessary to better comprehend how the mechanisms described above work in practice and interplay with phenomena such as selective exposure and polarization on SNS observed in other contexts, in case these phenomena are manifested among social media users in authoritarian states as well.

Background Information: Russia and Vkontakte

The hypotheses presented in this study are partially built on the characteristics of the Russian social media sphere in general, and the examined Vkontakte platform in particular. Thus, before moving on to the hypotheses, I briefly outline these characteristics and my reasons for choosing Russia and Vkontakte as the constituents of this case study.

In 2011, only 49% of Russians had Internet access (World Bank, n.d.); 20% and 7% named online media and social media, respectively, among their primary news sources, whereas 92% said that TV was their primary source of news ("Istochniki informatsii," 2017). Since 2011, the level of Internet penetration in Russia has increased significantly, as well as Russians' eagerness to rely on social media for the news. In 2016, 73% of Russians had Internet access (World Bank, n.d.). In 2018, 21% and 27% of Russians, respectively, said that they obtained their news from social media and online media (Levada Center, 2018).

On the one hand, the increase in the number of Internet and social media users should have increased the protest mobilization potential of SNS because information from pro-opposition actors circulated on social media in 2019 has a potentially broader reach than it had in 2011. On the other hand, since 2011, the Russian government has increased its efforts to obstruct the use of social media for protest mobilization (see Klyueva, 2016; Reuter & Szakonyi, 2015; Sanovich, Stukal, & Tucker, 2018; Soldatov & Borogan, 2015; Tselikov, 2014). Despite the growth from 7% in 2011 to 21% in 2018, the percentage of people relying on social media for news is still meager compared with those in other countries (see, e.g., Newman, Fletcher, Kalogeropoulos, Levy, & Nielsen, 2018).

Despite the relatively low levels of social media usage in 2011 and the increased control over the Internet in subsequent years, Russia has witnessed two waves of SNS-enabled protests—one in 2011–12 and the other in 2017. The exact role of different social media platforms in the 2011–12 protest mobilization is disputable. Some researchers argue that Western social media platforms, namely Facebook and Twitter, were the most crucial to the Russian protests of 2011–12, and Russian social media platforms, such as Vkontakte or Odnoklassniki (odnoklassniki.ru), were of negligible importance (Gainous, Wagner, & Ziegler, 2018; Reuter & Szakonyi, 2015; White & McAllister, 2014). Others demonstrate that Vkontakte usage also increased its mobilization potential (Enikolopov, Makarin, & Petrova, 2016). Nonetheless, there is unilateral

agreement about the importance of SNS for protest mobilization. Researchers have argued that increased control over the Internet in Russia has hindered its protest mobilization potential (Reuter & Szakonyi, 2015). However, the massive social-media-enabled protests of 2017 contradict this view. In 2017, the largest protest action since 2012 occurred on March 26, when the opposition leader Alexey Navalny, who is de facto banned from appearing on national TV or the major state media (Ragozin, 2017), called for the protests through SNS (Sebastian, 2017).

The Russian social media sphere can be perceived as a battlefield between the state and pro-opposition activists, making it a particularly relevant case for the study of news consumption and polarization on SNS in contexts other than liberal democracies. In this article, I focus on news consumption on the Russian social media platform Vkontakte. In December 2017, 65% of social network users in Russia were registered on Vkontakte, while only 20% and 7%, respectively, had Facebook and Twitter accounts (Berishvili, 2018). Despite the contested role of Vkontakte in the protest mobilization of 2011–12, there is an indication that since then the influence of pro-opposition actors on the platform has remarkably increased. In 2011–12, the protesters relied mostly on Facebook and Twitter because these two platforms contained more political information than those presented in the Russian Vkontakte and Odnoklassniki platforms (Gainous et al., 2018; Reuter & Szakonyi, 2015; White & McAllister, 2014). There are indications that by 2017, the situation had changed. For instance, in 2011, Alexey Navalny's Vkontakte page had around 60 followers (Reuter & Szakonyi, 2015). In subsequent years, the number of Navalny's Vkontakte followers surged, reaching 396,000 users in July 2018; in comparison, his Facebook page at that time had 408,000 followers. His recent posts have received similar numbers of "likes" on both platforms. Because Navalny is the most prominent Russian opposition activist as of 2019, and he was the organizer of the protests of 2017, his popularity is a good proxy for the influence exerted by the opposition on a given social media platform in Russia.

Vkontakte is a suitable case for this study for two primary reasons. First, it is the social media platform with the highest share of users in Russia. Thus, the examination of Vkontakte allows capturing the patterns of social media news consumption that is more representative of the general Russian population than the analysis of other platforms would. Second, it has a significant presence of pro-opposition actors. This proves that Vkontakte can be a relevant channel for the spread of antigovernment information and for protest mobilization. Therefore, the platform is worth investigating with regard to the possible effects of SNS in authoritarian states. Besides, in contrast to the cases of Facebook and Twitter, selective exposure and polarization on Vkontakte have not yet been explored in detail. Finally, because of less restrictive API limits, Vkontakte allows for the gathering of more data about more representative samples of users than Facebook and Twitter currently do (see Data and Methods section), making it a valuable source for communication research.

Research Questions and Hypotheses

In authoritarian states, social media can be a vital censorship circumvention channel. The decentralized nature of SNS makes it difficult for the state to monitor all the content spread through them. Thus, they allow for the spread of government criticisms and the news that are censored by the government-controlled mainstream media. For this reason, people in media environments with limited freedom tend to

seek information online (Behrouzian, Nisbet, Dal, & Çarkoğlu, 2016). There is evidence that in countries with nonfree media systems (Reporters Without Borders, 2018), higher percentages of citizens rely on social media for the news. In the majority of countries included in the Reuters Digital News Report (Newman et al., 2018), around 50% of the people claimed they access the news on SNS. In authoritarian states or those with nonfree media, such as Turkey, Singapore, or Hungary, the percentage is much higher than average, reaching about 70%. Russia was not included in the Reuters Digital News Report, so it is impossible to directly compare the statistics in Russia with those of other authoritarian states. Furthermore, the Reuters Digital News Report relies on survey data and SNS there include multiple platforms. This study focuses on directly observed digital trace data from a single platform. The discrepancies make it difficult to use Digital News Report data as a benchmark to assess how the share of news-interested Russian Vkontakte users compares with global averages. Hence, here I formulate a research question about the percentage of news-interested users on Vkontakte, and refrain from hypothesizing how high it might be in comparison with other countries:

RQ1:   How many Russian users of Vkontakte subscribe to news pages?

Though the Russian state has tightened its control over the Internet since 2011, the opposition still manages to use SNS to spread information critical of the government and mobilize people for the protests, as shown by the 2017 campaign. At the same time, the social-media-enabled campaigns in both 2011–12 and 2017 failed to achieve their declared primary goals (new and fair Duma elections in 2011–12 and an investigation into the corruption affairs of Russian prime minister Dmitry Medvedev in 2017). Nonetheless, the 2017 protests helped increase Navalny's recognition and popularity, and his team's Anti-Corruption Foundation currently has offices all over the country. Analysis of Navalny's 2018 presidential campaign shows that, given the obstacles faced by Navalny and his team, their mobilization power was impressive, but the movement still remained marginal in terms of the share of population reached and mobilized by their messages, largely due to overall political apathy (Dollbaum, Semenov, & Sirotkina, 2018). I suggest that the divide between the politically mobilized pro-opposition minority, including those reached and mobilized by Navalny's campaigns, and the apathetic majority that exists in Russian society is reflected on Vkontakte as well. In this regard, I present the following hypothesis:

H1:   On Vkontakte, a minority of users expose themselves to politicized content from nongovernmental actors more than users from other groups do.

In Russia, both progovernment and pro-opposition actors struggle to gain more influence on social media (see, e.g., Spaiser, Chadefaux, Donnay, Russmann, & Helbing, 2017). The state attempts to push forward its agenda through dedicated groups and pages of state-controlled media on SNS. The opposition and the independent press strive to circumvent censorship by disseminating their messages on social media platforms. The conflict between the two groups and their respective agendas is evident. The selective exposure phenomenon in such a situation could lead to the increased polarization in news consumption, where each group's supporters would avoid the media sources that they perceive as belonging to a "different camp." Building on this, I propose the second hypothesis:

H2:   News consumers on Vkontakte are polarized along progovernment versus pro-opposition lines.

Data and Methods

This study is based on data about the public pages followed by Vkontakte users. Data were collected in May–June 2018 through the Vkontakte open API using the R programming language and the vkR package (Sorokin & Antonov, 2016). I collected a data sample of 55,344 randomly chosen Russian Vkontakte users and the public pages they follow. To avoid sampling bias, the data were collected based on a computer-generated random sample of numeric user IDs, which were then filtered to correspond only to users who identified Russia as their country of residence on their public profiles. This technique allowed me to draw a representative sample of Russian Vkontakte users in general. Vkontakte assigns user IDs sequentially, based on the date when a user registered on the platform (the first registered account has ID number 1, the 500th account is assigned 500, and so on[2]). For this study, I generated a random sample of 250,000 numeric IDs from 0 to 460 million, queried the data on them, and extracted the Russian users. At the time of the data collection, there were around 480 million registered users. However, I excluded the IDs of the most recently registered 20 million users from the computer-generated sample. The data were collected several months after the Russian presidential elections, and there was a high probability that the most recently registered accounts might be bots created to alter the social media landscape during the election campaign.

The sample thus had 55,344 Russian users with randomly chosen registration dates. A similar sampling technique cannot be applied to Facebook and Twitter. First, in contrast to Vkontakte, they do not sequentially assign user IDs (Shontell, 2014; "Twitter IDs," n.d.). Second, Vkontakte's API at the time of data collection had no limits in terms of the number of calls to it within a specific time frame. Thus, it was possible to query the data on many users, select only those who stated Russia as their country of residence, and collect the data about the pages they followed, all within two weeks. With the restrictions of Twitter's API ("Rate Limits," n.d.), the same process could take up to several months. Facebook's API since 2018 has become increasingly restrictive, and it is challenging for researchers to even gain access to collect data (Bastos & Walker, 2018). Hence, the novel sampling approach used in this article applies only to Vkontakte or other platforms with sequential IDs and preferably less restrictive APIs.

To answer RQ1, I checked how many users out of the initial sample followed media pages and popular political blogs. To do so, I compiled a list of Vkontakte pages of the most cited Russian media outlets according to the Medialogia report of April 2018 (Medialogia, 2018; when the list was compiled, this was the latest publicly available report). Medialogia is an independent company that publishes monthly reports on the popularity rankings of Russian media outlets based on the number of citations. The reports cover all types of media outlets, ranging from TV channels and radio stations to online media and blogs. For instance, the list includes a blog by Alexey Navalny, as well as de facto Russian media outlets that are not officially registered in Russia, such as the Latvia-based independent Meduza. I also added to the list the pages of media sources that were not included in the Medialogia report, but that had more than 1 million followers on Vkontakte. The final list consists of 97 media outlets (see the Appendix). Next, I checked how many users from the Vkontakte data set followed at least one of the media sources on the list to calculate the percentage of news-subscribing Vkontakte users.

---

[2] The full catalogue of Vkontakte users listed by their numeric IDs is available at https://vk.com/catalog.php.

The Medialogia (2018) list is quite comprehensive, but does not include the sources that exist only in the form of social media pages—for instance, Vkontakte-based political blogs, such as Lentach (vk.com/oldlentach). Thus, simple filtering based on the Medialogia list is prone to selection bias. To expand the scope of the analysis and gain more insights, I applied network analysis to the sample of 55,344 Vkontakte users and the data on the pages to which they subscribed. For this analysis, only the public pages with at least 10 subscribers in the sample (0.02% of the initial sample of users[3]) were selected to reduce sparsity. This manipulation was necessary because the analysis of the raw data was not feasible. First, it would require too much computational power, and without using a supercomputer, the analysis would be impossible. Second, for the research questions addressed in this study, only relatively popular pages are relevant. In this study, I focus on the pages with a broad reach that have a potential influence on the audience; thus, minor pages with a few followers are beyond its scope.

After this manipulation, the number of unique pages in the sample decreased from 864,972 to 32,800, and the number of users dropped from 55,344 to 48,637. Therefore, the sparsity of the network was sufficiently reduced through a significant decrease in the number of pages, making the data computationally feasible to analyze. At the same time, the sample size decreased by 12%, which was significant. The remaining subset of users was still large enough for the analysis.

Before proceeding to the immediate analysis, I checked whether the page distribution by the number of followers in the sample followed the Zipf's law (also referred to as power law). This was done to test for the presence of bots on the data. The popularity distribution should follow the Zipfian distribution because following a power-law distribution is a typical property for social network data (Barabási & Albert, 1999; Muchnik et al., 2013); otherwise, the sample is likely influenced by bots (Rastogi, 2016) or the data are corrupted in some other way. Figure 1 shows the density plot of the popularity distribution of the pages in the sample, which follows the Zipfian distribution. Thus, it is reasonable to assume that the data are not influenced by bots. It has to be noted, though, that Rastogi's (2016) study is not peer reviewed, so the bot-detection method used here is not properly validated, which is a limitation of this study. However, because no accessible tools for bot detection on Vkontakte (similar to Botometer [see https://botometer.iuni.iu .edu/#!/] for Twitter) exist, I opted for Rastogi's method here, even if its validity is not confirmed.

---

[3] The benchmark was selected experimentally; this share appeared to be the most optimal when taking into account the balance between computational power necessary for the analysis and the share of data omitted after this manipulation with the original data set.
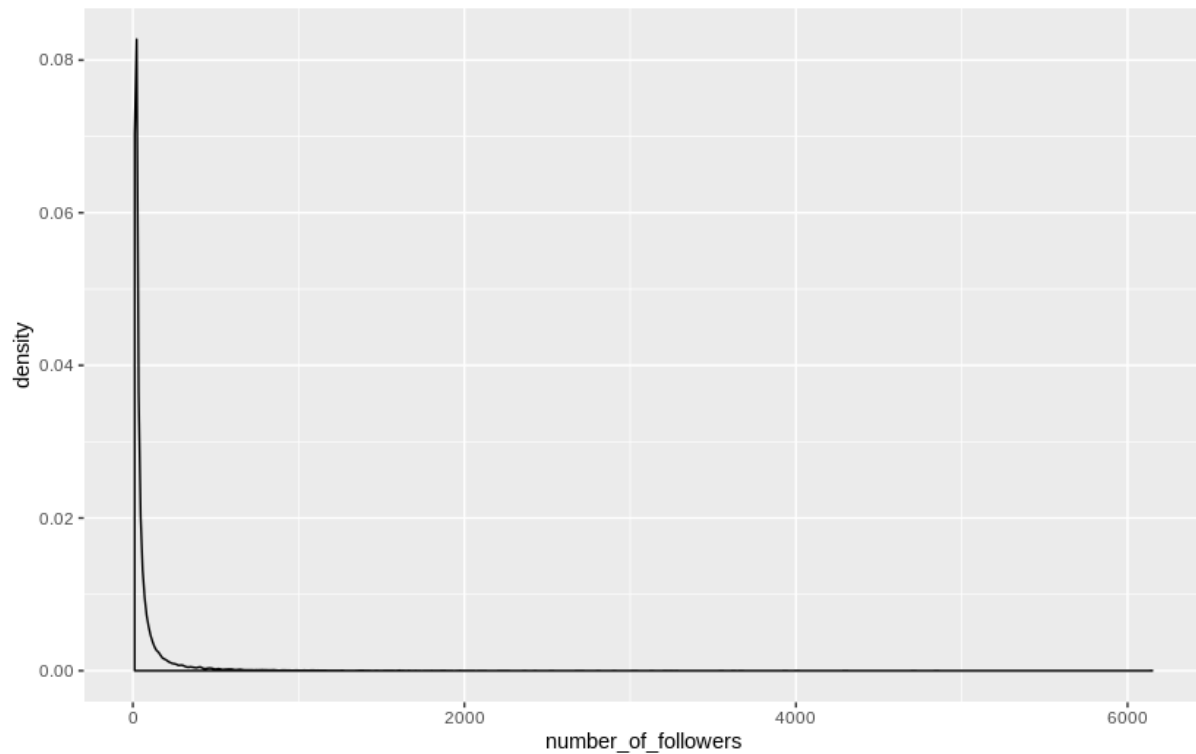
Figure 1. Density plot—the distribution of pages by the number of followers in the sample.

Of the cleaned subset of 48,637 users and 32,800 pages with at least 10 followers in the sample, I built a directed network of the social media users and the pages they followed. Each node represents either a user or a social media page. There is an edge between a user node and a page node if the user follows the page. I applied an automatic modularity-based community detection algorithm implemented in Gephi (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008) to divide the network into communities based on the network structure. The pages inside each community are connected to the pages from the same community more than from the others. In the present context, it means that they share audiences with each other more than with the pages from different communities. Thus, the users from one community follow significantly more pages from it than from the other communities. To test H1, I was explicitly interested whether the users who subscribe to politicized content coming from media and actors not associated with Russian government would form a separate, distinct group within the broader network structure. By politicized content I mean hard news and politically charged messages from independent media such as Meduza, NGOs such as Roskomsvoboda and political actors such as Navalny's team. After the network was divided into communities, I examined the top 70–100 (in terms of the number of followers from the sample) social media pages in each community to identify the dominant topics addressed by the pages in each group.

To test H2, I focused on news-interested users. I took the subset of users who followed at least one media source from the Medialogia (2018) list. I then applied the audience duplication approach (see Ksiazek, 2011; Webster & Ksiazek, 2012) to the data. This audience-centric network analysis approach has

proven effective for the studies on audience fragmentation and has been successfully applied to different types of media outlets, including digital media (e.g., Fletcher & Nielsen, 2017; Mukerjee, Majó-Vázquez, & González-Bailón, 2018; Taneja & Webster, 2016). According to the approach, media environments can be described as either fragmented or duplicated, depending on the level of the audience overlap between each pair of media outlets in the environment. Overlap is the share of the audience using both outlets. If many outlets have overlapping audiences, the environment is duplicated. Otherwise, it is fragmented, which might indicate the presence of polarization among the audiences. Following the approach, I constructed an audience duplication network. Each node represents a media outlet, and there is a connection between two nodes if they have overlapping audiences. Because some overlapping could occur by chance (Ksiazek, 2011), the level of overlapping has to be beyond the "by chance" threshold. This threshold is determined by multiplying the shares of users in the general sample who follow each outlet. In the final network, there is a link between two nodes representing them if the observed audience duplication is higher than this threshold (Fletcher & Nielsen, 2017; Ksiazek, 2011; Webster & Ksiazek, 2012). I applied an automatic community detection algorithm to the final network (Blondel et al., 2008) to determine whether the network could be divided into polarized clusters based on the patterns of audience duplication on social media. The original approach used unweighted edges in the audience duplication network. However, for the proper application of the community detection algorithm, the strength of the connections between the nodes would also be necessary. Thus, I used weighted edges.

Results

News? No Thanks.

Of the 55,344 users in the sample, only 8,144 (14.7%) followed a page of at least one of the major Russian media sources on the Medialogia (2018) list. This answer to RQ1 and possible implications of the observed seemingly low share of news-interested users on Vkontakte are further examined in the Discussion section.

If Not News, Then What? Jokes, Sex, and Traditional Gender Roles

Figure 2 presents the visualization of the network of the Vkontakte users and the pages they follow.
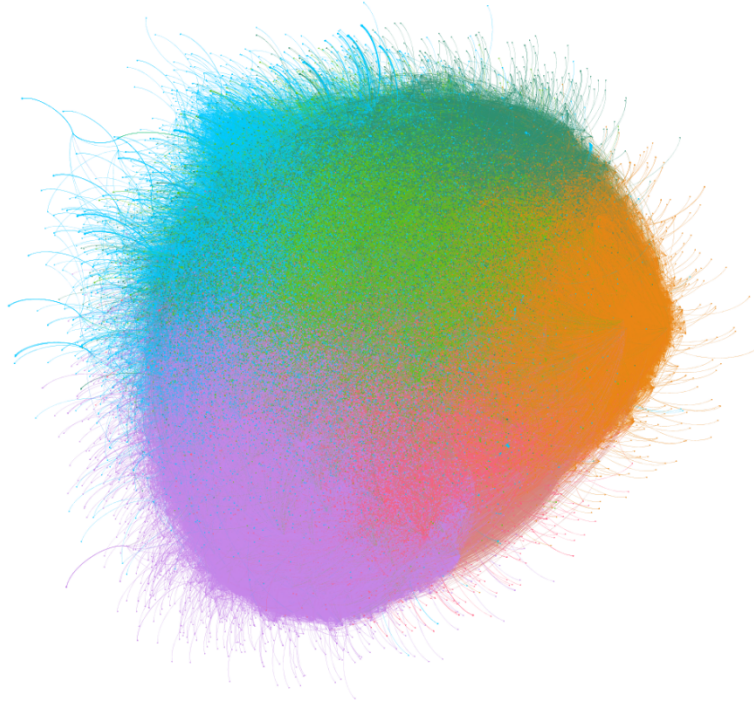
***Figure 2. The network of 48,637 Russian Vkontakte users and pages they follow. Detailed
description of the colors shown is in Table 1.***

It consists of six communities, as described in Table 1.

Table 1. Communities in the Followership Network of Vkontakte Users.

Color	% nodes	Main topics addressed by the pages in the community
Purple	26.0	Humor, cars, technology, men's fashion, "gangsta style"
Bright green	23.2	Humor, female fashion, cooking, kids, motherhood
Blue	17.8	Buy–sell ads, music, movies, work search, sexual partner search, humor
Orange	13.5	Humor, school, education
Dark green	11.2	Hard news, politics (pro-opposition stance),[4] education, humor
Pink	8.3	Horoscopes, romantic affairs, popular psychology

---

[4] Progovernment pages are scattered around the network and do not form a distinct community; the examples are in the text below.

The community structure of the Vkontakte network shows a distinct group of users subscribing to politicized opposition-leaning content, confirming H1. It is represented by the dark green community and is dominated by independent media (e.g., Meduza, Dozhd), bloggers (e.g., kamikadzedead), opposition actors (e.g., Alexey Navalny), and NGOs (e.g., Roskomsvoboda). This group contains only 11.2% of the nodes in the network, signaling that these users constitute a minority in the network, following H1. This community's users are more likely to subscribe to the pages in it than to those in other communities. The dark green community is the only one with a definite political leaning. All the other communities in the network comprise rather diverse media and pages, most of which are apolitical.

In contrast to the independent media, the government-controlled ones are not concentrated in one community, but are scattered across the network. For instance, the pages of the state-controlled Rossiya TV channel and RIA Novosti news agency belong to the purple community, together with entertainment media, such as the TNT TV channel. However, the state-controlled Pervyi Kanal (Channel One) is in the bright green community, along with the magazines that target mostly female audiences, such as Cosmopolitan. Hence, Vkontakte users seeking politicized content coming from actors not affiliated with the Russian government form a distinct group whose selective media diets on Vkontakte differ from those of other social media news seekers.

Polarization Is Real

Figure 3 illustrates the duplication network of the pages of media sources from the Medialogia (2018) list (see the Appendix). Its centralization score is 12.62%, which is low and indicates a highly fragmented network (Ksiazek, 2011). It is divided into three communities. The orange community encompasses the pro-opposition actors, NGOs, and independent blogs and media. The purple community mostly includes progovernment and state-sponsored media outlets with political content. Finally, the green community contains entertainment media. The communities demonstrate that the fragmentation of the audiences of Russian media outlets on the Vkontakte platform occurs mainly along political lines, following H2 of this study.
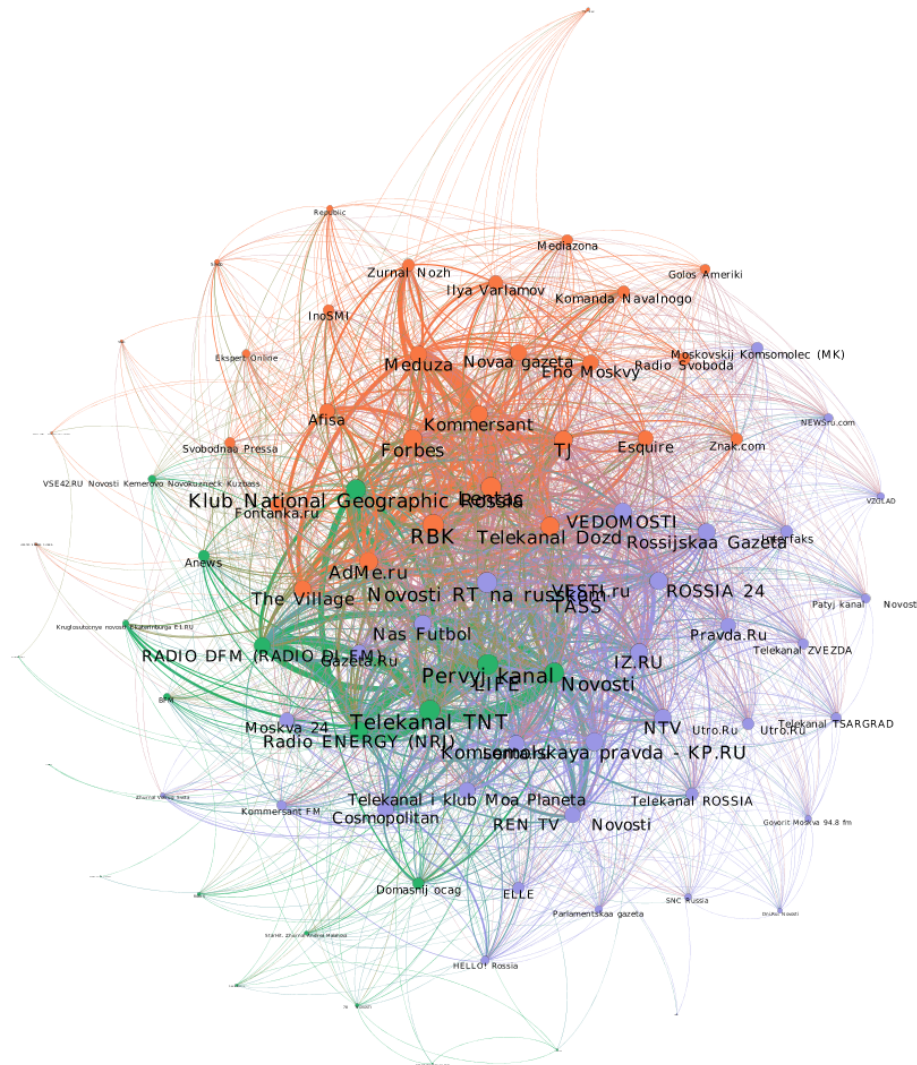
Figure 3. The network of Russian media outlets and their audience duplication on Vkontakte.
Orange – mostly independent and pro-opposition media
Purple – mostly state-owned and progovernment media
Green – mostly entertainment media.

Summary and Discussion

This study has three major findings: (1) The percentage of news-subscribing Russian users on Vkontakte is 14.7%; (2) the users interested in political content coming not from the Russian government and/or government-related sources form a distinct group within the broader network of Russian users; and (3) Russian news-consuming users are polarized along political lines (progovernment vs. pro-opposition/independent).

Only 14.7% of the sample of 55,344 users follow a Vkontakte page of one of the major Russian media sources or blogs. However, the finding does not necessarily mean that news consumption on social media in Russia is low. It does not represent the news consumption of all Russian SNS users. It is unclear whether similarly high rates of news avoidance are found among Russian users of Western platforms, such as Facebook and Twitter. In 2011–12, they contained a higher share of politically relevant information and were more extensively used for protest mobilization than Vkontakte (Reuter & Szakonyi, 2015). It might be that Russian news-seeking users still prefer these platforms to the local ones. Testing this assumption would require a similar study into the news consumption patterns of Russian Facebook and Twitter users. If that were the case, it would be worthwhile to check whether similar differences between Western and local platforms could be observed in other authoritarian states because the findings could indicate these platforms' significant differences in their potential for information dissemination and protest mobilization in authoritarian regimes.

The findings from this study cannot be directly compared with the data from other countries listed in the Reuters Digital News Report (see Newman et al., 2018), which suggests that in other authoritarian states users tend to increasingly seek information online, especially on SNS. This study draws on digital trace data from a single platform, whereas the report is based on the survey data about news consumption on social media in general. However, questionnaire-based reports from Russia also indicate the relatively low share (21%) of citizens who get the news from social media (Levada Center, 2018) in comparison with the global averages from the Reuters Digital News Report. Thus, it is safe to conclude that regardless of the potential differences between social media platforms, in comparison with other countries, Russia has a low percentage of news-interested social media users. The observed effect cannot be attributed only to authoritarianism, the lack of press freedom, or censorship. For instance, Turkey, which is currently similar to Russia in these respects, has a much higher share of news-seeking users. Still, in some democratic countries with free press, the percentages of news-interested users are closer to those of Russia than to those of Turkey or other states with censored media environments. For example, in the Netherlands, Germany, and South Korea, only 31%, 31%, and 25% of users, respectively, access the news on social media. This highlights that the patterns of social media usage are contextual, and more comparative studies are necessary to get more generalizable findings. The seeming disinterest of Russian users in political media might be associated with overall political apathy in Russia (Dollbaum et al., 2018).

The analysis shows that the minority of news-subscribing users are polarized along political lines. In the audience duplication network, independent, publicly owned, and foreign-funded media and pro-opposition actors form a cluster distinct from the entertainment media and those funded by the Russian government or promoting progovernment agenda. This finding highlights the necessity to consider local contexts when talking about polarization on SNS. So far, most research on the matter was conducted in the

U.S. context (e.g., Bail et al., 2018; Bakshy, Messing, & Adamic, 2015; Conover, Gonçalves, Flammini, & Menczer, 2012). There were few single-country studies not focused on the U.S. (Grömping, 2014; Gruzd & Roy, 2014), and comparative studies are almost nonexistent (Barberá, 2015; Bright, 2018, are notable exceptions). The present article demonstrates that polarization can take place across different lines, not just left–right/Democrat–Republican dimensions traditionally discussed in the U.S.-focused studies. Comparative studies and research in the non-Western context are necessary to make our understanding of polarization on SNS more comprehensive.

Though Russian news consumers are highly polarized, there is certain audience overlap between progovernment and pro-opposition media pages. It is thus possible to breach the existing divide. Judging from the structure of the audience duplication network, it would be easier to bridge through the broadly circulated media from different camps, such as Forbes, Kommersant, and Izvestia, than through less popular media and blogs, such as Tsargrad or Mediazona. The media outlets with a broader reach are located closer to the center of the network, thus sharing higher percentages of audiences with the media from other camps than the minor sources on the fringe of the network. Another important finding is that though the Russian user-followership network (see Figure 2) is divided into several communities, including a distinct group of users subscribing to politicized content from the sources not affiliated with Russian government in any way, most of these communities include humorous pages. This means that even nonengaged users who are apathetic toward the news and political information can potentially be reached by activists and mobilized through the popular humorous pages on the network. In fact, this may already be happening, and users who prefer entertaining content to hard news may be exposed to political messages as well if humorous pages circulate politically charged jokes. Because conducting content analysis of these pages was not within the scope of this study, it is not possible to test this idea, which is a limitation of this study.

Another limitation is that the study includes only the examination of the users' subscription patterns, not their sharing behavior or friendship ties. Additional analyses have to be conducted to uncover whether users with different political orientations and levels of political engagement communicate predominantly with those whose characteristics are similar to theirs or whether different groups are interconnected through friendships or form echo chambers, as well as whether polarization can be mitigated through active sharing.

Though it is not the focus of the present study, I must note that the network structure of the Vkontakte data hints at a strong gender divide among Russian users. The two largest communities identified by a modularity-based algorithm, the purple and the bright green (see Figure 2), represent interests traditionally associated with male and female roles. The orange community seemingly includes high school students and young people, as it comprises many pages with school-related humor and preparation materials for state exams. Unsurprisingly, the orange community is located close to the pro-opposition, dark green one within the network structure since high school students and young people have been among the most active participants of the protests in Russia in recent years. The network structure thus hints at the presence of not only political but possibly also gender and generational divides in media consumption on Vkontakte in Russia. These might be seen as additional dimensions of polarization, showing that it is not necessarily limited to the political one. I suggest the findings of this study underscore the argument that for better understanding of the phenomena, more studies with evidence from diverse contexts and platforms are necessary.

References

An, J., Quercia, D., Cha, M., Gummadi, K., & Crowcroft, J. (2014). Sharing political news: The balancing act of intimacy and socialization in selective exposure. *EPJ Data Science*, *3*(1), 1–21. doi:10.1140/epjds/s13688-014-0012-2

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, 15*(37), 9216–9221. doi:10.1073/pnas.1804840115

Bakshy, E., Messing, S., & Adamic, L. A. (2015). Exposure to ideologically diverse news and opinion on Facebook. *Science*, *348*(6239), 1130–1132. doi:10.1126/science.aaa1160

Barabási, A.-L., & Albert, R. (1999). Emergence of scaling in random networks. *Science*, *286*(5439), 509–512. doi:10.1126/science.286.5439.509

Barberá, P. (2015). *How social media reduces mass political polarization: Evidence from Germany, Spain, and the U.S.* (Working Paper). Retrieved from http://pablobarbera.com/static/barbera_polarization_APSA.pdf

Bastos, M., & Walker, S. T. (2018, April 11). Facebook's data lockdown is a disaster for academic researchers. *The Conversation.* Retrieved from http://theconversation.com/facebooks-data-lockdown-is-a-disaster-for-academic-researchers-94533

Behrouzian, G., Nisbet, E. C., Dal, A., & Çarkoğlu, A. (2016). Resisting censorship: How citizens navigate closed media environments. *International Journal of Communication*, *10*, 4345–4367.

Bennett, W. L., & Iyengar, S. (2008). A new era of minimal effects? The changing foundations of political communication. *Journal of Communication*, *58*(4), 707–731. doi:10.1111/j.1460-2466.2008.00410.x

Berishvili, N. (2018, January 18). *Polzovateley socsetey v Rossii stalo vdvoe bolshe* [The number of social media users in Russia has doubled]. Retrieved from https://iz.ru/696806/nataliia-berishvili/polzovatelei-sotcsetei-v-rossii-stalo-vdvoe-bolshe

Blondel, V. D., Guillaume, J.-L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of communities in large networks. *Journal of Statistical Mechanics: Theory and Experiment*, *2008*(10), P10008. doi:10.1088/1742-5468/2008/10/P10008

Breuer, A., Landman, T., & Farquhar, D. (2015). Social media and protest mobilization: Evidence from the Tunisian revolution. *Democratization*, *22*(4), 764–792. doi:10.1080/13510347.2014.885505

Bright, J. (2018). Explaining the Emergence of political fragmentation on social media: The role of ideology and extremism. *Journal of Computer-Mediated Communication*, *23*(1), 17–33. https://doi.org/10.1093/jcmc/zmx002

Conover, M. D., Gonçalves, B., Flammini, A., & Menczer, F. (2012). Partisan asymmetries in online political activity. *EPJ Data Science*, *1*(1), 1–19. doi:10.1140/epjds6

Dollbaum, J. M., Semenov, A., & Sirotkina, E. (2018). A top-down movement with grass-roots effects? Alexei Navalny's electoral campaign. *Social Movement Studies*, *17*(5), 618–625. doi:10.1080/14742837.2018.1483228

Dubois, E., & Blank, G. (2018). The echo chamber is overstated: The moderating effect of political interest and diverse media. *Information, Communication & Society*, *21*(5), 729–745. doi:10.1080/1369118X.2018.1428656

Edwards, K., & Smith, E. E. (1996). A disconfirmation bias in the evaluation of arguments. *Journal of Personality and Social Psychology*, *71*(1), 5–24. doi:10.1037/0022-3514.71.1.5

Enikolopov, R., Makarin, A., & Petrova, M. (2016). *Social media and protest participation: Evidence from Russia* (No. 11254). Retrieved from https://ideas.repec.org/p/cpr/ceprdp/11254.html

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Flaxman, S., Goel, S., & Rao, J. M. (2016). Filter bubbles, echo chambers, and online news consumption. *Public Opinion Quarterly*, *80*(S1), 298–320. doi:10.1093/poq/nfw006

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

Gainous, J., Wagner, K. M., & Ziegler, C. E. (2018). Digital media and political opposition in authoritarian systems: Russia's 2011 and 2016 Duma elections. *Democratization*, *25*(2), 209–226. doi:10.1080/13510347.2017.1315566

Garimella, K., Morales, G. D. F., Gionis, A., & Mathioudakis, M. (2018). Political discourse on social media: Echo chambers, gatekeepers, and the price of bipartisanship. *ArXiv:1801.01665 [Cs]*. Retrieved from http://arxiv.org/abs/1801.01665

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

Grömping, M. (2014). "Echo chambers": Partisan Facebook groups during the 2014 Thai election. *Asia Pacific Media Educator*, *24*(1), 39–59. doi:10.1177/1326365X14539185

Gruzd, A., & Roy, J. (2014). Investigating political polarization on Twitter: A Canadian perspective. *Policy & Internet*, *6*(1), 28–45. doi:10.1002/1944-2866.POI354

Gunitsky, S. (2015). Corrupting the cyber-commons: Social media as a tool of autocratic stability. *Perspectives on Politics*, *13*(1), 42–54. doi:10.1017/S1537592714003120

Guriev, S., & Treisman, D. (2015). How modern dictators survive: An informational theory of the new authoritarianism (Working Paper No. 21136). *National Bureau of Economic Research Working Paper Series.* doi:10.3386/w21136

Howard, P. N., Duffy, A., Freelon, D., Hussain, M. M., Mari, W., & Maziad, M. (2011). Opening closed regimes: What was the role of social media during the Arab Spring? (SSRN Scholarly Paper No. ID 2595096). *SSRN Research Paper Series.* Retrieved from https://papers.ssrn.com/abstract=2595096

Huang, H. (2015). Propaganda as signaling. *Comparative Politics*, *47*(4), 419–437. Retrieved from https://www.jstor.org/stable/43664158

Istochniki informatsii [Information sources]. (2017, May 12). Retrieved from http://fom.ru/SMI-i-internet/13323

Klapper, J. T. (1960). *The effects of mass communication*. New York, NY: Free Press.

Klyueva, A. (2016). Taming online political engagement in Russia: Disempowered publics, empowered state and challenges of the fully functioning society. *International Journal of Communication*, *10*, 4661–4680.

Ksiazek, T. B. (2011). A network analytic approach to understanding cross-platform audience behavior. *Journal of Media Economics*, *24*(4), 237–251. doi:10.1080/08997764.2011.626985

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication*, *50*(1), 46–70. doi:10.1111/j.1460-2466.2000.tb02833.x

Levada Center. (2018, August 5). *Social media* (Press release). Retrieved from https://www.levada.ru/en/2018/05/08/social-media/

Lewandowsky, S., Ecker, U. K. H., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and its correction: Continued influence and successful debiasing. *Psychological Science in the Public Interest*, *13*(3), 106–131. doi:10.1177/1529100612451018

MacKinnon, R. (2011). China's "networked authoritarianism." *Journal of Democracy*, *22*(2), 32–46. doi:10.1353/jod.2011.0033

Maréchal, N. (2017). Networked authoritarianism and the geopolitics of information: Understanding Russian Internet policy. *Media and Communication*, *5*(1), 29–41. doi:10.17645/mac.v5i1.808

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, *27*(1), 415–444. doi:10.1146/annurev.soc.27.1.415

Medialogia. (2018). *Federal media*. Retrieved from http://www.mlg.ru/ratings/media/federal/5997/

Muchnik, L., Pei, S., Parra, L. C., Reis, S. D. S., Andrade, J. S., Jr., Havlin, S., & Makse, H. A. (2013). Origins of power-law degree distribution in the heterogeneity of human activity in social networks. *Scientific Reports*, *3*(1783), 1–7. doi:10.1038/srep01783

Mukerjee, S., Majó-Vázquez, S., & González-Bailón, S. (2018). Networks of audience overlap in the consumption of digital news. *Journal of Communication*, *68*(1), 26–50. doi:10.1093/joc/jqx007

Nelson, J. L., & Webster, J. G. (2017). The myth of partisan selective exposure: A portrait of the online political news audience. *Social Media + Society, 3*(3), 1–13. doi:10.1177/2056305117729314

Newman, N., Fletcher, R., Kalogeropoulos, A., Levy, D., & Nielsen, R. K. (2018). Reuters Institute digital news report. Retrieved from http://media.digitalnewsreport.org/wp-content/uploads/2018/06/digital-news-report-2018.pdf?x89475

Pearce, K. E., & Kendzior, S. (2012). Networked authoritarianism and social media in Azerbaijan. *Journal of Communication*, *62*(2), 283–298. doi:10.1111/j.1460-2466.2012.01633.x

Ragozin, L. (2017, March 27). Inside Alexei Navalny's long-shot bid to beat Putin. *Bloomberg.com*. Retrieved from https://www.bloomberg.com/news/features/2017-03-28/inside-alexei-navalny-s-long-shot-bid-to-beat-putin

Rastogi, T. (2016). A power law approach to estimating fake social network accounts. *ArXiv:1605.07984 [Physics]*. Retrieved from http://arxiv.org/abs/1605.07984

Rate limits. (n.d.). Retrieved from https://developer.twitter.com/en/docs/basics/rate-limits.html

Reporters Without Borders. (2018). *World Press Freedom Index*. Retrieved from https://rsf.org/en/ranking/2018

Reuter, O. J., & Szakonyi, D. (2015). Online social media and political awareness in authoritarian regimes. *British Journal of Political Science*, *45*(1), 29–51. doi:10.1017/S0007123413000203

Ruijgrok, K. (2017). From the Web to the streets: Internet and protests under authoritarian regimes. *Democratization*, *24*(3), 498–520. doi:10.1080/13510347.2016.1223630

Sanovich, S., Stukal, D., & Tucker, J. A. (2018). Turning the virtual tables: Government strategies for addressing online opposition with an application to Russia. *Comparative Politics, 50*(3), 435–482. doi:10.5129/001041518822704890

Schmidt, A. L., Zollo, F., Vicario, M. D., Bessi, A., Scala, A., Caldarelli, G., . . . Quattrociocchi, W. (2017). Anatomy of news consumption on Facebook. *Proceedings of the National Academy of Sciences*, *114*(12), 3035–3039. doi:10.1073/pnas.1617052114

Sebastian, C. (2017, June 11). Alexey Navalny and Russia's YouTube insurgency. *CNN*. Retrieved from https://edition.cnn.com/2017/06/11/europe/russia-navalny-youtube-protests/index.html

Shontell, A. (2014, February 5). How to figure out exactly what day—and in what order—you signed up for Facebook. *Business Insider.* Retrieved from https://www.businessinsider.com/how-to-find-your-facebook-id-number-and-sign-up-date-2014-2

Smith, S. M., Fabrigar, L. R., & Norris, M. E. (2008). Reflecting on six decades of selective exposure research: Progress, challenges, and opportunities. *Social and Personality Psychology Compass*, *2*(1), 464–493. doi:10.1111/j.1751-9004.2007.00060.x

Soldatov, A., & Borogan, I. (2015). *The red web: The struggle between Russia's digital dictators and the new online revolutionaries*. New York, NY: Public Affairs.

Sorokin, D., & Antonov, A. (2016). vkR: Access to VK API via R (Version 0.1) [Computer software]. Retrieved from https://CRAN.R-project.org/package=vkR

Spaiser, V., Chadefaux, T., Donnay, K., Russmann, F., & Helbing, D. (2017). Communication power struggles on social media: A case study of the 2011–12 Russian protests. *Journal of Information Technology & Politics*, *14*(2), 132–153. doi:10.1080/19331681.2017.1308288

Stroud, N. J. (2008). Media use and political predispositions: Revisiting the concept of selective exposure. *Political Behavior*, *30*(3), 341–366. doi:10.1007/s11109-007-9050-9

Sunstein, C. R. (2001). *Echo chambers: Bush v. Gore, impeachment, and beyond*. Princeton, NJ: Princeton University Press.

Taneja, H., & Webster, J. G. (2016). How do global audiences take shape? The role of institutions and culture in patterns of web use. *Journal of Communication*, *66*(1), 161–182. doi:10.1111/jcom.12200

Tselikov, A. (2014). The tightening web of Russian internet regulation (SSRN Scholarly Paper No. ID 2527603). *SSRN Research Paper Series.* Retrieved from https://papers.ssrn.com/abstract=2527603

Tufekci, Z. (2017). *Twitter and tear gas: The power and fragility of networked protest*. New Haven, CT: Yale University Press.

Twitter IDs (Snowflake). (n.d.). Retrieved from https://developer.twitter.com/en/docs/basics/twitter-ids.html

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

White, S., & McAllister, I. (2014). Did Russia (nearly) have a Facebook revolution in 2011? Social media's challenge to authoritarianism. *Politics*, *34*(1), 72–84. doi:10.1111/1467-9256.12037

World Bank. (n.d.). *Individuals using the Internet (% of population).* Retrieved from https://data.worldbank.org/indicator/IT.NET.USER.ZS?end=2016&locations=RU&start=2011

Appendix

Table A1. Media from Medialogia That Were Included in the Analysis.

#	Transliterated Name	Short Description
1	Telekanal TNT	entertainment TV channel
2	Radio ENERGY (NRJ)	entertainment radio station
3	RIA NOVOSTI	Russian state sponsored news agency
4	LIFE Novosti	private news media
5	Lentach	opposition-leaning social media page that aggregates news
6	Pervyi Kanal	progovernmental (Russian state sponsored) TV channel
7	Nash Futbol	Our Football, entertainment (sports) media
8	AdMe.ru	entertainment media
9	Radio DFM	entertainment radio
10	Klub National Geographic Rossiya	NatGeo Russia
11	TASS	progovernmental (Russian state sponsored) news agency
12	Interfax	private news agency

13	RBK	private news media
14	Novosti RT na russkom	Russia Today, Russian edition, progovernmental (Russian state sponsored) news media
15	Gazeta.ru	news media, belongs to Rambler Media Group
16	Gazeta.ru	news media, belongs to Rambler Media Group
17	Komsomolskaya Pravda—KP.RU	private news media, progovernment-leaning
18	Fontanka.ru	private news media from St. Petersburg
19	Dni.ru: Novosti	news media, owned by an NGO with ties to the government
20	Znak.com	private news media, Yekaterinburg region
21	Meduza	private news media, opposition-leaning, de jure is registered and operates in Latvia
22	Moskva 24	TV Channel about Moscow, owned by Russian government
23	BBC News—Russkaya Sluzhba BBC	BBC Russian Service
24	BIZNES ONLINE | Novosti Kazani I Tatarstana	private news media, focus on Tatarstan region
25	IZ.ru—Izvestiya	news media, owned by National Media Group that has ties to the Russian government
26	Mediazona	private news media, opposition leaning
27	Utro.Ru	private news media
28	Svobodnaya Pressa	private news media, opposition leaning, right wing
29	Mediazona	private news and entertainment media, opposition leaning
30	Volga News—Novosti Samary	private news media, Samara Region
31	Kruglosutochnye novosti Yekaterinburga E1.RU	private news media, Yekaterinburg region
32	VESTI.ru | ROSSIYA 24	progovernmental (Russian state sponsored) TV channel
33	Realnoe Vremya	private news media, Tatarstan region
34	Podmoskovye Segodnya	private news media, Moscow region
35	78 | NOVOSTI	private news media, St. Petersburg region
36	Novye Izvestia	private news media

37	Argumenty Nedeli	private news media, progovernment leaning
38	NEWSru.com	private news media
39	VSE42.RU Novosti Kemerovo Nozokuznetsk Kuzbass	private news media, Kemerovo region
40	RIDUS	private news media, progovernment
41	The Bell	private news media, opposition leaning
42	Anew—	news aggregator
43	Komanda Navalnovo	Team Navalny, Alexey Navalny and his supporters' page where, among other things, content of his blog and YouTube channel is shared
44	Ilya Varlamov	blogger Ilya Varlamov's page, opposition leaning
45	Telekanal TSARGRAD	private TV channel, right wing
46	Republic	private news media, opposition leaning
47	The Village	private entertainment media
48	Novoe Vremya. The New Times	private news media, opposition leaning
49	Pravda.Ru	private news media, owner has ties to the government
50	Zhurnal "Nozh"	private entertainment media
51	InoSMI	Russian translations of foreign media articles, sponsored by Russian government
52	Afisha	private entertainment media, owned by Rambler Media Group
53	The Insider	private news media, opposition leaning
54	Vzglyad	news media, owned by an NGO with ties to Russian government
55	Radio 1—Pervoe Podmoskovnoe	radio station, Moscow region
56	BFM	business news radio station, belongs to Rumedia holding
57	Vesti FM	news radio station, progovernment
58	Kommersant FM	radio station, owned by Alisher Usmanov who has ties to Russian government

59	Radio Svoboda	Radio Liberty, U.S. government funded, opposition leaning in Russia
60	Golos Ameriki—Voice of Amerika	U.S. government funded, opposition leaning in Russia
61	Ekho Moskvy	private news media and radio station, opposition leaning
62	Govorit Moskva 94.8 fm	private radio station, Moscow region
63	Radio Sputnik	Sputnik radio station, Russian government funded
64	Radio Komsomolskaya Pravda	private radio station, progovernment leaning
65	NTV	TV Channel, owned by Gaprom media
66	REN TV | News	TV channel, owned by National Media Group that has ties to the Russian government
67	Telekanal "Zvezda"	TV Channel, partially controlled by the Russian Defense Ministry
68	Telekanal Dozhd	Private TV channel, opposition leaning
69	Telekanal i klub Moya Planeta	private TV channel, nature and traveling
70	TV Tsentr	state-run TV channel
71	Telekanal Rossiya-Kultura	state-sponsored TV channel, entertainment
72	Pyatyi Kanal | Novosti	TV channel, owned by National Media Group that has ties to the Russian government
73	Telekanal "Rossiya"	state-owned TV channel
74	Snob	private entertainment and news media, opposition leaning
75	Cosmopolitan Russia	
76	Esquire Russia	
77	Forbes Russia	
78	Elle	
79	Harper's Bazaar Russia	
80	Zhurnal "Vokrug Sveta"	entertainment media, nature, tourism, and traveling
81	Domashnyi Ochag	entertainment media

82	"Ekspert" Online	private business media
83	StarHit. Zhurnal Andreya Malakhova	entertainment media
84	SNC Russia	
85	Playboy Russia	
86	Hello! Russia	
87	Tatler Russia	
88	Zhurnal Karavan Istorii	entertainment media
89	Nezavisimaya Gazeta	private news media
90	Kommersant	news media, owned by Alisher Usmanov who has ties to Russian government
91	VEDOMOSTI	private business media
92	Rossiyskaya Gazeta	news media, owned by Russian government
93	Moskovskiy Komsomolets (MK)	private media
94	Novaya Gazeta	private news media, opposition leaning
95	Parlamentskaya Gazeta	
96	Argumenty I Fakty/aif.ru	news media, owned by the government of Moscow
97	EG.RU	private news media, belongs to Komsomolskaya Pravda holding

Paper 3

There can be only one truth: Ideological segregation and online news communities in Ukraine

There can be only one truth: Ideological segregation and online news communities in Ukraine

Urman A., Makhortykh M.

Abstract: In our paper we examine the ideological segregation among Ukrainian users in online news communities, using as a case platform Vkontakte, the largest social networking site in post-socialist countries. Using a large sample of Vkontakte data, we investigate how significant the presence of partisan news communities on social media is in the case of a society experiencing transition towards datafied media industries; additionally, we discuss the factors that predict users' interest in partisan online content. Our findings suggest that despite their insignificant numbers, partisan news communities attract substantial attention from Ukrainian users; furthermore, the audiences of these communities show minimal overlap, thus indicating that they can encourage the formation of isolated ideological cliques – or "echo chambers" – and increase societal polarization. We also establish that the region of residence is the most important predictor of selective consumption of pro-Ukrainian or pro-Russian partisan news content.

Introduction

The advent of digital media, in particular, social networking sites (SNS), has a significant impact on news consumption worldwide. The decreased costs of content production and distribution together with the adoption of data-driven techniques for user profiling and targeting allow both traditional and alternative news providers to reach their audiences through a multitude of socially mediated channels and formats. However, the growing digitization of news industries also raises numerous concerns, varying from the possible abuses of users' personal data and privacy by news providers (Helberger, 2016; Zuiderveen Borgesius et al., 2017) to the manipulation of the public sphere through fake news and disinformation (Allcot and Gentzkow, 2017; Tandoc, Lim and Ling, 2017; Lazer et al., 2018).

One of the major concerns with regard to the use of SNS in the context of news consumption is related to the threat of ideological segregation - i.e. the tendency among consumers to limit themselves

to the content which is likely to confirm their earlier views (Gentzkow and Shapiro, 2011; Flaxman, Goel and Rao, 2016). Frequently discussed in the context of "selective exposure" (Stroud, 2008), "filter bubbles" (Pariser, 2011) and "echo chambers" (Sunstein, 2017), ideological segregation can undermine the shared public agenda by leading to the formation of isolated social groups, which nurture biases and limit societal participation of their members. It can also facilitate the formation of discriminatory views and subsequent radicalization by diminishing the exposure to the opposing opinions; such a threat is particularly pronounced in the case of societies characterized by a high degree of polarization (e.g., in the case of a political crisis or a military conflict).

A number of academic studies (Saez-Trumper, Castillo and Lalmas, 2013; Hahn, Ryu and Park, 2015; Flaxman, Goel and Rao, 2016) use exposure to partisan news content as an indicator of ideological segregation. Hahn, Ryu and Park (2015) show that subscription to accounts of specific news outlets on Twitter follows partisan lines and is influenced by demographic variables such as gender and age. Similarly, Flaxman, Goel and Rao (2016) note that users regularly reading partisan news content online tend to expose themselves only to a single side of ideological spectrum. Gruzd and Roy (2014) suggest that selective exposure on social media can increase partisanship and polarization, which, in our view, is especially alarming for societies with the high degree of political polarization.

In our study, we are looking at how online news consumption interacts ideological segregation in Ukraine. Our choice of the case study is motivated by two major reasons: first, Ukraine is a country in transition in terms of digital innovations and their adaptation by the news market. Similarly to most post-Soviet countries, Ukraine is characterized by the lower Internet penetration rate compared with Western Europe (Kharchenko, 2016); however, the country currently experiences a fast development of Internet infrastructure (Freedom House, 2017) together with an explosive growth of IT industries (Kirilenko and Tyshchuk, 2018). By examining the case of Ukraine, we strive to go beyond the current focus on the small set of Western countries characterized by the high level of technological innovations

as well as their legislative regulations and to produce observations which can be applied to other countries which undergo a similar transition towards datafied media industries.

Second, since 2014 Ukraine experiences the conflict between the central government and separatist forces backed by Russia. Under the conditions of limited information supply from the conflict zone caused both by censorship and limited possibilities for the journalists' access to the frontline, digital media, in particular, SNS, turn into a major source of news both in Ukraine and in separatist republics (Pantti, 2016; Makhortykh and Sydorova, 2017). While online news channels are less susceptible to censorship and authorities' control, many of them are dominated by pro-Ukrainian and pro-Russian partisan media outlets, leading to the significant biases in their coverage of the conflict and the subsequent polarization of the Ukrainian public (Zhukov and Baum, 2016; Karamshuk, Lokot, Pryymak and Sastry, 2016). Often, these news channels are also instrumentalized as a means of information warfare, being used for the distribution of fake and propagandist content and stigmatization of the political opponents (Khaldarova and Pantti, 2017).

Based on this, we argue that the case of Ukraine is of particular interest in studying the impact of SNS on online news consumption under the condition of high ideological segregation and intense information warfare. To achieve this purpose, we examine how a large sample of Ukrainian users consume digital news content on Vkontakte, a Russian SNS which remains highly popular in Ukraine despite the ban introduced by the Ukrainian authorities. By doing so, we specifically address three aspects related to news consumption on SNS. First, we compare the visibility of online news communities, in particular, the ones devoted to partisan news content, with other types of SNS communities (e.g. entertainment-related ones). Second, we examine if partisan news communities actually lead to ideological segregation (e.g. by creating conditions for the formation of "echo chambers"). Third, we identify contextual factors (e.g. geographic and demographic variables) that predict users' interest in pro-Ukrainian and pro-Russian partisan news content.

Theoretical background

In today's media ecologies, SNS constitute an integral component of the process of news distribution and consumption. A growing number of media organizations and journalists employ SNS as a part of their content distribution routines extending their reach and adopting novel news formats (Newman, 2011; Russell, 2011; Thurman and Schifferes, 2012). The use of SNS allows users to engage with news in a multitude of ways by commenting, liking, and sharing specific stories across their personal networks (Hermida et al., 2012). By navigating these networks of contacts and connecting to other people and communities, SNS users are able to expand their information diets by selecting stories to read instead of selecting news outlets (Messing and Westwood, 2014); however, these novel selection capabilities also undermine the agenda-setting potential of legacy outlets and facilitate the distribution of fake and manipulative content, which can increase societal polarization.

The content provided through SNS, however, is not limited exclusively to news; instead, as de Zuniga, Jung, and Valenzuela (2012) note, online content often focuses on entertainment and not public affairs. This argument is supported both by user surveys (Nielsen and Schrøder, 2014) and large-scale studies of SNS content, for instance on Twitter (Rieder and Gerlitz, 2013), which find that only a small portion of content is devoted to news and that users themselves do not necessarily view SNS as a major means of finding news. Similarly, the analysis of user behaviour indicates a small percentage of online news-consumers contrasting with the higher self-reported values of news consumption (Flaxman, Goel and Rao, 2016; Kleppe and Otte, 2017)

The contradiction between the significant potential of SNS as a means of news distribution and the uneven degree of actual realization of this potential prompts the necessity to assess the presence of news content within specific platforms compared with other types of content. Such an assessment of content preferences is essential for understanding political implications of a specific medium through which the content is consumed (Prior, 2005). Consequently, we argue that comparing the distribution of

news and non-news content is important for assessing the role of SNS in the context of partisan news consumption online. Hence, the first research question we address in our paper:

RQ1: What is the place of news content, including partisan news content, on Vkontakte compared with other types of content (e.g. entertainment)?

Following the identification of the overall place of online news content on Vkontakte, we move towards examining its impact on partisan news consumption[1] and assessing if it actually leads to ideological segregation. Following earlier studies, we interpret ideological segregation as a tendency of users to consume disparate news content based on their pre-existing views that leads to the formation of fragmented news communities (Flaxman, Goel and Rao, 2013; 2016). However, unlike Flaxman, Goel and Rao (2013), who use audience-based approach to identify partisan slant of specific news outlets and differentiated between pro-Republican and pro-Democratic outlets, we followed Hahn, Ryu and Park (2015) and adopted content-based approach[2] to identify partisanship of specific SNS communities. We also differentiated between pro-Ukrainian and pro-Russian partisan communities, because this construct is particularly applicable for measuring partisanship in Ukraine in the context of the current Russian-Ukrainian conflict (Karamshuk et al., 2016).

The increase in the levels of audience fragmentation is a prominent concern in connection to news consumption on SNS. It causes moral panic related to the perspective of the formation of isolated ideological communities in the form of "filter bubbles" (Pariser, 2011) or "echo chambers" (Sunstein, 2017). The division of the audience into isolated clusters can lead to the ideological segregation, which is detrimental to the shared public sphere and increase societal polarization; in the longer perspective,

---

1   Following existing studies on media consumption in Ukraine in post-2014 period (Gruzd and Tsyganova, 2015; Karamshuk et al., 2016) we use the term "partisan" to denote news content which has strong pro-Ukrainian or pro-Russian leaning.

2   This decision is explained by limited applicability of the audience-based approach in the context of our study, in particular considering limited amount of information about geographical location of Vkonakte users (see more detailed discussion of data limitations in Methodology section) together with massive relocation of Ukrainian population triggered by the conflict in Eastern Ukraine (Rushing, 2017) that complicates the identification of partisanship based on earlier voting patterns.

ideological segregation can result in radicalization and reinforcement of internal divides, which can erode the foundations of democratic systems (Beaufort, 2018).

The concerns about the impact of online news consumption on audience fragmentation, however, so far have found little empirical support (Zuiderveen Borgesius et al., 2016). Instead, a number of studies (Flaxman, Goel and Rao, 2016; Mukerjee, Majó-Vázquez and González-Bailón, 2018) demonstrate that communities of digital news consumers do not form isolated ideological clusters, but their audiences instead frequently overlap with each other. Mukerjee, Majó-Vázquez, and González-Bailón (2018) show that audience networks are often centred around digital outlets of legacy media, which have disproportional reach compared with other outlets; in particular, the more partisan ones. Similar observations are reported by Flaxman, Goel, and Rao (2016) who argue that news consumption on social media does not only reinforce mainstream - and non-partisan - interpretations but also allows users to expose themselves to opposing views and diversify their information diets.

At the same time, the majority of studies mentioned above focus on Western democratic societies, which are often characterized by rather low degrees of ideological segregation. Even in the case of the US, where the degree of partisanship is high, society is less ideologically segregated than in many non-Western countries, which suffer from extreme political polarization. Romensky et al. (2018) note that in these non-Western contexts ideological segregation has a significant detrimental effect on the public sphere, leading to the escalation of hate crimes, political instability and violence; in some cases, it can also result in armed conflicts, such as the one currently occurring in Eastern Ukraine. Under such extreme conditions, not only the impact of ideological segregation is more visible than in the case of democratic systems, but also the necessity to deal with it is significantly more pressing as the persistence of segregated communities can lead to the aggravation of hostilities and undermine conflict resolution efforts (Hoffmann, 2014; Lynch, Freelon and Aday, 2016).

For these reasons, we emphasize the importance of advancing research on potential polarizing effects of online news consumption beyond the current focus on Western media systems and,

specifically, towards the societies which are already characterized by the high degrees of partisanship. In this vein, we align with several existing studies (Gruzd and Tsyganova, 2015; Duvanova, Semenov, and Nikolaev, 2015; Karamshuk et al., 2016) and suggest using the case of Ukraine to examine if under the condition of high ideological segregation online news outlets in the respective society turn into isolated partisan communities or their audiences still overlap, thus enabling the exposure of readers to different opinions on the ongoing strife. Thus, the second research question we discuss in the paper is:

RQ2: Is the consumption of partisan news content accompanied by the formation of isolated ideological communities (i.e. "filter bubbles")?

Lastly, we examine the factors influencing user involvement with partisan news sources, which is another urgent subject of academic inquiry on online news consumption (Hahn, Ryu and Park, 2015; Mitchell, Gottfried and Matsa, 2015; Taneja, Wu and Edgerly, 2018). Taneja, Wu and Edgerly (2018) note the role of age in their analysis of online news consumption by baby boomers and millennials: despite a number of similarities between two age groups, the former tended to consume news from the digital outlets of legacy media and favoured more conservative outlets, whereas the latter preferred more liberal news sources. At the same time, Mitchell, Gottfried and Matsa (2015) found that older users are inclined to consume news aligning with their views more than younger news consumers. By contrast, some other demographic variables (e.g. gender (Chyi and Lee, 2012) seem to have a limited impact both on online news consumption in general and partisan news consumption in particular.

In the case of Ukraine, Duvanova, Semenov, and Nikolaev (2015) emphasize the importance of geographic factors - i.e. the region where the user lives - on online partisanship. The significance of these specific factors is related to the regional divide of the Ukrainian political sphere, in particular, southeast versus northwest geographical division between pro-Russian and pro-Western voters (Clem and Craumer, 2008; Duvanova, Semenov and Nikolaev, 2015). In the case of online news consumption through SNS, these distinctions translate in the differences in information diets which can potentially

lead to the ideological segregation between users from different regions (Duvanova, Nikolaev, Nikolsko-Rzhevskyy, and Semenov, 2016).

In our article, we use data on demographic and geographic factors to analyze of these factors influence user involvement with partisan news communities on Vkontakte. Additionally, we employ data on linguistic factors – i.e. if the users communicate in Ukrainian, Russian, or both languages. The importance of the language factor is attributed to the specific Ukrainian content, where the choice of a certain language is often viewed as an identity marker that makes it an important element of identity politics (Charnysh, 2013). It also aligns with existing observations on the significant difference in the way the events in Ukraine, in particular related to the Russian-Ukrainian conflict and its background, are presented in different language streams on SNS (Etling, 2014; Lyebyedyev and Makhortykh, 2018). Consequently, we examine these three categories of factors – demographic, geographic and linguistic – to provide a more detailed assessment of possible predictors of the Ukrainian users' interest in partisan content. Thus, the third research question we examine in our article is:

RQ3: What is the relationship between demographic, geographic, and linguistic factors and the consumption of pro-Ukrainian and pro-Russian partisan news content?

Methodology

Similar to earlier studies on ideological segregation in the region (Gruzd and Tsyganova, 2015; Duvanova, Nikolaev, Nikolsko-Rzhevskyy, and Semenov, 2016), we used data from Vkontakte, a popular Russian social media platform. Despite its ban in 2017 by the Ukrainian authorities, Vkontakte remains the 7th most popular website in Ukraine (Alexa, 2018) with approximately 9 million active users (Tikhonova, 2018). Besides its popularity in the state-controlled parts of Ukraine, Vkontakte is extensively used in the separatist state formations in Eastern Ukraine as well as Crimea (Szwed, 2016) for distributing partisan news content offering interpretations of the situation in Ukraine alternative to the ones provided by the mainstream Ukrainian outlets.

Using Vkontakte API, in June 2018 we collected publicly available data about a large sample of users from Ukraine (n = 50,702) together with the information about online communities these users are subscribed to. To avoid selection bias, we used a random sample of users. First, we generated a random sample of numerical user ids and then filtered out of it only the Ukrainian users. For identifying if a user is from Ukraine, we relied on Vkontakte profile data; specifically, we used profile sections which allow users to self-report their country of living and included in the final sample users who stated that their country of living is Ukraine. For each user in the final sample, we extracted the data from users' profiles about their gender, age, languages they speak and their geographic location[3]; for the latter, we relied on Vkontakte profile fields which allow users to state the country and city where they live. Until now, Vkontakte identifies insurgent-controlled territories in Eastern Ukraine as part of Ukraine, so our sample included Vkontakte users from these regions; in the case of Crimea the situation is more complicated as Vkontakte attributes the peninsula differently depending on the country of living stated in the user profile.

After collecting user data, we used qualitative content analysis to analyze communities to which Ukrainian users' subscribed. Using inductive coding, we classified all communities which had more than 100 members from the initial sample (n = 4,219) according to the type of content these communities promote. While doing so, we removed from the sample deleted or blocked communities (n = 24), so the final sample of the communities is slightly smaller (n = 4,195). Our classification consists of five community types: 1) **commercial**: communities focused on advertising specific services or goods (e.g. *gepur* and *clothes_staff*; 2) **entertainment**: communities distributing

---

3

These data are subjected to usual limitations of optional self-reporting user profile data which often vary in quality and consistency (Irani, Webb, Li and Pu, 2009; Chen, Kaafar, Friedman and Boreli, 2012). In the case of our sample, these limitations are reflected in often inconsistent reporting of demographic (e.g. age and gender) and linguistic (e.g. languages spoken) variables by Vkontakte users. One possible way of dealing with these limitations, which we consider for the future work, is the use of cross-platform profile validation (e.g. by extracting additional data from the profiles of sampled users from other SNS such as Odnoklassniki); however, in addition to technical difficulties of such validation (e.g. limitations of APIs of other regional SNS), the practical implementation of such task is impeded by the frequent use of pseudonyms, in particular under the threat of legal repercussions of subscribing to partisan news communities in Ukraine and Russia.

entertainment content such as jokes or music (e.g. *exclusive_muzic* and *chotkiy_paca*); 3) **news**: communities informing users about current events in Ukraine and/or abroad (e.g. *tsnua* and *strelkov_info*); 4) **politics**: communities devoted to political actors and parties (e.g. *poroshenko.petro*); and 5) **technical**: communities focused on providing professional consultancy and help in relation to the technical aspects of Vkontakte (e.g. *team* and *ua*). The classification was done by two coders, each of whom coded 2,109 and 2,110 communities respectively; then, each coder coded 420 (20 percent) communities coded by the other coder to assess the degree of intercoder reliability. The resulting estimation of intercoder reliability measured with Krippendorff's alpha is 0.94 which suggests that the degree of intercoder reliability is high.

Following the classification of communities by type, we focused on the news communities and examined each of them to determine if the community promotes partisan or non-partisan content. In the former case, we also noted if the community distributes pro-Ukrainian (e.g. by expressing unequivocal support of Ukrainian right-wing groups such as Pravyi Sector) or pro-Russian partisan content (i.e. expressing unequivocal support of pro-Russian state formations in Eastern Ukraine, such as Donetsk and Luhansk People's Republics, or the annexation of Crimea). Two original coders examined all news communities (n = 112) and coded each of them as pro-Ukrainian, pro-Russian, or neutral. After producing the classification, both coders examined the resulted lists together and resolved disagreements through consensus-coding.

After determining the partisan orientation of news communities, we used exploratory network analysis to determine if partisan news communities form isolated clusters in the Vkontakte community topography. After identifying the position of news communities within the user-community network, we analyzed the degree of ideological segregation among the news consumers using the audience overlap approach (Webster and Ksiazek, 2012). This approach has been successfully applied to study audience fragmentation (Fletcher and Nielsen, 2017), polarization between the audiences of partisan news outlets (Ksiazek, 2016), and to explore selective exposure among online news-consumers (Nelson

and Webster, 2017; Mukerjee et al., 2018). Using a subset of users who subscribed to at least one news group from our list (n = 14,899), we constructed a news groups' audience duplication network based on the audience-centric approach to audience fragmentation. The approach assumes that media environments are either fragmented or duplicated: if audiences of the majority of outlets overlap, then these environments are duplicated, whereas little overlap indicates that these environments are fragmented and, in some cases, polarized (Ksiazek, 2011; Webster and Ksiazek, 2012). In the resulting network, each node represents a news group; two nodes are connected if their audiences overlap and the number of overlapping users is higher than the one which can occur by chance (for details see Ksiazek, 2011; Webster and Ksiazek, 2012; Fletcher and Nielsen, 2017). Afterwards, we applied community detection algorithms to analyze the resulting network to see if there are clusters of tightly connected nodes – i.e. the ones that have a significantly higher audience overlap with each other than with other news communities.

Finally, we analyzed possible factors influencing users' subscription to partisan news communities. Specifically, we looked at self-reported demographic variables (e.g. age and gender) as well as language preferences (e.g. Ukrainian or Russian); furthermore, we employed geographic variables (i.e. the region where users live), which according to Duvanova et al. (2016) are important predictors of ideological segregation in Ukraine. Out of 14,899 users subscribed to at least one news community, only 5,001 provided information about all these variables. Data about these 5,001 users were used to build a logistic regression model (Ordinary Least Square) to examine variables which can be significant for predicting subscription to the partisan news groups.

Findings

News content within Vkontakte media ecology. We started our analysis by examining differences between subscriptions to different types of online communities among Ukrainian users in Vkontakte. Based on the results of our coding summarized in Table 1, we found that the vast majority of

communities (95 percent) to which users subscribe are entertainment-oriented and deal with humour, cooking, and music. By contrast, news communities constitute a rather small number of communities with 100+ subscribers from our sample: 112 out of 4,206 (around 2.5 percent). Communities related to political/public actors are even more underrepresented in our sample; the only community we found is devoted to the current Ukrainian president, Petro Poroshenko. These observations align with earlier studies (de Zuniga, Jung, and Valenzuela, 2012; Flaxman, Goel and Rao, 2016) on Western social media platforms (e.g. Facebook) which argue that news content constitutes only a small proportion of social media content, thus making the impact of SNS on the news consumption questionable.

Table 1. Vkontakte communities subscriptions by content type

	N of communities	N of unique subscribers	Average n of subscribers
Entertainment	4,015	39,159	294
News	112	15,717	300
Politics	1	455	455
Technical	12	7,429	926
Commerce	55	7,449	207

Despite the fact that the number of news communities on Vkontakte is relatively small, our observations also indicate that these communities are rather popular. Approximately 30 percent of Vkontakte users from our sample subscribed to at least one news community, thus suggesting that these communities are more visible than commerce- or Vkontakte service-oriented ones. In order to identify possible differences between the audiences of these communities, we examined the distribution of self-reported user data depending on the type of community. Specifically, we looked at the self-reported gender and age of users together with the declared knowledge of Russian and Ukrainian languages and the region where users live.

Table 2. Vkontakte communities' subscriptions by content type and demographic variables

	Entertainment	News	Politics	Technical	Trade
Age [under 18]	1,540 (9%)	645 (9%)	29 (14%)	291 (9%)	302 (10%)
Age [18-24]	4,861 (29%)	1,988 (30%)	50 (24%)	922 (29%)	953 (30%)

Age [25-29]	3,660 (22%)	1,451 (22%)	47 (23%)	679 (22%)	678 (22%)
Age [30-49]	5,454 (33%)	2,164 (32%)	69 (34%)	1,044 (33%)	998 (32%)
Age [50+]	1,126 (7%)	455 (7%)	11 (5%)	228 (7%)	205 (6%)
Gender [female]	15,049 (54%)	6,118 (54%)	136 (43%)	2,578 (48%)	3181 (60%)
Gender [male]	13,067 (46%)	5,126 (46%)	182 (57%)	2,746 (52%)	2158 (40%)
Language [Russian only]	394 (8%)	141 (8%)	3 (2%)	90 (7%)	58 (6%)
Language [Russian & Ukrainian]	1,761 (38%)	760 (40%)	27 (23%)	472 (38%)	358 (40%)
Language [Ukrainian only]	2,527 (54%)	971 (52%)	88 (75%)	671 (55%)	481 (54%)
Region [Crimea]	756 (2%)	187 (1%)	2 (1%)	83 (2%)	59 (1%)
Region [Cent Ukr]	10,239 (29%)	3,999 (28%)	117 (40%)	1,416 (29%)	1,363 (29%)
Region [East Ukr; state-controlled]	5,814 (16%)	2,446 (17%)	32 (11%)	743 (15%)	747 (16%)
Region [East Ukr; insurgent-controlled]	4,164 (12%)	1,680 (12%)	14 (5%)	514 (10%)	408 (9%)
Region [South Ukr]	4,340 (12%)	1,775 (13%)	22 (7%)	614 (13%)	557 (12%)
Region [West Ukr]	10,356 (29%)	4,154 (29%)	107 (36%)	1,548 (31%)	1,644 (34%)

As Table 2 indicates, the distribution of demographic variables showed little variance between different types of Vkontakte communities[4]. The only exception is represented by the politics-related communities; however, these distinctions can be attributed to the data bias caused by the presence of only one such community in our sample. For all other types of communities except Vkontakte service-oriented ones, users reporting their gender as female are prevalent; similarly, in all four cases the majority of users state that their age is either between 30-49 or 18-24 years. Independently of the community type, more than half users note that they speak only Ukrainian language with approximately 40 percent mentioning both Ukrainian and Russian languages in their profiles. Relatively little number of users - between 6 and 8 percents - states that they speak only Russian; such a marginal percentage of Russian-only speakers can be attributed to the increasing number of

---

4

Such uniform distribution of variables between different community categories can be attributed to the unequal amount of information self-reported by users with more active subscribers – i.e. users subscribing to the larger number of different communities – being also the ones self-reporting the most information about themselves.

Russophone Ukrainians switching to Ukrainian language since the beginning of the conflict in Eastern Ukraine (International Alert, 2017). Surprisingly enough, the number of self-reported bilinguals and Ukrainian-only speakers was also high among the users from Eastern Ukraine, including the ones in insurgent-controlled areas.

The geographical distribution of users is similarly consistent between communities' types. In all four cases, the majority of users were either from Central or Western Ukraine; such user distribution reflects general population trends in Ukraine, where these two regions are the most populous. The number of users from separatist-controlled parts of Eastern Ukraine and Crimea in our sample was relatively low and varied from 10 to 14 percent of users who state where they live in their profiles. In the case of Crimea, such low numbers can be explained by the possibility of changing the attribution of the region to Russia introduced by Vkontakte in 2014. By contrast, the number of users from separatist-controlled parts of Ukraine was higher than we expected based on the population distribution: with approximately 3 million people living in DNR and LNR, the number of unique subscribers was the same as in the case of Southern Ukraine with roughly 6 million inhabitants (DSSU, 2017).

Together, our findings suggest that new communities constitute relatively small part of Vkontakte media ecologies in terms of communities' number that resonates with earlier studies (de Zuniga, Jung and Valenzuela, 2012; Nielsen and Schrøder, 2014) arguing that the presence of news content on SNS – as well as its impact on the public sphere – can be overestimated. At the same time, we observe that these communities attract rather significant attention from the users with approximately 30 percent of all users from our sample being subscribed to news content. Our analysis also did not show significant differences in terms of demographic/geographic profile of subscribers to different types of communities: independently of the community type, the majority of Vkontakte users from our sample are Ukrainophone or bilingual speakers from the young (18-24) and middle (30-49) age groups who come primarily from Western and Central Ukraine.
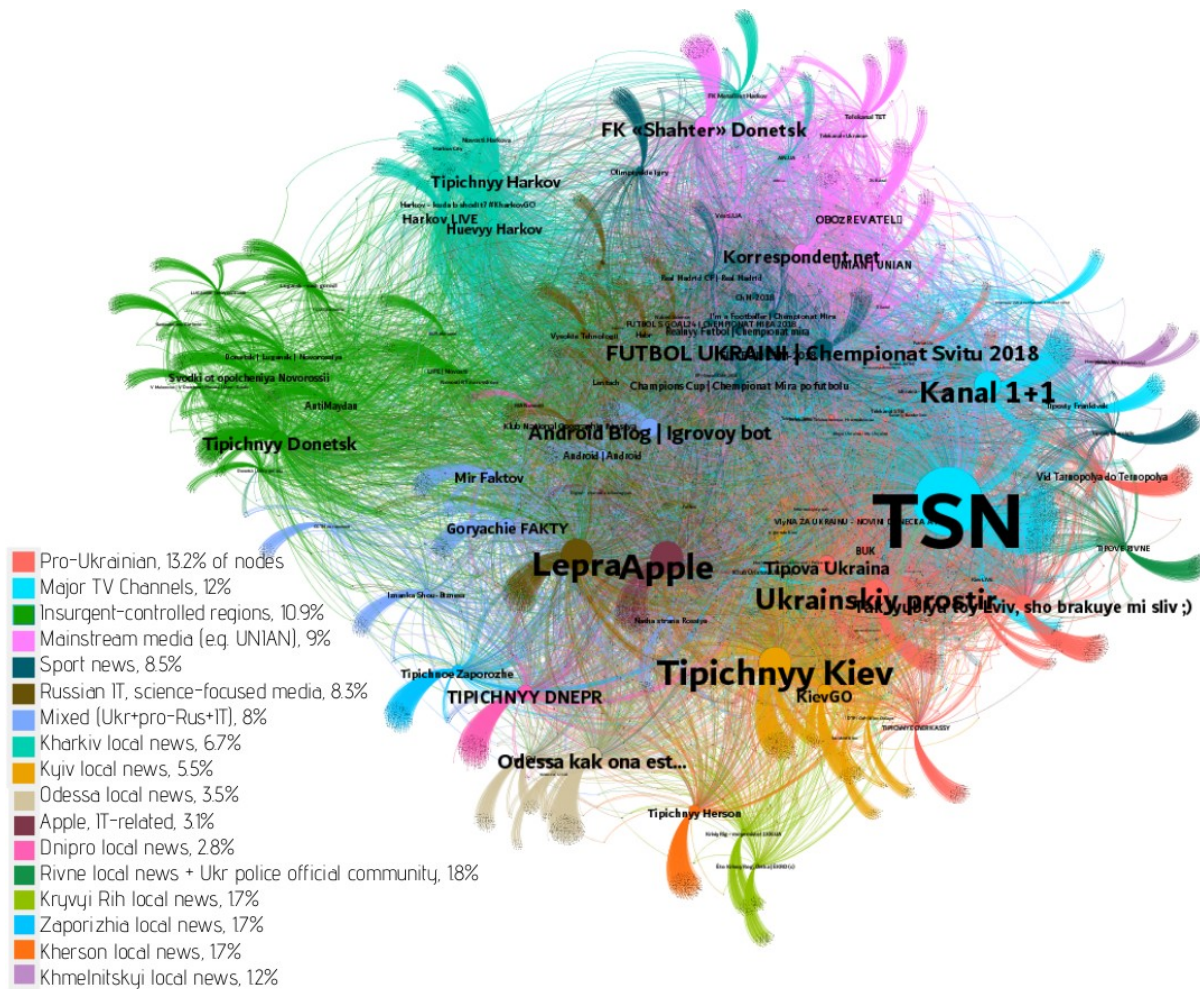
Partisan news content on Vkontakte. After examining the general place of news content within Vkontakte media ecology, we moved towards exploring the role of partisan news content. Table 3 summarizes the distribution of news communities according to their ideological orientation and the number of user subscriptions. The summary shows that the majority of news communities promote non-partisan content; yet, approximately 43 percent of news communities propagate partisan views. In contrast to the common assumption that Vkontakte is used for spreading pro-Russian propaganda in Ukraine (see, for instance, The Economist (2017) and Skichko (2017)), Table 3 suggests that the majority of partisan news communities to which Ukrainian users subscribe actually have pro-Ukrainian orientation; furthermore, the average number of subscribers is significantly higher for pro-Ukrainian news communities than for pro-Russian ones.

Table 3. News communities by ideological orientation

	N of communities	N of unique subscribers	Average n of subscribers
Neutral	63	11,105	284
Pro-Russian	13	2,131	182
Pro-Ukrainian	36	8,060	369

After identifying the distribution of news communities among Ukrainian users, we moved towards examining user subscriptions to news content on Vkontakte using clustering analysis. Specifically, we employed a community detection algorithm by Blondel et al. (2008) which resulted in 17 distinct clusters (modularity = 0.562) shown on Fig. 1. The modularity rating was verified with other community detection algorithms (e.g. walktrap (Gruzd and Tsyganova, 2015)) that produced similar estimations.

Figure 1. The network of Ukrainian Vkontakte users and news communities they follow (divided into clusters based on the network topology; the size of the nodes is proportional to the number of followers a community has; network layout is based on the Forced Atlas 2 algorithm (Jacomy, Venturini, Heymann, Bastian, 2014)

Legend:
- Pro-Ukrainian, 13.2% of nodes
- Major TV Channels, 12%
- Insurgent-controlled regions, 10.9%
- Mainstream media (e.g. UNIAN), 9%
- Sport news, 8.5%
- Russian IT, science-focused media, 8.3%
- Mixed (Ukr+pro-Rus+IT), 8%
- Kharkiv local news, 6.7%
- Kyiv local news, 5.5%
- Odessa local news, 3.5%
- Apple, IT-related, 3.1%
- Dnipro local news, 2.8%
- Rivne local news + Ukr police official community, 1.8%
- Kryvyi Rih local news, 1.7%
- Zaporizhia local news, 1.7%
- Kherson local news, 1.7%
- Khmelnitskyi local news, 1.2%

Our examination of the resulting clusters supports earlier observations by Gruzd and Tsyganova (2015), who found that geography is a strong factor for the modularity classification. Specifically, we identified distinct clusters which united local news communities from the large Ukrainian cities (e.g. Odessa, Kharkiv, Kyiv, and Lviv). Similarly, we identified a cluster of Luhansk/Donetsk local news communities; the latter cluster also includes the majority of pro-Russian partisan news communities, which might indicate the geographic focus of these groups.

We observed a similar connection between partisan news communities and regional news communities in the case of the largest cluster of our network, which ties pro-Ukrainian partisan content with Western Ukrainian news communities. We also identified two distinct clusters of communities related to legacy news organizations (e.g. 1+1 TV channel and UNIAN news agency); these

communities are grouped together, so potentially there might be a gap between the users who mostly subscribe to the legacy media news communities and users who consume news produced by alternative media. Finally, there are a few clusters focused on thematic news (e.g. sport); these clusters are located in the centre of the graph and act as "bridges" between partisan news communities.

The results of the analysis of the audience fragmentation of these news communities based on the audience overlap approach (Webster and Ksiazek, 2012) suggest that news consumption on Vkontakte is characterized by rather high partisanship. As Fig. 2 shows, the audience overlap network of news communities is divided into tightly connected modules; using Louvain community detection algorithm (Blondel et al. 2008), we calculated the modularity of this network which is equal to 0.412.

Figure 2. News groups' audience duplication network

Pro-Ukrainian news groups, in Ukrainian, 34.29% of nodes
Insurgents' news groups and pro-Russian media, 26.67%
Traditional mainstream media, mostly in Russian, 20.95%
Football news, 10.48%
Kharkiv unofficial local news, 6.67%
Apple (isolated node), 0.95%
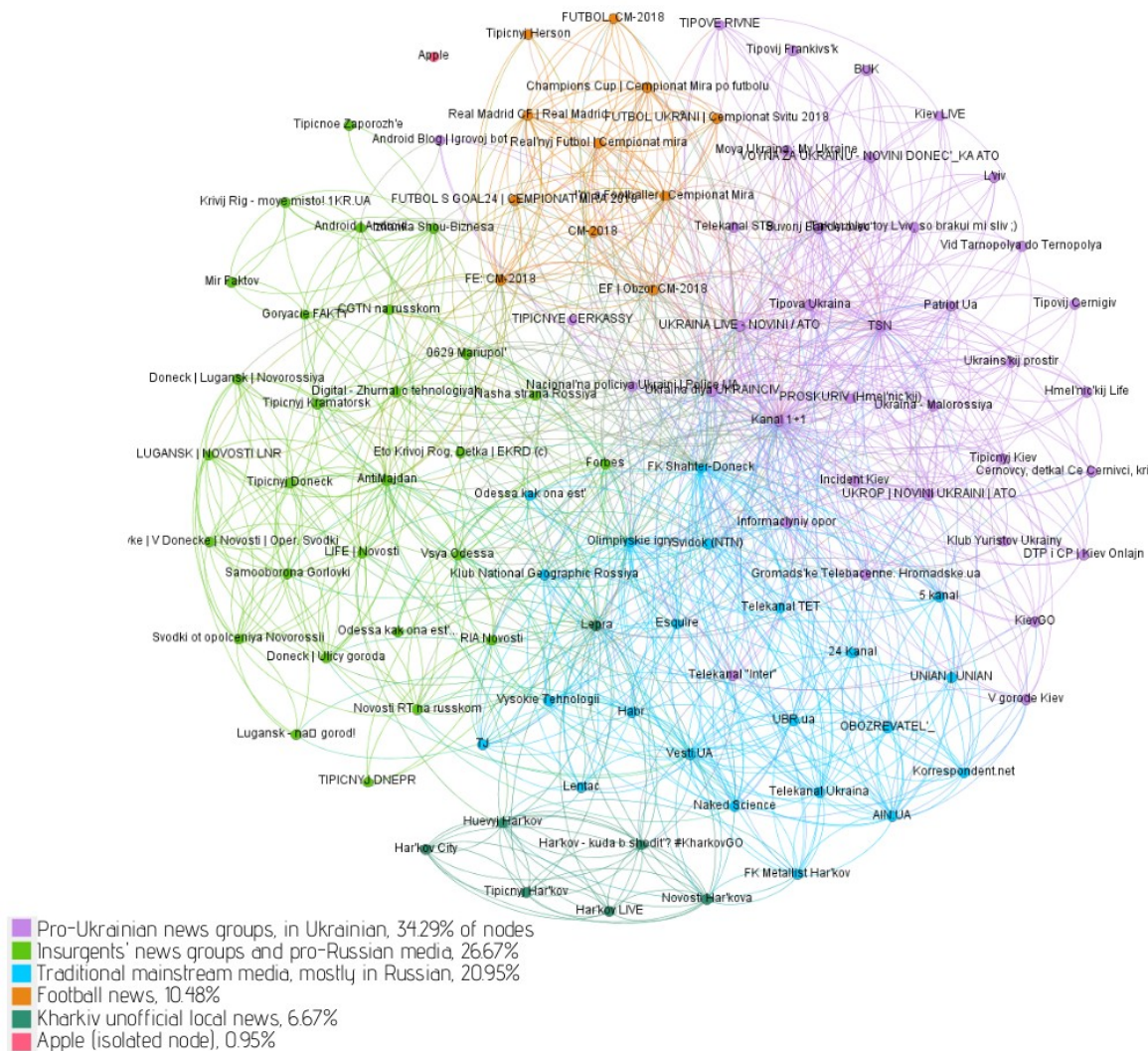
The resulting graph shows clusters of pro-Russian and pro-Ukrainian partisan news communities located at opposite poles with an in-between cluster of communities related to legacy media outlets as well as some non-partisan news content (e.g. technology and sport). The output of the community detection algorithms other than the Louvain algorithm also emphasizes the predominant presence of three major community clusters: the pro-Ukrainian one, pro-Russian one, and legacy media one. These algorithms produced the following modularity scores: 0.443 for the Newman-Girvan (2002) algorithm and 0.46 for the fast greedy algorithm (Clauset et al. 2004). Similarities in the output of different algorithms prove that our observations concerning the polarization between the subscribers of the partisan pro-Ukrainian, partisan pro-Russian and traditional media news communities' are quite robust.

The findings in this section suggest that partisan news communities constitute less than half of the news communities in our sample. Pro-Ukrainian partisan communities attract more users on average compared with non-partisan news communities as well as pro-Russian communities with the latter having a rather marginal position in terms of the number of users from our sample subscribing to this type of communities. We also found that pro-Ukrainian and pro-Russian partisan communities have rather distinct positions within the user-communities network topography and their audiences show very limited overlap, thus contradicting the argument by Flaxman, Goel, and Rao (2016) about SNS encouraging users' exposure to the views different from their own. A similar gap is present between the subscribers of communities associated with legacy media and alternative media; together, these observations suggest that Vkontake does, indeed, enable ideological segregation and that partisan news communities function as isolated "echo chambers", whose subscribers have limited possibilities for experiencing opposing points of view.

Determinants of partisan news consumption. After detecting the low audience overlap between partisan news communities, we looked at the factors which can explain users' interest in partisan news

content. Following earlier studies on partisan news consumption in Ukraine (Gruzd and Tsyganova, 2015; Duvanova, Nikolaev, Nikolsko-Rzhevskyy, and Semenov, 2016), we assumed that the region in which users live can be an influential factor; the importance of this specific variable is connected to the long-term regional divide in Ukrainian political sphere, where western parts of the country tended to favour pro-EU politicians, whereas eastern and southern regions gravitated towards pro-Russian candidates (Clem and Craumer, 2008). Additionally, we considered the self-reported language capabilities of users, their age, and gender to see if linguistic and demographic factors influence partisan news consumption.

We used regression analysis to check the statistical significance of the variables mentioned above. We ran two separate logistic regressions to determine which demographic, geographic, and linguistic variables can predict subscription to pro-Russian and pro-Ukrainian partisan news communities. As was mentioned earlier, after removing all NAs, we were left with 5,001 users who provided information about the required variables. Out of these users, 2,784 were subscribed to pro-Ukrainian communities and only 625 to pro-Russian communities. This, along with the earlier observations about the discrepancies between the numbers of pro-Ukrainian and pro-Russian partisan communities (see Table 3), puts the wide-spread statements about the spread of pro-Russian propaganda in Ukraine through Vkontakte (The Economist, 2017) under scrutiny.

The results of the regression analyses are summarized in Tables 4 and 5. We used different predictors for each logistic model: the choice of specific predictors in each case was determined by the level of model fit. We performed likelihood ratio tests and calculated McFadden's r-squared (McFadden, 1973) to find the best fitting set of predictors. For the model where a subscription to pro-Ukrainian partisan news communities was taken as the dependent variable, the best fitting combination of independent variables was Ukrainian language-speaking (binary), gender (binary) and region of residence (categorical). The latter variable was taken with 7 categories. Besides distinguishing between 4 regions of Ukraine (West, East, Center and South), we also distinguished between Ukrainian-

controlled and separatist-controlled regions in the East and Crimea that was annexed by Russia in 2014. This division was taken because of the model fit. We also ran models where we did not distinguish between the separatist-controlled and Ukrainian-controlled regions in the East and Crimea, but they had a worse fit to the data. The McFadden's r-squared for the final model is 0.89, which indicates that the model fits the data decently.

Based on the results of the regression analysis we can state that Ukrainian speakers (i.e. users who declare on Vkontakte that they speak Ukrainian) are more likely to follow pro-Ukrainian partisan communities; similarly, females are more likely to follow pro-Ukrainian communities than males. Finally, as expected, the declared residence in the separatist-controlled regions and Crimea is a very strong negative predictor of subscription to pro-Ukrainian communities. Residence in Ukraine-controlled eastern regions and in southern regions also is a strong negative predictor of subscription to pro-Ukrainian communities. The only positive regional predictor of interest in pro-Ukrainian partisan communities is the residence in Western Ukraine. This observation supports earlier findings about a strong pro-Ukrainian regional partisanship in the western part of the country (Clem and Craumer, 2008). It also suggests that online news consumption patterns of users from Western Ukraine are rather different from those of users from other parts of the country, who exhibit less interest in pro-Ukrainian partisan news content.

Table 4. Regression analysis results, predicting pro-Ukrainian partisanship

Dependent variable:	Subscription to pro-Ukrainian communities
Independent variable	**Rating**
Language: Ukrainian only	0.364*** (0.089)
Gender: male	-0.196*** (0.061)
Region [Crimea]	-1.438*** (0.283)
Region [East Ukr; DNR]	-1.901*** (0.121)
Region [East Ukr; state-controlled]	-0.728*** (0.090)
Region [East Ukr; LNR]	-2.038*** (0.204)
Region [South Ukr]	-0.818*** (0.099)
Region [West Ukr]	0.165** (0.082)
Constant	0.727*** (0.067)

Observations	5,001
Log Likelihood	-3,127.935
Akaike Inf. Crit.	6,273.870
Note:	*p<0.1; **p<0.05; ***p<0.01

For the logistic model where a subscription to pro-Russian partisan communities was taken as a dependent variable, we used age (categorical) and region of residence (categorical, similar to the model for pro-Ukrainian partisanship) as independent variables. The choice, in this case, was also determined by the model fit with the mentioned combination of variables providing the best results with McFadden's r-squared equal to 0.63. This model did not fit as well as the one for pro-Ukrainian partisanship, but its performance is acceptable since McFadden's r-squared is still closer to 1 than to 0. The model shows that young people under 18 years old are more likely to subscribe to pro-Russian partisan news communities than other age groups. The strongest predictors of interest in pro-Russian communities are, as expected, the declared residence in separatist-controlled regions in Eastern Ukraine. We also found that the residence in Western Ukraine is a statistically significant predictor of subscription to pro-Russian communities. This finding might look counterintuitive, considering that the same factor is also a positive predictor of the subscription to pro-Ukrainian communities; however, it can be attributed to the higher partisanship among residents of Western Ukraine as well as possible internal divisions along the political lines. We plan to further investigate this issue in follow-up analysis.

Table 5. Regression analysis results, predicting pro-Russian partisanship

Dependent variable:	Subscription to pro-Russian communities
Independent variable	**Rating**
Age [under 18]	0.371** (0.151)
Age [25-29]	-0.100 (0.138)
Age [30-49]	0.117 (0.117)
Age [50+]	-0.063 (0.189)
Region [Crimea]	-0.961 (0.725)
Region [East Ukr; DNR]	1.590*** (0.138)
Region [East Ukr; state-controlled]	0.121 (0.154)
Region [East Ukr; LNR]	1.864*** (0.190)

Region [South Ukr]	0.159 (0.169)
Region [West Ukr]	0.333** (0.130)
Constant	-2.478*** (0.128)
Observations	5,001
Log Likelihood	-1,766.222
Akaike Inf. Crit.	3,554.445
Note:	*p<0.1; **p<0.05; ***p<0.01

Our findings do not provide support to the argument of Taneja, Wu and Edgerly (2018) about the differences in partisan news consumption being attributed to demographic variables (e.g. different age categories). Instead, in the case of Ukrainian SNS users, geographical – in particular, the self-declared region of residence – and linguistic variables seem to be particularly significant, thus supporting earlier findings by Duvanova et al. (2016) about the importance of these variables for political partisanship. These observations suggest that the existing factors of ideological segregation in the case of Ukraine remain highly relevant for partisan news consumption in online spaces.

Conclusions

In our paper, we examined the ideological segregation among Ukrainian users in online news communities using as a case platform Vkontakte, the largest SNS in post-socialist space. Specifically, we were interested in how significant the presence of (partisan) news content on SNS is in the case of conflict-ridden societies experiencing the transition towards datafied media industries. Additionally, we tried to assess to what degree partisan news communities enhance ideological segregation – i.e. whether they entrap users within "filter bubbles" (Pariser, 2011) or "echo chambers" (Sunstein, 2017) – and what the factors which can predict users' interests towards partisan news content on SNS are.

Our findings partially align with a series of recent studies (Flaxman, Goel and Rao, 2016; Zuiderveen Borgesius et al., 2016; Mukerjee, Majó-Vázquez and González-Bailón, 2018) which suggest that concerns about the potential of SNS to undermine shared public agenda are overrated. News communities constitute just a small drop in the digital ocean of entertainment content – even in

the case of Ukraine, where SNS assumingly are a major source of information about the recent developments in the country, in particular in relation to the conflict in Eastern Ukraine.

At the same time, our observations point to the high degree of partisan news consumption on Vkontakte that contradicts the assumption that SNS encourage exposure to different views and, thus, counter ideological segregation (Flaxman, Goel and Rao, 2016). Despite the relatively little number of partisan news communities, almost two-thirds of users interested in online news on Vkontakte subscribe either to pro-Ukrainian or to pro-Russian communities; in the former case, the average number of subscribers is higher compared with non-partisan news communities. Our observations also indicate that the audiences of partisan news communities do not overlap; instead, their subscribers remain in self-chosen "echo chambers" and have limited possibilities to expose themselves to opposing viewpoints. Such a selective exposure to a single ideological view increases ideological segregation and facilitates societal polarization and potential radicalization which is a major concern for already polarized Ukrainian society.

Finally, our investigation of factors which stimulate user subscription to partisan news content suggests that variables related to existing ideological divides – i.e. geography- or language-related ones – tend to be the strongest predictors of online partisanship. Unlike other studies (Taneja, Wu and Edgerly, 2018) which suggest that age tends to be a strong predictor of partisan news consumption online, we did not find evidence suggesting that younger Ukrainian users are more eager to subscribe to partisan news content. Instead, our observations suggest that divisions between news consumers on Vkontakte reproduce - and, potentially, reinforce - existing ideological divides between Ukrainian regions (Duvanova, Semenov, and Nikolaev, 2015).

It is important to acknowledge the limitations of the study, in particular, the use of self-reported user information on Vkontakte. Unlike traditional surveys, we have limited possibilities for verifying if the user's declared age, gender, or language abilities actually correspond to the real state of affairs. This has limited impact on the detection of user overlap among audiences of partisan news communities;

however, it has significant implications for the analysis of factors influencing users' interest towards partisan content. In the future research, we anticipate addressing this limitation by using profile cross-referencing.

References

Alexa. (2018) '*Top Sites in Ukraine*'. URL (consulted 2018, December): https://www.alexa.com/topsites/countries/UA

Allcott, H. and Gentzkow, M. (2017) 'Social Media and Fake News in the 2016 Election', *Journal of Economic Perspectives* 31(2): 211-236.

Beaufort, M. (2018) 'Digital Media, Political Polarization and Challenges to Democracy', *Information, Communication & Society* 21(7): 915-920.

Blondel, V., Guillaume, J.-L., Lambiotte, R. and Lefebvre, E. (2008) 'Fast Unfolding of Communities in Large Networks', *Journal of Statistical Mechanics*: 1-6. URL (consulted 2018, December): https://arxiv.org/abs/0803.0476

Charnysh, V. 2013. Analysis of current events: Identity mobilization in hybrid regimes: Language in Ukrainian politics. *Nationalities Papers* 41(1): 1-14.

Chen, T., Kaafar, M., Friedman, A. and Boreli, R. (2013) 'Is More Always Merrier? A Deep Dive Into Online Social Footprints', paper presented at *Workshop on Online Social Networks*, Helsinki, August. URL (consulted 2018, December): https://conferences.sigcomm.org/sigcomm/2012/paper/wosn/p67.pdf

Chyi, H. and Lee, A. (2013) 'Online News Consumption: A Structural Model Linking Preference, Use, and Paying Intent', *Digital Journalism* 1(2): 194-211.

Clauset, A., Newman, M. and Moore, C. (2004) 'Finding Community Structure in Very Large Networks', *Physical Review E* 70: 1-6. URL (consulted 2018, December): https://arxiv.org/abs/cond-mat/0408187

Clem, R. and Craumer, P. (2008) 'Orange, Blue and White, and Blonde: The Electoral Geography of Ukraine's 2006 and 2007 Rada Elections', *Eurasian Geography and Economics* 49(2): 127–151.

de Zuniga, H.G., Jung, N. and Valenzuela, S. (2012) 'Social Media Use for News and Individuals' Social Capital, Civic Engagement and Political Participation', *Journal of Computer-Mediated Communication* 17: 319–336.

DSSU. (2017) *Chysel'nist' naiavnoho naselenniua Ukrainy*. Kyiv: DSSU.

Duvanova, D., Semenov, A. and Nikolaev, A. (2015) 'Do Social Networks Bridge Political Divides? The Analysis of Vkontakte Social Network Communication in Ukraine', *Post-Soviet Affairs* 31(3): 224-249.

Duvanova, D., Nikolaev, A., Nikolsko-Rzhevskyy, A. and Semenov, A. (2016) 'Violent Conflict and Online Segregation: An Analysis of Social Network Communication Across Ukraine's Regions', *Journal of Comparative Economics* 44(1): 163-181.

Economist. (2017) 'Ukraine Bans its Top Social Networks Because They are Russian'. URL (consulted 2018, December): https://www.economist.com/europe/2017/05/19/ukraine-bans-its-top-social-networks-because-they-are-russian

Etling, B. (2014) Russia, Ukraine, and the West: Social Media Sentiment in the Euromaidan Protests. Internet Monitor Special Report Series. URL (consulted 2019, July): http://cyber.law.harvard.edu/publications/2014/euromaidan

Freedom House. (2017) *Freedom on the Net 2017: Ukraine*. URL (consulted 2018, December): https://freedomhouse.org/report/freedom-net/2017/ukraine

Flaxman, S., Goel, S. and Rao, J. (2013) 'Ideological segregation and the

effects of social media on news consumption', *SSRN*. URL (consulted 2019, July): https://www.semanticscholar.org/paper/Ideological-Segregation-and-the-Effects-of-Social-Flaxman-Goel/768eb9576a9a478c95e8ed3434ea4752c4098aa7

Flaxman, S., Goel, S. and Rao, J. (2016) 'Filter Bubbles, Echo Chambers, and Online News Consumption', *Public Opinion Quarterly* 80(S1): 298–320.

Fletcher, R. and Nielsen, R. (2017) 'Are News Audiences Increasingly Fragmented? A Cross-National Comparative Analysis of Cross-Platform News Audience Fragmentation and Duplication', *Journal of Communication* 67(4): 476-498.

Gentzkow, M. and Shapiro J. (2011) 'Ideological Segregation Online and Offline', *The Quarterly Journal of Economics* 126: 1799-1839.

Gerlitz, C. and Rieder, B. (2013) 'Mining One Percent of Twitter: Collections, Baselines, Sampling', *M/C Journal* 16(2). URL (consulted 2018, December): http://journal.media-culture.org.au/index.php/mcjournal/article/view/620

Girvan, M. and Newman, M. (2002) 'Community Structure in Social and Biological Networks', *PNAS* 99(12): 7821-7826.

Gruzd, A., & Roy, J. (2014). 'Investigating Political Polarization on Twitter: A Canadian Perspective', *Policy & Internet, 6*(1): 28–45.

Gruzd, A. and Tsyganova, K. (2015) 'Information Wars and Online Activism During the 2013/2014 Crisis in Ukraine: Examining the Social Structures of pro- and anti-Maidan Groups', *Policy and Internet* 7(2): 121-158.

Hahn, K., Ryu, S. and Park, S. (2015) 'Fragmentation in the Twitter following of news outlets: The representation of South Korean users' ideological and generational cleavage'. *Journalism & Mass Communication Quarterly* 92(1): 56-76.

Helberger, N. (2016) 'Policy implications from algorithmic profiling and the changing relationship between newsreaders and the media', *Javnost* 23(2): 188-203.

Hermida, A., Fletcher, F., Korell, D. and Logan, D. (2012) 'Share, Like, Recommend: Decoding the Social Media News Consumer', *Journalism Studies* 13(5-6): 815-824.

Hoffmann, J. (2014) 'Conceptualizing "Communication for Peace"', *Peacebuilding* 2(1): 100-117.

International Alert. (2017) Pytannia identychnosti dlia rosiis'komovnyh v Ukraini v konteksti zbroinoho conflictu na shodi krainy. URL (consulted 2018, December): www.international-alert.org/sites/default/files/Ukraine_RussophoneIdentity_UK_2017.pdf

Irani, D., Webb, S., Li, K. and Pu, C. (2009) 'Large Online Social Footprints – an Emerging Threat', paper presented at International Conference on Computational Science and Engineering, Vancouver, August. URL (consulted 2018, December): https://ieeexplore.ieee.org/document/5283493

Jacomy, M., Venturini, T., Heymann, S., Bastian, M. (2014) 'ForceAtlas2, a Continuous Graph Layout Algorithm for Handy Network Visualization Designed for the Gephi Software', *PLoS ONE* 9(6): 1-12.

Karamshuk D., Lokot T., Pryymak O., Sastry N. (2016) 'Identifying Partisan Slant in News Articles and Twitter During Political Crises', In: Spiro E., Ahn Y. (eds) Social Informatics. Lecture Notes in Computer Science (pp. 257-272). Cham: Springer.

Kirilenko, A. and Tyshchuk, T. (2018) 'From Legacy to Digital: Ukraine's Plugged-In Economy', *Atlantic Council*. URL (consulted 2018, December): http://www.atlanticcouncil.org/publications/issue-briefs/from-legacy-to-digital-ukraine-s-plugged-in-economy

Khaldarova, I. and Pantti, M. (2017) 'Fake News: The Narrative Battle over the Ukrainian Conflict', *Journalism Practice* 10(7): 891-901.

Kharchenko, N. (2016) 'Dynamics of the Internet Usage in Ukraine', *KIIS*. URL (consulted 2018, December): http://www.kiis.com.ua/?lang=engandcat=reportsandid=621

Kleppe, M. and Otte, M. (2017) 'Analysing and Understanding News Consumption Patterns by Tracking Online User Behaviour with a Multimodal Research Design', *Digital Scholarship in the Humanities* 31(2): 158-170.

Ksiazek, T. (2011) 'A Network Analytic Approach to Understanding Cross-Platform Audience Behavior', *Journal of Media Economics*, 24(4): 237-251.

Ksiazek, T. B. (2016). 'Partisan audience polarization: Beyond selective exposure', *Atlantic Journal of Communication, 24*(4): 216–227.

Lazer, D.M., Baum, M.A., Benkler, Y., Berinsky, A.J., Greenhill, K.M., Menczer, F., Metzger, M.J., et al. (2018) 'The Science of Fake News', *Science* 359(6380): 1094-1096.

Lyebyedyev, Y. and Makhortykh, M. (2018) #Euromaidan: Quantitative analysis of multilingual framing 2013–2014 Ukrainian protests on Twitter. In 2018 IEEE Second International Conference on Data Stream Mining & Processing (pp. 276-280). Piscataway: IEEE.

Lynch, M., Freelon, D. and Aday, S. (2016) *Blogs and Bullets IV: How Social Media Undermines Transitions to Democracy*. Washington, DC: PeaceTech Lab.

Makhortykh, M. and Sydorova, M. (2017) 'Social Media and Visual Framing of the Conflict in Eastern Ukraine', *Media, War and Conflict* 10(3): 359-381.

McFadden, D. (1973) 'Conditional Logit Analysis of Qualitative Choice Behavior' in P. Zarembka (ed), *Frontiers in Econometrics*, pp. 105-142. New York: Wiley.

Messing, S. and Westwood, S. (2014) 'Selective Exposure in the Age of Social Media: Endorsements Trump Partisan Source Affiliation When Selecting News Online', *Communication Research* 41(8): 1042-1063.

Mitchell, A., Gottfried, J. and Matsa, K.E. (2015, June 1) 'Millennials and Political News', *Pew Research Center*. URL (consulted 2018, December):

http://www.journalism.org/2015/06/01/millennials-political-news/

Mukerjee, S., Majó-Vázquez, S. and González-Bailón, S. (2018) 'Networks of Audience Overlap in the Consumption of Digital News', *Journal of Communication* 68: 26–50.

Nelson, J. L., & Webster, J. G. (2017). 'The Myth of Partisan Selective Exposure: A Portrait of the Online Political News Audience', *Social Media + Society*.

Newman, N. (2011) *Mainstream Media and the Distribution of News in the Age of Social Discovery*. Oxford: Reuters Institute. URL (consulted 2018, December): https://reutersinstitute.politics.ox.ac.uk/our-research/mainstream-media-and-distribution-news-age-social-discovery

Nielsen, R. and Schrøder, K. (2014) 'The Relative Importance of Social Media for Accessing, Finding, and Engaging with News', *Digital Journalism* 2(4): 472-489.

Pantti, M. (2016) 'The Ukraine Crisis and the Media: An Introduction', in M. Pantti (ed), *Media and the Ukraine Crisis*, pp. xi-3. New York: Peter Lang.

Pariser, E. (2011) *The Filter Bubble: What the Internet is Hiding From You*. New York: Penguin Press.

Prior, M. (2005) 'News vs. entertainment: How increasing media choice widens gaps in political knowledge and turnout', *American Journal of Political Science* 49(3): 577-592.

Romenskyy, M., Spaiser, V., Ihle, T. and Lobaskin, V. (2018) 'Polarized Ukraine 2014: Opinion and Territorial Split Demonstrated with the Bounded Confidence XY Model, Parametrized by Twitter data', *Royal Society Open Science* 5: 1-11.

Rushing, E. (2017). Lives across the frontline: Internal displacement in a divided Ukraine. IDMC. URL (consulted 2019, July): http://www.internal-displacement.org/expert-opinion/lives-across-the-frontline-internal-displacement-in-a-divided-ukraine

Russell, A. (2011) 'Extra-National Information Flows, Social Media, and the 2011 Egyptian Uprising', *International Journal of Communication* 5: 1238–1247.

Saez-Trumper, D., Castillo, C. and Lalmas, M. (2013) 'Social media news communities: gatekeeping, coverage, and statement bias'. In Proceedings of the 22nd ACM international conference on Information & Knowledge Management (pp. 1679-1684). New York: ACM.

Stroud, N. (2008) 'Media Use and Political Predispositions: Revisiting the Concept of Selective Exposure', *Political Behavior* 30(3): 341-366.

Sunstein, C. (2017) *#Republic: Divided Democracy in the Age of Social Media*. Princeton: Princeton University Press.

Szwed, R. (2016) *Framing of the Ukraine-Russia Conflict in Online and Social Media*. Riga: NATO Stratcom. URL (consulted 2018, December): https://www.stratcomcoe.org/download/file/fid/6141

Tandoc, E., Lim, Z., and Ling, R. (2018) 'Defining "Fake News"', *Digital Journalism* 6(2): 137-153.

Taneja, H., Wu, A.X. and Edgerly, S. (2018) 'Rethinking the Generational Gap in Online News Use: An Infrastructural Perspective', *New Media and Society* 20(5): 1792-1812.

Tikhonova, N. (2018, May 16) 'Bez kontakta', *Novaia Gazeta*. URL (consulted 2018, December): https://www.novayagazeta.ru/articles/2018/05/16/76487-bez-kontakta

Thurman, N. and Schifferes, S. (2012) 'The Future of Personalization at News Sites', *Journalism Studies* 13(5-6): 775–790.

Webster, J. and Ksiazek, T. (2012) 'The Dynamics of Audience Fragmentation: Public Attention in an Age of Digital Media', *Journal of Communication* 62: 39–56.

Zhukov, Y. and Baum, M. (2016) 'Reporting Bias and Information Warfare', paper presented at *International Studies Association Annual Convention*, Atlanta, GA, March. URL (consulted 2018, December):

https://sites.hks.harvard.edu/fs/mbaum/documents/zb_isa_v5.pdf

Zuiderveen Borgesius, F.J., Trilling, D., Möller, J., Bodó, B., de Vreese, C.H. and Helberger, N. (2016) 'Should We Worry About Filter Bubbles?', *Internet Policy Review*, *5*(1). URL (consulted 2018, December):

https://policyreview.info/articles/analysis/should-we-worry-about-filter-bubbles

Zuiderveen Borgesius, F.J., Kruikemeier, S., Boerman, S.C., and Helberger, N. (2017) 'Tracking Walls, Take-It-Or-Leave-It Choices, the GDPR, and the ePrivacy Regulation', *European Data Protection Law Review* 3(3): 353-368.