

Network of Telegram Channels: Digital Repression in Authoritarian States

Daria Kuznetsova, Department of Political Science, The University of Iowa,
email: daria-kuznetsova@uiowa.edu

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Introduction

Early communication studies considered information communication technologies (ICTs) a vital tool for organizing collective action that can bring regime change in authoritarian countries (Howard, 2010). In the last two decades or so, states began to adopt the use of ICTs themselves, and, more recently, *authoritarian* states have become increasingly sophisticated in their use of ICTs for surveillance, censorship of information, and limiting connectivity. The technology is now seen as a potential tool for digital repression and information control (Earl et al., 2022; Rød & Weidmann, 2015; Vanderhill, 2020). Achieving information control allows the regime to influence attention to information and its diffusion. It allows the regime to promote favorable narratives and obstruct critical ones. Information control helps to manipulate public opinion and, as a result, behavior. This power is especially important during moments of public discontent and social movement, when there is an increased threat to regime survival (Feldstein, 2021; Geddes et al., 2018).

Using social network analysis, I investigate whether an autocratic regime and pro-government agents on social media engage in information control strategies during state-wide social movements in autocracies. Specifically, I focus on the activity of the state and pro-government agents on the messaging app Telegram during the 2020-21 protests in Belarus and the 2022 anti-war protests in Russia.

Telegram is one of the most popular messaging and social media apps for political communication in Russia and Belarus. In Belarus, Telegram played an important role in disseminating uncensored information and organizing the 2020-2021 protests (Mateo, 2022; Wijermars & Lokot, 2022). During Russia's full-scale invasion of Ukraine that began in February of 2022, and a wave of anti-war protests that followed, Telegram gained more popularity and, more importantly, remained unbanned unlike other Western social media (Safronova et al., 2022). As a weakly moderated social media platform¹, Telegram allows its users to discuss virtually almost any topic without restrictions or consequences, making it a perfect medium for state digital repression techniques such as spreading propaganda and disinformation. This popularity makes Telegram an important case to investigate in improving our understanding of the role digital media plays in information control and in influencing public opinion.

I build on the framework of digital repression developed by Earl et al. (2022) and rely on principles of Russian disinformation dissemination (Paul & Matthews, 2016) to theorize about information control strategies pro-government actors might engage in on social media. I argue that if pro-government agents engage in information control during social movements, we should observe increased forwarding activity between these actors (i.e., higher density in the network) as this helps the regime to disseminate information faster and further, creates repeated exposure to the same information (which generates a validity effect), and floods online communication spaces with information favorable to the regime. For the public, this complicates the sorting and

¹ Telegram's Terms of Service state: "by signing up for Telegram, you accept our Privacy Policy and agree not to: (1) use our service to send spam or scam users; (2) promote violence on publicly viewable Telegram channels, bots, etc; (3) post illegal pornographic content on publicly viewable Telegram channels, bots, etc" (Terms of Service, 2022).

sifting of information to find what is true, and what is not. I show that during social movements state and state-affiliated agents increase their within-community and between-community interactions (forwarding), a sign of an attempted increase in information control.

This study makes several contributions to existing literature. First, it provides one of the first looks at the network structure of the Belarusian and Russian pro-government public Telegram channels. A better understanding of these network structures can improve the detection of harmful content on social media platforms (e.g. Guarino et al., 2020). Second, while most of the studies on social movements focus on the use of social media by protesters, opposition leaders, activists, or NGOs figures (Mateo, 2022; Onuch, 2015; Sandra González-Bailón & Wang, 2016), this study focuses on the use of social media by the state and state-affiliated agents.

Digital repression and information channeling

In the digital era, Guriev & Treisman (2019, 2020) argue, dictators rely on convincing the public of their governments' competency and legitimacy, rather than on force and ideology, as they did in the past. In a world where information diffuses faster, cheaper, further, and to larger audiences than ever before, the key to dictators' survival is the manipulation of public opinion through information control. Because social movements pose a major threat to authoritarian regimes (Feldstein, 2021; Geddes et al., 2018), the regime's goals are to minimize the dissemination of information that challenges the regime or calls for collective contentious action and, therefore, to prevent anti-government movements from emerging (King et al., 2013).

Online, the regime competes against protesters and opposition by denying them attention, focus, and credibility (Tufekci, 2017). The overflow of conflicting information makes it difficult for ordinary people to sort and sift through and find what is reliable. The regime might

"deliberately sow mistrust and confusion, create information glut and distraction, and harass and abuse dissidents or political opponents" (Tufekci, 2017, p. 231). In addition, as a part of covert information channeling strategies, the regime can spread disinformation, work to lower trust among activists, and even undermine the institutional capacity of collective action organizers (Earl et al., 2022).

Literature on authoritarian politics shows the significance of information control and propaganda for regime stability and survival (Feldstein, 2021; Guriev & Treisman, 2019, 2020; Lankina et al., 2020; Roberts, 2018; Vanderhill, 2020; Way & Levitsky, 2006; Zhuravskaya et al., 2020). Rosenberg & Tarnikova (2022) show that, in Russia, the use of the internet and social media can lower government approval, an important indicator of regime stability and public belief in the government's competency. At the same time, they find that the use of social media platforms controlled by the regime and politicized by national elites is associated with an increase in approval of the government, potentially due to the dissemination of propaganda. Rosenberg & Tarnikova's example illustrates how social media can contribute to regime stability if the content is censored and controlled.

Information control can be achieved using digital repression. I follow the definition of digital repression proposed by Earl et al. (2022, p. 1) who describe digital repression as "actions directed at a target to raise the target's costs for digital social movement activity and/or the use of digital or social media to raise the costs for social movement activity, wherever that contestation takes place." Information control, according to Earl et al. (2022) framework, can be established via two means: information coercion and information channeling. Information channeling, the focus of this study, is meant to influence information production, dissemination, and consumption. Some examples of information channeling tools include posting distracting

information, information flooding with irrelevant material, redirection of attention, and dissemination of disinformation and propaganda.

Russian model for propaganda and disinformation

The Russian model of propaganda and disinformation is characterized as “the firehose of falsehood” (Paul & Matthews, 2016). There are four distinctive features of this model, including (1) high-volume and multichannel communication; (2) rapid, continuous, and repetitive dissemination of information; (3) lack of consistency; and (4) lack of commitment to objective reality (Paul & Matthews, 2016). Dissemination of disinformation serves several goals. First, it creates repeated exposure to the same information from different sources, as such exposure creates the validity effect (Boehm, 1994) which causes individuals to trust information and its source. Second, disinformation confuses the public and disrupts truthful reporting. In other words, the goals are to create chaos in the information space where finding truthful information becomes difficult and time-consuming. As a result, it becomes easier for disinformation spreaders to effectively manipulate public opinion.

Information flow in online networks

Empirical studies provide insight into how information and disinformation diffuse online. In general, the density of online networks, a proportion of existing connections between actors to all possible connections, is found to be positively related to the transmission of information on social media (Luarn & Chiu, 2016), suggesting that information spreads faster and further in more dense networks. Previous research shows that false news spreads farther, faster, and more broadly on social media than the truth (Vosoughi et al., 2018; Zhou & Zafarani, 2019). This means that the networks of disinformation spreaders are typically denser than the networks of true news sources (Zhou & Zafarani, 2019).

Building on the Russian model of disinformation (reliance on a high volume of rapid, continuous, and repetitive information disseminated via multiple channels) and information dissemination online (denser networks facilitate information dissemination; disinformation networks are denser than networks of truthful information), I argue that during a social movement (or other events that are threatening regime survival), the state and state-affiliated agents will activate a denser network within and between their communities by forwarding messages more frequently. A higher density means information is disseminated further and faster and, therefore, helps establish information control online. In addition, an increase in density helps the actors reach larger audiences because forwarding a message exposes subscribers of the forwarder to another agent and their posts. I formulate a testable hypothesis:

H1: During social movements, state and pro-government agents will forward messages from other state and pro-government agents more frequently to increase information control online.

Telegram and public channels

Telegram is a free, cloud-based, encrypted (questionably, see Doffman, 2021) messaging application that provides several functionalities to its users including direct messages (text, images, videos, or files of any type), calls, and the creation of public or private groups, chats, and channels. For the distribution of information to large audiences, chats and channels are the most effective Telegram tools. Chats support up to 200,000 members. Telegram channels—one-to-many broadcasting tools, similar to personal blogs—allow channel administrators to send messages to virtually unlimited audiences of subscribers. Any user can subscribe to public channels. Private channels are closed societies that can only be joined by invitation from the channel's owner. This study focuses on the network of public channels.

Data

Belarusian Telegramsphere

The data was collected using Telegram's open API and Telethon Python library (Lonami Exo, 2021) using snowball sampling. To retrieve data via Telegram API, a researcher needs a list of channel names. As a starting point for the snowball sampling (the first iteration of data collection) for the Belarusian case, I used a list of 100 of the most popular (by the number of subscribers) Telegram public channels geolocated in Belarus as of January 14, 2023. After the full histories of posts were collected, I retained the posts between May 1, 2020 and December 31, 2020. From these posts, I then extracted links to and mentions of other public Telegram channels. I retained channels that were mentioned at least twice. Channels that are mentioned only once are assumed to be peripheral in the network and therefore can be omitted. The remaining links and mentions were used to create a new list of unique channel names to be added to the analysis (the second iteration of data collection). This process was repeated a third time to complete the data pool (third iteration of data collection).

Overall, for the sample of Belarusian Telegramsphere, I collected the full histories of posts from 1,317 public Telegram channels. These 1,317 channels provide links to and/or mention 10,972 other Telegram channels. This results in a network with 12,289 total nodes.

Russian Telegramsphere

A similar procedure was performed to collect data from the Russian Telegramsphere. As a starting point for the snowball sampling (the first iteration of data collection), I used a list of 100 of the most popular (by the number of subscribers) Telegram public channels geolocated in Russia as of October 18, 2022. I retained the posts between January 1, 2021 and October 16,

2022 (Sunday, end of the week). The second and third iterations of data collection were performed in the way described above. Overall, for the sample of Russian Telegramsphere, I collected full histories of posts from 6,302 public Telegram channels. These 6,302 provide links to and/or mention 53,952 other Telegram channels. This results in a network with 60,254 total nodes.

Network characteristics

To model the interactions between the channels in the network, I operationalize links, mentions, and forwards of posts from other channels as outgoing ties (edges) from channel A to channel B when channel A mentions, links, or forwards a message from channel B. I treat forwards and mentions (links to) as the same outgoing ties from channel A because the use of either of these actions by channel A directs A's subscribers to channel B and information in channel B (similar mechanisms). Overall, the edges quantify the activity of the channels.

Table 1. Network characteristics

Network characteristic	Belarus	Russia
N (number of nodes)	12,289	60,254
E (number of directed weighted edges)	118,286	891,544
E (number of directed unweighted edges: parallel edges)	1,045,404	9,930,561
Mean degree centrality (unstandardized)	19.085	29.407
Max indegree	639	3690
Max outdegree	2357	5687
Reciprocity	0.082	0.077
Density (directed network)	0.00078	0.00025

The characteristics of the resulting networks for the case of Belarus and Russia are provided in Table 1. For the Belarusian case, the resulting network has 12,289 nodes and 118,286 weighted edges (weights are operationalized as the total number of mentions, links, and forwards from a source to a target channel) with a mean degree equal to 19. In the case of

Russia, the network consists of 60,254 nodes and 891,544 weighted edges. The mean degree centrality in the network is 29.4. In both cases, the networks are sparse and experience a low degree of reciprocity (a measure of the likelihood of nodes in a directed network to be mutually linked), a common feature of social media networks.

Methods

I set this study in a quasi-experimental setting (Manheim & Albritton, 1983) to compare the activity of state and pro-government actors before and during large social movements. I treat election day in Belarus and the beginning of the Russian full-scale invasion of Ukraine as rapid onset interventions in the actors' communication strategies. Although demonstrations and rallies in support of the presidential candidates had taken place since May 2020, elections held on August 9, 2020, became a catalyst for the largest movements. In Russia, the beginning of the Russian invasion of Ukraine on February 24, 2022, prompted anti-war protests in the country.

Community detection

To test the hypothesis, it was necessary to identify pro-government Telegram public channels. As the total number of nodes in both networks exceeds 70,000, making it too large to manually label each channel, I utilized community detection algorithms to identify communities within the network. Then, the identified communities were labeled based on the top channels within them. These labels were used for further analysis. Below I describe this process in more detail.

First, I identified communities within the network using three different community detection algorithms. Two of these algorithms, the multi-level modularity optimization algorithm (or Louvain algorithm, Blondel et al., 2008) and walktrap (Pons & Latapy, 2005), were based on an assumption that the density of ties within the communities should be higher than that between the communities. The multi-level modularity optimization algorithm or Louvain algorithm aims

to divide the network into communities in a way that maximizes a modularity score (Blondel et al., 2008). Modularity is a property of a network that allows quantifying the goodness of community assignment so that there are many ties within the communities and few between them. The walktrap algorithm (Pons & Latapy, 2005) finds densely connected communities by performing random walks in the network and accounting for how many times it reaches node i if it starts at node j . The algorithm assumes that the short random walks should stay within the same community.

Table 2. Performance of Community Detection Algorithms for the Russian Case

Algorithm	# of communities	Maximum modularity score Q	% of nodes in top 5 communities	Networks characteristics
Louvain (Blondel et al., 2008)	65	0.58	54.72% (N = 32,973)	Undirected and weighted
Walktrap (Pons & Latapy, 2005)	26,701 (26,067 communities contain a single node), 634 after removing isolates	0.48	25.67% (N = 15,469)	Undirected and weighted
Information flow mapping (Rosvall & Bergstrom, 2008)	1,593 (443 communities contain a single node), 1,150 after removing isolates	0.09	7.12 % (N = 4,294)	Directed and weighted

Table 3. Performance of Community Detection Algorithms for the Belarusian Case

Algorithm	# of communities	Maximum modularity score Q	% of nodes in top 5 communities	Networks characteristics
Louvain (Blondel et al., 2008)	25	0.60	59.60% (N = 7,324)	Undirected and weighted
Walktrap (Pons & Latapy, 2005)	4915 (4,792 communities contain a single node), 123 after removing isolates	0.53	30.03% (N = 3,813)	Undirected and weighted
Information flow mapping (Rosvall & Bergstrom, 2008)	451 (59 communities contain a single node), 392 after removing isolates	0.09	15.82 % (N = 1,944)	Directed and weighted

The information flow mapping approach (Rosvall & Bergstrom, 2008) is similar to the walktrap approach, but it allows us to account for the directionality of the ties. In other words, the information flow mapping algorithm identifies communities based on how ties between the nodes allow the information to flow. The analysis compares the consistency of the community classification based on different algorithms and uses the modularity scores to assess the level of fragmentation within the network. The performance of the community detection algorithms for the Belarusian and Russian cases is provided in Tables 2 and 3. Overall, the tables suggest, the Louvain algorithm performed the best because it separated the network into fewer communities with the largest modularity score. For further analysis, I retained communities that have at least 1% of the total nodes. In the case of Belarus, 15 communities remain (of 25), and, in the case of Russia, 20 communities remain (out of 65). I proceeded to label the communities based on the community assignment generated by the Louvain algorithm.

Labeling the communities and nodes within them

In line with previous research (Kuznetsova, forthcoming), I define four categories of channels: pro-government, opposition, neutral, and other. The pro-government channels are channels represented by state politicians, pro-government bloggers, actors affiliated with state-controlled media, or any other actors or entities that demonstrate support for the regime, help spread mis/disinformation, propaganda, or promote nationalism or xenophobia. The pro-opposition channels are channels run by activists, civil society figures, opposition politicians, journalists, or any other individuals that resist and challenge the authoritarian regime. The group of neutral channels includes those affiliated with domestic or international-based independent news media that publish in the Russian language, independent journalists, and channels that deliver neutral (factual) news. The other category includes channels that do not fit within any of the categories

described above and/or post primarily politically irrelevant information, jokes, advertising, or fundraising.

The communities were labeled based on the top 10 channels within these communities by the authority centrality measure. A high authority score suggests the node is important because other important and highly connected nodes in the network point to it. In the case of Telegram, a node with a high authority score is a channel that is being forwarded from by other highly connected channels, meaning that the information from such a high-authority channel is frequently shared and, perhaps, disseminated further and faster. For each identified high-authority channel, the top 10 most viewed forwarded messages were coded for content. The coding scheme for the channels and their content is described in the Appendix.

The labels of the communities are based on several pieces of information. First, the channels were coded based on who is behind the channel (channel administrators). If the channels are anonymous, then the description of the channel was considered. If the description of the channel is not informative or absent, then the channels are coded on the content of the top 10 most viewed forwarded messages. Detailed labels are provided in the Appendix. After the labels were assigned to each community, I sorted the communities into four major categories: pro-government, opposition, neutral, and other.

Measuring forwarding activity between and within communities of channels

To test the hypothesis, I evaluate the forwarding activity on the Telegram channels over time. To do that, I calculate weekly valued network density. The ties in the network represent the valued (weighted) activity between the channels: forwards of messages and mentions of other channels. Therefore, a measure of the density of these ties over time provides a way to analyze how the activity of the channels changed. Because the network data is valued (parallel ties are summed),

network density is calculated as the total of all tie values divided by the number of possible ties in the network. In other words, the valued density measure is the average value of interconnectedness found in the network. This is different from the conventional definition of network density which represents the share of the ties that are present in the network to the total number of all possible ties.

One of the limitations in the use of network density is difficulty in comparing the values across networks of different sizes, as the cost of maintaining a tie increases with the size of the network. While the size of the communities in the network differs, I argue that the use of network density measure is still valid. First, the cost of maintaining a tie in the social media network is lower than in other social settings, as the act of forwarding is a low-cost action, and therefore would not change drastically with a change in the size of the network. Second, this research is focused on evaluating *the change of the density over time* rather than on the actual values of the density. Given the focus on the trends in this social media network, the valued network density presents a valid way to evaluate the activity on the Telegram channels.

Results

Belarus

Figure 1 plots the communities in the network of the Belarusian Telegramsphere with weighted edges representing forwards and mentions for the timeframe of the analysis from May 1, 2020 to December 31, 2020. The size of the nodes is proportional to the size of the communities.

Communities that have less than 1% of the nodes from the original network are omitted. Three communities of the channels are of interest for the analysis: # 2, 6, and 15. Community #2 is the community of the opposition and neutral channels that are geolocated in Belarus. NEXTA, a Telegram channel that played an important role in organizing social movements in Belarus, falls

into this community. Community #6 represents independent journalism, investigative journalism, economic news, and neutral news (Deutsche Welle, Ekho Moskvyy). The channels in this community are geolocated in Belarus and Russia. Community #15 is a community of channels run or associated with the Belarusian state agencies (e.g., police), and also includes the pro-Belarusian channels run by bloggers and anonymous administrators geolocated in Belarus. The rest of the communities in the Belarusian Telegramsphere are the communities of channels that are geolocated in Russia, the Caucasus, or other countries, or report in non-Russian or non-Belarusian languages. These communities are labeled as “other”.

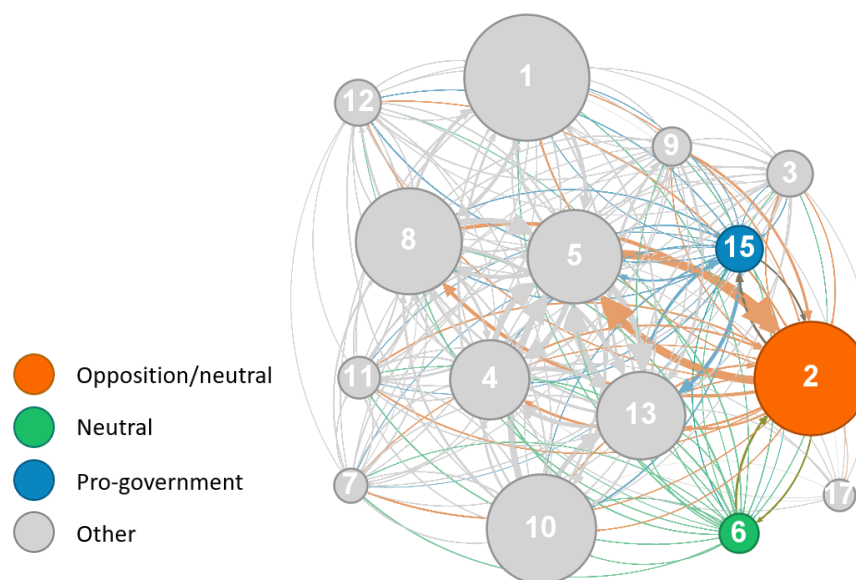


Figure 1. Network of the Belarusian Telegramsphere

Figure 2 plots the weekly densities of ties for each community in the Belarusian Telegram network. The graph separately plots densities of the incoming ties, outgoing ties, and density within the community. The vertical dashed line represents the week of the presidential election that took place on August 9, 2020.

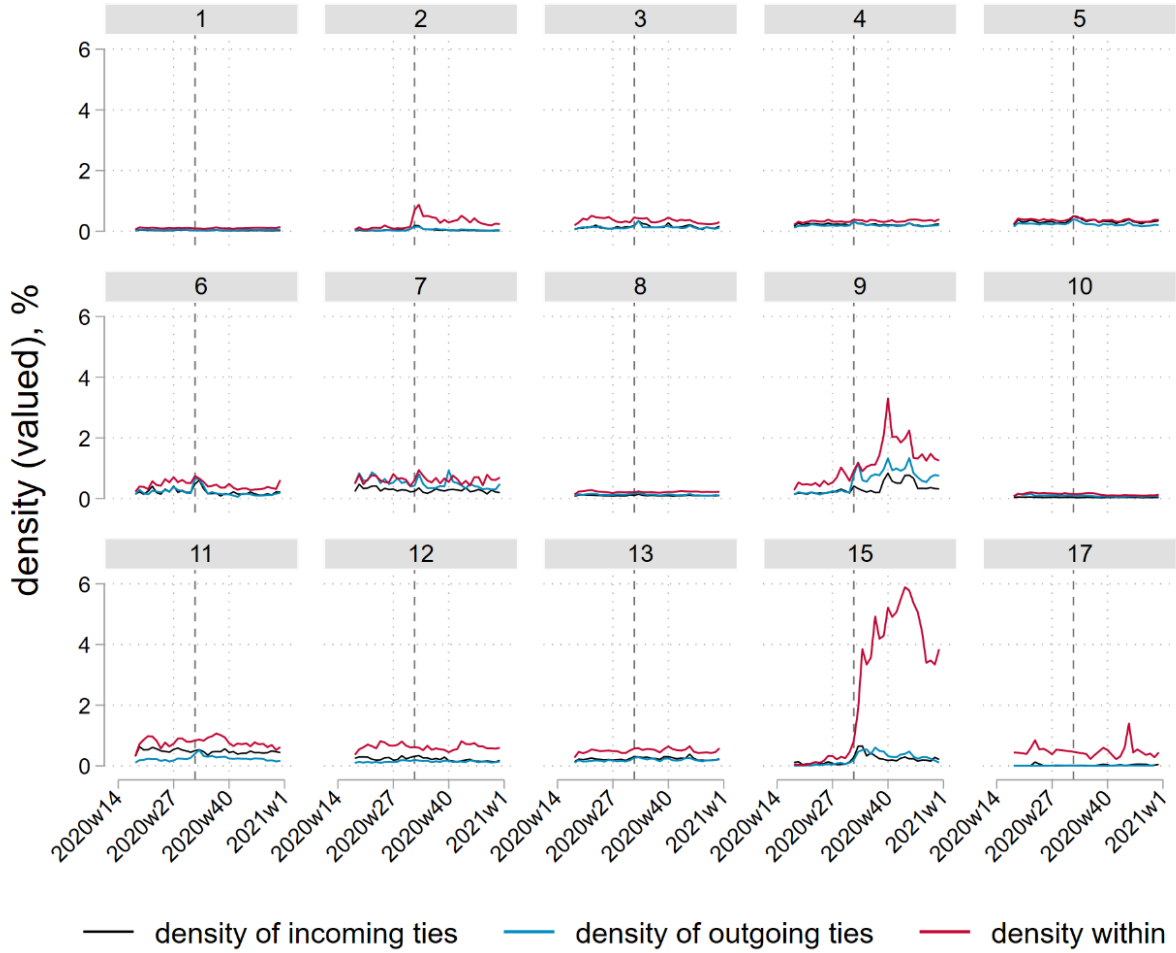


Figure 2. Weekly valued density measures for the network of channels within the Belarusian Telegramsphere.

Note: the vertical line represents the week of the presidential election (August 9th, 2020).

As we can see, the community of pro-government agents (community #15) experienced the largest increase in the within-community reposting and mentioning activity in the week following the election. Interestingly, the activity continued to increase after the initial spike up to the beginning of November, suggesting the state and pro-government actors continued their efforts in increasing control over information flow for some time. Perhaps, after the initial spike, the state and pro-government agents needed more time to respond to the increased amount of information on neutral and opposition communities (Kuznetsova, forthcoming) and the events on

the ground. Although the activity began to drop in November, it remained high compared to the pre-election period.

The densities of the incoming and outgoing ties for community #15 also increased after the election week, although at a much lower rate than within-community density. Nevertheless, the density of incoming and outgoing ties remained heightened in the later weeks, in comparison to the pre-election period. This provides support for the hypothesis that during social movements, state and pro-government agents forward messages from other state and pro-government agents more frequently to increase information control online.

Additional support for the hypothesis comes from comparing the network density of the state and pro-government community (#15) to the neutral and opposition communities (#2 and 6). If a salient event such as a social movement naturally produces an increase in the amount of information in media and an increased information flow, we should observe similar communication trends across all the communities in which channels are geolocated in Belarus. However, there are some differences. In the neutral/opposition community (#2), although there is an increase in the within-community activity after the election, it is at a lower rate than in the pro-state community (#15). The changes in the density of the incoming and outgoing ties are negligible for Community #2. This is a somewhat surprising finding given the large scale of the movement and the large audience that some of the opposition channels were able to reach (Kuznetsova, forthcoming). Perhaps, the social capital and offline social networks played a more important role in enabling social movement than the online networks of key activists and protesters. In the community of neutral agents (#6), although there are some increases in the density in all three types of ties around the time of the election, the densities revert to their pre-election levels in a couple of weeks.

Overall, the across-community comparison provides additional evidence to support the hypothesis. This comparison also suggests that state and pro-government communities engage in more coordinated information dissemination than neutral and opposition channels, an effort we would expect for communities engaged in deliberate information channeling.

Russia

Figure 3 plots the communities in the network of the Russian Telegramsphere with weighted edges representing forwards and mentions for the timeframe of the analysis from January 1, 2021 to October 16, 2022. The size of the nodes is proportional to the size of the communities. Community #4 is the community of the opposition and neutral channels. Communities that have less than 1% of the nodes from the original network are omitted. Communities 6 and 10 are the communities of neutral and pro-government channels. Communities #2, 5, 8, 9, 11, 12, and 20

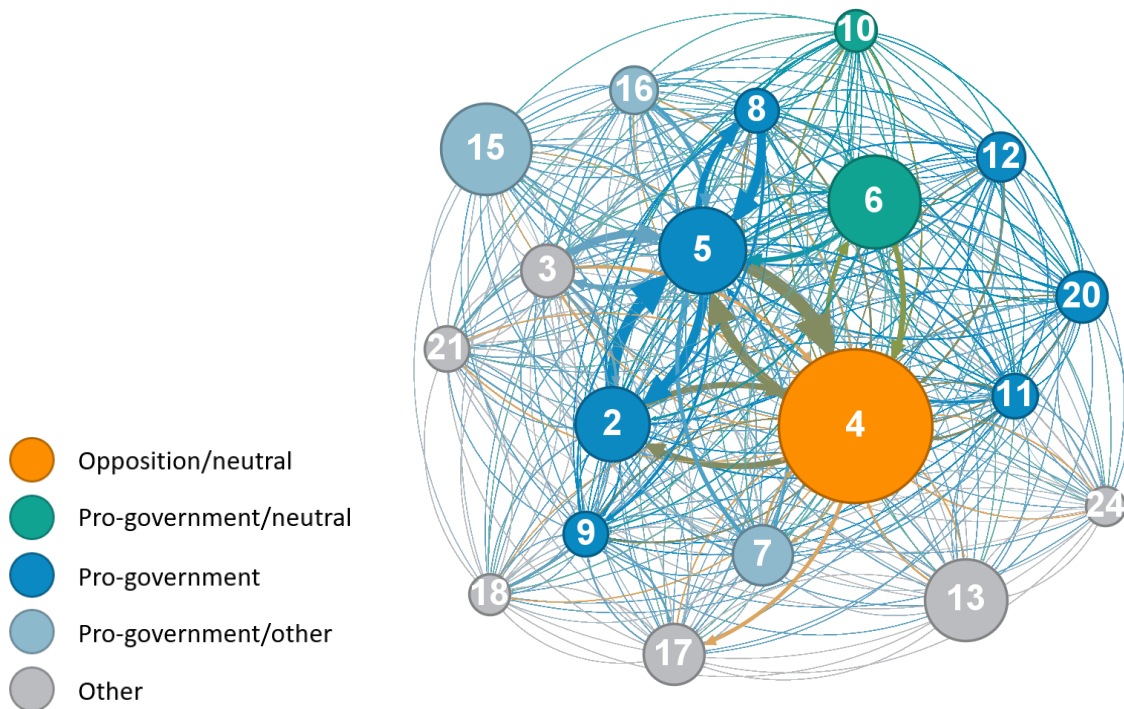


Figure 3. Network of the Russia Telegramsphere

are the communities of state and pro-government Telegram channels. These are the main focus of the analysis. The rest of the communities are coded as pro-state/other or other.

Figure 4 plots the weekly densities of ties for each community in the Russian Telegram network. The graph separately plots densities of the incoming ties, outgoing ties, and density within the community. The vertical dashed line represents the week of the Russian full-scale invasion of Ukraine (February 24, 2022).

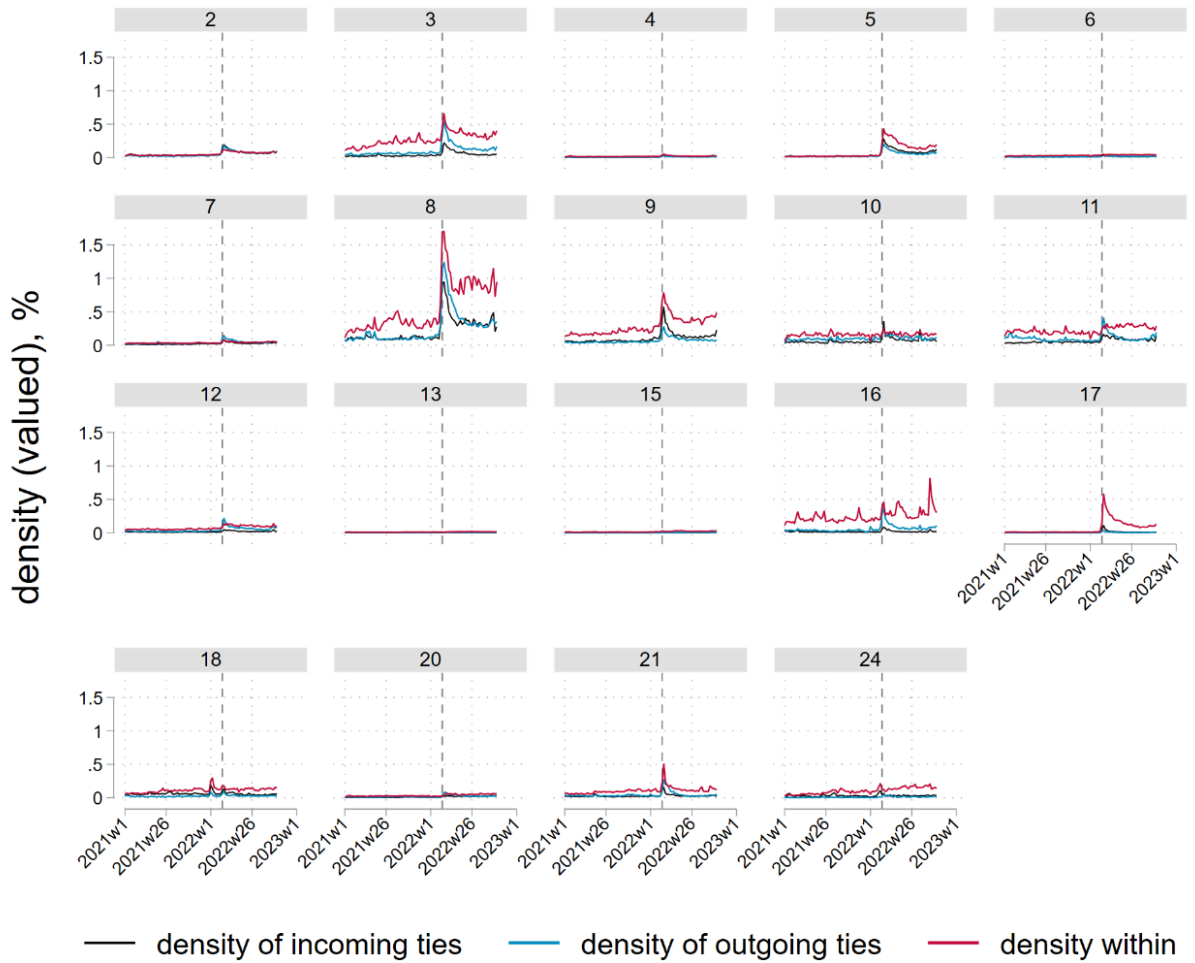


Figure 4. Weekly valued density measures for the network of channels within the Russian Telegramsphere.

Note: the vertical line represents the week of the Russian full-scale invasion of Ukraine (February 24, 2022).

Some similarities can be observed between the densities of ties of the state and pro-government communities (#2, 5, 8, 9, 11, 12, 20). Across most of the communities, we can see rapid increases in the densities of the incoming, outgoing ties, and ties within the communities during the first week of the invasion. In the following weeks, the densities remain higher in comparison to the pre-invasion period. The most pronounced changes can be observed in communities #5, 8, and 9. The up-going trend in the densities towards the end of the timeframe, especially observed in communities #5 and 9, is likely connected to the Ukrainian counteroffensive in the Kherson region and the explosion of the Crimean bridge in October, followed by the withdrawal of the Russian forces from Kherson later in November. Overall, the increases in all types of densities among the pro-government channels provide evidence to support the hypothesis.

In contrast to the increases in the network densities among the pro-government communities of Telegram channels, the densities of ties for the neutral and opposition actors show little change. Community #4, the community of the neutral and opposition channels, experienced only a small spike during the week of the invasion. The densities increased after the invasion, on average, but the change remained negligible overall. This provides a potential explanation for the relatively small scale of anti-war protests, in comparison to the 2020-2021 protests in Belarus or some previous protests in Russia, such as the 2012 Bolotnaya Square protests. Similarly, only small changes can be observed in the densities of the neutral/pro-government communities (#6 and 10). As in the case of Belarus, these varying patterns of the activities across the types of communities, provide additional evidence to support the hypothesis that during social movements, state and pro-government agents forward messages from other state and pro-government agents more frequently to increase information control online.

Comparing the cases

Overall, the results provide evidence that the state and pro-government agents on Telegram in both Belarus and Russia engage in information control during social movements. Nevertheless, we can observe some differences in the pro-government trends between the countries. In Belarus, after the initial spike, the density of the within-community ties in the pro-government community kept increasing for some time. In Russia, after the initial spike, the within-community density in the pro-government communities kept decreasing (evident from trends found in communities #5, 8, and 9). In the case of Belarus, this might suggest that the state and pro-government actors needed some time to respond to the actions on the ground and the increasing importance of some of the Telegram channels, such as NEXTA, in organizing protests. Given that the Belarusian state media control is based on coercion rather than on curation, cooptation, and covert information control (Greene, 2022), and that the control of the internet space is rather low in Belarus, perhaps, learning can be observed in these trends. As the government recognized that some Telegram channels played an important role in organizing protests, the pro-government actors kept increasing their activity to achieve information control.

In contrast, in Russia, the densities kept falling. This might suggest that for the Russian pro-government actors it was easy to initially increase their activity (as a part of the rally 'round the flag effect), but it was hard to maintain it given the growing resistance the Russian army faced in Ukraine. In addition, a failure of the Russian forces to gain a swift victory might have prompted a steady decrease in activity over time.

Another difference between the countries is the greater fragmentation of the Russian pro-government communities. While in Belarus there is one pro-government community of channels, in Russia the algorithm identified several. This suggests that, although all of these channels can

be labeled as pro-government, they post more diverse information tailored to different audiences. Alternatively, this also can be due to the large size of the Russian Telegramsphere, as the number of channels geolocated in Russia is approximately 75 times the number of channels geolocated in Belarus.

Discussion and conclusion

This study investigated whether state and pro-government agents in authoritarian states seek to establish information control on the social media platform Telegram during state-wide social movements. The results of the network activity among the public Telegram channels within Belarusian and Russian Telegramspheres suggest that the state and pro-state actors in both countries engaged in information control strategies by increasing the reposting and mentioning interaction between their channels. This increased activity, I argued, boosts information flow in the network, repeatedly exposes audiences to the same information from multiple sources, increases the audience reach, and creates an information glut making it harder for the public to sort through the information to find reliable sources. As a result, through information channeling, state and pro-government actors on Telegram create an opportunity to influence public consumption of the information and manipulate public opinion.

An increase in the network activity on social media during a salient political event can be natural, as the amount of information one can share increases during important events. However, the comparison of the activity between the pro-government, neutral, and opposition actors shows that the pro-government communities of channels engage in the forwarding and mentioning activity at a higher rate than other channels. This indicates that the pro-government actors engage in information dissemination in a more coordinated way than opposition or neutral actors, a sign of the organized effort in establishing information control.

The results of this study add to the existing literature on the use of digital and social media for contentious politics. Specifically, the study contributes to our understanding of the use of social media by the state and pro-government actors during social movements to prevent or minimize political contention.

This study provides empirical evidence for the coordinated information control engagement of the pro-government actors using social network analysis and investigating the activity within the network. This is, however, only one side of the coin. Future research could concentrate on the content of the information that circulates through the state and pro-government communities of channels to investigate what content is being shared, whether the narratives overlap across actors and/or communities, and whether the information circulated on low-moderated Telegram transitions to other social media platforms such as Twitter, Facebook, or Instagram.

References

- Blondel, V. D., Guillaume, J.-L., Lambiotte, R., & Lefebvre, E. (2008). *Fast unfolding of communities in large networks*. <https://doi.org/10.1088/1742-5468/2008/10/P10008>
- Boehm, L. E. (1994). The Validity Effect: A Search for Mediating Variables. *Personality and Social Psychology Bulletin*, 20(3), 285–293. <https://doi.org/10.1177/0146167294203006>
- Doffman, Z. (2021). *Yes, Telegram Really Is ‘Dangerous’ For You*. Forbes. <https://www.forbes.com/sites/zakdoffman/2021/04/22/forget-whatsapp-new-telegram-warning-for-millions-of-windows-10-users/>
- Earl, J., Maher, T. V., & Pan, J. (2022). The digital repression of social movements, protest, and activism: A synthetic review. *Science Advances*, 8(10). <https://doi.org/10.1126/sciadv.abl8198>
- Feldstein, S. (2021). *The rise of digital repression: How technology is reshaping power, politics, and resistance*. Oxford University Press.
- Geddes, B., Wright, J., & Frantz, E. (2018). *How dictatorships work: Power, personalization, and collapse*. Cambridge University Press.

- Greene, S. A. (2022). *The Informational Dictator's Dilemma. Citizens Responses to Media Censorship and Control in Russian and Belarus*. PONARS Eurasia Policy Memo No. 780. https://www.ponarseurasia.org/wp-content/uploads/2022/08/Pepm780_Greene_June2022.pdf
- Guarino, S., Trino, N., Celestini, A., Chessa, A., & Riotta, G. (2020). Characterizing networks of propaganda on twitter: A case study. *Applied Network Science*, 5(1), 59. <https://doi.org/10.1007/s41109-020-00286-y>
- Guriev, S., & Treisman, D. (2019). Informational Autocrats. *Journal of Economic Perspectives*, 33(4), 100–127. <https://doi.org/10.1257/jep.33.4.100>
- Guriev, S., & Treisman, D. (2020). The Popularity of Authoritarian Leaders: A Cross-National Investigation. *World Politics*, 72(4), 601–638. <https://doi.org/10.1017/S0043887120000167>
- Howard, P. N. (2010). *The digital origins of dictatorship and democracy: Information technology and political Islam*. Oxford University Press.
- King, G., Pan, J., & Roberts, M. E. (2013). How Censorship in China Allows Government Criticism but Silences Collective Expression. *American Political Science Review*, 107(2), 326–343. <https://doi.org/10.1017/S0003055413000014>
- King, G., Pan, J., & Roberts, M. E. (2017). How the Chinese Government Fabricates Social Media Posts for Strategic Distraction, Not Engaged Argument. *American Political Science Review*, 111(3), 484–501. <https://doi.org/10.1017/S0003055417000144>
- Kuznetsova, D. (forthcoming). Broadcasting Messages via Telegram: Pro-government Social Media Control During the 2020 Protests in Belarus and 2022 Anti-war Protests in Russia. *Political Communication*.
- Lankina, T., Watanabe, K., & Netesova, Y. (2020). How Russian Media Control, Manipulate, and Leverage Public Discontent: Framing Protest in Autocracies. In K. Koesel, V. Bunce, & J. Weiss (Eds.), *Citizens and the State in Authoritarian Regimes: Comparing China and Russia* (p. 0). Oxford University Press. <https://doi.org/10.1093/oso/9780190093488.003.0006>
- Lonami Exo. (2021). *Telethon*. <https://github.com/LonamiWebs/Telethon/>
- Luarn, P., & Chiu, Y.-P. (2016). Influence of network density on information diffusion on social network sites: The mediating effects of transmitter activity. *Information Development*, 32(3), 389–397. <https://doi.org/10.1177/0266666914551072>
- Manheim, J. B., & Albritton, R. B. (1983). Changing National Images: International Public Relations and Media Agenda Setting. *American Political Science Review*, 78(3), 641–657. <https://doi.org/10.2307/1961834>

- Mateo, E. (2022). “All of Belarus has come out onto the streets”: Exploring nationwide protest and the role of pre-existing social networks. *Post-Soviet Affairs*, 38(1–2), 26–42. <https://doi.org/10.1080/1060586X.2022.2026127>
- Onuch, O. (2015). EuroMaidan Protests in Ukraine: Social Media Versus Social Networks. *Problems of Post-Communism*, 62, 217–235. <https://doi.org/10.1080/10758216.2015.1037676>
- Paul, C., & Matthews, M. (2016). *The Russian “Firehose of Falsehood” Propaganda Model: Why It Might Work and Options to Counter It*. RAND Corporation. <https://doi.org/10.7249/PE198>
- Pons, P., & Latapy, M. (2005). *Computing communities in large networks using random walks (long version)* (arXiv:physics/0512106). arXiv. <https://doi.org/10.48550/arXiv.physics/0512106>
- Roberts, M. E. (2018). *Censored: Distraction and diversion inside China’s great firewall*. Princeton University Press.
- Rød, E. G., & Weidmann, N. B. (2015). Empowering activists or autocrats? The Internet in authoritarian regimes. *Journal of Peace Research*, 52(3), 338–351. <https://doi.org/10.1177/0022343314555782>
- Rosenberg, D., & Tarnikova, E. (2022). How the internet and social media reduce government approval: Empirical evidence from Russian regions. *Post-Soviet Affairs*, 39(3), 121–154. <https://doi.org/10.1080/1060586X.2022.2142427>
- Rosvall, M., & Bergstrom, C. T. (2008). Maps of random walks on complex networks reveal community structure. *Proceedings of the National Academy of Sciences*, 105(4), 1118–1123. <https://doi.org/10.1073/pnas.0706851105>
- Safronova, V., MacFarquhar, N., & Satariano, A. (2022, April 16). Where Russians Turn for Uncensored News on Ukraine. *The New York Times*. <https://www.nytimes.com/2022/04/16/world/europe/russian-propaganda-telegram-ukraine.html>
- Sandra González-Bailón, & Wang, N. (2016). Networked discontent: The anatomy of protest campaigns in social media. *Social Networks*, 44, 95–104. <https://doi.org/10.1016/j.socnet.2015.07.003>
- Telegram FAQ*. (2021). Telegram. <https://telegram.org/faq>
- Terms of Service*. (n.d.). Telegram. Retrieved October 10, 2022, from <https://telegram.org/tos>
- Tufekci, Z. (2017). *Twitter and tear gas: The power and fragility of networked protest*. Yale University Press.
- Vanderhill, R. (2020). *Autocracy and resistance in the internet age*. Lynne Rienner Publishers.

- Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science*, 359(6380), 1146–1151. <https://doi.org/10.1126/science.aap9559>
- Way, L. A., & Levitsky, S. (2006). The dynamics of autocratic coercion after the Cold War. *Communist and Post-Communist Studies*, 39(3), 387–410.
- Wijermars, M., & Lokot, T. (2022). Is Telegram a “harbinger of freedom”? The performance, practices, and perception of platforms as political actors in authoritarian states. *Post-Soviet Affairs*, 38(1–2), 125–145. <https://doi.org/10.1080/1060586X.2022.2030645>
- Zhou, X., & Zafarani, R. (2019). *Network-based Fake News Detection: A Pattern-driven Approach* (arXiv:1906.04210). arXiv. <https://doi.org/10.48550/arXiv.1906.04210>
- Zhuravskaya, E., Petrova, M., & Enikolopov, R. (2020). Political Effects of the Internet and Social Media. *Annual Review of Economics*, 12(1), 415–438. <https://doi.org/10.1146/annurev-economics-081919-050239>

Appendix

1. Coding scheme

This coding scheme is based on the coding scheme from King et al. (2017) and the typology by Earl et al. (2022).

The coding of the channels is done according to the following scheme. The coding has two phases. First, if it is possible to identify an individual/individuals or an entity behind the channel, they are coded according to the scheme, and this is noted in the coding process. If the channel administrators are anonymous, the first phase of coding then relies on the description of the channel. If a description is not present/not informative, the first phase is considered missing, and the coding moves to the second phase. In the second phase, the content of the channels is coded. To label the channel, both phases are taken into account if any information was detected in phase one. If nothing can be inferred from phase one, the coding of the channel relies on coding from Phase 2.

The channels were also geolocated (based on their geolocation in Telegram), so that they can be associated either with Belarusian, Russian, or other Telegramspheres.

For each community that has more than 1% of the total number of nodes in the network, the 10 top channels (based on the authority centrality score) are identified. For these channels, the top 10 most viewed forwarded messages are selected to be coded for content.

Pro-government	Opposition	Neutral
1. Who is behind the channel?		
State politicians, pro-government bloggers, state agents tightly connected with national political officials, state agents loosely connected with national political officials, actors affiliated with the state-controlled media, and anyone who demonstrates (demonstrated in the past) support for the regime	Anti-regime, opposition activists, civil society figures, opposition politicians, and individuals that resist and/or challenge the regime.	Independent media outlets, agents associated with independent media, independent journalists, media that provides factual reporting
2. What content does the channel forward?		
<ul style="list-style-type: none"> - Insulting of foreign countries, favorable comparisons of Belarus/Russia to other countries - Insulting of pro-democracy, pro- 	<ul style="list-style-type: none"> - Pro-democratic, pro-West, pro-individual liberties discussions - Desire to join the Western 	<ul style="list-style-type: none"> - Factual reporting. Descriptions of current government programs, projects, events, or initiatives, or planned or in

Wester, pro-individuals liberties, or pro-capitalism - Nationalistic, xenophobic content - Russian propaganda narratives (Ukraine is ruled by Nazis, Russia was forced to defend itself, etc. see [CITE papers on disinfo narratives]) - Cheerleading for the Belarusian/Russian government - Praise of government initiatives, projects, events, or officials	organizations, be affiliated with them - Praise of democratic values - Calls for anti-regime collective action	progress initiatives. Does not include any praise of these programs or events, just that they are occurring. Reporting on what the government and government officials are doing.
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Channels that do not fit within any of the categories described above are coded as “other”. The other category includes channels that post primarily politically irrelevant information, jokes, advertising, fundraising, etc.

2. Community labels

Belarus

Louvain community #	Label Description	Political actor coding
1	Russia-based Telegram channels about Russian regional politics, some pro-government narratives	Pro-government (Russia)
2	Belarus-based independent media channels and opposition channels (NEXTA): a community of neutrals and opposition	Opposition/neutral (Belarus)
3	Russia-based channels about Russian politics, economics, a situation in the country, some pro-government narratives	Pro-government (Russia)
4	Russia-based news channels about Russian and international politics, some pro-Kremlin narratives (Simonyan is in here, Делтранс Москвы), personal blogs and channels associated with state agents, a lot of neutral reporting, some pro-government bloggers	Pro-government (Russia)
5	Russia-based neutral reporting from state-affiliated (perhaps, most anonymous) agents	Pro-government (Russia)/neutral (Russia)

6	Independent journalism, investigative journalism, economic news, neutral news, first community to have mix of Russian and Belarusian neutral (independent) news channels, Deutsche Welle, Ecko Moskvyy journalist	Neutral (Belarus and Russia)
7	Light opposition to the regime, corruption, oligarchs/Russian elites (PhDs, politicians) that are opposition leaning/leftists, from 2022 in the list of inoagentov/ fine line between being neutral in terms of news posts and being opposed to the current regime)	Neutral (Russia)
8	Russian based channels discussing politics, economics, sociology in Russia, provide insider information into gov-t and big and local politics, corruption in the government/oligarchs (but not really opposing the regime). One of the channels descriptions states: We reveal the secrets of officials, oligarchs, gangsters, security officials. At first glance might seem like a group of channels that oppose the government (talking about corruption), but no real opposition to the regime. Some negative narratives towards protests in Belarus	Neutral (Russia)
9	World news, Russian domestic news, news about Nagorno-Karabakh, channels based in Russia, Armenia, predominantly neutral (factual reporting), some independent channels (at least what they claim), some oppositional figures/channels to the government (some opposition to Putin, oligarchs, but not the regime as a whole)	Neutral (Russia and Caucasus region)
10	Different news channels/news aggregator channels about Crimea, Kuban, China, regional politics in Russia. Predominantly neutral reporting, jokes, blogs, some pro-Russian propaganda narratives	Neutral/pro-government (Russia)
11	Neutral, independent Russian news channels (RBK), economic news, neutral reporting	Neutral (Russia)
12	Russian based Telegram channels of Russian bloggers that are pro-Kremlin, spread propaganda narratives; Ukrainian based Telegram channels that are pro-Kremlin, edited by people under investigation in Ukraine, included in the lists of channels identified by Intelligence Service of Ukraine as sponsored and coordinated by the Russian gov-t https://t.me/DIUkraine/894?single https://www.pravda.com.ua/rus/news/2022/07/15/7358291/	Pro-government (Russia)
13	Russia based bloggers, anonymous channels, and channels of Russian state media, pro-Kremlin narratives, anti-USA. Ukrainian based Telegram channels that are considered by the intelligence of Ukraine as operated by Russia (propaganda narratives)	Pro-government (Russia)
15	Russia and Belarus based pro-Belarusian state channels (bloggers, anonymous channels, state agency channel (МБД))	Pro-government (Belarus)
17	English language channels (includes British fascist political party channel)	Other (non-Russian language community)

Russia

Louvain community #	Label description
2	Main Russian propagandist channels, support and praise of Russian military, Ukraine is a Nazi regime disinfo narratives, anti-West narratives, channels are affiliated with state agents (officials, state-sponsored media affiliates, state-sponsored media), some neutral (factual) reporting
3	Belarusian pro-government Telegram channel based in Belarus and Russia
4	Russian based channels, report on local/domestic news in Russia, politics, economics, sport etc. Some neutral reporting of facts, although some pro-Russian propaganda narratives are present. Channels of some of the Russian media (Комсомольская правда), some reporters of which support the war and are under sanctions by the Western countries (@sashakots Военкор "Комсомольской правды" Александр Коц)
5	Pro-Russian Telegram channels based in Russia and Ukraine. Bogs, some anonymous channels, channels of people affiliated with state, state-sponsored media, people under Western sanctions due to their support of the Russian war in Ukraine
6	Predominantly a group of Russian based anonymous channels providing insider information into Russian domestic/regional politics, economics, discuss corruption within Russian elites, some pro-Russian disinfo narratives
7	Pro-Russian channels with conservative views (traditional family values, pro-life, pro-religion), pro-Russian military experts, somehow opposition to the Belarusian regime Nexta_live channel, primarily conservative pro-Russian channels. Primarily based in Russia (except Nexta)
8	Pro-Russian Telegram channels publishing about DNR (Donbass), news from Donbass, use of pro-Russian propaganda narratives. Geolocated in Russia and Ukraine
9	Pro-Russian (primarily pro-Russian rhetoric or criticism of Ukrainian gov-t with a potential goal of undermining trust) Russian and Ukrainian based Telegram channels. Some of the Ukrainian based channels are identified by the Ukrainian official agencies as those coordinated by Russia
10	Aviation-related news, some neutral reporting from Russian based channels. Some channels (related to military aviation) post pro-Russian content. News about Baltic states (primarily neutral reporting, although some pro-Russian narratives (praise) is present)
11	Russia based channels posting news about and from Crimea (and other news). Some factual reporting, some reporting includes pro-Russian content and disinformation narratives, some state-controlled media channels (RIA)
12	News from Дагестан, Caucasus, Ingushetia. One channel is a Telegram channel of the state-run news media posting news about Russia. Pro-Russian narratives and disinformation in support of the Russian invasion of Ukraine
13	Russia based non-political Telegram channels (art, fashion, theater, tech news)
15	Russian and English language Telegram channels based in Russia and abroad (Germany), pro-Russian propaganda narratives, channels run by Russian government agencies, pro-government content, LA news channel in English

16	Telegram channels discussing Armenia/Azerbaijan news, neutral reporting. Some channels associated with pro-Russian agents, among posts from these channels is pro-Russian content.
17	Ukrainian based channels posting neutral factual news, channels of Ukrainian officials, some calls for donations, anti-Russian sentiments
18	Russia and Central Asia (Kazakhstan) based Telegram channels with neutral news about Russian and Central Asian domestic politics predominantly
20	Pro-Russian channels of Russian state officials, other pro-Russian anonymous channels
21	Mix of channels (Russia and Ukraine based) with neutral posts (Ukraine based channel) and neutral and pro-Russian views, channels that are based in Russia but posting news about Turkey, the Caucasus region, Armenia/Azerbaijan conflict. Other category, not very cohesive community
24	Other category, Russian based sports Telegram channels (mostly neutral, unrelated to politics posts, although some pro-Russian sentiment due to bans of Russian athletes), Ukraine based blog channels with some news about domestic politics (neutral, other categories)
28	The top 10 channels from this community were not scraped for messages, the community in total has 650 channels, the total share is 1.08% of the total channels in the network. Only 1 channel from this community was scraped, it is based in Russia and posts about Russian domestic politics
