# Online discourse of vaccine hesitancy: discussions of COVID-19 vaccination in Russian-language social media

Victoria Dudina[1], Viktoriia Saifulina[2]

## Abstract

Doubts about vaccination in spite of the availability of vaccines are called "vaccine hesitancy". In the digital age vaccine hesitancy is significantly influenced by information from the Internet, online communication and discussions on social media. The research of the language of such discussion is very important for understanding attitudes of people towards vaccination. The vaccine hesitancy discourse varies from country to country due to its social context, but also has many similarities. The aim of the research was to describe the thematic structure of the online discourse of vaccine hesitancy in social media. We analyzed Russian language social media discussions around COVID-19 vaccination. Comments were selected from four most active discussion groups. Thematic analysis was implemented for data organization and interpretation. Main themes identified are as follows: doubts about the safety of vaccination; doubts about the effectiveness of vaccination; doubts about the need for vaccination; doubts about the fairness of vaccination. The study of discourses of vaccine hesitancy in different languages makes a significant contribution to understanding the general patterns of functioning of discourse in the field of health, in particular, discourse about vaccination. The research was supported by RSF (project No 22-18-00261).



### *Keywords*

Discourse, social media, vaccine hesitancy, thematic analysis, COVID-19

[1] St Petersburg University, Department of Sociology, viktoria_dudina@mail.ru
[2] LLC „Disrapp", vosayfulina@gmail.com

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## Introduction

In 2012, at the initiative of the World Health Organization, a working group was established within the Strategic Advisory Group of Experts on Immunization (SAGE) to study vaccine hesitancy. After reviewing available data and research, the SAGE Working Group defined vaccine hesitancy as delaying the decision to accept or refuse a vaccine despite the availability of vaccination services (MacDonald et al., 2015). World Health Organization called vaccine hesitancy, the reluctance or refusal to vaccinate despite the availability of vaccines, as one in the top ten threats to global health (World Health Organization, 2019). Vaccine hesitancy has attracted increasing attention from researchers in different countries in recent years, and COVID-19 has contributed to the urgency of research on this issue.

The research on vaccination and attitudes toward it has become particularly relevant in the context of the COVID-19 pandemic (Cordina, Lauri, 2021; Paul, Steptoe, Fancourt, 2021; Al-Jayyousi et al., 2021). Numerous media reports on attitudes toward vaccination tend to frame decisions regarding vaccination in pro or con terms (Zimand-Sheiner et al., 2021). But decisions about vaccination typically fall in the middle of these extremes. Many people, whether they are supporters or opponents of vaccination, have some doubts about the advisability and safety of vaccination for themselves, despite the availability of the vaccine, that is experience "vaccine hesitancy". Vaccine hesitancy considered a substantial global health risk. Understanding the factors influencing COVID-19 vaccination hesitancy is essential to improve the effectiveness of vaccination programs (Kafadar et al., 2023).



Decision-making regarding health, treatment, and prevention in the contemporary world is significantly influenced by information from the Internet and discussions on social media. Research shows that discussions on social media can influence decisions regarding vaccination (Samal, 2021). Thus, studies have shown that parents who decide not to vaccinate their children tend to form their opinion after reading online information on this topic, while most people are not interested in the degree of reliability of the source of information (Opel et al., 2011). Those who refuse vaccination more often use the Internet to search for information about vaccinations and trust information from specialists and medical institutions to a lesser extent. Research (Betsch et al., 2010; Nan, Madden, 2012) demonstrates that visiting vaccine-related websites and blogs negatively influences the intention to vaccinate. By comparing perceptions of vaccine risks among those who visited control websites (containing neutral facts without negative ratings or opinions) and websites dedicated to criticizing vaccines, the researchers found that even brief exposure to information on critical websites increased overall perception of the risk of vaccination compared with the outcome of visiting control websites. Another study concluded that the use of Twitter and Facebook as sources of health information and knowledge about influenza had a significant inverse relationship with influenza vaccine uptake (Ahmed et al., 2018).

Vaccine hesitancy in the digitized world is closely related to online communication. During the COVID-19 pandemic, when restrictions on social interaction and self-isolation have become part of everyday life, the role of Internet communication has increased significantly. Social media have become a platform for covering news on the spread of COVID-19 and for discussing measures taken to contain the pandemic, in particular,

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vaccination. Such discussions, on the one hand, reflect basic public sentiment, and on the other, have a formative impact on the opinions of participants in Internet communications. Understanding the discourse of vaccine hesitancy is impossible without studying the structure and characteristics of discussions on vaccination on social networks.

The vaccine hesitancy discourse varies from country to country due to its social context, but also has many similarities. We believe that the study of discourses of vaccine hesitancy makes a significant contribution to understanding the general patterns of healthcare discourse.

The practice of searching for health information on the Internet is widespread among Russians (Dudina, Ruppel, 2020). Relatively low level of institutional trust in general (Veselov et al., 2016) and, in particular, in medical institutions pushes some people to discuss the most disturbing health problems on social media. Multiple Russian-language online communities and chats contain discussions on health-related topics. Since the beginning of vaccination against Covid, extensive discussions about vaccination have taken place on Russian-language social networks.

Russia registered the first vaccine against COVID in August, 2020. The federal government announced plans to begin a mass vaccination campaign at the end of 2020, despite concerns that the vaccine had not yet been tested in clinical trials. Disagreement over COVID statistics and concerns about the rush to approve a vaccine have created a climate of public mistrust (King, Dudina, 2021) which had a negative influence on the readiness of people to be vaccinated. It should be noted that imported vaccines were not available in Russia due to legal restrictions on their use. Although the first Russian COVID-19 vaccine, Sputnik V, was later approved for emergency use in several other countries, such as Argentina, Belarus, Serbia and the United Arab Emirates, there has been much discussion about the safety and side effects of the vaccine. At the same time, the vaccination discourse has been highly politicized from the very beginning.



Recent research shows that online discussions about vaccines and vaccination among Russian Internet users cover a wide range of issues (Platonov, Svetlov, Saifulina, 2022). But so far, vaccine hesitancy in the Russian-language social media has been practically unstudied.The aim of the research was to analyze and describe the thematic structure of the discourse of vaccine hesitancy in Russian-language social media. In this article, we will consider approaches to the study of vaccine hesitancy and describe the main themes that make up the online discourse of vaccine hesitancy on analyzed social media.

## 1. Vaccine hesitancy: studies and concepts

Vaccine hesitancy is demonstrated both by people who simply forget about vaccination or put it off, and by those who actively oppose vaccination. Vaccine hesitancy is complex and contextual. The main determinants of vaccine hesitancy can be defined as complacency, inconvenience, and lack of confidence (MacDonald et al., 2015).

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Health complacency suggests that if an individual's perceived risk of a vaccine-preventable disease is low, then vaccination is not considered a necessary preventative measure. The impact of a given determinant may increase if other life priorities seem more important than health, or if illness is not perceived as a threat by the individual. Self-esteem and a person's actual ability to take action to get vaccinated may also influence this factor.

Inconvenience as a determinant of vaccine hesitancy involves the following manifestations: physical inability to access the vaccine, financial inaccessibility of the vaccine or unwillingness to pay, geographic inaccessibility, and low quality of vaccination services. Even if there is a positive intention to get vaccinated, structural barriers such as difficult access may discourage a person from deciding to get vaccinated.

The determinant of lack of confidence is more complex. It includes the following characteristics: uncertainty about the effectiveness and safety of vaccines; lack of trust in the system that provides the vaccination procedure (including uncertainty about the reliability and competence of medical services and health professionals); unconvincing arguments and rhetoric from politicians making decisions about the need for vaccines. Lack of trust can also lead to reluctance to get vaccinated.

The SAGE Vaccine Hesitancy Working Group has broken down the above determinants into 3 factors that determine vaccine hesitancy:

- contextual influence: factors determined by the historical, sociocultural, environmental context, institutional features of the health care system, politics, and economics;
- individual and group influence: factors due to personal perception of the vaccine or the influence of the social environment;
- factors directly related to the characteristics of the vaccine or the vaccination process itself (MacDonald et al., 2015).



Research shows that vaccine hesitancy in the context of the COVID-19 pandemic has become a pressing issue that is more related to contextual factors than psychological characteristics. Researchers in Austria have identified several important factors in vaccine hesitancy, ranging from demographic characteristics to more complex factors such as voting behavior and trust in government (Schernhammer et al., 2022). Among those who have doubts about the COVID-19 vaccine, those who voted for opposition parties or did not vote at all were 2.3 times more likely than those who voted for the ruling parties. Only 46.2% trusted the Austrian government to provide safe vaccines, and 80.7% sought independent scientific assessments of vaccine safety to make vaccination decisions. Contrary to expectations, psychosocial aspects were only weakly correlated with vaccine hesitancy. However, according to the study, the strong correlation between vaccine hesitancy and mistrust of authorities suggests a common cause of opposition to vaccination promotion in society.

The above factors contribute to vaccine hesitancy. Vaccine hesitancy is an unsustainable position. Consultations with doctors, searching for information on the Internet, and discussions on social media influence an individual opinion and can sway it towards even greater hesitancy or, on the contrary, acceptance of the vaccine. That is why, to

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better understand the causes of vaccine hesitancy and build an effective communication strategy, it is important to find out what topics appear in online discussions, what ideas about vaccination they form, which ideas are the most stable, and which are potentially more susceptible to change.

Research on online communication around vaccination issues can be divided into several areas. The first one is mapping discussions on social networks to determine patterns of information dissemination, key actors, and their audiences (Martin et al., 2020). Another one is focused on sentiment analysis of posts and messages posted on social networks (Piedrahita-Valdés et al., 2021). Researchers from the University of Toronto studied topics that arose in user posts on Twitter during the period of vaccination of the population against COVID-19 with Pfizer and AstraZeneca vaccines (Griffith, Marani, Monkman, 2021). As a result of a content analysis of users' posts, it was found that vaccine hesitancy is expressed in the following topics: safety concerns; suspicions regarding the political and economic forces driving the COVID-19 pandemic or vaccine development; lack of knowledge about the vaccine; anti-vaccine or conflicting messages from officials; no possible legal liability for vaccine manufacturers.

Australian researcher (Aechtner, 2021) conducted a content analysis of the online community "Australian Vaccination-risks Network," which has a reputation for being anti-vaccine. The study found that the main method used by the anti-vaccine communities to communicate with their audience is to refer to the dangers of the vaccine and rhetoric about the impact of pharmaceutical companies on the market. In messages from such communities, one can also often observe themes of obtaining material benefits from vaccination.



Social science researchers view health communication on social media as a tool for shaping attitudes toward vaccination. The works mentioned identify the topics that appear in such discussions: they concern not only health concerns, but also politics, ideological beliefs, and conspiracy theories.

## 2. Vaccine hesitancy discourse through the prism of social representations

To study the discourse of vaccine hesitancy, we adapted an approach developed in the theory of social representations (Moscovici, 1973; Moscovici, 1992). The value of this approach in health behavior research, including vaccination, is that it treats lay beliefs not as disparate and unrelated prejudices, but takes into account the own logic of representations and their integrity, conditioned by a specific social context. The online discourse that has developed around the pandemic and vaccination includes a set of concepts and topics that systematically arise in online communication and form a set of social representations about vaccination (Nerlich, Jaspal, 2021). The COVID-19 pandemic has brought vaccine hesitancy to the forefront of public discourse. The pandemic has increased awareness of the importance of vaccination, but has also increased mistrust and misinformation. The COVID-19 vaccination campaign has highlighted global disparities in access to

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vaccines and has made it important to discuss equitable access to vaccines. The discourse of epidemiologists from a specific professional field has spread into everyday language. The speech of lay people included such special professional terms as herd immunity, antibody titre, clinical trial and so on (Brennan et al., 2022). In our research, we consider the discourse of vaccine hesitancy as an environment for the formation, change and maintenance of social representations about vaccination.

Serge Moscovici described social representations as a system of values, ideas and practices with a dual function: to establish an order that will allow people to navigate and manage the material and social world, and also to ensure communication between members of the community, providing them with codes for social exchange, designation and unambiguous classification of various aspects of their world (Moscovici, Herzlich 1973). Social representations organize reality and contribute to its knowledge and ordering (Moscovici, 2000; Moscovici, 2001). The coronavirus pandemic is a "stress point", i.e. an event in which new social representations are formed. The source of social representations is knowledge and concepts circulating in discourse, the form of which changes depending on individual experiences, interests and beliefs (Potter, Edwards, 1999).

The structure of social representations consists of central and peripheral themes and concepts. Central concepts form the unchanging basis of discourse, while peripheral concepts are mobile elements prone to change (Abric, 1993). Therefore, it is expected that the central concepts shaping the vaccine hesitancy discourse will be more or less similar across all identified topics, while the peripheral ones will differ. Peripheral concepts act as grids for deciphering the situation and as indicators of the "normality" of what is happening. Peripheral elements have a lesser degree of abstraction than elements of the central core. In the case of an "abnormal" situation, when certain phenomena contradict basic ideas, the protective role of peripheral elements is activated, preserving the core from transformation. Transformation of the central core occurs when a sufficient amount of contradictory information accumulates that exceeds the range of flexibility of the peripheral elements. When studying the digital discourse of vaccine hesitancy, we need to trace which concepts form the core of ideas about vaccination, and which can be classified as peripheral elements.



Based on a preliminary review of the literature on vaccine hesitancy and consideration of the concept of social representations, we formulated a conceptual framework of the discourse structure of vaccine hesitancy that formed the basis of the empirical study. The core of discourse can be formed by one or several elements; it is the most stable element that resists change, which influences the meaning of other elements of discourse and determines the nature of the connections between them. Peripheral elements perform the function of protecting the central core, have greater flexibility for change and are less important for the stability of social representations. A discourse formed around the problem of vaccination contains classification schemes, descriptions, explanations and actions. The discourse of vaccine hesitancy should contain a set of ideas that allow one to classify events and phenomena related to vaccination, describe their properties, and offer typical explanations; in addition, the discourse should contain a series of examples, formulas, clichés illustrating basic statements, values, and corresponding action models.

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## 3. Research methods

We collected empirical data according to the following research questions:

What topics make up the content of online discourse of vaccine hesitancy?

What beliefs about vaccination that contribute to vaccine hesitancy are being developed in online discussions?

What concepts make up the core and periphery of online discourse of vaccine hesitancy?

A multi-stage selection process was carried out to select relevant comments in the largest Russian-language social network "VKontakte". This network contains both individual profiles and online discussion groups and communities on many topics including health issues. Despite the strengthening of government control over social networking services in Russia, users in thematic groups have the opportunity to openly discuss very controversial topics. Although the network VKontakte requires users to register by phone number, users have some options to post their comments anonymously if they need to hide their identity. They may post on behalf of a group, block public access to a personal profile, or provide very little personal information, making it difficult to identify the real person (Dudina, Judina, Platonov, 2019). In the first stage, we selected four online news communities. Communities were selected according to the following criteria: the number of community members exceeding 350 thousand users; community posts being open for comments; and communities belonging to different thematic areas. The thematic focus was assessed based on the description of the community posted by its administrators. In the second stage, we selected relevant comments. Comments were selected using the VKontakte API. All posts on the community wall for the period from January 18, 2021, to February 15, 2022, were obtained. The choice of the starting date is because the start of mass vaccination in the Russian Federation was announced on January 18, 2021. Then, from the resulting population, posts containing references to vaccination against coronavirus were selected. This filtering was carried out through a search for words with the same root as the word "vaccination". Next, all comments to such posts were downloaded. Thus, 10,056 comments were received that contained mention of COVID vaccination. The mention of vaccination in comments was determined by words with the same root, as was the case with the selection of posts. Then, from the total number of comments for each community, 1,500 comments were selected using a random string request in the DBrowser program. As a result, a final sample of 6,000 comments was formed from the general array, containing the text of the comment, date of publication, and information about the source (community ID).

Coding was conducted following Clarke and Braun's six-step thematic analysis methodology (Clarke, Braun, 2015). As a result of coding, deductive and inductive codes were identified, which were grouped into 24 categories. From the resulting categories, the core themes were then formulated to form the core of online discourse on vaccine hesitancy. To determine which concepts are central and which are peripheral, the frequency of mention of concepts was calculated using the word cloud package in the RStudio



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program. Analysis of the concepts included in each topic made it possible to determine the composition of the central core and peripheral system of each thematic group.

# 4. Results and discussion

## 4.1. Results

The categories identified as a result of coding and analysis of selected comments were divided into two large subgroups: reasoned doubts about vaccination (78.5% of messages) and unreasoned judgments regarding vaccination (21.5% of messages). The subgroup "Reasonable doubts about vaccination" included statements in which users substantiated their opinions and mentioned specific reasons for their doubts. This justification may consist of references to specific examples, personal experience, media reports, or scientific publications. The subgroup "Unreasoned judgments regarding vaccination" includes emotionally loaded statements (humor, insults, regrets, etc.) that are not justified by any reasons for doubts about vaccination and questions about vaccination. Categories generated from coded comments are presented in Table 1.

**Table 1. Categories generated from coded comments. .**

| № п/п | Categories | Share of comments, % |
|---|---|---|
| **Reasoned doubts about vaccination (78,5%)** | | |
| 1 | Mistrust of authorities | 20,41 |
| 2 | Doubts about the effectiveness of vaccination | 9,80 |
| 3 | Doubts about the safety of vaccination | 9,17 |
| 4 | Conflicting messages from government officials and the medical community | 7,82 |
| 5 | Lack of knowledge and information about the vaccine | 7,01 |
| 6 | Compulsory vaccination | 5,85 |
| 7 | Inconsistent government policy | 3,87 |
| 8 | Conspiracy theories | 3,78 |
| 9 | Doubts about the qualifications of those responsible for vaccination | 3,78 |
| 10 | Poor conditions for vaccination | 3,24 |
| 11 | Conflicting information disseminated in the mass media | 1,98 |
| 12 | No possible legal liability for the consequences of vaccination | 1,26 |
| 13 | Lack of recognition of the vaccine by the WHO | 0,45 |
| 14 | Vaccination is contrary to religious beliefs | 0,09 |



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| № п/п | Categories | Share of comments, % |
|---|---|---|
| **Unreasoned judgments (21,5%)** | | |
| 15 | Insulting and ridiculing anti-vaxxers | 5,16 |
| 16 | Humor about vaccination and vaccines | 4,07 |
| 17 | Emotional appeals to get vaccinated | 3,35 |
| 18 | Insulting and ridiculing those vaccinated people | 3,17 |
| 19 | Declarative refusal to vaccinate | 2,87 |
| 20 | Vaccination in other countries as a model | 0,99 |
| 21 | Priority to more pressing social issues than coronavirus | 0,90 |
| 22 | Questions about vaccination | 0,45 |
| 23 | Vaccination policy in the Soviet Union as a model for vaccination | 0,45 |
| 24 | Regrets about a previous decision to vaccinate | 0,09 |

Analysis of the semantic content of the identified categories, their frequency of occurrence, and the concepts they contain allowed us to identify four main themes in the online discourse of vaccine hesitancy: doubts about the safety of vaccination; doubts about the effectiveness of vaccination; doubts about the need for vaccination; doubts about the fairness of vaccination. These topics are substantiated through a set of peripheral concepts that serve to reinforce the arguments expressed and at the same time go beyond the direct discussion of the properties, features, and possible effects of vaccination.



The theme "doubts about the safety of vaccination" portrays vaccination as an unsafe act with unknown consequences. This theme is embedded within a broader discourse of risk. Doubts about vaccination are associated primarily with awareness of possible health risks. The theme is built around the discussion of vaccination as a measure that could lead to more negative than positive health consequences. Doubts about the safety of the vaccine for health and discussion of possible risks form the core of this topic.

On the periphery of this theme are discussions of the lack of reliable knowledge about the vaccine, lack of legal responsibility for the consequences of vaccination, contradictory rhetoric from officials, poor vaccination conditions, doubts about the qualifications of medical workers, and suspicions of non-compliance with vaccine production conditions (concerns about the safety and quality of vaccine production, including the possibility of contamination or errors during production).

The theme "doubts about the effectiveness of vaccination" is built around such concepts as "consequences", "effect", and "result". The leitmotif of discussions about the questionable effectiveness of the vaccine is the comparison of the possible consequences of vaccination with the role of the vaccine in preventing the disease. As part of such discussions, users actively give examples of people who "were vaccinated but got sick" or "weren't vaccinated and didn't get sick."

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Peripheral subtopics include discussions of conflicting messages from the media, politicians, and medical experts about the effectiveness of vaccination; and discussion of the lack of recognition of the Russian vaccine "Sputnik" by the WHO. These doubts appeal to a general understanding of the impact of vaccination, to arguments about the insufficient study and testing of the effectiveness of the coronavirus vaccine and its too rapid production in the Russian Federation, to the specific conditions of production of the coronavirus vaccine.

The theme "doubts about the need for vaccination" is formed around the idea of vaccination as an unnecessary measure, since the significance of the disease itself is called into question. In these discussions, vaccination is interpreted as an unnecessary measure, and coronavirus as a disease that does not pose a great danger or mutates so quickly that the vaccine cannot resist it. Within the framework of this topic, personal examples are given of cases of people who encountered infected people and did not get sick; users often appeal to personal experience. Concepts such as "meaning," "immunity," and "mutation" play an important role in discussions within this theme.

Peripheral aspects of this theme include discussion of conflicting information disseminated by the mass media regarding the danger and severity of COVID-19; providing personal examples of encountering the virus without serious health consequences; the suspicion is that the authorities and elites exaggerate the danger of the disease for their interests. Also, within the framework of this theme, such an aspect as the priority of more pressing social and economic problems than coronavirus is discussed.



The theme "doubts about the fairness of vaccination" portrays vaccination as the product of a conspiracy by political elites or a "global conspiracy" aimed at obtaining material gain, establishing digital control, and reducing the population. The basic concepts most often found in discussions of this topic are "profit", "management", "collusion", "coercion", and "rights". This group of ideas is formed from subtopics that discuss mistrust of the authorities, inconsistency of state policies, conflicting messages from officials, and forced vaccination. The keynote of this topic is that vaccination in the form in which it is carried out is considered not just as a risk to individual health, but as harm to the population as a whole since vaccination companies primarily have political and economic interests. Vaccination is viewed as questionable because it is based on the selfish motives of vaccine manufacturers, and vaccine production and distribution are driven by profit interests that have little to do with concern for public health. The idea of vaccination as part of an unfair state policy, which is implemented by the authorities to limit the civil rights and freedoms, is also present in discussions related to this thematic group.

Peripheral concepts that underpin the core doubts relate to concerns that political and economic interests involved in the production of a vaccine could negatively affect its quality, as well as influence the exaggeration of its effectiveness and necessity. It can be noted that this topic resonates with the basic ideas of anti-vaccine discourse, which often appeals to conspiracy theories.

In the structure of all the identified themes, there is a connection between categories of trust, knowledge, and power. These categories form the discourse of each theme, forming

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an overall meaning with certain nuances. These key categories suggest that vaccine hesitancy discourse is based on broader social issues that are closely related to each other, such as lack of trust in social institutions, skepticism towards government measures, lack of reliable knowledge about the properties of vaccines and vaccination side effects, and mistrust of medical knowledge in general.

Online discussions about coronavirus vaccination are highly politicized. Most of the identified categories are somehow related to politics. The most frequently discussed category in the context of reluctance to get vaccinated was mistrust of authorities – such discussions accounted for 20.41% of all comments. According to the Edelman Trust Barometer study, in 2020 Russia was recognized as the country with the lowest overall indicator of trust in government institutions, media, and business among the countries examined. Mistrust of authorities was expressed in comments in different ways, from simply declaring mistrust to expressing suspicions that the authorities are trying to profit from the pandemic and vaccination of the population, and interpreting vaccination as the result of a collusion between the state and pharmaceutical companies. Here is an example of such a comment: "There is confidence that they will not do anything for people, just to make money once again and make money either on vaccines or on masks...". Being a complex concept, trust consists of both affective, related to emotions and personal attitudes, and rational components. One of the components of trust is the correspondence of expected actions to real ones.

Another aspect of vaccine hesitancy in online discourse relates to categories capturing doubts about the safety and effectiveness of the vaccine (18.97%) and lack of information and knowledge about the vaccine (7.01%). Doubts are expressed in judgments about the uselessness of vaccination, since "the virus mutates." The lack of information is often compensated by personal spontaneous experiments and everyday observations, when users, to support their point of view, appeal to their own "statistics": "Personal observations of deaths in my environment: because of Covid – 1 since 2019, and after vaccination – 11 in the last 7 months."



It should be noted that abstract doubts regarding vaccination in the analyzed comments prevail over concerns related, for example, to poor conditions for vaccination, which are mentioned in only 3.24% of the analyzed comments. Poor conditions mean both insufficient technical equipment of medical institutions and the impossibility of choosing a vaccine. Low qualifications of persons and institutions responsible for vaccination are noted in 3.78% of comments. The lack of legal liability for the consequences of vaccination is also sometimes mentioned (1.26%). Doubts regarding the conditions of vaccination, the qualifications of medical personnel and their responsibility are more specific than statements about the inability to trust the existing authorities or medicine in general. At the same time, abstract concerns, not supported by facts or observations, prevailed in the analyzed texts. Thus, the discourse of vaccine hesitancy, presented in the analyzed comments, appears to be tied to complex issues of the organization of political power, the interests of elites and pharmaceutical companies, as well as problems of trust in medical knowledge and information about vaccine trials. Here, such a property of the organization of social representations as schematization is manifested, when some features are given increased attention, they are emphasized, while others fall out of sight and are obscured.

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Discussions about the properties of the vaccine and the specific problems of its use are replaced by a discussion of general social and political problems indirectly related to vaccination.

The frequent mention of specific political figures in discussions of vaccination suggests that the actions and statements of public figures play an important role in the formation of beliefs about vaccination. For example, the Russian President is mentioned in 76% of comments related to the topic of trust in government. According to commentators, the lack of personal examples from people in power who would get vaccinated publicly reduces the level of confidence in vaccination. Some comments expressing doubts about vaccination appealed to the lack of a corresponding example of the use of a domestic vaccine on the part of the government officials ("Putin did not inject himself, so screw this vaccine," "Let them get vaccinated themselves").

In the topic of conspiracy theories, the vaccination process in the world as a whole is personified through the figure of Klaus Schwab, head of the World Economic Forum (he is mentioned in 53% of comments related to this topic), as well as Bill Gates (15% of comments). The WEF itself is often referred to by commentators as a conspiracy aimed at establishing a new world order. As a rule, turning to conspiracy theories manifests itself when a social group or individual, instead of trusting social institutions, chooses to believe in the so-called "stigmatized knowledge" for example, conspiracy theories, alternative medicine, etc. Research shows that such thinking allows individuals in a subjective situation of helplessness to gain a sense of control over their own lives.



Coronavirus is often compared in comments to other diseases, most often to the flu and measles. Such a comparison is usually made in the context of justifying the lack of need for vaccination. From the point of view of the theory of social representations, such comparisons can be considered as the formation of ideas about a new disease through the "anchoring" of its characteristics in the properties of already known diseases. Commentators draw parallels regarding the effectiveness of vaccines against these diseases and the severity of side effects: "Everyone gets sick again, whoever was sick, but then what's the use of vaccination? Everyone will get sick even less, just like with the regular flu every year." From a historical perspective, such consolidation is also carried out in the comments through historical parallels as a comparison of a modern vaccination company with vaccination companies in the Soviet Union.

Emotionally charged statements also form a significant part of the vaccination discourse. As a rule, such messages do not contain a direct indication of the reasons for readiness or unwillingness to get vaccinated but characterize the emotional context in which the communication takes place ("I'm tired of these vaccines!"). Categories describing the emotional side of the discourse included comments containing humorous messages about vaccination, as well as emotional condemnation of both anti-vaxxers and people who have already been vaccinated ("Ahaha... they forced them to get vaccinated with unknown means, and now they will take tests for money") or stubbornly unwilling to get vaccinated ("How many idiots are there in the comments who shout that this is dangerous. Do you also believe in 5G and chipping?").

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## 4.2. Discussion

The thematic structure of online vaccine hesitancy discourse, as examined in this research, generally fits the vaccine hesitancy model described above, which was developed by the SAGE research group. Our results are also consistent with the most commonly documented factors associated with COVID-19 vaccination hesitancy, such as trust in the healthcare system, public health authorities, and governments; concerns about vaccine safety, perceived vaccine effectiveness, and concerns about rapid vaccine development (Kafadar et al., 2023; Jennings et al., 2021). However, the analyzed texts also contain topics specific to Russian-speaking users, such as the non-recognition of the Sputnik V vaccine by the WHO; links to successful vaccination campaigns in the former USSR; certain historical parallels; and priority of specific social and economic problems.

Results by other research, as well as our results, indicate skepticism about the actions of the authorities and concerns about the safety of the vaccine as leading topics in discussions of vaccination on social media (Chen, Croitoru, Crooks, 2023). Canadian researchers also suggested that doubts about the safety of the vaccine are caused by misinterpretation of scientific facts (Rotolo et al., 2022). The other research noted that the most prominent topics in online discussions of the COVID-19 vaccine were comparisons with other infectious diseases, vaccine safety concerns, and conspiracy theories (Hwang et al., 2022). While positive discourse about vaccination includes a wide range of topics such as "vaccine development," "vaccine effectiveness," and "vaccine trials," negative discourse focuses on topics such as "conspiracy theories" and "security issues." However, positive discourse is more likely to rely on data from authoritative sources (scientists/doctors, medical media/journalists), while negative discourse tends to refer to politicians and online influencers. Our study revealed a similar pattern. But among the sources that users appealed to in their discussions, references to personal examples from everyday life were also very noticeable. An active appeal in all selected topics when discussing vaccination to personal experience, to the experience of friends, relatives, and acquaintances is a vivid example of such a phenomenon as "everyday epidemiology" (Nuti, Armstrong, 2021). Everyday epidemiology adapts official messages regarding behavioral risks to "non-scientific" and non-medical concepts, which is both a way of incorporating new information and a potential barrier to the acceptance of expert information by the medical community. Everyday epidemiology, as an important part of the process of vaccine hesitancy, has a significant impact on the persuasiveness of public health messages. Given the role that social media plays in promoting vaccine hesitancy, it is important to understand how social media can be used to improve health literacy and build public confidence in vaccination (Puri et al., 2020).



It is worth noting that our research has certain limitations and assumptions related both to the specifics of the methods used and to the chosen theoretical framework. Studying vaccine hesitancy through the lens of online discourse poses certain limitations to the study. Firstly, there is no way to link a particular topic to a specific social group, since the available social network data lacks reliable socio-demographic information. Second, our study focused on the discourse generated around vaccination news, and the data were obtained from news communities, which may also have influenced the characteristics of the comments that were selected for analysis. Thirdly, the thematic analysis method

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assumes the high involvement of the researcher in the process of processing and analyzing data, and the identified themes and their interpretation are to a certain extent subject to subjective assessment.

## Conclusion

Examining the discourse of vaccine hesitancy through the prism of the theory of social representations is important for understanding the potential for changing health attitudes and behavior. Vaccine hesitancy, understood through the lens of health behavior theories (e.g., health belief model or theory of planned behavior), suggests that decisions to vaccinate are influenced by beliefs about susceptibility to disease, severity of disease consequences, benefits of vaccination, barriers to vaccinations and social norms associated with vaccination. Vaccine hesitancy is related to these factors and influences people's decisions to vaccinate and can undermine the public health impact of vaccination programs (Yang et al., 2023).

The functions of the social representations that make up the online discourse of vaccine hesitancy are to describe, classify, and explain vaccination, the pandemic, and related activities; in adapting new facts and phenomena to pre-existing views, opinions and assessments through the so-called consolidation models, turning the unusual into understandable, in regulating behavior by the learned system of ideas. The interpretation of a set of opinions and attitudes as elements of an integral internally ordered system of representations that form a specific discourse demonstrates the difficulty of influencing individual components of this set to promote good health behavior. Due to the multi-stage protection of the central core, social representations are quite stable and resistant to change. Therefore, the process of developing new representations about health and health behavior, including vaccination, is quite long, cannot be carried out through short-term media campaigns, and requires a detailed study of the discursive patterns underlying such phenomena as vaccine hesitancy.



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