WHAT AND WHY DO OPPONENTS OF VACCINATION WRITE ON THE INTERNET

And how successful they are in their attempts to convince other people

Over the past eight months, almost as many posts and comments with the word "vaccine" have appeared in Vkontakte as in total for the previous eight years.

Mandatory vaccination against COVID-19 has caused a wave of disputes on the Internet, which continues to this day. We analyzed more than three million posts and comments about vaccines that were written from January to August 2021, and found out that the reports of opponents of vaccinations are stylistically different from the rest.

We will tell you what language techniques social media users use to convince others of the harm of vaccination, how they call their opponents and the vaccine itself in their messages and how popular such messages are among other users.

BE ATTENTIVE TO THE SOURCES OF HEALTH INFORMATION

This article is about coronavirus disease, or COVID-19. In all articles about coronavirus disease, we adhere to the position of the World Health Organization, or WHO. Before reading further, we recommend that you read WHO's position on COVID-19.

Our articles are written with love for evidence-based medicine. We refer to authoritative sources and go for comments from doctors with a good reputation. But remember: the responsibility for your health lies with you and your doctor. We do not prescribe recipes, we give recommendations. It's up to you to rely on our point of view or not.

THE WAY WE WORKED ON THE PROJECT

We have parsed more than three million posts and comments from all over Russian-language Vkontakte social network (biggest Russian-language Social media), which contained the word "vaccine" and were published from January 1 to August 31, 2021. We removed then repetitive as well as uninformative(less then 40 characters).

Of the remaining records, we randomly selected 10,000 texts, for which, their authors' attitude to vaccines (negative, neutral or positive) was then manually determined by the authors'team.

We couldn't mark up all the messages: it would take us about 15,000 hours. We entrusted this task to machine learning. The complexity of the classification was that there were too many opinions about vaccines: some users were not against vaccination, but against mandatory vaccination, others refused to stab Sputnik, and many did not write their opinion about vaccines directly at all. We couldn't always decide which group to include the message, so we couldn't demand perfect accuracy from the computer either.

The best model turned out to be the one which divided messages into two classes - opponents of vaccination and everyone else (neutral and positive): in 75% of cases, its conclusions coincided with ours. We failed to separate neutral messages from messages from vaccination supporters with high accuracy.

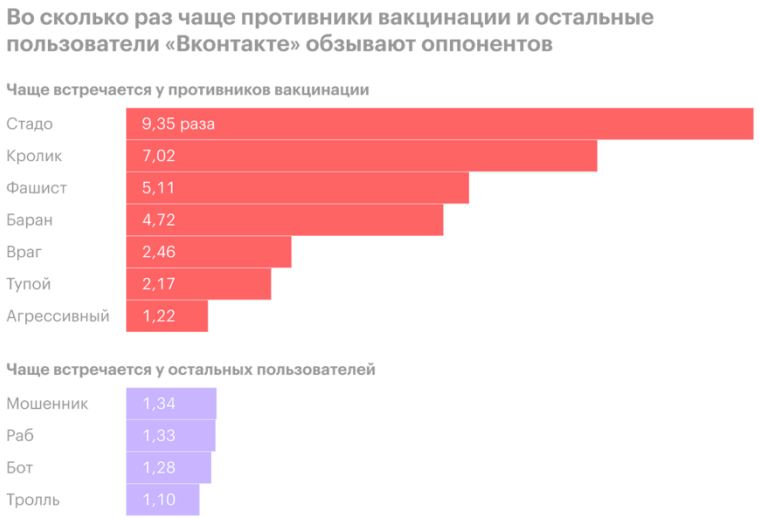
After that, with the help of linguists and frequency analysis of texts, we compiled a list of words that helped us identify the features of messages from opponents of vaccination - assessments, swearing, arguments.

Here's the link to the detailed tutorial about cleaning and classification stage of our project with some Python code: *https://habr.com/ru/post/593427/*

WHAT TECHNIQUES DO PEOPLE USE TO CONVINCE EACH OTHER?

To convince the interlocutor, we often use a variety of language tools without realizing it. Such techniques are called persuasive: metaphors, words with an emotional shade - for example, "beautiful" or "dummy"; reduction of distance - when we address the interlocutor personally or even familiarly; involvement in dialogue - with the help of rhetorical questions; contrast - "we and they".

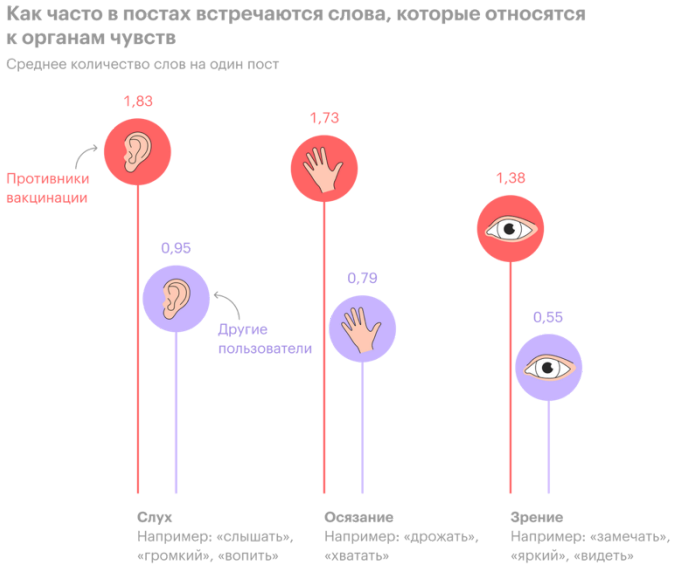
All these techniques are found in messages from supporters and opponents of vaccines. For example, in the posts written by antivaxers, we found 4 times more rough names of the opposite group - "stupid herd", "zombies", and evaluative words such as "nightmare", "beautiful" etc. In other words, opponents of vaccination are more likely to try to influence interlocutors not with logic, but emotionally.



In addition, opponents of COVID-vaccination actively use a technique that could be called "reverse euphemization". In politics,

euphemisms are used to soften some words and mislead the audience. For example, they say not "torture", but "interrogation with addiction", not "prison", but "place of imprisonment". In our case, it seems that there was a reverse process, and the neutral word "vaccine" has many emotional synonyms: "poison", "shmurdyak", "e-juice".

Opponents of vaccination more often use verbs and nouns that involve the senses: vision, hearing, touch. Their posts have 2.5 times more words that relate to the visual perception of information - for example, "to notice", "bright", "to see"; 2.19 times more kinesthetic, that is, related to sensations - for example, "smelling", "tremble", "grab"; and 1.93 times audio - "hear", "loud", "smell". Some researchers believe that such words are more able to convince people, as they create visual images in their minds.



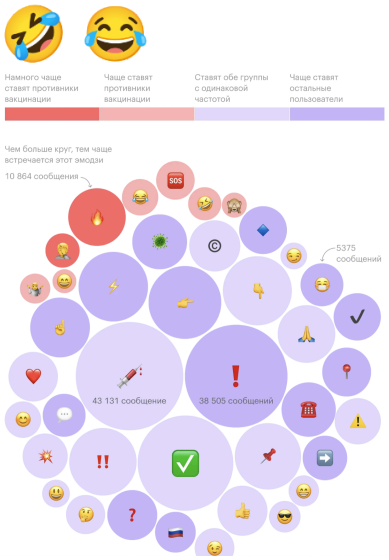
Interestingly, words expressing uncertainty are also more common in anti-vaccination posts - such as "allegedly", "possibly", "probably". It seems illogical - because if you want to prove yourself right to someone, you need to sound as convincing as possible. However, in this way, as linguists note, people are insured and disclaim responsibility. Opponents of vaccination used such words twice as

often as supporters or those who treat vaccinations neutrally - in about every post and sometimes even repeatedly.

In addition, opponents of vaccination often use words related to thinking: for example, "think", "think", "understand". On the one hand, this can be interpreted as a call to draw conclusions on your own, and on the other hand, as another option to absolve responsibility.

Opponents of vaccination posts differ from neutral and positive posts in terms of methods of formatting and punctuation. Each publication where coronavirus vaccination was mentioned in a negative context contains an average of one exclamation mark and question mark. In vaccination supporters and neutral users, these punctuation marks were used on average every two messages. Interestingly, both sides used the capslock at about the same frequency.

The most popular emojis in vaccine-related texts were a syringe (💉), an exclamation mark (❗) and a tick (✅), which is typical for information messages. However, compared to other users, vaccine opponents more often used more emotional symbols: 🔥 🤦 🆘



What does this mean?

Opponents of coronavirus vaccination are more likely to turn to the experiences of the interlocutor than its supporters and people neutral to vaccinations. They often use emotionally colored words and emojis, insult opponents, in their messages there are more references to the senses - "hear", "see". In addition, the posts of opponents of vaccination differ in the way they are issued - there are more exclamation and question marks - but everyone uses the capslock with the same frequency.

At the same time, people who are negative about vaccination are more likely to use techniques that can be interpreted as an attempt to absolve themselves of responsibility - express uncertainty and call for "thinking with your head".

WHAT FEARS DO ANTI-VACCINATIONISTS ADDRESS?

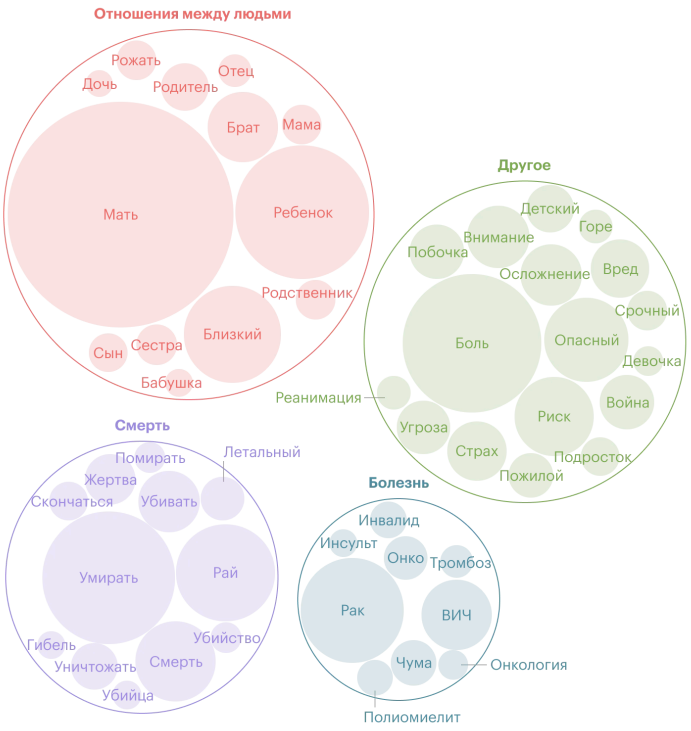
According to a VTsIOM survey, the main reasons why Russians would not be vaccinated are insufficient, in their opinion, vaccine research and fear of side effects.

These fears are also reflected in the posts that users write. About three times more often, opponents of vaccinations use words related to death: "die", "pass away" and five times - words related to murder - "kill", "destroy", "murder".

They also mentioned potential dangers about twice as often - "harm", "risk", possible side effects - "side effects", "complication", "trace", and called specific diseases - "thrombosis", "oncology", "HIV", "cancer".

Separately, there are fears that the vaccine will somehow affect the possibility of having a child in the future. Supporters of vaccination and those who are neutral about it spoke about pregnancy, infertility and sterilization three times less often as opponents of vaccinations.

Both sides are afraid for the health of loved ones, but critics of the vaccine are about twice as likely to write about relatives and children. At the same time, it is interesting that representatives of different groups worried about the elderly with about the same frequency. Perhaps this is due to the fact that the COVID-19 vaccination campaign focused on the vulnerability of older people.



What does this mean?

Like supporters of coronavirus vaccination, its opponents have many fears. However, if the former see a threat in the disease, the latter are afraid of the vaccination itself. Probably that's why their posts more often contain words related to side effects and specific diseases, as well as active verbs describing murder.

At the same time, everyone worries about relatives - and opponents of vaccinations are even more than their opponents. But both camps worry about the elderly with the same frequency.

WHAT ARGUMENTS ARE USED

To convince interlocutors of their own rightness, social network users used different techniques. Near-scientific vocabulary and database mentions occur at almost the same frequency - in 60.56% of anti-vaccination messages and 61.73% of other posts. And mention of statistics - for example, words such as "degree", "million", "percentage", "indicator" - in 36.14% of negative and 39.69% of positive and neutral posts.

Opponents of vaccines were more often called to the authority of doctors - in 35% of posts. By comparison, vaccination supporters and neutral users mentioned doctors in 28% of posts. Curiously, in recent years, trust in doctors among Russians, according to VTsIOM, has constantly fallen: if in 2010 doctors were trusted by 54%, then in 2017 - already 36%.

Conspiracy theories related to pharmaceutical companies are popular on the Internet. Supporters of these theories say that doctors and businesses come up with diseases to make money, and also do not want to develop effective medicines. Words such as "conspiracy", "elite", "bunker", "plan", "genocide", "biotechnological", "chip" contained 25% of the posts of opponents of vaccination - five times more than those of vaccination supporters. Another argument used by users in vaccine disputes is the absence or concealment of information. The words "hearing", "false", "backstage", "discover" contained 28% of vaccine opponents and 12% of vaccination supporters and those who treat vaccines neutrally.

Antivaxers also consider mandatory vaccination to be abuse of power, enslavement, the first step towards dictatorship, as in Nazi Germany. About 8.5% of posts opposed to vaccinations contained the words "Nazism", "fascism", "Nuremberg", "Nuremberg Code", "Reich", "conclamination camp", "genocide", "segregation". Vaccination supporters and those who treat it neutrally did not use such words.

But users cry to the law at about the same frequency. Words such as "constitution", "judicial", "rules" were contained in 9.67% of anti-vaccinators' posts, and 8.47% of vaccination supporters and those who treat it neutrally.

What does this mean?

Both user groups almost treated statistics with the same frequency and used scientific vocabulary. But strangely enough, opponents of vaccines called to the authority of doctors more often than their supporters or people with a neutral position.

Logically, opponents of vaccinations spoke more about conspiracy theories and information concealment, and also used a comparison with the Nazi dictatorship as an argument. But both sides called for the law at an equal frequency.

USER REACTION

For a more detailed analysis, we divided user texts into four categories: posts on behalf of groups, user posts, group answers and user responses. On average, reports of opponents of vaccination were more popular than posts of her supporters and information messages.

Posts of anti-vaccination groups received almost three times more likes on average than posts of all other groups. The same is true for likes to groups' answers. For user texts, the difference was not so noticeable - posts of opponents of vaccination in their own profiles received 1.35 times more likes, and comments - 1.55 times more. At the same time, the comments were reversed: there were fewer comments to the posts and answers of opponents of vaccinations than to the posts of vaccine supporters. As for reposts, opponents of vaccination again had this figure lower in all cases. The greatest

difference was observed in user posts - they were shared 2.53 times more often.

We have also identified a group of the most active users. It turned out that 16 people who entered the category "against vaccination" wrote at least 500 posts and comments with the word "vaccine". In total, they accounted for more than 19,000 posts and comments. At the same time, the record holder was a person who wrote 2,224 negative posts or comments - this means that on average he left at least 9 messages per day on the social network.

WHAT'S THE RESULT?

Talking about vaccines is difficult. To help people in this difficult matter, the World Health Organization has even released a special guide in which it wrote a recipe for successful communication: to contact not the people themselves who promote the refusal of vaccinations, but to their audience, to pay attention to the techniques used by opponents of vaccination.

Our study showed that the posts of opponents of COVID vaccination are partly hyperbolized - they have more emotions, more fears, more punctuation marks. This difference may have several explanations. First of all, it is necessary to take into account the policy of the state that supports vaccination, which affects the nature of the discussions. Opponents of vaccinations in this case are in a weaker position, and therefore are forced to protect it more actively. Supporters of vaccination often refer to official texts that are built quite differently.

At the same time, posts of opponents of vaccinations are ultimately more popular. Perhaps people who are wary of the vaccine really use more convincing techniques, or maybe distrust of vaccinations resonates with the general distrust of the state that forces them to do these vaccinations. According to the 2020 Edelman Trust

Barometer study, Russia is the country with the lowest aggregate level of people's trust in media, state, business and non-governmental organizations among all countries that participated in the study. Other CIS countries did not get into the Edelman rating, however, judging by the Wellcome 2018 survey, residents of Ukraine, Kazakhstan and Belarus trust the government even less than Russians.

The results of our work partly coincide with the work of sociologists from MIT 2018. They studied how news spreads on Twitter, and found that fake news users are more willing than usual. Scientists suggest that this may be due to the novelty factor. On social networks, people can attract attention if they are the first to share previously unknown information - so they do not always check it for reliability. A hypothetically similar factor can also play a role in the dissemination of posts about the dangers of vaccinations.