
Research article

UDC 316.65:159.9.072.43

<https://doi.org/10.21702/rpj.2021.2.7>

Cognitive Aspects of Students' Attitudes Towards COVID-19 Vaccination

Elena V. Ryaguzova 

Saratov State University, Saratov, Russian Federation
rjaguzova@yandex.ru

Abstract

Introduction. In the context of a large-scale transmission of the new coronavirus infection, it seems very important, relevant, and useful to examine and identify psychological factors affecting the refusal to vaccinate, caused by mistrust or uncertainty about the safety and effectiveness of the vaccine, doubts about its benefits and concerns about uncontrolled consequences. This study is the first report of the cognitive aspects of students' attitudes towards COVID-19 vaccination that lead to their refusal to vaccinate.

Methods. The study involved 76 university students ($M = 20.63$; $SD = 2.38$; 56 females and 20 males). For data collection, the author used the original questionnaire, aimed at identifying subjective attitudes towards the vaccine and vaccination against COVID-19, and the Fear of COVID-19 Scale by D. K. Ahorsu et al.; data was interpreted using frequency, correlation, and P. Verges' prototypical analyses.

Results and Discussion. Against the background of a predominantly low level of COVID-19 fear, it was revealed that the majority of study participants had a negative attitude towards vaccination, expressed in their refusal of potential vaccination (63 respondents). The most frequent reasons for refusal were mistrust, fear of consequences, unreliability of the vaccine, and the presence of antibodies. It was identified that the central core of representations of the vaccine reflected formally neutral associations, lack of axiological and emotionally charged notions, absence of relevant personal meanings, whereas the periphery included important descriptors indicating ambivalent attitude towards possible consequences of vaccination. The results obtained were interpreted in the context of cognitive aberrations actualized in situations of uncertainty, including exaggeration of one's own awareness, illusion of competence, imposed delusions, egocentric bias, illusion of control, illusory correlation, and cognitive dissonance.

Keywords

COVID-19 pandemic, vaccination, refusal to vaccinate, representation structure, mistrust, false awareness, illusion of competence, imposed delusions, cognitive dissonance, egocentric bias

Highlights

- ▶ Being a global challenge, the pandemic actualizes the problems associated with all spheres of human and society existence.
 - ▶ An individual's decision to vaccinate is determined by numerous reasons and is a responsible person's choice in the context of 'factuality/prospects'.
 - ▶ The negative attitude of university students towards COVID-19 vaccination results from ambivalent assessment of its possible consequences, cognitive aberrations, actualized in response to a complex and uncertain situation of the pandemic, as well as from formal neutrality of core semantic structure of vaccine representation, which sets a safe context and makes an individual take a cautious approach to COVID-19 vaccination.
-

For citation

Ryaguzova, E. V. (2021). Cognitive aspects of students' attitudes towards COVID-19 vaccination. *Russian Psychological Journal*, 18(2), 109–121. <https://doi.org/10.21702/rpj.2021.2.7>

Introduction

The global pandemic and restrictive measures caused by transmission of the new coronavirus infection have led to the situation, where practically the whole world found itself in the conditions of self-isolation, forced social distancing and reflection on the real threat to its own existence. Undoubtedly, this challenge to civilization affected all functioning spheres of the society and stimulated overall increase in research in various scientific fields. A sufficient number of published psychological papers convincingly prove that the pandemic affects the human psyche in at least three ways, influencing our sense of security, changing our needs, and transforming our value sphere (Kruglanski, 2020).

Psychological studies revealed natural mental reactions to the pandemic situation: narrowing and negativization of the time perspective (Nurkova & Gofman, 2020); construction of a new everyday life with altered life priorities, habits and behavioral patterns (Yarmak, Panova, Maranchak, & Savina, 2020); formation of the 'collective pattern of the disease' and the effect of 'understanding' COVID-19 (Pervichko, Mitina, Stepanova, Konyukhovskaya, & Dorokhov, 2020); decrease in the level of positive emotions (Rasskazova, Leont'ev, & Lebedeva, 2020); impaired constructive thinking and increase in psychopathological symptoms (Enikolopov, Boiko, Medvedeva, Vorontsova, & Kazmina, 2020); increased fear of COVID-19 (Gritsenko et al., 2020); changes in moral and ethical standards (Enikolopov, Medvedeva, Boiko, Vorontsova, & Kazmina, 2020); reduced life satisfaction at different stages of the pandemic (Zacher & Rudolph, 2020; Bono, Reil, & Hescocx, 2020; Kanekar & Sharma, 2020; Marmarosh, Forsyth, Strauss, & Burlingame, 2020).

An important contribution to the understanding of how an individual, a group, a society function in the context of the new virus transmission is made by the studies, which identify personal traits that determine perception specifics of the coronavirus infection and degree of its threat (Egorova, Parshikova, Zyryanova, & Staroverov, 2020; Modersitzki, Phan, Kuper, & Rauthmann, 2020), problematize and predict socio-economic and socio-psychological risks and consequences of the pandemic and infodemic (Nestik, 2020; Ushakov, Yurevich, Nestik, & Yurevich, 2020; Yurevich, Ushakov, & Yurevich, 2020; Tkhostov & Rasskazova, 2020; Zhuravlev & Kitova, 2020).

At the same time, it can be stated that the first shock from the encounter with the COVID-19

virus has already passed; there are diagnostic tools and prevention means, treatment protocols and regimens, new data on the nature of the virus and its modifications. All this certainly does not lessen immediacy and severity of the problem, but rather raises new questions that require serious scientific research. In our opinion, one of such issues is an individual's decision regarding COVID-19 vaccination, which is currently taking place in all civilized countries and making some people express fear, mistrust, resistance, and overt protest (Giubilini, Savulescu, & Wilkinson, 2020; Peretti-Watel et al., 2020; Paul, Steptoe, & Fancourt, 2021).

Thus, we developed a research project aimed at identifying psychological predictors of students' attitudes towards COVID-19 vaccination. The choice of the student community was dictated by a rather high educational level of this social group, its specific status and orientation towards the future, since there is scientific evidence that non-educated individuals, with low social status and income, as well as representatives of minorities and unemployed are the ones who most often resist vaccination (Malik, McFadden, Elharake, & Omer, 2020). However, the most important argument for choosing students as an empirical object of research was the following scientifically proven fact. Under the influence of dedicated educational and professional activity, as well as their inclusion into new social communities and transition into different living conditions, on the intellectual level students develop new mental formations that enable them to resolve problem situations actively and effectively and to make independent and responsible predictions about their consequences (Zimnyaya, Serova, & Stegnii, 2009).

However, the results obtained were unexpected and demonstrated that the vast majority of study participants did not even have the intention to get vaccinated, which shifted the focus of our scientific interest to the very problem of vaccination.

Concerns about the benefits and necessity of vaccination, doubts about its safety and consequences for the human body, justifiability of the risk and speculations about the profits of pharmaceutical companies date back to the invention of vaccines and certainly still exist to this day. Despite the fact that the advantages of vaccination, its role and importance in reducing the growth of dangerous diseases, improving the quality and expectancy of life are recognized by medical experts of the World Health Organization, the attitude towards the vaccine and the very policy of vaccination (especially, childhood vaccination) is ambiguous and controversial in many countries (Hornsey, Harris, & Fielding, 2018; Kukhtevich et al., 2018).

Our review of studies that examine the attitudes towards an individual's decision to get vaccinated allows to identify four attitudes and four behavioral strategies (Yaqub, Castle-Clarke, Sevdalis, & Chataway, 2014; Ward, Alleaume, & Peretti-Watel, 2020). They include active acceptance based on a conscious choice, awareness, understanding of the necessity and benefits of vaccination, readiness for vaccination; passive acceptance due to conformal behavior of an individual, his/her concessions to power, authorities or the group, delegation of responsibility for possible consequences; active denial of the benefit and advantages of vaccination, associated with a categorical refusal and open protest of an individual against the vaccine; indecisive hesitation, determined, on the one hand, by an individual's involvement and concern about his/her own health or the health of family members and, on the other hand, by fears about the results and potential adverse side effects, doubts about the value and safety of the vaccine.

The conventionality of the given typology is explained by the multitude of different factors that affect the choice of a particular strategy, including (a) the scale of the threat and its novelty, transmission speed and contagiousness of the virus, case fatality and mortality rates; (b) economic,

political, socio-cultural characteristics of the society, indicators of living standards and the progress of herd immunity; (c) public and personal awareness of not only the symptoms of the disease, possible complications and dangers of vaccination, but also of the risks associated with the consequences of vaccine refusal; (d) the level of social trust – how reliable, safe and effective the vaccine is, what is known about the practice of its use and the reputation of the manufacturer and medical institutions that administer the vaccination, what overall institutional trust people have in science, healthcare, government, politics, information sources; (e) the measure and vector of responsibility – whether an individual decides to get vaccinated himself or it concerns another person, e.g., a child or elderly parents, who are forced to cope with an overload of the immune system; (f) an individual's belonging to a certain cultural, religious, and professional group; and (g) a certain configuration of individual-typological, personal, and cognitive characteristics (high individual susceptibility to disease, sensitivity to pain, intolerance to injections, stress resistance and vitality, anxiety and tolerance to uncertainty, trust and responsibility, specifics of cognitive patterns and attributional styles, insecurity and anxiety).

Given the limited scope of this article, we will focus only on the characteristics of the individual's cognitive sphere, which determine the decision regarding COVID-19 vaccination. In particular, we will pay special attention to mental aberrations as subjective beliefs, prejudices and stereotypes, which arise in response to the unexpectedness and uncertainty of the pandemic, integrate into cognitive patterns of an individual and distort the perception and understanding of the current problem situation, as well as planning and development of an adequate rational behavioral response. A detailed classification of cognitive biases by such grounds as overabundance of information, difficulty of understanding meanings, response rate, and relationship among mnemonic processes is presented by Heick (n.d.).

The aim of this research is to study the cognitive aspects of students' attitudes towards COVID-19 vaccination.

Our hypothesis assumes that the cognitive aspects of students' attitudes towards COVID-19 vaccination, caused by mental aberrations, ambivalent assessment of possible results of vaccination and the meaningful content of the core meaning structure of representations of the vaccine, determine an individual's decision to get vaccinated against COVID-19 as a conscious pandemic response.

Methods

The study, carried out in late February – early March 2021, was based on the methodology of social constructivism. It involved students of different years of study from a university of the Volga Federal District (N = 76; M = 20.63; SD = 2.38; 56 females and 20 males).

The research methods included psychodiagnostic testing and survey using an original questionnaire comprised of the following blocks: (a) data on socio-demographic status of the respondents and their experience of direct encounter with the coronavirus infection; (b) assessment of subjective attitude towards vaccination and the intention to get or not to get vaccinated against COVID-19, specifying the reasons for that decision; and (c) subjective representations of the vaccine and vaccination against COVID-19 (associations to the 'vaccine' stimulus and definitions of the term). The study also used the Fear of COVID-19 Scale (Ahorsu et al., 2020), which was tested on Russian and Belarusian samples (Gritsenko et al., 2020).

The results were analyzed and interpreted by means of frequency, correlation, and P. Verges' prototypical analyses (Verges, 1992), in which median frequency of association occurrence in the

sample and its average rank were used as criteria for including the obtained associations into different structural elements of the representation – the central core or the periphery.

Results and Discussion

According to the survey, 26 % of the respondents have had a coronavirus infection themselves, more than half of the study participants (51 %) have a close family member who contracted the virus, which indicates that they are aware of the actual threat of COVID-19, have gone through it and accumulated some experience. At the same time, the majority (74 %) of respondents are characterized by a low level of COVID-19 fear, despite the fact that infection is spreading in real time, 'here and now' (Fig. 1).

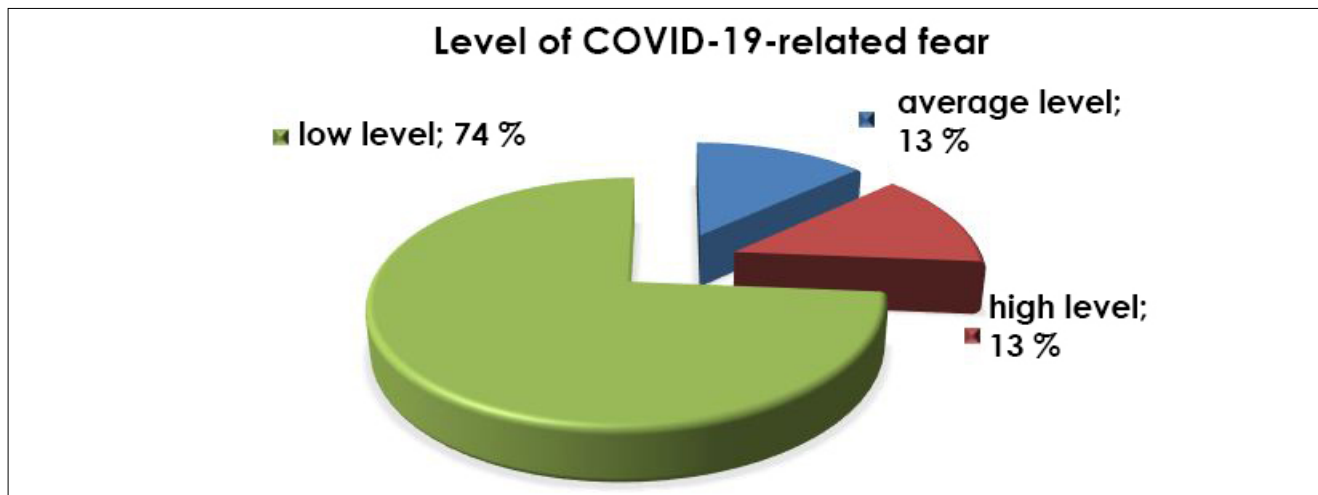


Figure 1. Level of experienced COVID-19-related fear

The result obtained can be explained by the respondents' young age, since it has been observed that the intensity of experienced COVID-19-related fear increases with age (Gritsenko et al., 2020). Another explanation rests on the fact that young people are less likely to suffer from severe consequences after COVID-19 (Pastorino et al., 2021). At the same time, we emphasize that the level of experienced COVID-19-related fear is not associated with personal experience of the respondents, since no statistically significant associations were found between the presence of personal or family history of coronavirus infection and the level of experienced COVID-19-related fear ($p > 0.05$). This may result from the light course of the disease among the respondents and their close ones, absence of serious complications, effectiveness of taken measures, personal characteristics, and the fact that the global nature of the pandemic turns a personal issue of resolving a health problem into a social one, which has been emphasized by some researchers (Pogue et al., 2020).

A significant majority (88 %) of respondents comply with protective measures (mask requirements, social distance, and sanitary procedures), which also indicates that study participants are aware of the danger and wish to avoid infection; however, in our sample 63 students (more than 80 %) have not been vaccinated against COVID-19 and are not planning to. The data obtained

show a discrepancy between subjective interpretation of the current situation caused by the pandemic and behavioral intentions of an individual. That being said, the results are consistent with a study of college students' attitudes towards the H1N1 virus vaccine, which indicated a small percentage of respondents wishing to be immunized (Ramsey & Marcinski, 2011), but differ significantly from the data on COVID-19 vaccination: 94.73 % of Italian students are ready to get vaccinated against COVID-19 (Pastorino et al., 2021), 68.57 % of American respondents agree to be immunized and only 15.89 % refuse a potential vaccine (Pogue et al., 2020). A survey conducted in June 2020 with representatives from 19 countries indicated that 71.5 % of participants reported their intention to vaccinate (assuming the vaccine was tested and recommended by their employer); notably, an interesting heterogeneity was observed in these indicators – in China they reached 83.7 %, whereas in Russia they were only 59.1 % (Lazarus et al., 2021).

The range of reasons for vaccine refusal, specified by study participants, is quite extensive and diverse – from the categorical "I do not want to!", "I have no time", and the alarmist "This is microchip implantation!" to the selfish "I will see what consequences the others have" and the defensive "For ethical reasons".

The main reasons indicated by the respondents include *insufficient amount of research regarding the vaccine, mistrust, fear of adverse side effects, negative experience of others, allergy, unreliability, doubts about the necessity of vaccination, reliance on natural immunity* (Fig. 2).

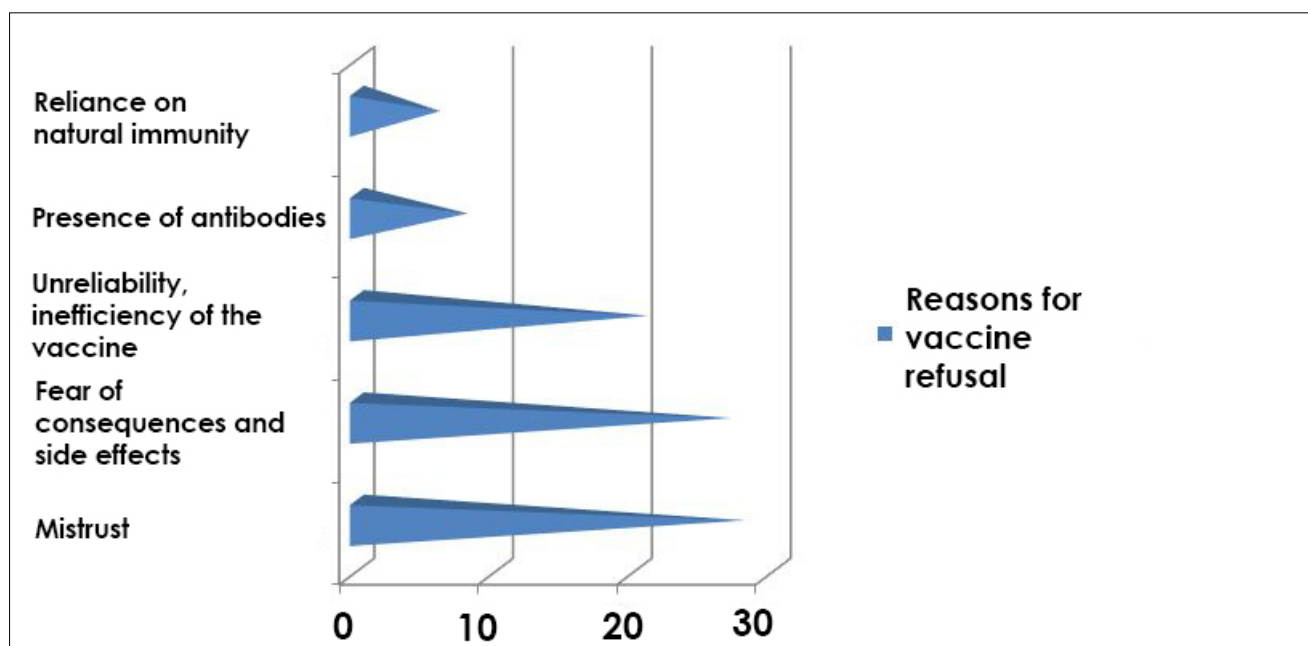


Figure 2. The most frequent reasons for vaccine refusal

The reasons for vaccine refusal obtained in our study are consistent with those analyzed in a large-scale European survey conducted in April 2020 (Neumann-Böhme et al., 2020). Reasons like a lack of trust or legitimacy of the vaccine certainly deserve a separate study and will be addressed in our further research.

Due to the limited sample size and a small number of respondents who expressed their intention to get vaccinated, we could not use statistical criteria to compare the reasons that induced an individual to make a particular decision. The qualitative analysis demonstrated the presence of cognitive aberrations in the judgments of those who refused the vaccine. They included egocentric bias and egocentric error, manifested in the overestimation of one's own opinion (*"I think vaccination is an unreliable method of protection"*, *"It was developed too quickly"*, and *"I see no point in it"*); illusion of control, based on the belief that one can influence the external events (*"This will aggravate the situation with the virus"*, *"My body will cope on its own"*); the empathy gap, which is related to the orientation of an individual towards functioning "here and now" and the inability to predict his/her own behavior in another situation (*"Everything is fine as it is"*, *"Neither I nor my close ones were sick"*); illusory correlation (*"There are many examples of vaccine deaths"*, *"Statistics of infections and their consequences"*).

Those respondents who plan to get vaccinated against COVID-19 specify such reasons for their decision as *safety for themselves and others, preventive care, psychological comfort, and recommendations of their close ones.*

We should note the presence of a contradictory result obtained in the course of the survey: despite the reluctance of most study participants to get vaccinated, almost half of the respondents consider vaccination as an opportunity to stop the infection (51.3 %), to protect oneself (29 %) and to perform a social duty (9.2 %). In our opinion, this indicates a clear cognitive dissonance, which may lead to motivational conflicts and contradictions, cognitive biases in the perception and assessment of the situation. It needs to be specified that although the categorical framework was set by the researcher, the respondents had an opportunity to offer their own response, but only 10.5 % used this option, of which 6.6 % neither chose any existing option nor offered any answer of their own.

To identify the meaning structure of social representations of the vaccine, we analyzed associations to the 'vaccine' stimulus. A total of 356 associations were obtained, the conceptual thesaurus of vaccine representation – its core and periphery – included 259 associations (72.7 % of the total number of associations obtained) (Table 1).

Table 1 <i>The structure of social representations of the vaccine</i>		
Frequency	Rank	
	< 2.8	≥ 2.8
> 13	Inoculation (1.73; 33) Medicine (2.17; 18) Injection (2.26; 27) Virus (2.54; 26) Healing, recovery (2.7; 14)	Syringe (3.29; 17) Disease (3.33; 15) Health (3.42; 13) Medical worker (3.36; 14)

Frequency	Rank	
	< 2.8	≥ 2.8
≤ 13	Protection (2.45; 11)	
	Infection (2.3; 8)	Healthcare (3; 9)
	Pandemic (2.4; 5)	Medical treatment (3.33; 7)
	Antibodies (2.63; 8)	Compulsion (3.7; 6)
	Pain (2.78; 9)	Death (2.67; 6)
	Immunity (2.76; 13)	

The data above indicate that the central core of representations of the vaccine (its most stable part) is characterized by descriptors associated with the specifics of the vaccination procedure ('inoculation, 'injection'), the reason for vaccination ('virus') and perception of the vaccine as medicine. At the same time, the study reveals distorted ideas about its purpose, since the goal of vaccination is not recovery or healing, but preventive care, protection and activation of the reserves and resources of the individual's immune system. It can be stated that the core of vaccine representation is characterized by formal neutrality of associations, verbalized and fixed in collective memory, lack of axiological and emotionally charged notions, associated with the reflection on the global threat and the use of vaccine as an effective coping strategy, absence of relevant personal meanings.

The periphery of representation reflects possible changes and transformations of its content; in addition to associations related to the external setting of the vaccination procedure ('medical worker', 'syringe'), it includes extremely important descriptors that indicate alternative results of vaccination, or rather their subjective perception. On the one hand, the study reveals associative relationship of the vaccine to health, protection, immunity, and antibodies, which indicates positive perception of the vaccine as a preventive measure in the context of current difficult situation and responsible attitude towards one's own health and the health of others. On the other hand, through the negative connotations the vaccine is associated with disease, pandemic, infection, pain, and even death. Such dichotomous content also generates cognitive dissonance, internal conflict, tension of the personality and determines the behavioral pattern regarding vaccination.

Let us analyze other cognitive aspects identified in our study, which influence the attitudes towards vaccination and significantly determine the behavioral strategy of study participants, namely, their intention to refuse potential vaccination (63 respondents, more than 80 %).

The first aspect that needs to be considered is the awareness level of students. On the one hand, the respondents put forward absolutely fair and reasonable demands for careful development and reliable testing of the vaccine, identification of side effects, and possible contraindications.

On the other hand, in the context of exaggerated notion of their own awareness, the study reveals cognitive aberrations caused by subjective beliefs (egocentric bias and egocentric error). This is proved by both survey data and the results of prototypical analysis, which reveal stereotypical, non-interiorized descriptors of the central core of vaccine social representation, as well as the presence of associations that distort the meaning and purpose of vaccination. Overconfidence, overestimation of one's own awareness and the illusion of competence as manifestations of the Dunning-Kruger metacognitive effect have previously been considered as an explanatory principle for vaccine refusal due to autism (Motta, Callaghan, & Sylvester, 2018).

Another block of cognitive biases is associated with imposed delusions, caused by large amounts of misinformation regarding the COVID-19 vaccination and specific vaccines on the Internet, social media, and television. Obviously, such messages are very often politicized and have a clear ideological background, but nevertheless they always increase or even fabricate doubts and significantly reduce people's intention to get vaccinated. And although the ideological context can hardly be adjusted, even despite the global scale of the threat to the whole of humanity, the distribution and persistence of COVID-19 misinformation as a network phenomenon requires network intervention (Young et al., 2021).

A cognitive dissonance, which arises in response to a complex, unexpected and uncertain situation of the pandemic, is explained by an individual's lack of clear cognitive patterns and proven adequate algorithms of actions. It can be reduced either by selective perception of incoming information related to COVID-19, or by constructing a simple and subjectively relatable situation in the framework of 'we – they' dichotomy ('conspiracy', 'microchip implantation', 'compulsion', 'artificial selection') and categorization of certain causality in the given context (illusion of control, illusory correlation). In this case, causal attribution facilitates a non-conflict inclusion of uncertain situation into mental space of an individual, formation of explanatory personality patterns, justification of one's choice and stimulation of confidence in its exclusivity and legitimacy.

Interestingly, Kahneman, Slovic, & Tversky (2005) in their study of an 'irrational human' conducted an experiment using an assumed situation of vaccination as a form of protection and demonstrated the importance of contrast between reducing the risk of the decision and its complete elimination. They convincingly proved that the influence of the context ('framing effect') determined the nature of the decision made as follows: in a positive context of benefits and gains, an individual inclined towards a cautious and safer decision, whereas the context of penalties and obvious losses encouraged more risky actions. Apparently, the majority of study participants perceived and assessed the given positive context of the term of 'vaccine' – self-protection, ability to stop transmission of the infection, and social duty – as congruent with a cautious decision not to get vaccinated, and they easily fell into the 'trap' set by the researcher, making it possible to identify another cognitive bias.

Conclusion

The pandemic caused by the COVID-19 virus has been recognized by the World Health Organization as a real threat to the existence of humanity. A possible response to this civilizational challenge is large-scale immunization of the population, facilitated by the world's leading companies that carry out research and implement innovations, which can stop transmission of the infection, achieve the desired level of herd immunity, and restore the economic, political, and socio-cultural order. However, it is important to not only create an effective and safe remedy

and make it as affordable as possible for all social groups, but also to convince people of the necessity to get vaccinated, since indecisive attitude or overt protest against the vaccine pose a serious threat to global health.

This study, aimed at identifying the cognitive aspects of students' attitudes towards COVID-19 vaccination, confirms that an individual's refusal of the vaccine as a conscious pandemic response is caused by ambivalent assessment of its possible consequences, and cognitive aberrations (overestimation of one's own competence, imposed beliefs, egocentric error, illusion of control over the situation, illusory correlation, and cognitive dissonance). The analysis of the meaning structure of representations of the vaccine shows that the central core of representations contains formally neutral associations, which set a relatively safe context and encourage an individual to make cautious decisions about COVID-19 vaccination.

At the same time, the results obtained require further refinement, since the study has certain limitations, associated with empirical sampling (small sample size, gender imbalance, and geographical homogeneity), overdetermined and complex structure of attitudes towards an individual's decision to vaccinate, including cognitive, emotional and behavioral components, ongoing status of the pandemic, its different waves, outbreaks and remissions, each stage of which is sensitive to current information and attitudes towards the vaccine.

References

- Ahorsu, D. K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID-19 scale: Development and initial validation. *International Journal of Mental Health and Addiction*. <https://doi.org/10.1007/s11469-020-00270-8>
- Bono, G., Reil, K., & Hescox, J. (2020). Stress and wellbeing in college students during the COVID-19 pandemic: Can grit and gratitude help? *International Journal of Wellbeing*, 10(3), 39–57. <https://doi.org/10.5502/ijw.v10i3.1331>
- Egorova, M. S., Parshikova, O. V., Zyryanova, N. M., & Staroverov, V. M. (2020). Personal traits and perception of the COVID-19 pandemic. *Voprosy Psichologii*, 4, 81–103. (in Russ.).
- Enikolopov, S. N., Boiko, O. M., Medvedeva, T. I., Vorontsova, O. Yu., & Kaz'mina, O. Yu. (2020). Dynamics of psychological reactions at the start of the pandemic of COVID-19. *Psikhologopedagogicheskie issledovaniya (Psychological-Educational Studies)*, 12(2), 108–126. <https://doi.org/10.17759/psyedu.2020120207> (in Russ.).
- Enikolopov, S. N., Medvedeva, T. I., Boiko, L. A., Vorontsova, O. Yu., & Kaz'mina, O. Yu. (2020). Moral decision-making during COVID-19 pandemic. *Vestnik Moskovskogo universiteta. Seriya 14. Psikhologiya (Moscow University Bulletin. Series 14. Psychology)*, 4, 22–43. <https://doi.org/10.11621/vsp.2020.04.02> (in Russ.).
- Giubilini, A., Savulescu, J., & Wilkinson, D. (2020). COVID-19 vaccine: Vaccinate the young to protect the old? *Journal of Law and the Biosciences*, 7(1). <https://doi.org/10.1093/jlb/ljaa050>
- Gritsenko, V. V., Reznik, A. D., Konstantinov, V. V., Marinova, T. Yu., Khomenko, N. V., & Izrailovits, R. (2020). Fear of coronavirus disease (COVID-19) and basic personality beliefs. *Klinicheskaya i spetsial'naya psikhologiya (Clinical Psychology and Special Education)*, 9(2), 99–118. <https://doi.org/10.17759/cpse.2020090205> (in Russ.).
- Heick, T. (n.d.). *The cognitive bias codex: A visual of 180+ cognitive biases*. Retrieved from <https://www.teachthought.com/critical-thinking/the-cognitive-bias-codex-a-visual-of-180-cognitive-biases>
- Hornsey, M. J., Harris, E. A., & Fielding, K. S. (2018). The psychological roots of anti-vaccination

- attitudes: A 24-nation investigation. *Health Psychology*, 37(4), 307–315. <https://doi.org/10.1037/hea0000586>
- Kanekar, A., & Sharma, M. (2020). COVID-19 and mental well-being: Guidance on the application of behavioral and positive well-being strategies. *Healthcare*, 8(3), 336. <https://doi.org/10.3390/healthcare8030336>
- Kahneman, D., Slovic, P., & Tversky, A. (2005). *Judgment under uncertainty: Heuristics and biases*. Kharkov: Humanity Center. (in Russ.).
- Kruglanski, A. (2020). 3 ways the coronavirus pandemic is changing who we are. *The Conversation*. Retrieved from <https://theconversation.com/3-ways-the-coronavirus-pandemic-is-changing-who-we-are-133876>
- Kukhtevich, E. V., Martynov, Yu. V., Kulagina, M. G., Gurevich, K. G., Arkhangel'skaya, A. N., & Mitrikova, L. Ts. (2018). Immunoprophylaxis: Positive and negative trends. *Infektsionnye bolezni: novosti, mneniya, obuchenie (Infectious Diseases: News, Opinions, Training)*, 7(2), 84–91. <https://doi.org/10.24411/2305-3496-2018-12010> (in Russ.).
- Lazarus, J. V., Ratzan, S. C., Palayew, A., Gostin, L. O., Larson, H. J., Rabin, K., ... El-Mohandes, A. (2021). A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine*, 27, 225–228. <https://doi.org/10.1038/s41591-020-1124-9>
- Malik, A. A., McFadden, S. M., Elharake, J., & Omer, S. B. (2020). Determinants of COVID-19 vaccine acceptance in the US. *EclinicalMedicine*, 26. <https://doi.org/10.1016/j.eclinm.2020.100495>
- Marmarosh, C. L., Forsyth, D. R., Strauss, B., & Burlingame, G. M. (2020). The psychology of the COVID-19 pandemic: A group-level perspective. *Group Dynamics: Theory, Research, and Practice*, 24(3), 122–138. <https://doi.org/10.1037/gdn0000142>
- Modersitzki, N., Phan, L. V., Kuper, N., & Rauthmann, J. F. (2020, July 14). *Who is impacted? Personality predicts individual differences in psychological consequences of the COVID-19 pandemic in Germany*. <https://doi.org/10.31234/osf.io/s65ux>
- Motta, M., Callaghan, T., & Sylvester, S. (2018). Knowing less but presuming more: Dunning-Kruger effects and the endorsement of anti-vaccine policy attitudes. *Social Science & Medicine*, 211, 274–281. <https://doi.org/10.1016/j.socscimed.2018.06.032>
- Nestik, T. A. (2020). The impact of the COVID-19 pandemic on society: Socio-psychological analysis. *Institut psikhologii Rossiiskoi akademii nauk. Sotsial'naya i ekonomicheskaya psikhologiya (Institute of Psychology, Russian Academy of Sciences. Social and Economic Psychology)*, 5(2), 47–83. <https://doi.org/10.38098/ipran.sep.2020.18.2.002> (in Russ.).
- Neumann-Böhme, S., Varghese, N. E., Sabat, I., Barros, P. P., Brouwer, W., van Exel, J., ... Stargardt, T. (2020). Once we have it, will we use it? A European survey on willingness to be vaccinated against COVID-19. *European Journal of Health Economics*, 21, 977–982. <https://doi.org/10.1007/s10198-020-01208-6>
- Nurkova, V. V., & Gofman, A. A. (2020). Looking at the future through the lens of self-isolation. *New challenges of uncertainty: Proceedings of the All-Russian Scientific and Practical Conference* (pp. 64–66). Novosibirsk: Novosibirsk State University. (in Russ.).
- Pastorino, R., Villani, L., Mariani, M., Ricciardi, W., Graffigna, G., & Boccia, S. (2021). Impact of COVID-19 pandemic on flu and COVID-19 vaccination intentions among university students. *Vaccines*, 9(2), 70. <https://doi.org/10.3390/vaccines9020070>
- Paul, E., Steptoe, A., & Fancourt, D. (2021). Attitudes towards vaccines and intention to vaccinate against COVID-19: Implications for public health communications. *The Lancet Regional Health – Europe*, 1. <https://doi.org/10.1016/j.lanepe.2020.100012>

- Peretti-Watel, P., Seror, V., Cortaredona, S., Launay, O., Raude, J., Verger, P., ... Ward, J. (2020). A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation. *Lancet Infectious Diseases*, 20(7), 769–770. [https://doi.org/10.1016/S1473-3099\(20\)30426-6](https://doi.org/10.1016/S1473-3099(20)30426-6)
- Pervichko, E. I., Mitina, O. V., Stepanova, O. B., Konyukhovskaya, Yu. E., & Dorokhov, E. A. (2020). Perception of COVID-19 during the 2020 pandemic in Russia. *Klinicheskaya i spetsial'naya psikhologiya (Clinical Psychology and Special Education)*, 9(2), 119–146. <https://doi.org/10.17759/cpse.2020090206> (in Russ.).
- Pogue, K., Jensen, J. L., Stancil, C. K., Ferguson, D. G., Hughes, S. J., Mello, E. J., ... Poole, B. D. (2020). Influences on attitudes regarding potential COVID-19 vaccination in the United States. *Vaccines*, 8(4), 582. <https://doi.org/10.3390/vaccines8040582>
- Ramsey, M. A., & Marczynski, C. A. (2011). College students' perceptions of H1N1 flu risk and attitudes toward vaccination. *Vaccine*, 29(44), 7599–7601. <https://doi.org/10.1016/j.vaccine.2011.07.130>
- Rasskazova, E. I., Leont'ev, D. A., & Lebedeva, A. A. (2020). Pandemic as a challenge to subjective well-being: Anxiety and coping. *Konsul'tativnaya psikhologiya i psikhoterapiya (Counseling Psychology and Psychotherapy)*, 28(2), 90–108. <https://doi.org/10.17759/cpp.2020280205> (in Russ.).
- Tkhostov, A. Sh., & Rasskazova, E. I. (2020). Psychological contents of anxiety and the prevention in an infodemic situation: Protection against coronavirus or the 'vicious circle' of anxiety? *Konsul'tativnaya psikhologiya i psikhoterapiya (Counseling Psychology and Psychotherapy)*, 28(2), 70–89. <https://doi.org/10.17759/cpp.2020280204> (in Russ.).
- Ushakov, D. V., Yurevich, A. V., Nestik, T. A., & Yurevich, M. A. (2020). Socio-psychological aspects of the COVID-19 pandemic: Results of an expert survey of Russian psychologists. *Psikhologicheskii zhurnal (Psychological Journal)*, 41(5), 5–17. <https://doi.org/10.31857/S020595920011074-7> (in Russ.).
- Verges, P. (1992). L'évocation de l'argent: Une méthode pour la définition du noyau central d'une représentation [The evocation of money: A method for defining the central core of a representation]. *Bulletin de Psychologie*, 45, 203–209.
- Ward, J. K., Alleaume, C., & Peretti-Watel, P. (2020). The French public's attitudes to a future COVID-19 vaccine: The politicization of a public health issue. *Social Science & Medicine*, 265. <https://doi.org/10.1016/j.socscimed.2020.113414>
- Yaqub, O., Castle-Clarke, S., Sevdalis, N., & Chataway, J. (2014). Attitudes to vaccination: A critical review. *Social Science & Medicine*, 112, 1–11. <https://doi.org/10.1016/j.socscimed.2014.04.018>
- Yarmak, O. V., Panova, E. M., Maranchak, A. G., & Savina, Z. S. (2020). Coronavirus as a social driver of everyday life transformation. *Izvestiya vysshikh uchebnykh zavedenii. Severo-Kavkazskii region. Obshchestvennye nauki (Bulletin of Higher Educational Institutions. North Caucasus Region. Social Science)*, 3, 27–35. <https://doi.org/10.18522/2687-0770-2020-3-27-35> (in Russ.).
- Young, L. E. et al. (2021). Disrupting the COVID-19 misinfodemic with network interventions: Network solutions for network problems. *American Journal of Public Health*, 111(3), 514–519. <https://doi.org/10.2105/AJPH.2020.306063>
- Yurevich, A. V., Ushakov, D. V., & Yurevich, M. A. (2020). COVID-19: Results of the second expert survey. *Psikhologicheskii zhurnal (Psychological Journal)*, 41(6), 78–85. <https://doi.org/10.31857/S020595920012591-6> (in Russ.).
- Zacher, H., & Rudolph, C. W. (2020). Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *American Psychologist*, 76(1), 50–62. <https://doi.org/10.1037/amp0000702>

Ryaguzova

Cognitive Aspects of Students' Attitudes Towards COVID-19 Vaccination

RUSSIAN PSYCHOLOGICAL JOURNAL, 2021, Vol. 18, No. 2, 109–121. doi: 10.21702/rpj.2021.2.7

SOCIAL PSYCHOLOGY

Zhuravlev, A. L., & Kitova, D. A. (2020). Attitudes towards information on the coronavirus pandemic among residents of Russia (a case of users of the Internet search systems). *Psikhologicheskii zhurnal (Psychological Journal)*, 41(4), 5–18. (in Russ.).

Zimnyaya, I. A., Serova, T. S., & Stegnii, V. N. (2009). Assessment of the formation of students' social competence in the structure of the social and occupational system. *Vestnik Permskogo gosudarstvennogo tekhnicheskogo universiteta. Sotsial'no-ekonomicheskie nauki (Bulletin of the Perm State Technical University. Humanities)*, 4, 91–101. (in Russ.).

Received: March 12, 2021

Revision received: April 28, 2021

Accepted: May 01, 2021

Author Details

Elena Vladimirovna Ryaguzova – Dr. Sci. (Psychology), Associate Professor, Head of the Chair of Personality Psychology, Saratov State University, Saratov, Russian Federation; ResearcherID: S-1861-2016, SPIN-code: 3724-7921; e-mail: rjaguzova@yandex.ru

The author declares no conflict of interest.