



Article

Behavioral Approach to the COVID-19 Vaccination Policy: An Empirical Study in Serbia

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Abstract: The article presents the results of empirical research on the general population's attitudes towards the COVID-19 vaccination policy in the Republic of Serbia. The research aims to examine if and to what extent the respondents were vaccinated against COVID-19, their attitudes towards the vaccination policy, and, especially, why they did not get vaccinated or were hesitant. The research was conducted on a sample of the general population ($n = 501$) by distributing a specially designed questionnaire comprising twelve open and closed questions. The starting hypothesis was that there was significant resistance to vaccination and that respondents were reluctant to get vaccinated due to distrust not only of the COVID-19 vaccines but also of the Serbian health authorities and the public vaccination policy. The findings confirm this hypothesis and reveal specific reasons for resistance and hesitancy, including concerns about the vaccine's safety, side effects, and insufficiently tested vaccines. A large number of respondents disclosed distrust in the health authorities and noted that they were not prone to changing their minds. The authors explain these reasons by numerous cognitive biases. The conclusion provides an overview of specific behavioral measures for improving the effectiveness of the vaccination policy in Serbia.

Keywords: COVID-19; vaccination policy; resistance; hesitancy; behavioral measures



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1. Introduction

The pandemic of the infectious disease COVID-19 caused by the SARS-CoV-2 virus drastically changed the world and led to the so-called “new normality”. It was reflected in reduced social and physical contacts, considerable changes in business operations, loss of employment, mental health impairment, endangerment of material existence, etc. [1]. While the situation seemed hopeless at the outset of the pandemic, generating great fear and anxiety, people became mentally accustomed to the new situation over time. The situation was significantly improved upon with the discovery of vaccines, but the emergence of vaccines was accompanied by new dilemmas, social divisions and conflicts. The point of contention between experts and citizens was the vaccine's safety. Contradictory information started spreading through social networks, creating huge animosity among citizens. It resulted in a division into “vaxers” and “anti-vaxers”. These pejorative terms have further strengthened the ubiquitous polarization.

In the circumstances of polarized opinions and strong emotional charge, the space for rational reasoning and action was suddenly narrowed. Thus, the automatic and fast System 1 of our cognitive apparatus prevailed over the slow and rational System 2 [2]. It was in such a heated atmosphere that an adequate vaccination policy had to be conceived and implemented. Judging by the percentage of the vaccinated population, some countries have succeeded in their efforts (e.g., Portugal), and some have not (e.g., Serbia). Generally, both Serbia and Portugal applied a universal vaccination policy (vaccines were available to all). According to recent data [3], Portugal records 93% of fully vaccinated citizens (updated data from 10 March 2022) while Serbia has 47.6% (updated data from 22 March 2022).

Absolute numbers are even more convincing: Portugal records 9.66 million vaccinated people (population: 10.4 million) while Serbia has 3.35 million vaccinated (population: 6.9 million); the number is almost three times higher in Portugal. It may be interesting to look at the ratio of “booster” doses in these two countries, according to the initial protocol of doses per 100 inhabitants: Portugal 61:164 (total: 225), Serbia 27:96 (total: 124). When looking at the number of deaths, the data are as follows: Portugal records 21,545 deaths (on 28 March 2022), with the number doubling in the last 427 days (more precisely, in relation to 10,721 deaths since 25 January 2021); Serbia records 15,768 deaths (on 28 March 2022), with the number doubled in the last 188 days (more precisely, in relation to 7846 deaths from 21 September 2021). Both countries may be compared with the trend at the European level: 371 days in which the number of deaths has doubled; thus, Portugal is 156 days above this level while Serbia is 283 days below this level. These numbers clearly show that, in the last six months, Serbia has recorded a drastic increase in the number of deaths from COVID-19, in a situation when the vaccine was widely available!

Such data have drawn the research attention to countries with a lower percentage of vaccinated population when compared to the world average (57.6% fully vaccinated people) or the European average (65.23% fully vaccinated people). Naturally, the emphasis is on the unvaccinated, i.e., the reasons why they were not vaccinated and especially why they are reluctant to be vaccinated. The reasonable assumption was mainly that there was fear or concern about the side effects of the vaccine, given the ubiquitous and contradictory information about vaccines in the public. Starting from that assumption, we conducted a survey on a sample of the general population in Serbia with the aim of establishing the percentage of unvaccinated people, the reasons why they were not vaccinated or why they were hesitant. We were especially interested in the respondents’ attitudes towards the national vaccination policy, its advantages and disadvantages. What is more or less common to all questions in the research is what the respondents give more weight to: freedom of choice or health protection. This dichotomy was the central research question we sought to examine, on the basis of which we conceptualized the recommendations intended for vaccination policymakers.

2. Literature Review

A study was conducted in Japan with the aim of examining the causes of negative attitudes towards vaccination, resulting in a refusal to get vaccinated [4]. The target group included people of different age groups. The research showed that young people were more vaccine-hesitant than older people, as well as that young women were more hesitant than young men. The roots of such a repulsed attitude are health concerns, i.e., uncertainty regarding the side effects of the vaccine. Considering the different age groups of the respondents, the researchers concluded that an effective fight against vaccination indecision should include a change in communication strategy to avoid applying a single strategy to all age categories (*one size fits all approach*). Another research project on resistance to vaccination was conducted on a sample of young people in America [5]. The most common reasons among respondents (about 24%) who had a negative attitude toward vaccination were: (1) the desire to wait to make sure the vaccine is safe (about 56%); (2) concern about possible side effects of the vaccine (about 53%); (3) other people are in more need of a vaccine (44%); (4) disbelief that a vaccine is needed (about 23%). The researchers concluded that, in the group of young people who were hesitant to get vaccinated, health authorities should address the reasons for hesitancy, their concerns about the vaccine’s safety and side effects, and promote the importance of vaccination for this population group.

Some studies specifically deal with the relationship between *fear and anxiety* and people’s hesitancy to get vaccinated. For instance, one study [6] investigated the impacts of the COVID-19 vaccination on fear and economic anxiety (measured by Google search trends regarding different topics, including recession, stock market crash, survivalism, and conspiracy theories) by using a worldwide sample of 194 countries observed from 1 December 2020 to 4 March 2021. The main finding is that fear and economic anxiety were

highly influenced by the emergence of COVID-19 vaccines, given that fear and anxiety increased once the vaccines started being applied. The authors recommended that the number of older adults willing to get vaccinated would increase if the competent authorities explained the benefits of vaccination and refuted false information about the vaccine and its severe side effects. Another research project in Germany [7] investigated the effects that personality traits, risk-taking conduct and anxiety have on affective reactions (e.g., worries and concerns) and anticipated behaviors (e.g., denial of medical operations) among the general population during the COVID-19 pandemic. As opposed to risk-taking and personality traits, *anxiety* had a direct effect on people's concerns about safety and hygiene in hospitals. The study recommended that health workers should carefully address the issue of people's anxiety in the context of hospitalization.

Vaccine hesitancy has been a research subject in other countries. For example, a study in Bangladesh [8], conducted on a sample of 1134 respondents of the general population, found that 32.5% were hesitant. The authors recommended that the evidence-based educational and policy-level initiatives should be applied mainly to the poor, elderly and chronically ill individuals. A recent study in the same country [9] identified 27.4% of vaccine-hesitant people after one year of vaccine introduction; the authors recommended that educational campaigns should specifically target semi-urban, low-income and low-educated Bangladeshis. Further, COVID-19 Vaccine Hesitancy (VH) was the subject matter of a systematic review and meta-analysis in Pakistan [10], including a total of 323 studies from January 2020 to October 2021. The main finding was that there was a significant heterogeneity in the reported VH in the population, which could not be explained by any co-variables from these studies. The authors recommended that an in-depth analysis of COVID-19 VH on a representative sample should be undertaken to measure the magnitude of VH and to explore and identify the VH factors. A qualitative study conducted on the Nepali population in the UK [11], which included in-depth interviews with 20 people, found that attitudes towards COVID-19 are mainly positive. The authors identified three main factors of vaccine hesitancy on which vaccination policy for ethnic minorities in the UK should be based: (1) *external* (rumors and misinformation, religious restrictions; preference of home remedies and yoga; etc.); (2) *specific* (doubt in vaccine effectiveness after changing the second dose timeline); and (3) *personal* (lack of confidence in the vaccine, past negative experience with flu vaccines, and concern about side-effects).

Some studies focus on *conspiracy theories* during the COVID-19 pandemic and their harmful impact on people's conduct. Recent research [12], including two studies conducted in the USA ($n = 220$; $n = 288$) and one in the UK ($n = 298$), has shown that different forms of conspiracy beliefs have different effects on people's behavior during the pandemic. Thus, the belief that the pandemic is a *hoax* leads to people not taking sufficient protective measures (personal hygiene, physical distancing), while the belief that the virus was "made in a laboratory" increases egocentric prepping behavior (alternative remedies, hoarding). The authors connect these beliefs with the existence of the so-called *conspiracy mentality*. Another cross-cultural study [13], conducted by using an online survey in the UK ($n = 1088$) and Turkey ($n = 3936$), examined the levels of COVID-19 vaccine hesitancy and its association with beliefs about the origin of the new Coronavirus. The results have shown a worrying level of vaccine hesitancy, especially in Turkey (31%) as opposed to 14% in the UK, and a 3% rejection vaccination level in both countries. The authors emphasized that a wider communication of the scientific consensus on the origin of the virus with the public is needed.

Another study [14] recommends adjusting interventions depending on individual barriers to vaccination: complacency, convenience, a lack of confidence in vaccines and utility calculation (the so-called *Four C Model*). For instance, since people with a lack of confidence in vaccines hold strong negative attitudes toward vaccination (as opposed to the complacency and convenience types), debunking vaccination myths would be an appropriate intervention. Another paper, focusing on the extensive use of behavioral and social science findings [15], provides a critical overview of previous research on topics relevant to

pandemics, such as: threat management, social and cultural impact on behavior, communication science, moral decision making, leadership and stress management. Relying on this review, the authors recommend numerous behavioral measures that are appropriate for COVID-19, such as: (1) playing the card of “common identity” and acting for the common good; (2) identifying credible authorities in the community who would share public health messages; (3) promoting cooperative behavior; (4) combining norms of pro-social behavior with the expectation of social approval from the authorities; (5) highlighting “bipartisan” support for anti-COVID measures to reduce polarization and biased reasoning; (6) targeting public health information towards marginalized communities; (7) sending messages that: (i) emphasize the benefits to the recipient, (ii) focus on protecting others, (iii) align with the moral values of the recipient, (iv) call for social consensus or scientific norms, and/or (v) emphasize the possibility of group approval; (8) developing people’s awareness of the benefits of access to other preventive measures; (9) preparing people for disinformation and providing accurate information and counter-arguments against false information before encountering conspiracy theories, false news or other forms of misinformation; (10) the use of the term “physical distancing” rather than “social distancing” because social connection is possible even when people are physically separated. There are also studies that point to the importance of nudge policies in encouraging people to get vaccinated [16]. In this regard, recent meta-research on the effectiveness of behavioral interventions confirms a statistically significant relationship between these interventions, especially defaults, and changes in human behavior in different domains [17].

In addition, there are opinions [18] from the behavioral science perspective on what we have learned during the COVID-19 pandemic for future use in the same or similar pandemics: (1) trust in the state (government) is one of the strongest predictors of adherence to prescribed measures and vaccination; (2) adherence to measures is not only a consequence of human motivation but also of possibilities and abilities, which especially refers to socially and economically vulnerable groups, such as ethnic minorities; (3) clarity and consistency of vaccination policy and messages are very important because people must understand the rules of conduct, which means that they should be clearly formulated and “communicated”; (4) pandemic preparedness should focus on protection, not restrictions, which especially refers to financial and other measures aimed at supporting work from home. Finally, it is worth mentioning a special edition of a book dedicated to COVID-19 from the behavioral science perspective [19]. It contains 34 articles on the use of behavioral insights in health care, divided into six subtopics: (1) risk communication and public health messaging; (2) public education and health literacy; (3) community engagement; (4) psychological impact of COVID-19; (5) coping strategies and the COVID-19 pandemic; (6) adherence to public health preventive recommendations. Last but not least, in October 2020, the World Health Organization (WHO) published a report [20] which identifies the shortcomings in the existing vaccination policy and emphasizes the need to apply measures from the corpus of behavioral science in order to popularize the vaccine against Coronavirus: (1) creating a favorable environment for vaccination by facilitating the vaccination process, making vaccines available to all without excessive administrative burden; (2) encouraging social influence by engaging trusted people in the community to promote vaccination as an example of good practice; (3) increasing the motivation of citizens for vaccination through open and transparent dialogue and communication about the risks that the vaccine may involve.

A review of the Serbian Citation Index [21] indicates abundant scientific research on the topic of COVID-19, mostly from the perspectives of medical science and various social sciences but not from the perspective of behavioral science. The research we conducted in Serbia seeks to fill this gap and to popularize behavioral science in the field of health care.

3. Materials and Methods

3.1. Description of the Research Sample

The research was conducted from October 2021 to March 2022 on a sample of the general population in the territory of the Republic of Serbia. The total sample ($n = 501$)

included respondents of different gender and age structures. Females dominated (66%) compared to males (34%). The respondents' average age was 30.7 years (29.9 years for females and 32.3 years for males). A total of 98.4% of respondents are Serbs, and 1.6% are of other nationalities (Croatian, Montenegrin and Bulgarian) or did not specify their nationality. A vast majority of respondents have health insurance (95%); most of them have public (state) insurance (90%) (see Table 1).

Table 1. Demographic descriptors of respondents (average age: 30.7).

Analytic Data Sample (<i>n</i> = 501)	Weighted %
<i>Sex</i>	
male	34%
female	66%
<i>Nationality</i>	98.4%
Serbian	0.8%
other (Croatian, Montenegrin and Bulgarian)	0.6%
not specified	
<i>Insurance status</i>	
yes	95%
no	5%
public	90%
private	7%
other	3%

3.2. The Research Instrument and Statistical Data Processing Plan

A questionnaire was developed for research purposes. In addition to questions related to general socio-demographic data, it included twelve subject-specific questions on vaccination. The questionnaire was made in Google forms and distributed to respondents in different ways: via social networks (Facebook, LinkedIn and Twitter), sharing in Viber groups, and informal contacts. The questions are short and concise in order to focus the respondents' attention on the core research question: whether they were vaccinated and with how many doses, and if not, what are the reasons. The questions are designed as a combination of closed-ended and open-ended questions. We tried to leave space for the respondents to explain the reasons why they received only one dose of the vaccine, why they plan to receive the third dose of the vaccine, etc. The central questions concern the examination of the attitudes of those respondents who have not been vaccinated or are reluctant to get vaccinated and the reasons for such a decision or reluctance.

First, in the group of unvaccinated people (N group), we tried to identify the following subgroups of respondents:

- A. those who definitely want to be vaccinated (positive attitude).
- B. those who are likely to be vaccinated (less hesitant).
- C. those who are unlikely to be vaccinated (more hesitant).
- D. those who definitely do not want to be vaccinated (negative attitude).

We were primarily interested in the percentage difference, as well as the difference in attitudes, between those who definitely want to be vaccinated (A subgroup), those who definitely do not want to be vaccinated (D subgroup), and the hesitant respondents who are either likely or unlikely to be vaccinated (B and C subgroups). The respondents who stated that they definitely wanted to be vaccinated (A) were identified as respondents with a *positive* attitude towards vaccination; those who definitely did not want to be vaccinated (D) were identified as respondents with a *negative* attitude towards vaccination; those who were likely to get vaccinated (B) and those who were unlikely to get vaccinated (C) were identified as respondents who were *hesitant* or *reluctant* to be vaccinated. In the group of "hesitant" respondents (B and C), we were interested in the percentage difference between those who are closer to being vaccinated (probably will—B) as compared to those who are

closer to not being vaccinated (probably will not—C), as well as the differences in their views on the reasons for hesitation or reluctance.

We then excluded those who definitely wanted to be vaccinated (A) and focused on those who did not want to be vaccinated (D) or were hesitant to do so (B and C) in order to identify the reasons for their decisions. The respondents were asked to specify why they did not want to be vaccinated, and they were offered the following responses (including the option to state “other” reasons):

- (a) I would like to wait to make sure the vaccine is safe and maybe get it later.
- (b) I am concerned about possible side effects of the vaccine.
- (c) I think that other people need the vaccine more than me.
- (d) I don’t believe I need a vaccine.
- (e) Other:

Next, the respondents were asked why they did not believe that they needed a vaccine. They were offered the following responses (including the “other” reasons option):

- (a) I believe that I do not belong to the risk group.
- (b) I do not believe that COVID-19 is a serious disease.
- (c) I have already had the COVID-19 virus.
- (d) I use masks and other preventive measures.
- (e) I do not think that vaccines are useful.
- (f) I do not trust the Crisis Management Team (abbr. CMT).
- (g) I do not believe in vaccines in general.
- (h) Other: . . .

After that, we examined the key reasons for the general disbelief in vaccines or the belief that they are not useful by asking an open-ended question. Respondents from the unvaccinated group (N) were free to express their views on the key reasons for their disbelief. Another open-ended question focused on identifying factors that would potentially influence the change of the respondents’ opinions on vaccination (including both vaccinated and unvaccinated respondents). By asking this question, we wanted to determine the “firmness” of their attitudes (primarily of the unvaccinated respondents) and under what conditions they may be changed. The responses were expected to help us design proposals and practical policy measures aimed at promoting the effectiveness of health policy measures in similar situations. We started from the presumption that we cannot propose “hard” (coercive) measures if their attitudes remained predominantly unchanged. In that case, it is necessary to choose measures from the corpus of “soft paternalism” (nudge policy) and try to change people’s attitudes.

We further sought to examine the respondents’ attitudes regarding the improvement of vaccination policies. To this effect, the respondents were placed in the role of “creators” of the vaccination policy and were asked to make suggestions in the direction of improving that policy. The goal was to potentially reveal good proposals, compare them with the measures that are already being implemented, and include them in the proposal of the practical vaccination policy that we intended to offer. The respondents’ views on this issue are highly important given that any public policy should be conceived in line with the previously identified needs of its users and in cooperation with them. Finally, the respondents were given an opportunity to freely express their views on or concerns about vaccination, which may not have been addressed in the previous questions. We were particularly interested in the difference in attitudes between male and female respondents. Considering the combination of obtained quantitative and qualitative data, the statistical analysis of the quantitative data was performed by using the SPSS program (version 25), while the qualitative data was processed by using the MS Excel program.

4. Results

The respondents were first asked if they had received the COVID-19 vaccine. More than half of the respondents, 270 (54%), provided a positive response, while 226 (46%) respondents provided a negative response, which makes a total of 496 out of 501 respondents. Then, we examined whether there was a difference between males and females in terms of being vaccinated. The result shows that significantly more women than men were vaccinated, and the size effect is large ($X^2(4) = 305.634$, $p = 0.000$, $r_\phi = 0.781$, see Tables S1–S3). Further, more than three-quarters of respondents (77%) out of the total number who responded (350) received two scheduled doses of the vaccine, while 23% provided a negative reply. Essentially, almost all of those who declared themselves vaccinated received two doses (269 out of 270). At the same time, significantly more women than men received the second dose, but the size effect is small ($X^2(4) = 13.229$, $p = 0.010$, $r_\phi = 0.162$, see Tables S4–S6).

The respondents were further asked why they received only *one* dose of the vaccine. A total of 25 answers were given, of which 13 respondents “did not receive the vaccine” and two “received both vaccines”; other meaningful answers included: “I already had the virus”; “I had to receive it because of work”; “I did not receive the first two vaccines voluntarily”; “COVID-pass”, etc.

Then, the respondents were asked if they intended to receive a *third* (booster) dose of the vaccine; 56% provided a positive response and 44% provided a negative response. There is a difference in terms of gender, given that significantly more women than men planned to receive the third dose, but the size effect is small ($X^2(4) = 13.975$, $p = 0.007$, $r_\phi = 0.167$, see Tables S7–S9).

Then, we asked the following question: *What are the reasons for receiving the third dose of the vaccine?* We received a large number of answers (a total of 201, of which, 189 were valid), and observed the following patterns:

1. for (additional) health care (complete immunization), safety, strengthening immunity, alleviation of symptoms, achieving a “booster effect” (97 responses or over 50%);
2. for reasons of work, travel, movement restrictions, COVID-passes (17 answers);
3. the recommendation of doctors/medical professionals (14 answers);
4. I believe in (the importance of) vaccines (6 answers);
5. other answers (“political reasons”; “because it is so prescribed”, “administrative and financial reasons”, etc.).

As expected, care for one’s own health and the health of others dominates in the responses on the third dose of the vaccine, and the motivation stems from a sense of responsibility for oneself or the community (family).

The next set of questions referred to respondents who were *not vaccinated*. We were first interested in whether they intended to receive a vaccine against the Coronavirus. A four-point scale of responses was offered (definitely yes, probably yes, probably no, and definitely no). The results are as follows: 89 respondents (36.6%) said they would probably not receive the vaccine, 123 respondents (50.6%) said they definitely would not, 18 respondents (7.4%) said they probably would, and only 13 respondents (5.3%) said that they would definitely get vaccinated (see Table 2). Thus, a total of 87% of respondents stated that they would definitely not or probably not be vaccinated, as opposed to a total of 13% of respondents who stated that they would definitely or probably get vaccinated (see Table 3). Notably, there is a low percentage of those who definitely wanted to be vaccinated (5.3%), and the percentage between them and those who definitely would not get vaccinated (50.6%) is almost ten times higher in favor of the latter. Moreover, if we exclude the group of those who definitely wanted to be vaccinated (about 5%), we come to about 95% of respondents who were still more or less hesitant or would definitely not get vaccinated (see Table 4).

Table 2. Percentage of unvaccinated respondents who (do not) intend to get vaccinated.

Responses	1. Definitely Yes	2. Probably Yes	3. Probably No	4. Definitely No
% of respondents	5.3% (1.3%)	7.4% (7.5%)	36.6% (38%)	50.6% (53%)

Table 3. Percentage of unvaccinated respondents who intend to get vaccinated vs. those who do not intend.

Responses	Definitely and Probably Yes	Definitely and Probably No
1st and 2nd group vs. 3rd and 4th group	13% (9%)	87% (91%)

Table 4. Percentage of unvaccinated who intend to get vaccinated vs. those who do not intend or hesitate to get vaccinated.

Responses	Definitely Yes	Definitely No and Probably Yes/No
1st group vs. 2nd, 3rd and 4th group	5.3% (1.3%)	94.6% (98.5%)

There was a total of 243 responses to this question. If we exclude from this number the 16 vaccinated respondents (who responded to the question that was initially addressed to the unvaccinated people) and one who did not say whether he/she was vaccinated or not (17 in total), we come to the (total) number of 226 unvaccinated respondents and the following proportions: definitely yes 3 (1.3%), probably yes 17 (7.5%), probably not 86 (38%), definitely not 120 (53%) (see Tables 2–4, **bold** data). This “deviation” may be interpreted in two ways: either the respondents did not read or understand the question well, or they were not honest when answering the first question (whether they were vaccinated or not). There is a noticeable difference in the first group (“definitely yes”), where the percentage decreases from 5.3% to 1.3%.

In addition, there is no difference between unvaccinated females and males in terms of the probability of not receiving the vaccine ($X^2(8) = 7.989$, $p = 0.435$, see Tables S10 and S11).

Then, we tried to examine the reasons why *unvaccinated respondents* decided not to get vaccinated or would not receive the vaccine. Here, we summarize the obtained results according to the number (percentage) of dominant responses:

1. I am concerned about possible side effects of the vaccine (97 responses, 41.8%);
2. I do not believe that I need a vaccine (92 responses, 39.7%);
3. I would wait to make sure the vaccine is safe, and I may get it later (63 responses, 27.2%);
4. I think that other people need the vaccine more (17 responses, 7.3%);
5. Other reasons (2.9%).

It is obvious that the majority of respondents are worried about the side effects of the vaccine (42%), followed by those who think they do not need the vaccine (40%) and those who would wait to make sure it is safe (27%), while a smaller number of respondents consider it needed more by others (7%). Other reasons (2.9%) include the following responses: *vaccination cannot be forced but must be an expression of free will; vaccines have not been (sufficiently) tested; Corona is a common virus; politics is involved; the profit of pharmaceutical companies is behind it all; etc.*

We were interested in the difference in attitudes between the four groups of unvaccinated respondents (definitely yes/no, probably yes/no). Considering that the unvaccinated respondents could choose several answers (or add their own), Table 5 shows the frequency of their responses.

Table 5. Response frequency in terms of likelihood of being vaccinated.

	1. Definitely Yes	2. Probably Yes	3. Probably No	4. Definitely No	Total of Respondents
(I) number (%) of respondents	13 or 5.3%	18 or 7.4%	89 or 36.6%	123 or 50.6%	243 + 258 * = 501
(II) number (%) of resp. (excluding vaccinated)	3 or 1.3%	17 or 7.5%	86 or 38%	120 or 53%	226 + 258 = 484
(a) I am concerned about possible side effects of the vaccine	/	5 (5)	34 (34)	56 (55)	
(b) I don't believe I need a vaccine	/	4 (4)	32 (31)	54 (54)	
(c) I would wait to make sure the vaccine is safe and I might get it later	/	7 (7)	38 (36)	18 (18)	
(e) I think that others need the vaccine more than me	1 (1)	2 (1)	5 (5)	9 (9)	
Other reasons	/	1 (1)	4 (5)	18 (16)	
No response	12 (3)	/	/	3 (3)	
(I) total responses	1	19	113	155	288
(II) total responses	0	18	111	152	281

* This is the number of respondents who provided no response on the likelihood of being vaccinated. In this group, two vaccinated respondents specified the reasons why they would not be vaccinated.

If we exclude the responses of vaccinated respondents (16) and one respondent who did not say whether he was vaccinated, which makes a total of 17 respondents, we may focus on the remaining answers (Table 5: data in **bold**). For example, in the group of respondents who definitely do not want to be vaccinated (column 4), there are two dominant reasons: (a) concerns about possible side effects of the vaccine (55 responses), and (b) disbelief that they need the vaccine (54 responses). In the group of those who are unlikely to be vaccinated (column 3), we recorded the same reasons: (a) possible side effects (34 responses); (b) disbelief that they need the vaccine (31 responses); as well as (c) waiting to make sure the vaccine is safe and possibly getting it later (38 responses). Statistical analysis shows a difference in responses between the two groups (those who definitely will not and those who are unlikely to be vaccinated) in terms of response frequency, a, b and c ($X^2(2) = 14.4009$, $p = 0.0007$, see Table S12), but also in terms of all responses offered, a, b, c and d ($X^2(3) = 14.8303$, $p = 0.0019$, see Table S13). In other words, there are significantly more respondents who definitely do not want to be vaccinated because they are worried, do not believe in the vaccine or think that others need it more; in contrast, there are significantly more respondents who are unlikely to be vaccinated because they are not sure that the vaccine is safe and who may receive it later. On the other hand, there is no difference in the answers between those who are unlikely to be vaccinated (column 3) and those who are likely to be vaccinated (column 2); they are equally worried, do not believe they need the vaccine or believe others need it more or would wait to receive it (for a, b i c: $X^2(2) = 0.4207$, $p = 0.81$, see Table S14; for a, b, c, i d: $X^2(3) = 0.4599$, $p = 0.92$, see Table S15).

Next, we focused on *the reasons for disbelief in the usefulness of the vaccine or the belief that it is not needed*, where we offered seven possible answers (a to d) and the possibility to state other reasons. As a reminder, there were 92 answers that said they did not need a vaccine and 17 answers that said others needed it. Almost half of the received responses (95 responses or 46.6%) relate to the fact that respondents already had a virus, followed by distrust in the CMT (68 responses or 33.3%), belief that vaccines are not useful (62 responses or 30.4%), belief that they do not fall into the risk group (53 responses or 26%), stance that

they are using masks and other preventive measures (38 responses or 18.6%), stance that COVID-19 is not a serious disease (31 responses or 15.2%), disbelief in vaccines in general (26 responses or 12.7%) and other reasons (“distrust in companies”; “the medical profession did not convince me”; “I don’t trust globalists and philanthropists”; etc. (16 responses or 8%).

Then, we addressed the following question: *If you do not believe in vaccines in general or think that they are not useful, what are the key reasons?* Being aware that the answers will intertwine with the ones given in the previous question, our focus here was general disbelief in vaccines, not just against the Coronavirus vaccine. We received a total of 87 interesting answers, 80 of which were valid. The dominant reasons are: (1) the vaccines are insufficiently tested/safe or are made quickly (24 responses), and (2) the experience or information that vaccinated people also get sick, are not protected or die (22 responses). It is noticeable that the respondents “observe” the vaccinated persons (acquaintances or relatives) or “have information” from which they conclude that the vaccine is not effective. There are also (a few) answers that vaccination is a “manipulation” or a matter of “reducing the human population on a global scale (“the golden billion”)”, or “a great policy of controlling the obedience of the entire society”, etc.

Furthermore, we examined what would encourage the respondents to *change* their opinion regarding vaccination. We received a total of 165 answers, 159 of which were valid. Although the respondents expressed various degrees of likelihood, the result shows that (predominantly unvaccinated) respondents are not ready to change their opinions on vaccination (63 responses). This is followed by responses indicating that some unvaccinated respondents are willing to change their minds if they were given proof that the vaccines have been tested/useful/effective, largely based on validated scientific trials (32 responses). On the other hand, vaccinated respondents are ready to change their minds, but only if they were provided with proof of the harmfulness of the vaccine. Then, there is a group of respondents who are also ready to change their minds, but only if the vaccinated do not get sick (as proof that they are protected), or consider that it takes time for them to be convinced that the vaccine has no undesired effects (eight responses). Finally, there is a pattern indicating that a change of opinion would be possible if there was a unified and reliable opinion of the medical professionals (six responses), and if citizens were provided better/relevant information, better and impartial media reporting (without spreading panic) and better education by spreading awareness about the importance of vaccination (seven responses). The respondents also noted some other conditions for changing their opinions: *if globalists and proponents of this agenda stopped advocating for vaccination with such enthusiasm; if they invented a vaccine that should be received only once and thus solve the problems of spreading the infection; if the law prescribed the responsibility of vaccine manufacturers for all side effects, obliging them to pay appropriate compensation in case one gets sick from the vaccine; if the promotion of vaccines had been less intrusive; if the state provided relevant guarantees; if the law allowed for the freedom of choice in vaccination; if the Serbian health system had been organized better; if pharmaceutical industry accepted full responsibility for their vaccines; if the vaccination were compulsory.*

When we put the respondents in the role of “creators of vaccination policy”, we received a lot of interesting answers (total: 220; valid: 209). The proposals were grouped as follows:

1. improve the quality of information and media promotion of vaccination, with emphasis on more coordinated communication of professional information (58 responses);
2. introduce mandatory vaccination, as well as some types of prohibitions, penalties or restrictions (30 responses);
3. the choice of vaccination should be free, without pressure, persuasion or coercion (28 responses);
4. ensure further education of the population about vaccination (25 responses);

5. reduce the politicization of vaccination (and deception), ensure competent, transparent and efficient work of the CMT, improve the health system and state system in general (12 responses);
6. improve the COVID vaccine testing procedures (11 responses);
7. rely on the policy of (monetary) incentives and benefits (five responses);
8. other proposals: (a) give vaccines only to risk groups (e.g., the elderly); (b) prescribe the responsibility of vaccine manufacturers, (c) reduce promotion of vaccination on television and electronic media.

It's worth noting that there was only one answer where the respondent expressly approved and supported the existing vaccination policy in Serbia ("I am satisfied with what is being done in Serbia").

Finally, the respondents had an opportunity to freely express their opinions or provide comments on vaccination. We received a total of 125 answers (valid: 110), 60 of which (over 50%) explicitly noted that they had nothing to add. In the provided comments, respondents mostly emphasized their preferences in terms of compulsory vaccination, the freedom of choice in vaccination and/or the importance of natural immunity. We singled out some interesting answers: (a) "any imposition and restriction of freedoms brings suspicion and resistance, and people resort to fake vaccinations or certificates"; (b) "too many mistakes were made, such as hastily and poorly organized lockdowns, paying the amount of 3000 dinars to the vaccinated, etc."; (c) "people are confused and distrustful, equating trust in vaccination with trust in the government regime"; (d) "I believe that the same measures should apply to both vaccinated and non-vaccinated people"; (e) "the key question should be asked: are you immunized, either naturally or by vaccination? Why restrict the freedom of a healthy person!"; (f) "it is important that there is a central e-register of vaccinated people in order to easily obtain data on the current number/percentage of vaccinated and unvaccinated people, and direct or adjust the immunization strategy accordingly"; (g) "commenting and discussing vaccination (not only against COVID but generally against all diseases) should be banned on social networks because lay people and people who have no contact with medicine write about it, causing fear and panic, spreading misinformation among citizens"; (h) "meaningless and unnecessary panic, there will be mental problems now".

5. Discussions

Over half of the respondents (54%) said that they had been vaccinated, and 46% said that they had not. This percentage of vaccinated respondents is slightly higher than the already mentioned percentage of vaccinated citizens at the national level (47.08%). Otherwise, almost all vaccinated respondents received the two prescribed doses, while 73% received or will receive the third dose. At the same time, significantly more women than men received the vaccine, including the second and third doses (with a small size effect). A possible reason is the higher degree of responsibility and care that women take for their health as compared to men. We find partial confirmation of this thesis in the answers regarding the reasons for the third (booster) dose, where "female" answers predominate when it comes to care, additional protection and safety. In any case, care for one's own health and the health of others dominates in the responses pertaining to the third dose of the vaccine, and the motivation stems from a sense of responsibility for oneself or the community (family). In second place, there are reasons related to work and travel, while the recommendations of doctors/medical professionals are in third place.

The findings on the unvaccinated respondents' decisions on whether they will get vaccinated and the probability of being vaccinated is of particular importance. We received a total of 243 responses, but we excluded 17 responses as "disputable", which makes 226 valid responses in total. The results are as follows: 87% of unvaccinated respondents are close to not being vaccinated, as opposed to 13% who want to be vaccinated (Table 3). So, there are almost seven times more unvaccinated people who will definitely not or will probably not be vaccinated than those who definitely want or probably want to get

vaccinated. Moreover, about 95% of the unvaccinated respondents will definitely not be vaccinated or are more or less hesitant! Including the previously mentioned deviation, this percentage goes up to around 99% versus (only) 1% of those who will definitely be vaccinated (Table 4). Obviously, *the data reveals that there is significant resistance of unvaccinated respondents to vaccination*. This is confirmed by the difference between the percentages of those who definitely want and those who definitely do not want to be vaccinated, the latter of which is ten times higher. Otherwise, there is no difference between unvaccinated females and males in terms of the likelihood of being or not being vaccinated.

We identified four key factors that contribute to this resistance, the first three being most prominent:

- a. respondents' concern/fear of vaccine side effects (42%);
- b. disbelief that they need a vaccine (40%);
- c. concerns about the vaccine's safety, and waiting to receive it later (27%);
- d. the vaccine is needed by other people (7%);
- e. other reasons (3%).

The common feature of the first and the third factors is the feeling of fear or anxiety, which is most likely of a cognitive nature since it is conditioned by (wrong or contradictory) information, which was later confirmed by the respondents' attitudes. In general, these findings about the importance of fear and anxiety are consistent with the studies on the influence of fear and anxiety on the reluctance to get vaccinated, previously mentioned in Section 2 (see: [6,7]). On the other hand, the second and the fourth factors can be regarded as one because, if someone does not believe that he/she needs the vaccine, he/she probably thinks that others need it more; thus, if we "compressed" these two factors into one, the obtained score (109) would put it in the first place in terms of frequency.

The frequency of their responses is particularly interesting. The findings show that there are significantly more unvaccinated respondents who will definitely not be vaccinated because they are worried, do not believe in the vaccine or think that others need it; on the other hand, there are significantly more hesitant respondents who are unlikely to be vaccinated and would prefer to wait and get it later. Thus, factors 1, 2 and 4 dominate among those who are "firmly" determined not to get vaccinated, while factor 3 dominates among the hesitant ones. If we merge factors 2 and 4 into one, we come to the conclusion that the reasons for the definitive decision not to receive the vaccine are: (1) concerns about side effects, and (2) the belief that they do not need the vaccine; on the other hand, the key factor for hesitation (and delay) is the vaccine's safety (factor 3). Further, if we merge factors 1 and 3, we conclude that the vaccine's safety comes first in importance. Unvaccinated respondents simply do not believe in the vaccine's safety, and one of the key reasons is certainly that it is new and possibly insufficiently tested. On the other hand, there is no difference in answers between those who are unlikely or likely to be vaccinated; they are equally concerned, do not believe that they need the vaccine or believe that others need it more or would prefer to wait and receive it later. In other words, there is no difference among those who are more or less hesitant concerning the reasons for not being vaccinated, which boils down to concerns about the vaccine safety and a belief that they do not need the vaccine.

Next, we tried to establish the reasons for the respondents' *disbelief that they need a vaccine*. In that context, we identified seven common answers:

1. I have already had the virus (47%);
2. I distrust the CMT (33%);
3. Vaccines are not useful (30%);
4. I do not fall into a high-risk group (26%);
5. I use masks and abide by other preventive measures (19%);
6. COVID-19 is not a serious disease (15%);
7. I do not believe in vaccines in general (13%);
8. Other reasons (8%).

While the first response has a reasonable justification, the second deserves attention. The respondents' distrust of the CMT reflects the general public's attitude that this national (government-appointed) body has no credibility and that its decisions were confusing. Certainly, when assessing the position of the CMT, it should be taken into account that this body largely had an advisory role and that its decisions were not binding.

Furthermore, the third attitude (*vaccines are not useful*) can be related to the seventh attitude (*I do not believe in vaccines in general*). Namely, one may not believe in vaccines in general and think that they are not useful or one may think that they are not useful and thus not believe in them. In any case, those who do not believe in vaccines may believe in other preventive measures, such as masks (5th most frequent attitude) or in factors that contribute to strengthening natural immunity (such as food, exercise, etc.), which was later supported by respondents' answers. To test their general disbelief in vaccines, we asked the respondents to give their reasons, and received two dominant answers:

1. Vaccines are not sufficiently tested/safe as they are made quickly (24);
2. Vaccinated people are not fully protected, get sick or die (22).

First, we may notice that the respondents' attention shifted from general disbelief in vaccines to disbelief in the vaccine against COVID-19. Alternatively, they pointed out that they believe in vaccines in general but not the COVID-19 vaccine. Such a stance is understandable to some extent, considering the media and general public attention on the issue of vaccination against COVID-19. It is a matter of the *availability heuristic*, i.e., inference about something based on how quickly it comes to our mind [22]. On the other hand, the *representativeness heuristic* may explain another factor that respondents highlighted as important. Namely, the respondents estimate that they will get sick or die on the basis of "representative evidence" (the existence of infected vaccinated family members or others), neglecting abstract statistical reasoning [23]. Second, the lack of vaccine testing is in line with earlier answers about the vaccine's safety as the most worrying factor. Third, only a small number of respondents associated disbelief in the vaccine with manipulation, profit of pharmaceutical companies, reduction of the world's population and other speculative reasons. Although there were no explicit attitudes that the vaccine was a hoax, there were a few answers that the vaccine was made in a laboratory or that it was part of the politics of controlling the obedience of mankind. All these irrational beliefs might be linked to various speculative vaccine theories, which were very present during the pandemic.

The remaining two most frequent answers are: *I do not fall into the risk group* and *COVID-19 is not a serious disease*. A possible explanation for these attitudes lies in underestimating the risk of disease as a consequence of the psychological defense mechanism or various cognitive biases. Namely, people usually estimate that the number of infected people in the conditions of a pandemic is growing linearly but, in fact, it is growing exponentially; as a result, they underestimate the importance of the pandemic and precautionary measures. On the other hand, there is a line of reasoning, forefronted by Cass Sunstein, which claims that people underestimate the likelihood of a pandemic due to "probability neglect" [24]. This latter bias means that people completely ignore or overestimate low risks and overreact to them, while underestimating high risks. We believe that the initial "irrational" reaction of people to the outbreak of the pandemic had a rational justification because it is a natural human reaction to a new and insufficiently known phenomenon. People are more likely to underestimate the exponential increase in the number of patients and believe that they will not get sick and die. The course of the pandemic shows that people no longer react emotionally and panic (due to neglect of probability), but they still underestimate the risks of disease. This underestimation of risk consequently leads to the decision not to receive the vaccine or hesitation to receive it. Thus, the view that "it is not a serious disease" or that "I do not fall into a risk group" can only serve to rationalize the underestimated risk and negative vaccine decisions.

We also established the factors of changes in attitudes regarding vaccination. The result is that unvaccinated respondents are more or less unlikely to change their opinion regarding vaccination (63 responses). The "firmness" of these attitudes may be of concern

to vaccination policymakers. Yet, in terms of frequency, these attitudes are immediately followed by responses indicating that unvaccinated respondents are willing to change their minds if evidence is provided that:

1. vaccines are safe on the basis of proven scientific research (32);
2. the vaccinated are really protected (8);
3. there is a better quality of information and media reporting (7);
4. there is a congruent opinion of the medical profession (6).

On the other hand, vaccinated respondents (as expected) are likely to change their minds about vaccination if they are provided evidence about the harmfulness of the vaccine.

The first and second conditions correspond to the previously given answers regarding the vaccine's safety. Most experts agree that vaccines are safe, but it is obviously insufficient for the respondents, who expect a congruent opinion, consistent conduct and coordinated communication of the medical profession without dissonant tones, which were present in the Serbian public, especially from the so-called "experts". Secondly, in order to avoid harm, the respondents rationally calculate with vaccination; thus, they are willing to wait and make sure that the vaccinated "are doing well", or at least that there are no "harmful consequences" to their health. However, the occurrence of "harmful consequences" with people in their immediate environment deters them from vaccination, despite the fact that general statistics speak in favor of a lower infection rate and especially a lower death rate of the vaccinated. This rational calculation (the "avoid harm" approach) is a consequence of their concern about the vaccine's safety. The calculation may be rational, but the question is whether the intensity of concern is rational. It gives rise to another question: *Is the harm of the possible side effects of the vaccine greater than the harm of the possible side effects of the infection?* We believe that vaccinated and unvaccinated people differ in what they give more weight to: the harm from the vaccine or the harm from infection. It also refers to their preferred methods of health care protection, i.e., whether they give more weight to vaccines or other preventive measures. That question brings us again to whether or not they believe in the vaccine. It is the responsibility of vaccination policymakers to provide evidence that the harm from infection is potentially greater, i.e., that the harm from vaccination is lower or non-existent. This can only be done by good promotion of the vaccine based on well-substantiated evidence of its effectiveness. In this regard, vaccination policy can be more effective if conceived in a positive context by *emphasizing the benefits of the vaccine for human health*.

In addition, we put the respondents in the role of the vaccination policy creators. Their proposals (seven in total) can be divided into two groups of measures: *intrusive* and *non-intrusive*. The former include mandatory vaccination, prohibitions, penalties and restrictions; according to the intensity of measures, the latter include:

1. freedom of choice in vaccination;
2. providing better information to citizens and media promotion of vaccination;
3. education (to raise awareness of the importance of vaccines); and
4. incentives policy.

The respondents' proposals also include measures aimed at improving the institutional framework for the implementation of vaccination policy (health system and competent authorities) and further scientific research to examine the vaccine's safety. Finally, some respondents have raised new questions or made suggestions for new research:

- "You may also raise the issue of the composition of the vaccine against COVID-19 and side effects. The facts and statistics should be officially presented.";
- "Unvaccinated people are not entirely anti-vaxers or people of a lower level of education and awareness, nor do all vaccinated people have a positive attitude towards vaccination.";
- "I'd like to know [. . .] what percentage of the population was vaccinated because they believe in the effect of the vaccine, or because they are unable to leave the city or country, or for work and travel purposes."

6. Conclusions

In order to improve the effectiveness of vaccination policies in Serbia, relying on the findings of our research, we recommend the conceptual framework of nudge policy, embodied in the so-called **EAST** behavioral framework (Easy, Attractive, Social, Timely). It is based on four simple principles: (1) the principle of ease (simplicity); (2) the principle of attractiveness; (3) the principle of sociability and (4) the principle of timeliness [25].

The principle of ease (simplicity). One of the proposals for improving the vaccination policy in our research was to provide better information to citizens and media promotion. Starting from that, we would like to draw the attention of vaccination policymakers to several issues. Firstly, the *choice of the vaccine*. Although Serbia has provided a large number of vaccines to its citizens, the question is whether it was wise to leave the choice of vaccine to the citizens themselves. It is well known in the behavioral literature that too much information can lead to a choice not being made [26]. Bearing in mind that the choice is based on professional (medical) information, which the average person usually does not understand enough, confusion is guaranteed. This aspect of the choice of vaccine seems to have been neglected, and the Serbian health authorities seem to have been convinced that it was enough to provide more types of vaccines. Instead, it was possible to prescribe vaccines according to age groups, which would bring more order into the vaccination process and encourage citizens to be vaccinated to a greater extent. Another option was to specify that a certain vaccine is valid for a certain age group (as a default) but to envisage the possibility of choosing another (preferred) type of vaccine. In any case, *improving and simplifying communication between health authorities and citizens regarding vaccine choice is an important lesson for future pandemics*. In this regard, primary health care physicians (general practitioners) could play a more active role in the future since they are most frequently in direct contact with citizens. Secondly, the principle of ease (simplicity) relates not only to the content of information but also to the *messengers* who convey information to citizens. This issue has not been properly and sufficiently addressed in Serbia, which further implies that the cognitive bias pertaining to trust in competent authorities has not been sufficiently used [27]. The message is as follows: *information can only be transmitted by trusted professionals and there should be no dissonant tones*. In that sense, there is a need for a good communication strategy, which should be implemented by competent authorities. In particular, they should take fear and anxiety seriously as an accompanying phenomenon of the pandemic, both in the context of hospitalization and otherwise. In order to reduce fear and anxiety, the competent medical professionals have to convey *unambiguous messages* about the benefits of vaccination. Yet, policymakers should bear in mind that a communication strategy based on unambiguous messages might potentially affect people who fear getting vaccinated or have doubts about vaccines, but such a communication strategy is unlikely to affect those who believe in conspiracy theories (see [28]). As already stressed [13], a potential reason is that conspiracy theories are more receptive to the intuitive part of our cognitive apparatus (*intuitive biases*) than to the rational one. In addition, it is important to adjust this strategy to different age groups and avoid a *one size fits all approach*, as discussed in Section 2. Thirdly, competent authorities have not used another powerful behavioral tool in the current pandemic: *default (pre-set) options that rely on the status quo bias* [29]. We can only assume how much higher the percentage of vaccination would have been if mandatory vaccination had been offered as the default option and if citizens had had the opportunity to give it up if they wished. Moreover, in such a model, additional administrative barriers might be set up (e.g., filling out detailed forms) in order for citizens to get out of the vaccination process. This model implies that citizens are already well informed about the vaccine and that the model has been established before the outbreak of a pandemic. Introducing such a model in the course of the pandemic would increase the resistance of citizens who are against vaccination or reluctant to be vaccinated, which could further result in even greater social conflicts. Vaccination policymakers should consider this model for future pandemics or similar phenomena with prominent external effects. Fourthly, authorities have insufficiently used the behavioral instrument of *salience* [30], which relies

on the *availability heuristic*. Given that the *salience bias* rests on ease and complacency (being aware of prominent features and avoiding strain), the possibilities of this tool are endless (e.g., creating simple and effective media messages about the importance of protection, highlighting absolute numbers of deaths to convince indecisive citizens that it is a serious disease, putting the message content in a positive frame, etc.). In this regard, this tool can be put into use by relying on *confirmation bias*: respect for citizens' existing beliefs [31]. Our research indicates that respondents value freedom of choice, which has to be acknowledged by sending a clear message that the goal of vaccination policy is not to change one's attitudes (especially not by force) but to protect the population's health. Citizens' concerns about vaccine safety should also be taken into account and competent authorities should unobtrusively provide evidence proving the opposite. Another effective strategy may include highlighting positive examples, especially the citizens who have already been vaccinated or the percentage of people vaccinated in other countries (such as Portugal). Last but not least, another useful tool is the so-called *narrative fallacy*, which implies the human tendency to believe in coherently-told stories more than in "dry" facts [32]. The space for "telling stories" through various media (including podcasts) and the use of effective audio-visual content may certainly be useful in the vaccination process.

The principle of attractiveness. We would like to draw attention to the *framing effect* and people's propensity to take risks [33,34]. Our research indicates that people are afraid of the vaccine's side effects. Technically, they either have an aversion to the risk of being vaccinated (*risk-aversion*) or perceive receiving the vaccine as a "loss" and try to avoid it (*loss aversion*). However, there is also the risk of illness and death. In that sense, refusing vaccination is a higher "stake". Therefore, the key question is how to enhance their propensity to be vaccinated. One way is to *emphasize the usefulness or the benefit of the vaccine in preserving health or human life*, thus changing the negative perception into a positive one ("reframing"). To achieve that, it is necessary to respect the views of respondents who are reluctant to be vaccinated but ask them to consider the indirect benefits of vaccination. A behavioral framework can only be attractive and effective if the citizens' autonomy and freedom of choice are respected because, after all, they have to decide for themselves whether they will be vaccinated or not. So, it is up to the vaccination policy framers to facilitate that choice by creating an attractive positive framework.

The principle of sociability. In this regard, several measures can be applied [35]. First, it is essential to inform citizens about desirable social norms, taking into account the compatibility of the descriptive and value components of the social norm [36]. Second, it is necessary to conduct a positive media campaign on the effects of vaccination to better link the norm with the target group. Third, it is important to use the influence of social networks, or networking in general. Fourth, it is vital to pay attention to the treatment of undesirable social behaviors so that they do not become standard forms of behavior and to control and limit them. We would add the use of the so-called "mirror effect", which implies citizens' natural tendency to compare with others, especially with citizens of other countries. There is also a *tendency to make group comparisons* due to the cognitive bias toward belonging to one's own group [37]. The aspiration behind this comparison is to maintain a positive self-image and egocentric inclination [38]. The latter tendency may be used in creating positive messages that vaccination is an extremely *useful* and *social* activity which contributes to citizens' social acceptance and appreciation. However, one should be careful with this measure because social pressure may have counterproductive effects. Thus, it is necessary to combine the previous measure with the *measure of encouragement and faith in the citizens*, by using the so-called *Pygmalion effect* [39]. Overall, it is necessary to follow the approach we have named: Help-Encourage-Believe (abbr. HEB approach). Last but not least, *reciprocity* [40,41] is a powerful means of influencing people, where we would single out "soft" methods: gifts or rewards, informal contracts, emphasizing the injustice to others if they did not get vaccinated and fines (only in exceptional cases). Taking into account the preferences of our unvaccinated respondents, we favor non-intrusive measures, such as:

information and media promotions, education and incentive policies. These non-intrusive measures can be successfully combined with the “soft” methods.

The principle of timeliness. As already mentioned, mandatory vaccination only makes sense if it is envisaged as a “default option” before a pandemic begins. Time plays a vital role in the selection and implementation of adequate measures. Considering that the pandemic caught us “unawares”, we only had behavioral measures at our disposal. Unfortunately, they were inadequately and insufficiently used in Serbia. Therefore, an important lesson for future externalities is that if we want to introduce some kind of obligation, we should inform people in advance and thus prepare them for such a measure in time. Moreover, if we need to apply some measures in the process of vaccination, it should be done with more scruples and determination and without calculation. This brings us to the crisis management issue, where Serbia has not been quite successful, which was clearly confirmed by our respondents in the research findings. Therefore, *an important lesson is that it is essential to manage a crisis (pandemic) in time*. In addition, the principle of timeliness refers to applying some simple and cost-efficient behavioral measures, such as sending timely vaccination reminders or continuously broadcasting media messages about the positive effects of vaccination. It is also crucial to “adjust” the amount of the incentive (reward) and choose the right moment for its application. All in all, the effectiveness of vaccination policy largely depends on the time factor.

These four principles are the starting point for deeper investigation of other concrete measures that can be applied in future pandemics. Our research, as the first of its kind in Serbia, has set a conceptual framework for further research on this topic. This study certainly involved some limitations, which can be avoided in future research. First, there were twice as many women than men in the research sample. It may be explained by the greater willingness of women to participate in the research and the greater attention they paid to the pandemic as compared to men [42]. Second, the average age of our respondents is 30.7 years. It raises the question of the dissimilar attitudes of young and elderly people towards vaccination, especially considering their different health care needs. Therefore, taking into account the predominance of women and younger people in our research sample, the generalizability of our research results is open to debate. However, it should be borne in mind that the chi-square test is not sensitive to different sizes of subsamples because it considers relative frequencies (percentages) as the critical data. Given that we started our research in October 2021, it should also be noted that more women received the first and the second dose of the available vaccines by April 2021 than men (about 52% of the female population as compared to slightly more than 47% of the male population in Serbia) [43]. In this context, a question arises as to why the research sample was not larger. The reasons are the limited research time frame and a lack of financial resources necessary to ensure large respondent participation. Another significant issue is the timing of the research and whether there has been a change in the respondents’ attitudes towards vaccination. As the Coronavirus is still active, it inevitably raises the question of subsequent vaccination. Therefore, future research should address the potential change in attitudes. Finally, to explore the respondents’ attitudes, we designed our own research instrument, but there are other available instruments which may be used in some future research, such as the COVID-19-Induced Anxiety Scale or the Protective Behaviors Towards COVID-19 Scale [44].

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su141710728/s1>.

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