

# Vaccination Stance in Adolescents and Emerging Adults: The Role of Trust and Knowledge<sup>1</sup>

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The present study investigates the predictive contribution of generalized trust (in a relatively large circle of unfamiliar others, e.g., the authorities, healthcare system, alternative medicine) and particularized trust (in significant others, such as family members and friends) and vaccination knowledge in explaining the youth's vaccination intention, as well as the moderating role of vaccination status in the previously mentioned relationships. A total of 835 adolescents and emerging adults (aged 15 to 25,  $M_{\text{age}} = 18.35$ ,  $SD = 2.86$ ) from Serbia completed the measures of vaccination intention and vaccination status, generalized and particularized trust, and vaccination knowledge. The results of the hierarchical regression analysis

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showed that the prior uptake of the vaccine against the coronavirus (vaccination status) was the best predictor of the youth's intention to receive the coronavirus vaccine in the future (vaccination intention). In addition, trust in the authorities and media, trust in the health-care system and science, and knowledge about vaccines stood out as significant positive predictors, while trust in alternative medicine and God(s) will negatively influenced the behavioural intention to vaccinate. Contrary to expectations, trust in the family and friends did not contribute to the explanation of the AEA's intention to get vaccinated. Besides, no moderating role of vaccination status was detected; regardless of the vaccination status, the same determinants of the AEA's vaccination intention were registered. The theoretical and practical implications of these findings are discussed in the light of the importance of the development of evidence-based national vaccination programmes for young people that can have a preventive role in a period of global confidence crisis.

**Keywords:** adolescents, vaccination, generalized trust, particularized trust, knowledge about vaccination

## Introduction

Adolescents' and emerging adults' (AEAs) stance towards vaccination against COVID-19 is an important factor of health public policy, and, due to psychosocial and cognitive aspects of that developmental phase, it is posited as a particular research topic. Public communication about vaccination should take into account the influences and reasons that are relatable to young people. Even though the AEA population is not considered a risk group from a public health perspective, and the mortality rate among young infected people is very low, they are still at risk to themselves and others, and successful mitigation of the outbreak called for coordinated effort across generations (Ilić et al., 2022). Equally important, in the context of the long-lasting vaccination behaviour, the AEA population is the "generation to come", who will not only follow, but form public vaccination policies, and the stance towards the COVID-19 vaccine could be a precursor for the stance regarding other vaccines within the national vaccination schedule, both for adults and for children. Risky health behaviour established in emerging adulthood has long-term consequences, especially if non-desirable health-behaviours have been adopted (Frech, 2012).

The decreasing influence of external social (gender, religion, moral, and legal) norms provides emerging adults with more freedom compared to previous generations, but, at the same time, volatile economic conditions in industrialized contexts contribute to instability during the transition to adulthood (Lanz et al., 2021). This notion is important since this age group may be less likely to adhere to public health guidelines (Afifi et al., 2021), and findings have also shown that social connectedness of young adults is a protective factor for both their physical and psychological health (Frech, 2012). While being less influenced by injunctive social norms (what others

approve or disapprove of), AEAs are more prone to be guided by descriptive social norms (what others do) (Rivis & Sheeran, 2003). The pertinent literature maps another mechanism that shapes the AEA's health behaviour dubbed as subjective invulnerability, which is related to the implicit stance of physical and psychological invulnerability (Lapsley & Hill, 2010). As for the cognitive aspects of risk, the stance of physical invulnerability is supported by the AEA's risk perception – having experienced fewer dangerous and risky situations during their lifespan, the gist representation of potential danger that they form is less saturated with riskiness (Reyna & Farley, 2006). In short, what adults observe as youth's hazardous behaviour is, from the AEA's point of view, merely a novel experience.

### **Adolescents and Emerging Adults and Vaccination against COVID-19**

Though the COVID-19 pandemic has affected everyone, not everyone's experience of the pandemic has been the same, among other reasons, because of age differences (e.g., Birditt et al., 2021; Pearman et al., 2021; Ilić et al; 2022; Lep & Zupančič, 2020). AEAs perceive the pandemic differently and behave differently during the pandemic, while simultaneously facing the developmentally-specific challenges (Ilić et al; 2022; Lep et al, 2021). They were disadvantaged in terms of their education (Petrovic, 2021; Viner et al., 2020), impending changes in the economy (Lep & Zupančič, 2020), mental health issues (Power et al., 2020; Racine et al, 2021), and social relationships (Orben et al., 2020), all of which were confirmed in the systematic review by Panchal et al. (2021).

Taking into account both public health and developmental specificity of AEAs in the pandemic circumstances, calls were made to include their viewpoints when organizing the post-pandemic society (Peisah et al., 2020; Ilić et al, 2022).

The vaccination of older adolescents (20–29 years old) against COVID-19 in the EU was introduced on 1 June 2021, and it has been enabled in Serbia since January 2021. Up until June 2022, when we gathered the data for our study, 46.79% of people over the age of 18 had received all three doses prescribed by the initial vaccination protocol, while 1.11% were only partly vaccinated (data obtained from <https://ourworldindata.org>, since there are no official data available).

Concerning the attitude towards vaccination, in May 2021, for instance, the data from the representative sample show that while 53% of the adult population had already been vaccinated or had applied for vaccination, and another 23% reported that they most probably would get vaccinated, in April 2021 only 20% of emerging adults (18–19 years old) had the definite “yes” stance or had been vaccinated, while 26% reported that they would probably get vaccinated (IPSOS, 2021).

When considering vaccination, AEAAs have their reasons for vaccination acceptance or refusal. They share concerns with people older than them, but the importance and the degree of those concerns differ between the general population and young people. The most common self-reported reasons among adolescents for not wanting a vaccine are related to safety, knowledge, and effectiveness (Afifi et al., 2021). Studies have shown that vaccine hesitancy and vaccine refusal are higher in the adolescents from the deprived socioeconomic contexts, who smoked or vaped, and spent more time on social media (Afifi et al., 2021; Fazel et al., 2021). The same studies report the adolescents' underestimation of the risk to both personal and public health (Afifi et al., 2021; Han et al., 2021b).

The perception of the comparison between two risks, the risk of getting infected by COVID-19 and the risk of getting a vaccine, changes with age. Young people estimate the risk of getting infected as lower than the risk from vaccination – almost 56% reported this belief, while 44% perceived that getting the disease was indeed riskier than vaccination. This ratio consistently changes with age, and in the direction of a more rational risk estimation. For instance, only 15% of people above the age of 65 considered the vaccine and the COVID-19 infection equally risky (IPSOS, 2021). Again, this is in line with the notion proposed by the fuzzy trace theory which states that the cognitive perception of risk is indeed qualitatively different in children and emerging adults, specifically in reliance on gist representations, derived from previous experience, and processing that reflects understanding – which has been associated with health-protective effects (Reyna & Farley, 2006).

In addition, it appears that young people are more flexible and open regarding the vaccination stance. Consequently, they are also motivated by incentives and aspects of everyday life that differ from those of people above the age of 30. The data from a representative sample in Serbia show that 64% of non-vaccinated 19- to 29-year-olds were open to rethinking their stance if given an adequate argument and incentive (IPSOS, 2021). As for the reasons which could motivate them to get the COVID-19 vaccine, the strongest reason was certainty that vaccines were safe through observation of the experience of vaccinated others (27%), followed by obtaining the vaccine certificate to travel abroad, certainty that vaccines indeed do build immunity against COVID-19 (again by observing the experiences of others, 17%) and witnessing positive examples of other countries (12%). All of these potential motivators for vaccination were less important for the general population than for the AEAAs. One reason that was more important for the general population was a recommendation for vaccination from a trusted healthcare provider, while only 8% of AEAAs reported that they would be motivated by that advice. Similarly, 10 percent reported that advice coming from immediate community (friends and family) would motivate them to vaccinate. For them, the least important is the logistics.

## Vaccination against COVID-19 and Trust

Research has continuously shown that trust, generalized or particularized, shapes individuals' behavioural responses to the pandemic to some extent (eg. Gvozden et al., 2021; Lep et al., 2021). Trust can serve as a heuristic decision-rule, in the situations and relations in which a decision cannot be reached solely based on relevant information (Lewicki & Brinsfield, 2011). Researchers distinguish between generalized social trust – in a relatively large circle of unfamiliar others (e.g., governments, healthcare system), and particularized trust – in a particular relationship or a person (e.g., family members and friends) (Shilke et al, 2021). For example, secondary school students in Serbia display very low (below the theoretical average) trust in the institutions of state and local government (generalized trust), while having the highest trust in the family and friends (particularized trust) (Džamonja Ignjatović et al., 2019). Adequate trust in relevant actors, such as healthcare providers, officials of state and health-system, decision-makers, the credibility of media, as well as the general trust in science and scientists, is a factor that shapes decisions about vaccination (Damnjanović et al., 2021; Camargo & Grant, 2015). On the other hand, a lack of trust in the health-system officials diminishes the credibility of the information they provide, leading to decreased engagement in the mitigation of epidemic and health services in general (Seddig et al., 2022).

## Vaccination against COVID-19 and Knowledge about vaccines

Knowledge, information, and basic general understanding of the vaccine mechanism have been identified as important protective factors for vaccination uptake (Petrovic et al., 2003; Richards & Sheridan, 1999; Zingg & Siegrist, 2012). Similar findings have been observed in the AEA's population: knowledge about vaccines proved to be a significant predictor of youth's vaccination intention (e.g., Ekezie et al., 2022). Relative abundance of congruent reliable information is related to a higher perceived level of knowledge in decision-making about vaccination (Rachiotis et al., 2010). Studies have also shown that with relatively low-cost knowledge transfer interventions, it is possible to significantly increase vaccine uptake in isolated and difficult-to-reach communities, and among marginalized groups (e.g., Andersson et al., 2009). Complementary to the protective role of knowledge about the effectiveness of vaccines, the lack of knowledge about it, as well as the unrealistic underestimation of the risks of epidemics, are considered to be one of the most easily solvable barriers to increasing vaccination rates (Ekezie et al., 2022).

However, assessing lay peoples' knowledge about vaccination proved to be somewhat challenging. Zingg and Siegrist (2012) have noticed a lack of a general knowledge scale about vaccination that has good psychometric

properties. Therefore, they proposed a general knowledge scale, and tested its validity by examining the impact of knowledge on people's decision to vaccinate. Since there are many studies in which there is no clear distinction between knowledge and the attitude towards vaccines, these authors used the term "knowledge" for the items that could be clearly classified as either correct or incorrect, based on scientific evidence. Attitudes were clearly separated from knowledge since they were defined as the items that measured how positively or negatively vaccines were perceived, as well as the items that had no correct or incorrect answer. Apart from distinguishing knowledge from attitudes, Zingg and Siegrist's intention was to develop a scale that would be relevant for decision-making about vaccines in general, not only about the specific vaccines, so they included the questions about the immunization process related to vaccination, the impact of vaccination, and the consequences of vaccination.

### *The focus of the current study*

Recognizing that young people can be a target population of public health policies, but also a resource and potential agents of change (Branquinho et al., 2020; Zeldin et al., 2007), deeper comprehension of their willingness to adopt a protective vaccination behaviour becomes a necessity. In order to derive not only theoretical, but also practical implications for public health policies, we conducted the study with two main goals: (1) to investigate the predictive contribution of generalized and particularized trust and vaccination knowledge in explaining youth's vaccination intention, and (2) to examine the moderating role of the vaccination status (previous uptake of the vaccine against the coronavirus) in the aforementioned relationships. We grounded our approach in the integration of the above-presented empirical and theoretical assumptions to identify different factors that drive vaccination intention (the AEA's intention to receive the coronavirus vaccine in the future) since it is a complex motivational construct that cannot be easily explained with just one psychological theory (Brewer et al., 2017).

## **Method**

### *Sample*

The sample ( $N = 835$ , 59% female) comprised participants who, at the time of participation, were 15 to 25 years old ( $M_{\text{age}} = 18.35$ ,  $SD = 2.83$ ). More than two-thirds of the sample consisted of the participants who had not received the vaccine against COVID-19 (71.6%;  $N = 598$ ), while one-third of participants had received one (2%;  $N = 17$ ) or two doses (13.7%;  $N = 114$ ) or had been fully vaccinated (9.3%;  $N = 78$ ) at the time of participation

(3.4% ( $N = 28$ ) participants did not answer this question). The questionnaire was administered in high-school classrooms in the paper-pencil form, or online, using the Google Forms platform and distributing the questionnaire via social networks. The sample was convenient, the choice of schools was not random. Participation was voluntary and anonymous and participants received no fee or any kind of reimbursement. This research was approved by the ethics committee of the Department of Psychology, Faculty of Philosophy, University of Novi Sad. The database is available on request from the first author.

### *Materials*

#### Intention to Vaccinate and Vaccination Status

For the purposes of measuring the vaccination intention, we used Seddig et al.'s (2022) and Lueck & Spiers's (2020) recommendations for creating items in accordance with Fishbein and Ajzen's model of planned action (2010). A short vignette accompanied the evaluation of vaccination intention. Participants were asked to imagine that the number of COVID-19 infections would rise in the coming months (with several thousands of new cases and about a hundred deaths due to COVID-19 per day) and that health experts had unanimously agreed that adolescents aged 15 and older should receive the COVID-19 vaccine. After the vignette had been presented, participants rated (on a 7-point scale (from 1 = *completely untrue* to 7 = *completely true*) their agreement with the following three statements: *I intend to get vaccinated against the coronavirus*; *I expect to get vaccinated against the coronavirus*; and *It is highly likely that I will get vaccinated against the coronavirus* (Appendix A). The scale showed excellent reliability (Cronbach's  $\alpha = .984$ ).

Vaccination status was registered using one question (Have you received the vaccine against coronavirus?) to which participants provided an answer by choosing one of the four following options: no, yes (one dose), yes (two doses), yes (more than two doses).

#### *Knowledge about Vaccines*

Knowledge about vaccines was measured using the Vaccination Knowledge Scale (VKS; Zingg & Siegrist, 2012). The scale comprised nine items formulated as statements regarding vaccine (in)efficacy, risks, and necessity. Participants indicated whether each of the statements was true or false, and were provided with the "I don't know" option as well. The knowledge score was calculated as the total number of correct answers (correct = 1, incorrect = 0, doesn't know = 0). The scale showed high test-retest reliability ( $r = .70$ ) and high Mokken's reliability estimate (.80).

### *Generalized and Particularized Trust*

Trust in different people and the authorities was measured using an 11-point Likert scale (0 – I don't trust (him/her/them) at all, 10 – I completely trust (him/her/them)). Participants were provided with 16 items, and, for each item, they indicated their level of trust. Principal component analysis with promax rotation showed that these 16 items loaded on 4 factors, which explained 67.34% of the variance. These factors were later used as separate predictors in the analyses employed in the present study: trust in the official authorities and media (14.95% of variance explained), trust in the health-care system and science (34.08%), trust in friends and family (12.01%), and trust in alternative medicine and God's will (6.30%). The scores for each factor/predictor were calculated as mean evaluations of all items subsumed under the particular factor. Cronbach's alpha was .92 for trust in the health-care system and science (5 items), .87 for trust in the official authorities and media (6 items), and .70 for trust in friends and family (3 items). The trust in alternative medicine and God's will subscale consisted of two items with the same name/meaning.

### *Data analysis*

In order to answer the previously defined research questions, hierarchical regression analyses were conducted in the statistical package SPSS version 26. To test whether the vaccination intention can be predicted by the levels of knowledge about vaccines and trust in different institutions and people, as well as whether the vaccination status moderated this relationship, a hierarchical linear regression analysis was run in two separate blocks. In the first block, the dummy variable representing the vaccination status (0 = not vaccinated, 1 = vaccinated) and the standardized values of knowledge about vaccines, trust in the authorities and media, health-care system and science, God's will and alternative medicine, and friends and family were entered. In the second block, interaction terms representing the interactions between the moderator and different predictors (vaccination status x trust in the authorities and media, vaccination status x trust in the health-care system and science, vaccination status x trust in God's will and alternative medicine, vaccination status x trust in friends and family, vaccination status x knowledge about vaccines) were entered. The dependent variable was the vaccination intention.

### **Results**

The data revealed that participants placed most trust in friends and family ( $M = 6.75$ ,  $SD = 2.03$ ), followed by alternative medicine and God's will ( $M = 5.96$ ,  $SD = 2.83$ ) and health-care system and science ( $M = 5.41$ ,  $SD = 2.75$ ),



while they trusted the authorities and media ( $M = 1.56$ ,  $SD = 1.88$ ) least. Note here that the scales used were 11-point scales, so the mean values of trust, except for the authorities and media, are around the scales' middle, and the same applies to knowledge about vaccines (a 9-point scale;  $M = 3.39$ ,  $SD = 2.26$ ). The mean level of the intention to vaccinate amounted to 3.00 ( $SD = 2.37$ ), which is, again, indicative of ambivalence, since the answers were provided on a 7-point scale (1 – completely untrue, 7 – completely true).

The analyses showed that the first block of hierarchical regression analysis, including only the main effects, was statistically significant ( $F(6, 820) = 189.67$ ,  $p < .001$ ). The percentage of variance in the intention to vaccinate explained by these predictors amounted to .632 (Adjusted  $R^2 = .629$ ). The standardized beta coefficients, B coefficients, standard errors, t-statistics, and significance levels for each predictor are presented in Table 1.

Table 1

*Regression model – the first block*

Predictor	B	S.E.	$\beta$	$t$	$P$
Trust in the authorities and media	0.128	0.033	0.102	3.865	.000
Trust in the health-care system and science	0.126	0.027	0.144	4.746	.000
Trust in God's will and alternative medicine	-0.099	0.023	-0.117	-4.402	.000
Trust in friends and family	-0.059	0.031	-0.049	-1.907	.057
Knowledge about vaccines	0.172	0.030	0.165	5.756	.000
Vaccination status	1.246	0.059	0.578	21.225	.000

Note. B = Unstandardized B Coefficient. S.E. = Standard Error.  $\beta$  = Standardized Beta Coefficient.  $t$  = t-statistic.  $p$  = Alpha Probability.

As can be seen from the table, besides the vaccination status, significant predictors of vaccination intention were knowledge about vaccines, trust in the authorities and media, and trust in official medicine (health care system and science) and God's will and alternative medicine. The greater the trust in the authorities and media and in official medicine, the greater the intention to vaccinate. Conversely, the greater the trust in alternative medicine and God's will, the lower the intention to vaccinate due to a hypothetical situation.

In the next step, we tested possible moderation effects of the vaccination status on the relationship between trust and the knowledge about vaccines and intention to vaccinate given a hypothetical situation. Again, this model was statistically significant ( $F(11, 815) = 104.552$ ,  $p < .001$ ). However, the variance explained did not differ from the first model (Adjusted  $R^2 = .630$ ,  $R^2$  change = .001,  $F$  change = 1.496,  $p = .189$ ), nor did any of the interaction terms reach statistical significance, while the same variables remained significant predictors (Table 2).

Table 2  
*Moderation model*

Predictor	B	S.E.	$\beta$	<i>t</i>	<i>P</i>
Trust in the authorities and media	0.186	0.061	0.149	3.055	0.002
Trust in the health-care system and science	0.161	0.048	0.184	3.332	0.001
Trust in God's will and alternative medicine	-0.142	0.041	-0.167	-3.456	0.001
Trust in friends and family	.004	0.058	.003	.066	0.947
Knowledge about vaccines	0.184	0.055	0.177	3.356	0.001
Vaccination status	1.600	0.242	0.741	6.624	0.000
Vaccination status x Trust in the authorities and media	-0.035	0.029	-0.068	-1.233	0.218
Vaccination status x Trust in the health-care system and science	-0.025	0.026	-0.104	-.940	0.348
Vaccination status x Trust in God's will and alternative medicine	0.023	0.020	0.070	1.188	0.235
Vaccination status x Trust in friends and family	-0.032	0.028	-0.117	-1.147	0.252
Vaccination status x Knowledge about vaccines	-0.005	0.028	-0.016	-.169	0.866

Note. B = Unstandardized B Coefficient. S.E. = Coefficients Standard Error.  $\beta$  = Standardized Beta Coefficient. *t* = *t*-statistic. *p* = Alpha Probability.

## Discussion

The main goals of the present study were (1) to investigate the predictive contribution of generalized and particularized trust and vaccination knowledge in explaining the AEA's vaccination intention, and (2) to examine the moderating role of the vaccination status in the aforementioned relationships. We integrated several empirical and theoretical assumptions to identify different factors that drive the vaccination intention, since it is a complex motivational construct that cannot be easily explained with just one psychological theory (Brewer et al., 2017). In addition, we recognized the necessity of gaining a deeper comprehension of the AEA's willingness to adopt a particular desirable behaviour in the future, such as the vaccination uptake, to derive not only theoretical but also practical implications for public health policies.

### *Vaccination Status of AEA's Predicts Future Vaccination Behaviour*

As expected, we found that the prior uptake of a vaccine against the coronavirus was the best predictor of the AEA's intention to receive the coronavirus vaccine in the future. This is in line with previous studies, which established a close association between the past behaviour and future behaviours, in different contexts, i.e. in the case of a wide range of behaviours

(e.g., Ouellette & Wood, 1998; Valois et al., 1988). In a meta-analysis conducted by Conner and Armitage (1998), past behaviour was found to explain an additional 7.2% of the variance in intention, after controlling for attitudes, subjective norms, and perceived behavioural control, as well as 13% of the variance in subsequent behaviour, after taking into account the intention and perceived behavioural control. Although currently there are no findings available for the coronavirus vaccines, a strong association was found between the previous influenza vaccination uptake and flu vaccine acceptance, by reporting odds ratios between 4.5 and 27.6 (e.g., Chapman & Coups, 1999; Fiebach & Viscoli, 1991). According to Chapman and Coups (1999), previous acceptance of vaccines is likely to predict future acceptance, based on the fact that past behaviour can represent a summary of the perceived risks and benefits. The findings of that study indicate that people were more likely to get vaccinated if they thought vaccines were safe and effective, based on previous experience. On the other hand, the likelihood of vaccination decreased when side effects had been previously experienced (Chapman & Coups, 1999). In addition, regardless of the perceived risks and benefits, it is expected that those previously vaccinated will intend to be vaccinated again due to generally favourable attitudes towards the vaccines, as well as the perceived social pressure, i.e. supportive subjective norms concerning the vaccination (Ajzen, 1991; Ajzen, 2020). In particular, people's behaviour is based not only on the previously observed risks and benefits but also on the so-called behavioural beliefs about the general consequences and outcomes of the behaviour of interest (Ajzen, 2020). Furthermore, injunctive normative beliefs (approval and disapproval of certain behaviour by significant others) and descriptive normative beliefs (significant others behaving in a certain way) contribute to the overall perceived social pressure to engage in the behaviour every time it is recommended or expected (Ajzen, 2020).

### **Trust in the Health-Care System and Science and Trust in God and an Alternative Approach to Healthcare as the Precursors of the AEA's Vaccination Behaviour**

Besides the vaccination status, trust in the healthcare system and science, on the one hand, and in God's will and alternative medicine, on the other, were significant predictors of the AEA's vaccination intention. With the increase of trust in science and the healthcare system, as well as with the decrease in trust in alternative medicine and God's will, the intention of AEAs to get vaccinated increases, although small effect sizes were registered. Numerous studies have shown that trust in science is positively associated with the positive attitudes towards the coronavirus vaccination, and people's higher intention to get vaccinated (Allington et al., 2021; Jennings et al., 2021). Also, previous research has shown that in addition to general scientific scepticism,

mistrust in medicine and the results of medical research, as well as the lack of evidence-based knowledge about vaccines, also have a significant association with the negative attitudes towards vaccination against the coronavirus (Cook & Lauer, 2021).

Vaccine acceptance, in addition to trust in the product (vaccine) and the creators of that product (scientists), also includes trust in the providers (healthcare professionals), who provide and administer the vaccines (Larson et al., 2015). This type of trust, based on previous experience with healthcare professionals and the entire healthcare system, proved to be a very important factor that influenced the vaccine-related decision-making process (Larson et al., 2014; Paterson et al., 2016). However, if trust is lost, people will resort to other authorities in the field, who may be indifferent to the desired behaviour or even propagate attitudes against a certain health behaviour (Larson et al., 2018). In our research, trust in alternative approaches to healthcare, i.e. in the individuals perceived and accepted as epistemic authorities in the field of healthcare that are neither medical professionals nor scientists, proved to decrease the AEA's vaccination intention. This is in line with previous studies which found that negative attitudes towards vaccines were associated with a tendency to choose complementary and alternative medicine over evidence-based conventional medicine (Browne et al., 2015). People in favour of complementary and alternative medicine cite a lack of trust in the authorities (healthcare providers and scientists) as the reason for their preference for the alternative healthcare approaches, as well as the belief that a natural way to strengthen the immune system is better than introducing potentially harmful chemical substances into the body (Attwell et al., 2018). Similarly, mistrust in pharmaceutical companies and the interests of powerful people who would profit from an adverse and life-threatening situation are cited as other reasons (Attwell et al., 2018). In addition to the above, conspiracy beliefs are known to be involved in nearly all forms of science denial, which can be a result of deep mistrust not only in the scientists or the healthcare system but also in policy-makers, such as the government or state institutions (Corace et al., 2016).

### **Trust in the Authorities and Media**

We observed extremely low trust in communication sources and politicians or governmental institutions (trust in the authorities and media) among AEAs, and, conversely, very high levels of trust in friends and family. Low trust in the officials and media and high interpersonal trust are in line with the results of previous research (e.g. Džamonja Ignjatović et al., 2019), which has shown that trust in the official sources of information in Serbia declined during the pandemic, while interpersonal trust (e.g. trust in a personal doctor, not doctors in general) remained high (Ninković et al., 2022), and confirmed the assumption about the dynamic nature of trust in institutions

and official sources of information during the outbreak (Lep et al., 2021). A cross-national online survey, conducted on the representative samples from six jurisdictions in the Asian and Western societies, showed that institutional trust (e.g., trust in government) may increase vaccine willingness and uptake, and reduce the negative impact of misinformation on vaccine willingness and uptake (Chen et al., 2022). These findings are in line with the results of our study with respect to trust in the authorities and media. However, we should note that a very small effect size was registered, i.e., the role of state authority and media is very small in explaining the AEA's vaccination intention. Public trust is particularly challenged when public authorities disagree, the media spread false narratives, contradictory recommendations, conspiracy theories, and misinformation relating to important health topics (Larson et al., 2011). The main challenge for us is that in the conditions of a "crisis of public confidence", AEAs are not heavily reliant on state authorities who are the main source of information on vaccines. This would mean that AEAs are left to find other alternative sources to rely on when making decisions about vaccination. Accordingly, it is important to build tailor-made communication strategies for AEAs, in order to avoid relying on invalid sources of information as an alternative to resistance to official sources of information.

### **Knowing How it Works Propagates the AEA's Vaccination Uptake**

In this study, knowledge about vaccines proved to be a significant predictor of the AEA's vaccination intention, which is a previously well-established empirical finding (e.g., Ekezie et al., 2022). Overall, numerous studies consistently showed a strong association between increased knowledge about the vaccine and vaccination uptake (Petrovic et al., 2003; Richards & Sheridan, 1999). Previous studies have shown that with relatively low-cost knowledge transfer interventions, it is possible to significantly increase the vaccine uptake, in isolated and difficult-to-reach communities, and among marginalized groups (e.g., Andersson et al., 2009). Also, increasing vaccine and health literacy, and using schools as an important resource in national vaccination programmes were considered positive factors for increased vaccine coverage (Hardelid et al., 2016). In addition, the lack of knowledge about the effectiveness of vaccines, as well as the lack of awareness of the risks of epidemics, are considered to be one of the most easily solvable barriers to increasing vaccination rates (Ekezie et al., 2022). In contrast to hard-to-change trust, knowledge is something that can be more easily influenced by systematic health education programmes and a well-planned national vaccination strategy for sustainable long-term health care. However, though it is achievable to increase knowledge in the population of AEAs, maybe even more than in older populations due to the exposure to the school system, knowledge does not work alone, rather it is a part of a complex interplay of many health-protective factors.

### *Complex Interplay of Trust and Knowledge*

Our second research question is related to whether the relationships between trust-related constructs and vaccination knowledge on the one hand, and AEA's vaccination intention on the other, are of equal intensity and direction, regardless of the previous vaccination status. In this study, no moderating role of vaccination status was detected, i.e., regardless of the vaccination status, the same determinants of vaccination intention were registered. With the increase in vaccination knowledge and trust in the official sources of information, such as scientists, healthcare professionals, and institutions where they work, as well as with the decrease in trust in unofficial alternative medical authorities, the intention of AEAs to get vaccinated also increases, regardless of whether they had been previously vaccinated against the coronavirus or not. This finding can be useful to policy-makers when creating long-term national immunization programmes to prevent the risk of declining vaccine coverage.

According to our knowledge, this is one of few studies that dealt with the so-called "generation to come" when it comes to vaccination stance. In addition to the exceptional importance of researching the determinants of youth's vaccination behaviour in the context of a pandemic, we must take into account that the stance towards the coronavirus vaccine could be a precursor of the stance towards other vaccines within the national immunization schedule for both adults and children. Evidence-based national programs that are focused on the individuals who will be the population of parents in the upcoming decades must be developed in order to ensure that there is not a sudden drop in the immunization rate of the following generation.

### **Limitations and Directions for Future Research**

This study has several drawbacks and limitations. Firstly, it was conducted on a convenient sample and in only one cultural context; it should therefore be replicated on a representative sample of young people, as well as in different cultural and cross-cultural contexts. An additional limitation of the study is the limited number of determinants that were used in the model. Therefore, in subsequent research, it is necessary to examine a wide range of different determinants of the AEA's vaccination intention, as well as vaccination behaviour. Including more potential determinants in the model would provide clearer and more comprehensive practical implications for public health policies. Finally, it would be important to investigate the determinants of the AEA's vaccination intention in hard-to-reach, marginalized and rural communities. The only way to systematically increase vaccination coverage is to focus special attention on those for whom timely and verified information about vaccination is more difficult to access, as well as among those for whom healthcare institutions are often inaccessible.

## Conclusion

The continual return of diseases that can be prevented by vaccination prompted the WHO (World Health Organization, n.d.) to highlight vaccine hesitancy as a significant danger to global health. Accordingly, the importance of examining which determinants contribute to the explanation of the attitudes towards vaccines, vaccination intention, and vaccination behaviour was highlighted. However, according to our knowledge, few studies in our region examined the determinants of stance towards vaccination among the so-called “generation to come”, which will make decisions about vaccination of the next generation in the coming decades. Accordingly, we conducted research that dealt with the predictors of the AEA’s vaccination intention towards coronavirus vaccination, and highlighted the importance of examining trust-related factors and vaccine knowledge. In this study, the importance of understanding the predictors of attitudes toward vaccines has also been highlighted, in the context of building practical implications for the development of evidence-based national vaccination programmes that can have a preventive character in a period of a global confidence crisis.

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## **Stavovi o vakcinaciji kod adolescenata i mladih odraslih osoba: uloga poverenja i znanja**

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Cilj ovog istraživanja je provera prediktivnog doprinosa generalizovanog i partikularizovanog poverenja i znanja o vakcinaciji u objašnjenju namere mladih da se vakcinišu, kao i provera moderatorske uloge vakcinalnog statusa u prethodno spomenutim odnosima. Ukupno 835 adolescenata i mladih odraslih osoba (u dobi

od 15 do 25 godina, Mage = 18,35, SD = 2,86) iz Srbije popunilo je mere namere za vakcinisanjem i vakcinalnog statusa, generalizovanog i partikularizovanog poverenja i znanja o vakcinaciji. Rezultati hijerarhijske regresijske analize pokazali su da je prethodno vakcinisanje protiv koronavirusa najbolji pokazatelj namere mladih da se vakcinišu protiv ovog virusa u budućnosti. Osim toga, kao značajni prediktori bihevioralne namere izdvojili su se poverenje u vlast, poverenje u službenu (zdravstveni sistem i nauka) i alternativnu medicinu, te znanje o vakcinama. Suprotno očekivanjima, poverenje u porodicu i prijatelje nije pridonelo objašnjenju namere mladih da se vakcinišu. Osim toga, nije pokazana moderatorska uloga vakcinalnog statusa; bez obzira na vakcinalni status, registrovane su iste determinante namere za vakcinisanjem kod mladih. O teorijskim i praktičnim implikacijama ovih saznanja raspravljaje se u svetlu važnosti razvoja nacionalnih programa vakcinisanja mladih utemeljenih na dokazima, koji mogu imati preventivni karakter u razdoblju globalne krize poverenja.

**Ključne reči:** adolescenti, vakcinacija, znanje o vakcinama, poverenje