Yıldız Journal of Educational Research
Web page info: https://yjer.yildiz.edu.tr
DOI: 10.14744/yjer.2021.008

YILDIZ JOURNAL OF EDUCATIONAL RESEARCH

Original Article / Orijinal Makale

Attitudes toward COVID-19 vaccine: Investigating the role of COVID-19 related factors and trait personality

COVİD-19 aşısına yönelik tutumda COVİD-19 ile ilişkili faktörler ve kişilik özelliklerinin rolü

Mehmet Engin DENİZ, Ceren BEKTAŞ-AYDIN*, Gaye BIRNİ, Zahide Gül KARAAĞAÇ

Department of Psychological Counseling and Guidance, Yildiz Technical University, Istanbul, Türkiye

Psikolojik Danışmanlık ve Rehberlik Bölümü, Yıldız Teknik Üniversitesi, İstanbul, Türkiye

ARTICLE INFO

Article history
Received: 07 September 2022
Revised: 14 November 2022
Accepted: 17 November 2022

Key words:
COVID-19, vaccine, personality, emerging adulthood, conspiracy, faith.

MAKALE BİLGİSİ

Makale hakkında
Geliş tarihi: 07 Eylül 2022
Revizyon tarihi: 14 Kasım 2022
Kabul tarihi: 17 Kasım 2022

Anahtar kelimeler:
COVİD-19, aşı, kişilik, beliren yetişkinlik, komplo teorisi, inanç.

ABSTRACT

The aim of the study is to examine personality traits and COVID-19 related factors as predictors of attitudes toward the COVID-19 vaccine. Fear of COVID-19 and perceived causes of COVID-19 are investigated as COVID-19 related factors. The sample consists of 1697 Turkish emerging adults (50.1% female; ages 18-25). The result of T-test for gender difference shows that females (M=35.19, SD=8.27) have significantly more positive attitude towards COVID-19 vaccine than males (M=33.86, SD=8.76). Attitude towards COVID-19 vaccine is predicted by conspiracy, environment and faith as causes of COVID-19, fear of COVID-19 and openness to experience as personality traits. All of these predictors explained 29% of the total variance in attitudes toward the vaccine. Results are discussed in light of previous research.

ÖZ

Bu araştırmanın amacı COVİD-19 aşısına yönelik tutumun yordayıcıları olarak kişilik özelliklerini ve COVİD-19 ile ilişkili bazı faktörleri incelemektir. Araştırılan COVİD-19 ile ilişkili faktörler, COVİD-19 korkusu ve COVID-19'un nedenlerine dair algılardır. Örneklem, 1697 beliren yetişkinden (50.1% kadın; yaş aralığı 18-25) oluşmaktadır. Cinsiyet farkına dair yapılan T-test sonucu kadınların COVİD-19 aşısına yönelik tutumunun (M=35.19, SD=8.27) erkeklere göre (M=33.86, SD=8.76) anlamlı düzeyde daha olumlu olduğunu göstermektedir. Covid-19'un nedenlerine dair algının alt boyutlarından komplo teorisi, çevre ve inanç, COVİD-19 korkusu ve deneyime açıklık kişilik özelliği COVİD-19 aşısına yönelik tutumu anlamlı düzeyde yordamaktadır. Tüm bu değişkenler birlikte aşıya yönelik tutumdaki toplam varyansın %29'unu açıklamaktadır. Sonuçlar önceki çalışmalar ışığında tartışılmıştır.

Cite this article as: Deniz, M.E., Bektaş-Aydın, C., Bırni, G., Karaağaç, Z.G. (2022). Attitudes toward COVID-19 vaccine: Investigating the role of COVID-19 related factors and trait personality. *Yıldız Journal of Educational Research, 7*(2), 79–88.

***Corresponding author / Sorumlu yazar**
*E-mail address: cerenbektasaydin@gmail.com

INTRODUCTION

Throughout history, the world has witnessed deadly and contagious epidemics such as SARS, Spanish Flu, HIV, Ebola (Sampath et al., 2021). Epidemics have negative consequences in many ways, such as economic, psychological, and safety. (Qiu et al., 2016). As the last of these epidemics, the COVID-19 continues to pose as a public health threat with approximately 600 million reported cases and over 6.4 million deaths worldwide (WHO, 2022). It turns out that taking effective measures to lower the rate of disease and reduce the likelihood of negative outcomes in the pandemic COVID -19 allows for more successful management of the process (Kim, 2021). Vaccination is an effective method in the treatment of infectious diseases, it is effective in increasing the number of people vaccinated, reducing the incidence of disease and death, and is a precaution that should be taken in the face of a possible pandemic in the future (Kwok et al., 2021; Coccia, 2022).

Knowledge of the characteristics of society is an important element in the fight against pandemics (Peng et al., 2016). It is important that the strategies used in different countries to combat the pandemic match the profile of the country and the characteristics of the population, and determining which strategy is implemented where, when, and by whom is important to achieving successful results (Weng et al., 2020). At this point, it is important to understand people's attitudes toward the vaccine in order to develop the right strategies.

Emerging adulthood is explained as the stage between adolescence and adulthood between 18 and 25 years of age (Arnett, 2014). Emerging adults are a large specific group in the population of Türkiye. This group of people are spending more time outdoors, such as school and workplace. This could play a large role in the spread of COVID-19 and The Turkish Ministry of Health emphasizes the importance of vaccination for the young population. (TRT News, 2021). While the number of cases in Türkiye is currently close to 17 million, the number of deaths has exceeded 100 thousand (The Turkish Ministry of Health, 2022). Considering the effect of the young population on the spread of the disease, vaccination of emerging adults is an important issue for their and public health.

Fear of COVID-19 could be a possible factor in vaccine acceptance. The results of a study conducted in Canada showed that a higher perception of the severity of COVID-19 predicted willingness to be vaccinated with COVID-19 (Mant et al., 2021). In addition, in Saudi Arabia, infection or death due to COVID-19 was found to influence vaccine acceptance (Alamri et al., 2021). Ahorsu et al. (2020) and Satıcı et al. (2020) discussed the negative impact of COVID-19 on people's mental health. These studies emphasized that the feelings of panic, anxiety, and fear evoked by COVID-19 should not be overlooked. Accordingly, fear of COVID-19 may be a factor that should be examined when studying attitudes toward the vaccination.

Another possible factor could be perceived causes of coronavirus. A dissertation study found an association between conspiracy theories and attitudes toward the COVID-19 vaccine (Andrews, 2021). The results showed that belief in the veracity of COVID-19 conspiracies was associated with negative attitudes toward the vaccine. In another study in the UK, people who were hostile to the COVID-19 vaccine were less likely to seek information about the pandemic from authorities (Murphy et al., 2021). A dataset from 19 countries showed that people were more likely to accept the COVID-19 vaccine if they had a higher level of confidence in the information coming from the government (Lazarus et al., 2021). These results may suggest that perceptions of the causes of COVID-19 may predict attitudes and behaviors toward COVID-19 and are therefore important for understanding public hesitation and resistance.

The possible relationship between personality traits and decision-making could be another perspective for understanding people's perceptions of their attitudes toward COVID-19 vaccine (Gerber et al., 2011). Big five personality traits theory is one of the explanations for personality in psychology literature. Studies of factors for personality started with Alport (Eryılmaz & Öğütülmüş, 2010). Based on Alport's (1961) studies, Norman (1963) investigated personality factors and found five strong factors that form personality. These five factors are extroversion, agreeableness, conscientiousness, emotional stability, and culture (Eryılmaz & Öğütülmüş, 2010; Somer, 1998). Today, these factors studied as extroversion, agreeableness, conscientiousness, openness to new experiences, and neuroticism in the Big Five theory (Costa & McCrea, 1992).

When literature is examined for relationships between personality traits and decision-making, some links comes to surface. Riaz, Riaz, and Batool (2012) found significant relationships between personality traits and decision-making styles in an Asian study group. For example, the trait neuroticism was positively correlated with avoidant decision-making style. In addition, Lauriola and Levin (2001) found that personality traits with five factors were associated with risky decision making, and Carter et al. (2013) found that personality predicts decision-making when the information received is unreliable.

Current Study

The above research findings on COVID-19 vaccine hesitancy, fear of COVID-19, personality traits, and decision making, as well as people's views on the causes of COVID-19, might lead us to reflect on the possible effects of these factors on attitudes toward the COVID-19 vaccine. In examining the studies, it is striking that there are few studies on emerging adults' perceptions of the COVID-19 vaccine. On the other hand, studies targeting this specific group are becoming increasingly important for public immunization in countries with young populations. The

aim of the present study is to investigate whether fear of COVID-19, perceptions of the causes of COVID-19, and personality traits predict attitudes toward the COVID-19 vaccine among Turkish emerging adults.

METHOD

A cross-sectional study design was used in this study. The data were collected through self-administered questionnaires. Descriptive and correlational relationships between study variables were examined.

Participants and Procedure

The study was conducted with a total of 1697 Turkish emerging adults aged 18-25 years (M=21.32, SD=1.73). Of these, 851 (50.1%) were female and 846 (49.9%) were male. Regarding the educational level of the participants, 1332 (78.5%) have a high school degree, 358 (21.1%) have a bachelor's degree, and 7 (.4%) have a master's degree. One thousand (59%) participants have received at least two doses of the vaccine COVID-19, 391 (23%) have received one dose of the vaccine, and 306 (18%) have not been vaccinated at all. Because of coronavirus infection, 924 (54.4%) participants lost an acquaintance and 104 (6.1%) lost a family member. Data were collected online using Google forms. Convenient sampling and snowball sampling methods were used for data collection. We shared the link to the online form with our social circle and students and asked them to share the link with others. We provided participants with an informed consent form and collected data only from voluntary participants.

Measures

Fear of COVID-19 Scale

The scale is a single-factor, 7-item, 5-point Likert-type scale. It was originally developed by Ahorsu et al. (2020) and adapted into Turkish by Satıcı et al. (2020). The internal consistency reliability was reported to be .85. The validity results showed that the Turkish form of the scale met the validity criteria. In our study, we determined a Cronbach's alpha coefficient of .87.

Adjective Based Personality Scale (ABPT)

The ABPT was developed by Bacanlı et al. (2009) based on the five-factor personality theory. The scale is a bipolar scale and contains 40 pairs of opposing adjectives (e.g., optimist vs. pessimist). Individuals rate themselves on a 7-point scale for each adjective pair. It has five subdimensions (extroversion, neuroticism, agreeableness, responsibility, and openness to experience).The Cronbach's alpha coefficients for the subscales range from .73 to .89.

Attitudes Towards the COVID-19 Vaccine Scale (AtCV)

AtCV was originally developed by Çırakoğlu (2011) for H1N1 virus. Geniş et al. (2020) adapted the scale to the COVID-19 pandemic and conducted a validity and reliability study. They found that the scale has good psychometric properties. AtCV is a 9-item, 5-point Likert-type scale. It has 2 subdimensions, namely positive attitude (e.g., I want to have the vaccine to be developed / developed for this disease as much as possible) and negative attitude (e.g., The vaccine to be developed / developed is dangerous). High scores in the positive attitude subdimension indicate a positive attitude toward vaccination. Items in the negative attitude subdimension are scored inversely. The higher the score in the negative attitude subdimension, the lower the negative attitude toward the vaccine. As it can be seen, scoring the scale is quite complex and confusing because high scores in the negative attitude subscale represent less negative attitude. Without needing the subscales of the scale for positive and negative attitude, we can say that as the score on the overall scale increases, so does the positive attitude. To this end, we reverse coded the items of the negative attitude subscale and conducted a factor analysis of the AtCV. We found a reliability of the scale of .91.

Perception of Causes of COVID-19 Scale

The scale was originally developed by Çırakoğlu (2011) for H1N1 virus. Geniş et al. (2020) adapted the scale to the COVID-19 pandemic and conducted the validity and reliability study. The scale includes 14 items and three subdimensions, namely conspiracy (e.g., This disease is a political game uncovered by developed countries), faith (e.g., This pandemic is a wrath of God against social degradation), and environment (e.g., Global warming is one of the causes of the pandemic). The higher the score, the more pronounced the perception in that dimension. The Cronbach's alpha coefficient was .88 for the overall scale, .96, .85, and .90 for the conspiracy, environment, and faith dimensions, respectively. In the present study, the Cronbach's alpha coefficient was .83 for the total scale, .94, .84, and .81 for the conspiracy, environment, and faith dimensions, respectively.

Data Analysis

To assess the unidimensional structure of AtCV, we performed exploratory factor analysis. We performed a t-test to test for gender differences in attitudes toward the vaccine and a series of Pearson correlation analyses to examine the relationship between study variables. To reduce the risk of type I error, we used the Bonferroni correction and set the new significance level at 0.005 (0.5/10). We then performed hierarchical regression analysis to examine whether the variables that showed a significant association with attitudes toward COVID-19 vaccine predicted attitudes toward vaccine. We used SPSS 26.0 to analyze the data.

Ethical Approval

The study protocol (project ID 003724) has been approved by Yıldız Technical University Scientific Research and Ethical Review Board. The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its following updates.

RESULTS

Factor Analysis of AtCV

First, we reverse coded the items of the Negative Attitude subscale and conducted a factor analysis to determine the factor structure of the scale. For factor analysis, we used the principal component analysis (PCA) method. We checked normality (skewness between -1,61 and -.18 ; kurtosis between -1,72 and .61) and linearity and concluded that the data met the criteria. The Kaiser-Meyer-Olkin measure of sampling adequacy was .93, which was above the recommended value of .6 (Tabachnick and Fidell, 2007). Bartlett's test for sphericity was also significant (χ^2 (36)=10595.6, p<.001) so we concluded that the data were suitable for PCA.

The PCA results showed that the items loaded on one factor as expected. As can be seen in Table 1, all items met the criterion of a primary factor loading of .4 or more. All communalities were above .2 so there was no need for item deletion (Child, 2006). Since only one factor was extracted, there was no cross loading.

As can be seen in Figure 1, the initial eigenvalues indicated that only one factor had an eigenvalue greater than 1. The single factor explained 61% of the total variance. The results showed that AtCV met the validity criteria with a single-factor structure. We measured the internal consistency of single-factor AtCV with Crobach's alpha. We found an alpha of .91.

The result of the T-test for gender difference showed that women (M=35.19, SD=8.27) have significantly higher positive attitudes toward vaccination than men (M=33.86, SD=8.76), (t (1695)=3.21, p<0.01) . The results of the correlation analyses are shown in Table 2. There is a positive correlation between AtCV and FoC (r=0.14, p<0.005), AtCV and CoC-E (r=0.09, p<0.005), and AtCV and OtE (r=0.16, p<0.005). Of the 5 personality traits, only openness to experience is significantly correlated with attitudes toward vaccination. There is a negative correlation between AtCV and CoC-C (r=-0.49, p<0.005), and AtCV and CoC-F (r=-0.25, p<0.005).

Table 1. Factor Loadings and Communalities for the 9 items of AtCV

	Factor Loadings	Communalities
Item 1	0.86	0.74
Item 2	0.88	0.78
Item 3	0.88	0.77
Item 4	0.84	0.71
Item 5	0.48	0.23
Item 6	0.77	0.59
Item 7	0.80	0.64
Item 8	0.74	0.54
Item 9	0.69	0.48

AtCV: Attitudes Towards the COVID-19 Vaccine Scale.

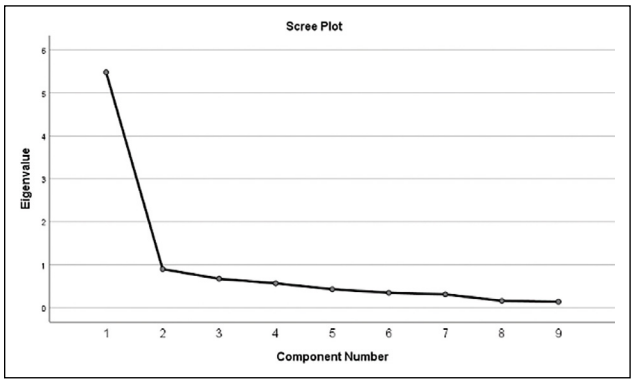

Figure 1. Scree plot for AtCV.

AtCV: Attitudes Towards the COVID-19 Vaccine Scale.

As part of preliminary analyses, we also checked the assumptions of multiple regression. We detected 4 multivariate outliers and removed them from the data set. Our final data consisted of 1697 individuals. As can be seen in Table 1, there is no multicollinearity among the independent variables. To test the independence of the residuals, we applied the Durbin-Watson test. Since the value was equal to 2, we concluded that there was no autocorrelation. To check for normality, linearity, and homoscedasticity, we examined the histogram, normal P-P plot, and scatterplot and found that the data also met these assumptions.

Hierarchical Multiple Regression Analysis

We performed a hierarchical regression analysis with 3 blocks. The results of the regression analysis are shown in Table 3. The independent variable for the first block analysis was fear of COVID-19, which significantly predicted 2% of the variance in attitudes toward the COVID-19 vaccine (F(1, 1695)=34.75, p<0.001). For the second block analysis, we added the variables perceived causes of COVID-19 to the model, namely conspiracy, environment, and faith. The new model proved to be significant (F(4, 1692)=167.36, p<0.001).

The R2 change value of [0.263] suggests that the addition of the causes of COVID-19 variables to the first model explains 26.3% of the total variance in attitudes toward COVID-19 vaccine. According to the standardized regression coefficient (β), conspiracy made the largest contribution to model 2. For the third block analysis, we added the openness to experience variable to the analysis and obtained another significant model (F(5, 1691)=(137, 84), p<0.001). Openness to experience contributed an additional 0.7% to the explained variance, and the final model explained 29% of the total variance in attitudes toward COVID-19 vaccine. According to the standardized regression coefficient (β), the rank order of importance of predictor variables against attitude toward COVID-19 vaccine is conspiracy, fear of COVID-19, faith, openness to experience, and environment, respectively.

Table 2. Correlations among study variables

Variables	1	2	3	4	5	6	7	8	9	10
1. Attitude towards COVID-19 Vaccine (AtCV)	-									
2. Fear of COVID-19 (FoC)	**0.14***	-								
3. Causes of COVID-19/ Conspiracy (CoC-C)	**0.49***	0.08*	-							
4. Causes of COVID-19/ Faith (CoC-F)	**0.25***	0.01	0.31*	-						
5. Causes of COVID-19/ Environment (CoC-E)	**0.09***	0.21*	0.04	0.09*	-					
6. Openness to Experience (OtE)	**0.16***	0.04	-0.09*	-0.24*	0.10*	-				
7. Extroversion	0.02	0.07	0.14*	-0.02	0.07*	0.51*	-			
8. Agreeableness	0-.02	0.10*	0.08*	0.07*	0.05	0.18*	0.19*	-		
9. Responsibility	0.03	0.08*	0.13*	0.07*	0.06	0.31*	0.45*	0.24*	-	
10. Neuroticism	0.07	0.23*	0.00	0.08	0.01	-0.11*	-0.20*	-0.30*	-0.18*	-

*p<0.005.

Table 3. Hierarchical multiple regression analysis results

	B	SE B	β	R^2	Δ R^2
Step 1					
FoC	0.19	0.03	0.14		
				0.02*	
Step 2					
FoC	0.22	0.03	0.16		
CoC-C	-0.58	0.03	-0.47		
CoC-E	0.13	0.03	0.08		
CoC-F	-0.31	0.06	-0.11		
				0.283*	0.263
Step 3					
FoC	0.22	0.03	0.16		
CoC-C	-0.58	0.03	-0.47		
CoC-E	0.11	0.03	0.07		
CoC-F	-0.25	0.07	-0.09		
OtE	0.11	0.03	0.08		
				0.29*	0.007

*p<0.001. FoC: Fear of compassion, CoC-C: Causes of coronavirus-conspiracy, CoC-E: Causes of coronavirus-environment, CoC-F: Causes of coronavirus-faith, OtE: Opennes to experience.

DISCUSSION

The results obtained from the differences depending on the gender of the respondents show that women are more positive toward the vaccine than men. There are some studies with similar findings to ours (Malik et al., 2021; Jiang et al., 2022). On the other hand, Bendau et al. (2021), Hwang et al. (2021), and Reno et al. (2021) reported that vaccination acceptance was higher in men than in women. However, Milligan et al. (2021) and Berg & Lin (2021) found no significant relationship between gender and vaccine acceptance. Because of no consistent conclusion has been reached regarding gender differences in coronavirus vaccination, we advise caution in interpreting gender-related results. Cultural factors may play a role in interpreting gender differences. Considering our results, one possible explanation could be that being female requires being more protective in Turkish culture. Especially, women who have a child are more likely to be vaccinated because they feel responsible for the health of their children (Kaya & Aydin-Kartal, 2022). The reason Turkish women have more positive attitudes toward vaccination then Turkish men, might be because of their desire to protect their loved ones.

We found that greater fear of COVID-19 predicted more positive attitudes toward the COVID-19 vaccine. There are some studies indicating that fear of COVID-19 was associated with acceptance of the COVID-19 vaccine, similar to our results (Bendau et al., 2021; Nindrea et al., 2021; Scrima et al., 2022). When people need to make decisions about health-related issues, emotions can play an important role in disease outcomes (Ferrer et al., 2016). Fear is an emotion that contributes to avoiding risky decisions and taking an action to hedge against uncertainty. It can be triggered by pessimistic predictions, but it can also contribute to avoiding risky decisions or actions (Lerner & Keltner, 2001). Thus, experiencing fear may motivate people to be more cautious about health-related issues such as viruses and making health-related decisions.

In our study, belief in conspiracy theories about the cause of coronavirus is one of the negative predictors of positive attitudes toward the COVID-19 vaccine. This finding is parallel with previous studies on conspiracy beliefs and vaccine acceptance (e.g., Scrima et al., 2022; Wirawan et. al., 2021). When a new phenomenon occurs, people need to make sense of it. Conspiracy theories or beliefs help fill the gap by compensating for true information about new matters. Therefore, people tend to accept these conspiracies to build on the familiar ground of this new phenomenon (Goertzel, 1994). The rapid progression and uncertainty of

the pandemic process may cause people to feel less hopeful and confident (Karataş & Tagay, 2021). When people feel uncertain, anxious, and worried, conspiracy theories are powerful sources to inspire people by reducing their negative feelings and thoughts (Douglas, 2021). While COVID-19 pandemic has a scary and unknown feature for people, conspiracy theories may have emerged as saviors at this point. Therefore, people who feel safe by believing in conspiracy theories may not feel the need to get vaccinated. It is also argued that conspiracy theories have a negative effect by discouraging individuals from acting for the good of society and others (Van der Linden, 2015).

One approach to environmental disturbances such as climate change, industrial development, loss of biodiversity, etc. is that they may be a cause of infectious disease occurrence (McMicheal, 2004). Wu et al. (2016) also stated that climate changes affect the emergence, progression, or transmission of infectious diseases. Regarding COVID-19, in one study, most participants stated that COVID-19 was caused by nature (Salali & Uysal, 2020). Holding the belief that environmental disturbances can affect the climate and nature, causing new diseases, may motivate individuals to take measures to protect themselves from these natural mutations. These protective measures include vaccination against the newly mutated virus, which is strongly recommended by scientists, health departments, and local and global authorities (CDC, 2022; Ministery of Health of Republic of Türkiye, 2022; WHO, 2022). Our results support this association, as belief in environmental change as a cause of COVID-19 increased along with positive attitudes toward COVID-19 vaccine.

The final dimension is faith as a cause of COVID-19. Pivetti et al. (2021) showed that belief in science, rather than faith, was positively associated with vaccine uptake. People with strict religious beliefs had higher levels of hesitancy/resistance to the COVID-19 vaccine (Murphy et al., 2021; Milligan et al., 2021; Hwang et al., 2021). Our result is consistent with the results of the above studies.

Openness to experience as a personality trait is the other variable that predicts positive attitudes toward the COVID-19 vaccine. There are few studies that have examined personality traits and their relationship with COVID-19 vaccine or protective behaviors. For example, Yanto et al. (2021) found that open-minded people were most likely to accept vaccines, unlike others. Openness to experience is one of the personality traits that show adaptive behavior when exposed to coronavirus (Pilch et al., 2021). Mo et al. (2021) also indicated that openness to experience is associated with intention to get COVID-19 vaccine. Open-minded people tend to understand and try new things (McCrea and Costa, 2005). Therefore, these individuals might accept COVID-19 vaccination, while some others might have doubts. The COVID-19 vaccine is a topic that concerns everyone. It is understandable to be unsure about getting vaccinated. However, open-minded people may be willing to get involved with the vaccine and learn about the consequences of vaccination. Vaccination against COVID-19, which is a new experience, can be described as a journey of discovery for them.

Extraversion, agreeableness, neuroticism, and responsibility were not correlated with attitude toward the vaccine. It might be expected that extraverted people would have positive attitudes toward the COVID-19 vaccine because it is important for them to interact and spend time with others. However, no significant relationship was found between extraversion and attitudes toward the COVID-19 vaccine. Murphy et al. (2021) also found that extraversion was not a significant variable when they compared the group that was resistant or hesitant to the vaccine with the group that accepted the vaccine. The decision to be vaccinated depends on many factors, such as the perceived risks of vaccination (Caserotti et al., 2021), whether the vaccine is recommended by the government and physicians, its availability, and production conditions (Tam et al., 2021). The reason for the lack of significance could be that Extraversion has some characteristics such as assertiveness, sociability, talkativeness, and activity that are not related to the vaccination factors mentioned above.

Agreeableness, like extraversion, emphasizes social relationships. It includes some traits such as trust, altruism, and cohesiveness with others (Graziano & Eisenberg, 1997). In relation to attitudes toward the COVID-19 vaccine, Murphy et al. (2021) found that Agreeableness was the personality trait that best predicted vaccine acceptance, in contrast to the results of our study. Vaccination against the COVID-19 is not yet accepted and widespread among the general public. The inability to reach consensus in society regarding the COVID-19 vaccine has revealed divergent views, with some people vehemently anti-vaccination while others fully support vaccination. In this case, some of the approving people might follow the supporters and have a positive attitude toward the vaccine, while the others follow the anti-vaccination people and have a negative attitude. Agreeable people tend to prefer to make decisions together with others (McCrea and Costa, 2005). From a different perspective, the results of Martin-Raough et al. (2016) showed that agreeable people have sufficient knowledge about behaviors that are beneficial in a social setting, but they do not translate this knowledge into behavior to the same extent. These aspects of the personality trait of agreeableness may explain why there was no significant association with attitudes toward vaccination.

Responsible people engage in behaviors that lead to success, such as responsiveness, discipline, and planned action. The personality trait "responsibility" were not correlated with attitude toward the vaccine, which can also be considered surprising. Responsible people are active in making and implementing health-protective decisions (Bermudez,

1999). However, one of the characteristics that define the personality trait responsibility is tradition (Roberts et al., 2005). While this trait shows that individuals with the responsible personality trait stick to their habits, it could also explain the lack of attitude toward the newly developed and applied COVID-19 vaccine.

The trait neuroticism also were not correlated with attitude toward the vaccine. Neuroticism is described as intense experience of anxiety, worry, anger, and hostility. Neurotic individuals are less involved in health-related decisions (Flynn et al., 2007). They are also more negatively affected by the flow of information in the media about COVID-19 than other personality traits (Yamauchi et al., 2022). Neurotic individuals may perceive the current coronavirus outbreak as more intense and negative than it is. In this case, their anxiety may increase significantly, and they may avoid making a decision to vaccinate, whether that decision is positive or negative. Therefore, there may not be a relationship between neuroticism and attitudes toward the vaccine.

Recommendations, Implication and Limitations

The study has some limitations. First, the samples were recruited using convenient sampling and snowball sampling, which poses a problem for the generalizability of the results. Second, we did not have demographic information such as socioeconomic status, sexual orientation, or marital status of the participants. We recommend that future studies collect more demographic information and compare the attitudes of different demographic groups toward vaccination. Emerging adults were identified as the target population for the study. However, new insights may be gained through studies targeting participants in other age groups, such as adolescents.

Personality types can be critical in determining how people will behave or in what direction they will decide to go. Assessing public responses in campaigns to prevent and stop the pandemic under current pandemic conditions can be effective in helping to achieve the purpose of the campaign. At this point, the results of this study are a source that shows the attitudes of personality types toward the vaccine.

Fear of COVID-19 is a significant predictor of positive attitude toward the vaccine. On the other hand, conspiracy theories are shown to be the variable that most negatively predicts positive attitude toward the vaccine. This information can have a positive impact on vaccination campaigns depending on how fear is channeled. If the public is informed in an objective manner about the negative aspects of coronavirus, without giving conspiracy theories a chance they may become aware of the threat posed by the disease and act to protect their health. As for faith, it can be suggested that clergy participate with government agencies and scientists in vaccination campaigns to prevent negative attitudes toward COVID-19 vaccination. Authorities can take new measures, such as creating materials for media, social media, schools, TV programs, meeting places, etc., to replace false religious and conspiracy thinking with scientific information.

Ethics: There are no ethical issues with the publication of this manuscript.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Financial Disclosure: The authors declared that this study has received no financial support.

Etik: Bu makalenin yayınlanmasıyla ilgili herhangi bir etik sorun bulunmamaktadır.

Hakem Değerlendirmesi: Dış bağımsız.

Çıkar Çatışması: Yazarlar, bu makalenin araştırılması, yazarlığı ve/veya yayınlanması ile ilgili olarak herhangi bir potansiyel çıkar çatışması beyan etmemiştir.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir.

REFERENCES

Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID-19 scale: Development and initial validation. *International Journal of Mental Health and Addiction, 20*(1), 1–9. [CrossRef]

Alamri, A., Alshahrani, N. A., Al Bakita, A. A., Alqahtani, A. S., Alshahrani, M. S., & Alshahrani, J. H. A. (2021). Public willingness to receive COVID-19 vaccine in Saudi Arabia. *World Family Medicine, 19*(8), 21–32.

Allport, G. W. (1961). *Pattern and growth in personality* (New ed.). Harcourt College Publishers.

Andrews, E. A. (2021). *Combating COVID-19 vaccine conspiracy theories: debunking misinformation about vaccines, bill gates, 5G, and microchips using enhanced correctives* [Unpublished Master Thesis]. State University of New York at Buffalo.

Arnett, J. J. (2014). *Emerging adulthood: The winding road from the late teens through the Twenties* (1st ed.). Oxford University Press. [CrossRef]

Bacanlı, H., Ilhan, T. & Arslan, S. (2009). Development of a personality scale based on five factor theory: Adjective based personality test (ABPT). *Türk Eğitim Bilimleri Dergisi, 7*(2), 261– 279. [Turkish]

Bendau, A., Plag, J., Petzold, M. B., & Ströhle, A. (2021). COVID–19 vaccine hesitancy and related fears and anxiety. *International Immunopharmacology, 97*, Article 107724. [CrossRef]

Berg, M. B., & Lin, L. (2021). Predictors of COVID-19 vaccine intentions in the United States: The role of psychosocial health constructs and demographic factors. *Translational Behavioral Medicine, 11*(9), 1782–1788. [CrossRef]

Bermúdez, J. (1999). Personality and health-protective behaviour. *European Journal of Personality, 13*(2), 83–103.

Carter, A. J., Marshall, H. H., Heinsohn, R., & Cowlishaw, G. (2013). Personality predicts decision making only

when information is unreliable. *Animal Behaviour, 86*(3), 633–639. [CrossRef]

Caserotti, M., Girardi, P., Rubaltelli, E., Tasso, A., Lotto, L., & Gavaruzzi, T. (2021). Associations of COVID-19 risk perception with vaccine hesitancy over time for Italian residents. *Social Science & Medicine*, 272, Article 113688.

Centers for Disease Control and Prevention (CDC). (2022, August 17). *Benefits of getting a COVID-19 vaccine*. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/vaccine-benefits.html.

Child, D. (2006). *The Essentials of Factor Analysis* (3rd ed.). Bloomsbury Academic.

Coccia, M. (2022). Optimal levels of vaccination to reduce COVID-19 infected individuals and deaths: A global analysis. *Environmental Research*, 204, Article 112314.

Costa Jr, P. T., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and individual differences, 13*(6), 653–665. [CrossRef]

Cırakoglu, O. C. (2011). Domuz gribi (H1N1) salgınıyla ilişkili algıların, kaygıve kaçınma düzeyi değişkenleri bağlamında incelenmesi. *Turk Psikoloji Dergisi, 26*(67), 49–64. [Turkish]

Douglas, K. M. (2021). COVID-19 conspiracy theories. *Group Processes & Intergroup Relations, 24*(2), 270–275.

Eryılmaz, A., & Ogulmus, S. (2010). Subjective well-being and big five personality model

at adolescence. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi, 11*(3), 189–203. [Turkish]

Ferrer, R., Klein, W., Lerner, J., Reyna, V. F., & Keltner, D. (2016). Emotions and health decision-making: extending the appraisal tendency framework to improve health and healthcare. In C. Roberto, & I. Kawachi (Eds.), *Behavioral economics and public health* (pp. 101–132). Harvard University Press. [CrossRef]

Flynn, K. E., & Smith, M. A. (2007). Personality and health care decision-making style. *The Journals of Gerontology: Series B, Pschological Sciences and Social Sciences, 62*(5), 261–267. [CrossRef]

Genis, B., Gurhan, N., Koc, M., Genis, C., Sirin, B., Cirakoglu, O. C., & Cosar, B. (2020). Development of perception and attitude scales related with COVID-19 pandemia. *Pearson Journal of Social Sciences & Humanities, 5*(7), 306–326.

Gerber, A. S., Huber, G. A., Doherty, D., & Dowling, C. M. (2011). The big five personality traits in the political arena. *Annual Review of Political Science, 14*, 265–287. [CrossRef]

Goertzel, T. (1994). Belief in conspiracy theories. *Political Psychology, 15*(4), 731–742. [CrossRef]

Graziano, W. G., & Eisenberg, N. (1997). Agreeableness: A dimension of personality. In R. Hogan, J. Johnson & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 795–824). Academic Press. [CrossRef]

Hwang, S. E., Kim, W. H., & Heo, J. (2022). Socio-demographic, psychological, and experiential predictors of COVID-19 vaccine hesitancy in South Korea, October-December 2020. *Human Vaccines & Immunotherapeutics, 18*(1), 1–8. [CrossRef]

Jiang, N., Gu, P., Liu, K., Song, N., & Jiang, X. (2021). Acceptance of COVID-19 vaccines among college students: A study of the attitudes, knowledge, and willingness of students to vaccinate. *Human Vaccines & Immunotherapeutics, 17*(12), 4914–4924. [CrossRef]

Karatas, Z., & Tagay, O. (2021). The relationships between resilience of the adults affected by the covid pandemic in Turkey and Covid-19 fear, meaning in life, life satisfaction, intolerance of uncertainty and hope. *Personality and Individual Differences*, 172, Article 110592. [CrossRef]

Kaya, L., & Aydın-Kartal, Y. (2022). Hesitancy towards a COVID-19 vaccine among midwives in Turkey during the COVID-19 pandemic: A cross-sectional web-based survey. *European Journal of Midwifery, 6*(3), 1–8. [CrossRef]

Kim, P. S. (2021) South Korea's fast response to coronavirus disease: Implications on public policy and public management theory. *Public Management Review, 23*(12), 1736–1747. [CrossRef]

Kwok, K. O., McNeil, E. B., Tsoi, M. T. F., Wei, V. W. I., Wong, S. Y. S., & Tang, J. W. T. (2021). Will achieving herd immunity be a road to success to end the COVID-19 pandemic? *Journal of Infection, 83*(3), 381–412. [CrossRef]

Lauriola, M., & Levin, I. P. (2001). Personality traits and risky decision-making in a controlled experimental task: An exploratory study. *Personality and Individual Differences, 31*(2), 215–226. [CrossRef]

Lazarus, J. V., Ratzan, S. C., Palayew, A., Gostin, L. O., Larson, H. J., Rabin, K., Kimball, S., & El-Mohandes, A. (2021). A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine, 27*(2), 225–228.

Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology, 81*(1), 146–159.

Malik, A., Malik, J., & Ishaq, U. (2021). Acceptance of COVID-19 vaccine in Pakistan among healthcare workers. *PloS One, 16*(9), Article e0257237. [CrossRef]

Mant, M., Aslemand, A., Prine, A., & Jaagumägi Holland, A. (2021). University students' perspectives, planned uptake, and hesitancy regarding the COVID-19 vaccine: A multi-methods study. *PloS One, 16*(8), Article e0255447. [CrossRef]

Martin-Raugh, M. P., Kell, H. J., & Motowidlo, S. J. (2016). Prosocial knowledge mediates effects of agreeableness and emotional intelligence on prosocial behavior. *Personality and Individual Differences, 90*, 41–49. [CrossRef]

McCrea R. R., & Jr Costa, P. T., (2005). *Personality in adulthood, a five-factor theory in perspective* (2nd ed.). The Guilford Press.

Milligan, M. A., Hoyt, D. L., Gold, A. K., Hiserodt, M., & Otto, M. W. (2022). COVID-19 vaccine acceptance: Influential roles of political party and religiosity. *Psychology, Health & Medicine, 27*(9), 1907–1917. [CrossRef]

Ministry of Health of the Republic of Turkey. (Dec 08, 2022). General Table of Coronavirus. 2022. https://covid19.saglik.gov.tr/TR-66935/genel-koronavirus-tablosu.html

Mo, P. K., Luo, S., Wang, S., Zhao, J., Zhang, G., Li, L., Li, L., Xie, L., & Lau, J. T. F. (2021). Intention to receive the COVID-19 vaccination in China: Application of the diffusion of innovations theory and the moderating role of openness to experience. *Vaccines, 9*(2), Article 129.

Murphy, J., Vallières, F., Bentall, R. P., Shevlin, M., McBride, O., Hartman, T. K., McKay, R., Bennett, K., Mason, L., Gibson-Miller, J., Levita, L., Martinez, A. P., Stocks, T. V. A., Karatzias, T., & Hyland, P. (2021). Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. *Nature Communications, 12*(1), Article 29. [CrossRef]

Nindrea, R. D., Usman, E., Katar, Y., & Sari, N. P. (2021). Acceptance of COVID-19 vaccination and correlated variables among global populations: A systematic review and meta-analysis. *Clinical Epidemiology and Global Health, 12*, Article 100899. [CrossRef]

Norman, W. T. (1963). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. *The Journal of Abnormal and Social Psychology, 66*(6), 574–583. [CrossRef]

Peng, X. L., Xu, X. J., Small, M., Fu, X., & Jin, Z. (2016). Prevention of infectious diseases by public vaccination and individual protection. *Journal of Mathematical Biology, 73*(6-7), 1561–1594. [CrossRef]

Pilch, I., Wardawy, P., & Probierz, E. (2021). The predictors of adaptive and maladaptive coping behavior during the COVID-19 pandemic: The protection motivation theory and the big five personality traits. *PloS One, 16*(10), Article e0258606. [CrossRef]

Pivetti, M., Melotti, G., Bonomo, M., & Hakoköngäs, E. (2021). Conspiracy beliefs and acceptance of covid-vaccine: An exploratory study in Italy. *Social Sciences, 10*(3), Article 108. [CrossRef]

Qiu, W., Mao, A., Rutherford, S., & Chu, C. (2016-2017). The pandemic and its impacts. *Health, Culture and Society, 9*-10, 3–11. [CrossRef]

Reno, C., Maietti, E., Fantini, M. P., Savoia, E., Manzoli, L., Montalti, M., & Gori, D. (2021). Enhancing COVID-19 vaccines acceptance: Results from a survey on vaccine hesitancy in Northern Italy. *Vaccines, 9*(4), Article 378.

Riaz, M. N., Riaz, M. A., & Batool, N. (2012). Personality types as predictors of decision-making styles. *Journal of Behavioural Sciences, 22*(2), 99–114.

Salali, G. D., & Uysal, M. S. (2020). COVID-19 vaccine hesitancy is associated with beliefs on the origin of the novel coronavirus in the UK and Turkey. *Psychological Medicine*, 1–3. [CrossRef]

Sampath, S., Khedr, A., Qamar, S., Tekin, A., Singh, R., Green, R., & Kashyap, R. (2021). Pandemics throughout the history. *Cureus, 13*(9), Article e18136. [CrossRef]

Satıcı, B., Gocet-Tekin, E., Deniz, M. E., & Satıcı, S. A. (2021). Adaptation of the fear of COVID-19 scale: Its association with psychological distress and life satisfaction in Turkey. *International Journal of Mental Health and Addiction, 19*(6), 1980–1988. [CrossRef]

Scrima, F., Miceli, S., Caci, B., & Cardaci, M. (2022). The relationship between fear of COVID-19 and intention to get vaccinated. The serial mediation roles of existential anxiety and conspiracy beliefs. *Personality and Individual Differences, 184*, Article 111188. [CrossRef]

Somer, O. (1998). The five-factor model in personality traits. *Turkish Psychological Review, 1*(2), 35–62. [Turkish]

Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Pearson Education.

Tam, C. C., Qiao, S., & Li, X. (2022). Factors associated with decision making on COVID-19 vaccine acceptance among college students in South Carolina. *Psychology, Health & Medicine, 27*(1), 150–161. [CrossRef]

The Turkish Ministry of Health. (Nov 27, 2022). *COVID-19 bilgilendirme platformu*. https://covid19.saglik.gov.tr/ [Turkish]

TRT News. (Oct 8, 2021). *Gençlerde vaka sayısı artıyor*. https://www.trthaber.com/haber/saglik/genclerde-vaka-sayilari-artiyor-615361.html [Turkish]

Van der Linden, S. (2015). The conspiracy-effect: Exposure to conspiracy theories (about global warming) decreases pro-social behavior and science acceptance. *Personality and Individual Differences, 87*, 171–173. [CrossRef]

Weng, S. H., Ni, A.Y., Ho, A. T. K., & Zhong, R. X. (2020). Responding to the coronavirus pandemic: A tale of two cities. *The American Review of Public Administration, 50*(6–7), 497–504. [CrossRef]

Wirawan, G. B. S., Mahardani, P. N. T. Y., Cahyani, M. R. K., Laksmi, N. L. P. S. P., & Januraga, P. P. (2021). Conspiracy beliefs and trust as determinants of COVID-19 vaccine acceptance in Bali, Indonesia: Cross-sectional study. *Personality and Individual Differences, 180*, Article 110995. [CrossRef]

World Health Organization. (2022). (Dec 08, 2022) *WHO coronavirus (COVID-19) dashbord.* https://covid19.who.int/

Wu, X., Lu, Y., Zhou, S., Chen, L., & Xu, B. (2016). Impact of climate change on human infectious diseases: Empirical evidence and human adaptation. *Environment International, 86*, 14–23. [CrossRef]

Yamauchi, T., Suka, M., & Yanagisawa, H. (2022). Personality traits, media exposure, and deterioration of psychological wellbeing in Japan during the COVID-19 pandemic. *The Journal of Nervous and Mental Disease, 210*(2), 83–90.

Yanto, T. A., Octavius, G. S., Heriyanto, R. S., Ienawi, C., Nisa, H., & Pasai, H. E. (2021). Psychological factors affecting COVID-19 vaccine acceptance in Indonesia. *The Egyptian Journal of Neurology, Psychiatry and Neurosurgery, 57*(1), Article 177. [CrossRef]