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Arastırma Makalesi

The Relationship Between Vaccine Hesitancy and Personality Traits

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Makale Bilgisi

Keywords:

Vaccine hesitancy, personality traits, COVID-19, Turkey, neuroticism

Abstract

The current study aimed to examine the relationship between vaccine hesitancy and personality traits. 404 volunteers between the ages of 18-65 participated in the study. Sociodemographic Data Form, Scale of Vaccine Hesitancy [SVH], and Big Five Inventory [BFI] were administered. The determined relationships between the SVH-total scores and specific personality traits were as follows: a positive weak correlation with neuroticism scores (p = 0.05; r = 0.10), a weak negative correlation with the conscientiousness scores (p = 0.03; r = -0.11), and a weak negative relationship between the agreeableness scores (p = 0.03; r = -0.20). The results of the T-test and ANOVA revealed that vaccine hesitancy levels differed on the basis of marital status and age [Marital Status: $t(402)$ = 1.99; Age: p = 0.05; $F(3, 400)$ = 3.27; p = 0.05]. According to multiple linear regression analysis, agreeableness and age variables predicted vaccine hesitancy levels [Agreeableness (ß = -.16; p = .004); Age (ß = .13; p = .02)]. The results of our study showed that personality factors are associated with vaccine hesitancy. It was reported that individuals with high neurotic personality levels have an increase in vaccine hesitancy levels. Similarly, as the agreeableness and conscientiousness scores decreased, the anti-vaccination levels increased. We believe that our findings will be helpful in predicting the tendency of individuals to be vaccine hesitant and in determining the target group in vaccine persuasion studies.

Anahtar kelimeler:

Aşı karşıtlığı, Kişilik özellikleri, COVID-19, Türkiye, nevrotiklik

Öz

Çalışmamızın amacı aşı karşıtlığı ile kişilik özellikleri arasındaki ilişkinin incelenmesidir. Çalışmaya 18-65 yaş arası 404 gönüllü kişi katılmıştır. Katılımcılara Sosyodemografik Veri Formu, Aşı Karşıtlığı Ölçeği [AKÖ] ve Beş Faktör Kişilik Envanteri [BFI] uygulanmıştır. Katılımcıların AKÖ-toplam puanları ile nevrotiklik puanları arasında pozitif yönlü ilişki olduğu (p = 0.05; r = 0.10), sorumluluk puanları arasında negatif yönlü çok zayıf ilişki olduğu (p = 0.03; r = -0.11) ve uyumluluk puanları arasında negatif yönlü zayıf ilişki olduğu (p = 0.03; r = -0.20) tespit edilmiştir. Bunun yanı sıra, yürütülen T testi ve Anova analizleri sonucunda aşı karşıtlığının araştırmaya dahil edilen sosyodemografik değişkenlerden evlilik durumu ve yaşa göre farklılaştığı tespit edilmiştir [Evlilik Durumu: $t(402)$ = 1.99; Yaş: p = 0.05; $F(3, 400)$ = 3.28; p = 0.05] Çoklu doğrusal regresyon analizine göre ise uyumluluk ve yaş değişkenleri aşı karşıtlığını yordamaktadır [Uyumluluk (ß = -.16; p = .004); Yaş (ß = .13; p = .02)]. Çalışmamızın sonuçları aşı karşıtlığında kişilik faktörlerinin ilişkili olduğunu göstermektedir. Nevrotik kişilik düzeyleri yüksek olan bireylerin aşı kararsızlığı düzeylerinde artış olduğu görülmektedir. Benzer biçimde bireylerin uyumluluk ve sorumluluk puanları düştükçe aşı karşıtlığı düzeylerinde artış gözlemlenmiştir. Bulgularımızın bireylerin aşı karşıtlığı eğilimlerini öngörmede ve aşı ikna çalışmalarında hedef kitlenin belirlenmesine yardımcı olacağına inanmaktayız.

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Introduction

Vaccine hesitancy is defined as “delay in accepting vaccines or refusal to vaccine administration despite the availability of vaccine services” (WHO, 2015). The first vaccination applications occurred as a result of the studies on the smallpox vaccine by the British Doctor Edward Jenner, and after this discovery, opposition to the vaccination also emerged (Kutlu & Altındiş, 2018). Although opposition to vaccination is an individual attitude, it has the power to affect the whole society compromising the acquisition of social immunity (Yiğit et al., 2020). Vaccination is questioned and opposed for several reasons that are primarily related to scientific, political, religious, philosophical, and conspiracy-based beliefs (Ataç & Aker, 2014; Larson et al., 2014). Beliefs such as the chemicals in vaccines are harmful to human health, the companies producing the vaccines have financial benefits, it is possible to protect against diseases by alternative natural means, and someone is not at risk are the leading arguments put forward against vaccines (Ataç & Aker, 2014; Gür, 2019).

Much of the literature on vaccine hesitancy focuses on the apparent reasons why some individuals support anti-vaccination. The information obtained about the noticeable causes of vaccination opposition is helpful in many ways. However, it is also essential to identify the psychological processes that push individuals to resist vaccines (Larson et al., 2014; Marti et al., 2017; Schmid et al., 2017). Identifying such mechanisms will contribute to the determination of why some individuals are reluctant to be vaccinated and to develop more effective actions to address their concerns. It has been suggested that psychological structures such as altruistic beliefs, neuroticism and conscientiousness personality traits, locus of control, and cognitive reflection might be related with vaccine acceptance or opposition (Amit et al., 2018; Damnjanovic et al., 2018; Johnson, 2000; Patty et al., 2017; Rieger, 2020).

Personality, which is one of the factors associated with anti-vaccination; is conceptualized as the entirety of the individual’s inherited and acquired abilities, motives, feelings, wishes, habits, and behaviors, which are permanent across different situations and times, distinguishing a person from other people with these aspects (Burger, 2016; İnanç & Yerlikaya, 2021). Distinctive models and opinions are suggested to identify and assess personality. The five-factor model of personality recognizes the individual’s personality across five fundamental dimensions titled Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience (McCrae & John, 1992). The extraversion personality dimension typically represents the individual's sociability and assertiveness level; agreeableness is more related to interpersonal relations and refers to the individual's cooperation; conscientiousness is the individual's self-control and tactfulness; neuroticism refers to the individuals who are emotionally unstable and more prone to experiencing negative

emotions; and the openness to experience is associated with the individual's openness to new feelings, thoughts, and activities (Benet-Martinez & John, 1998; Horzum et al., 2017).

There are few studies examining the relationship between vaccine hesitancy and personality traits. In one of those recent studies, Howard (2022) revealed that extraversion and openness are negatively related to vaccine hesitancy, while conscientiousness has a positive relation with reluctance to get vaccinated. Besides, it is also shown that decreased neuroticism is a predictor of vaccine hesitancy (Halstead et al., 2022) while agreeableness is the only predictor of supporting vaccination (Murphy et al., 2021). Such studies have revealed that the relationship between vaccine hesitancy and personality traits varies by situation, country, and scales used. Therefore, it is essential to conduct various replication studies in other samples.

Our study aimed to examine the relationship between personality, which is one factor that drives individuals against vaccination, and vaccination attitudes in Turkey. In addition, the relationship between relevant factors and sociodemographic variables was also inspected within the scope of the current study. Since these variables have not been investigated together in a Turkish sample before, we believe that our findings will provide a preliminary ground for future research focusing on the relationship between anti-vaccination and personality traits in Turkey. As the literature findings are inconclusive, it was mainly hypothesized that personality traits would be associated with vaccine hesitancy. Based on the limited data available in the literature, we expected that extraversion and openness to experience would be negatively correlated with vaccine hesitancy; while there would be a positive association between conscientiousness and vaccine hesitancy. Besides, neuroticism was expected to have a significant negative correlation with vaccine hesitancy, and a positive association was hypothesized between agreeableness and hesitancy to get vaccinated.

Method

Procedure

The study was carried out via correlational design, and a straightforward snowball sampling method was used based on the principle of accessibility-convenience. The data collection process was carried out by constructing an online questionnaire via Google Forms and sending the questionnaire link to students, academics, other people, and their social circles. The purpose of the study was explained on the first page of the link and participants were provided to an informed consent form for voluntary participation. Then, those who agreed to participate were asked to fill out the questionnaire online. A sociodemographic data form containing descriptive information such as gender, age, marital status, education,

occupation, income level, Scale of Vaccine Hesitancy [SCI], and Big Five Inventory [BFI-44] were administered to the participants. The study was approved by the Ethics Committee of the University of Health Sciences (2021-37/11).

Participants

Primarily, a power analysis was calculated by using the version of G*Power 3.1.9.7. A-priori power analysis was conducted to detect effect size with a significance (α) of 5 % and power (1-β) of 95 % for correlation. This analysis suggested the number of participants required to be included in the research was 138. A total of 404 people, 70.8% (*n* = 286) female and 29.2% (*n* = 118) male, aged between 18-65 participated in the study. Age ranges of participants were revealed as follows; 37.6% (*n* = 152) were between 18-25 age range, 30.7% (*n* = 124) were between 26-35 age range, 22.5% (*n* = 91) were between 36-50 age range, and 9.2% (*n* = 37) of them were between the 51-65 age range. As for education, the participants were dispersed as follows; 10.6% (*n* = 43) were primary school graduates, 15.1% (*n* = 61) were high school graduates, and 74.3% (*n* = 300) were university graduates. Lastly, 35.9% (*n* = 145) of the participants were married, 64.1% (*n* = 259) were single; 48.5% (*n* = 196) were working, 13.6% (*n* = 55) were not working, and 37.9% (*n* = 153) were students. In addition, 18.8% (76) of the participants reported that their economic levels as low, 74.8% (302) as medium, and 6.4% (26) as high.

Measures

Sociodemographic Data Form. It was developed by researchers to obtain information such as gender, age, educational status, marital status, occupation, and perceived income level of the participants.

Scale of Vaccine Hesitancy [SVH]. Kılınçarslan et al. (2020) developed a scale to measure individuals' vaccine hesitancy levels. The scale is a five-point Likert type (1 = strongly disagree, 5 = strongly agree), rated self-report tool which has a 21-item long-form and a 12-item short-form. The long form of the scale was used in the study. The 21-item long form consists of 4 subscales conceptualized as benefit and protective value of vaccine (e.g., “If everyone is vaccinated, the diseases will decrease”), vaccine repugnance (e.g., “Vaccines have disadvantages as much as their advantage”), solutions for non-vaccination (e.g., “The vaccine should be optional, not mandatory”), and legitimization of vaccine hesitancy (e.g., “I may refuse vaccination because I am afraid of injections”) besides the single factor total score. The first five items of the scale are reverse-coded. Higher scores obtained from the scale indicate that the individual's opposition to vaccination is high. In the original study, the Cronbach

Alpha value of the scale was 0.86 (Kılınçarslan et al., 2020). Cronbach Alpha score of the scale in the current study was .74.

Big Five Inventory [BFI-44]. The scale consisting of 44 items and five subscales was developed by Benet-Martinez and John (1998) to assess personality traits. It is a self-report tool and items are rated on a five-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). It examines personality traits in 5 sub-dimensions: extraversion (e.g., "Is talkative"), openness to experience (e.g., "Is original, comes up with new ideas"), neuroticism (e.g., "Is depressed, blue"), conscientiousness (e.g., "Does a thorough job"), and agreeableness (e.g., "Has a forgiving nature"). Sümer and Sümer (2005) carried out the Turkish validity and reliability study and found that Cronbach Alpha scores of the subscales range between .70 and .79. Cronbach Alpha score of the scale in the current study was .75.

Statistical Analysis

After the data obtained from the participants were coded, they were analyzed with the SPSS 26.0 package program. No questions or missing values were found prior to the analysis. Since the sample size of the current study was greater than 30, it was determined to use Kolmogorov–Smirnov test to inspect the assumption of normality rather than the Shapiro-Wilk test. As indicated, the normality distribution of the data was examined with the Kolmogorov-Smirnov test of normality, and it was observed that there were variables with and without normal distribution. Since the number of participants was over 30 and the skewness and kurtosis values of the variables were between -2 and +2, it was decided to use parametric tests (George, 2011; Pallant, 2013).

In the analysis of sociodemographic data, a t-test analysis was used to detect the differentiation of two-category variables according to scale scores, analysis of variance [ANOVA] was applied to determine the differentiation of variables with more than two categories according to scale scores, various post-hoc tests were performed to determine the source of differences between groups. Pearson correlation analysis was applied to identify the relationships among the study variables, and multiple linear regression analysis was utilized to determine the variables that predicted the level of vaccine hesitancy. The significance level was accepted as 0.05 in all statistical analyses conducted in the study.

Results

Vaccine Hesitancy Scores of the Groups According to Sociodemographic Data

Each component of the sociodemographic data had its level of vaccine hesitancy (see Table 1). As stated above, the research sample consisted predominantly of women, and women's vaccine hesitancy level (M = 56.7, SD = 9.7) was lower than men's (M = 57.3, SD = 11.5). On the other hand, the groups were not homogeneously distributed in terms of age, and the participants between the ages of 18-25 constituted the majority. The vaccine hesitancy levels of the age groups were as follows: 18-25 years (M = 56.4, SD = 10.3), 26-35 years (M = 56.3, SD = 9.4), 36-50 years (M = 59.5, SD = 11.5), and 51-65 age (M = 54.0, SD = 8.5). Married individuals (M = 56.1, SD = 10) had higher vaccine hesitancy levels than singles (M = 58.2, SD = 10.5) although the groups did not have an equal sample size.

Table 1.

Vaccine Hesitancy Scores of the Groups According to Sociodemographic Data: ANOVA Scores

	n	%	$\bar{x}$	*SD*	*F*	*p*
Age*					3.27	.02
18-25 age	152	37.60	56.40	10.30		
26-35 age	124	30.70	56.30	9.40		
36-50 age	91	22.50	59.50	11.50		
51-65 age	37	9.20	54.00	8.50		
Education Level					1.79	.15
Primary school	27	6.70	59.60	11.40		
Middle School	16	4.00	59.50	11.50		
High school	61	15.10	58.20	10.30		
University and above	300	74.30	58.20	10.10		
Occupation					.93	.45
Student	153	37.90	56.40	10.30		
Employed	196	48.50	57.20	10.20		
Housewife	36	8.90	57.70	10.50		
Retired	9	2.20	52.10	8.40		
Unemployed	10	2.50	60.10	11.10		
Economic Level					1.12	.33
Low	76	18.80	56.20	8.30		
Moderate	302	74.80	57.30	10.60		
High	26t	6.40	54.50	11.40		

n = number of observations, % = percentage value, $\bar{x}$ = mean, *SD* = standard deviation
*$p < .05$
**$p < .01$

In addition, the vaccine hesitancy levels of our sample differed according to education levels: Primary school (M = 59.6, SD = 11.4), Middle school (M = 59.5, SD = 11.5), High school (M = 58.2, SD = 10.3), and University and above (M = 58.2, SD = 10.1). In terms of occupation, the levels turned out as follows: Student (M = 56.4, SD = 10.3), Employed (M = 57.2, SD =

10.2), Housewife (*M* = 57.7, *SD* = 10.5), Retired (*M* = 52.1, *SD* = 8.4), and Unemployed (*M* = 60.1, *SD* = 11.1). Finally, vaccine hesitancy appeared as follows by income level: Low (*M* = 56.2, *SD* = 8.3), Moderate (*M* = 57.3, *SD* = 10.6), and High (*M* =54.5, *SD* = 11.4). Further analyses were conducted to test for statistically significant differences in the groups' vaccine hesitancy levels.

Association Between Demographic Characteristics and the Vaccine Hesitancy

Before examining the main hypotheses, the differentiation of the sociodemographic data of the participants according to the total scores of the scale of vaccine hesitancy was examined. As a result of F tests and Levene's Test, the homogeneity of variances assumption was met for all of the variables except income level and age. As seen in Table 1 and Table 2, gender [$t(402) = -.51$; $p = .05$; Cohen's $d = 0.05$], educational status [$F(3, 400) = 1.79$, $p = .05$; $\eta^2 = .04$], profession [$F(4, 399) = .92$, $p = .05$; $\eta^2 = .01$] and income level [$F(2, 401) = 1.12$, $p = .05$; $\eta^2 = .05$] did not show a statistically significant difference in the participants' vaccine hesitancy scores. It was found that marital status showed statistically significant differences with a small effect size in the participants' total scores on the vaccine hesitancy scale. It was observed that the married people obtained higher total scores on the scale of vaccine hesitancy when compared with single people [$t(402) = 1.99$, $p = 0.05$; Cohen's $d = 2.80$]. Besides, it was found that age showed statistically significant differences in terms of total vaccine hesitancy scores [$F(3, 400) = 3.27$, $p = 0.05$; $\eta^2 = .03$]. However, the age variable did not meet the homogeneity of variances assumption; therefore, the statistically significant finding should be interpreted with caution. As a result of the post-hoc analysis, it was observed that the total scores of the individuals in the 36-50 age group on the vaccine hesitancy scale were higher than those in the 51-65 age group (Table 3). The vaccine hesitancy levels of the participants aged 18-25 and 26-35 did not differ statistically significantly from other age groups.

Table 2.

Vaccine Hesitancy Scores of the Groups According to Sociodemographic Data: T Test Scores

	n	%	$\bar{x}$	*SD*	*t*	*P*
Gender					-.52	.60
Women	286	70.80	56.70	9.70		
Men	118	29.20	57.30	11.50		
Marital Status*					2.00	.04
Single	259	64.10	56.10	10.00		
Married	145	35.90	58.20	10.50		

n = number of observations, % = percentage value, $\bar{x}$ = mean, SD = standard deviation

*$p < .05$

**$p < .01$

Table 3.

Multiple Comparison Scores of the Age Groups According to Vaccine Hesitancy Total Scores

Post Hoc Analysis - Scheffe						
Dependent Variable: Vaccine Hesitancy Total Score						
(I)	(J)	Mean Difference	Std.		95% Confidence Interval	
Age Group	Age Group	(I-J)	Error	Sig.	Lower Bound	Upper Bound
18-25	26-35	,13	1,2	1,0	-3,3	3,6
	36-50	-3,1	1,4	,15	-6,9	,68
	51-65	2,4	1,87	,65	-2,8	7,6
26-35	18-25	-,13	1,2	1,0	-3,6	3,3
	36-50	-3,2	1,4	,15	-7,2	,70
	51-65	2,3	1,9	,70	-3,1	7,6
36-50	18-25	3,1	1,3	,15	-,68	6,9
	26-35	3,2	1,4	,15	-,70	7,2
	51-65	5,6	1,1	,05	-,06	11,1
51-65	18-25	-2,4	1,87	,64	-7,60	2,80
	26-35	-2,3	1,9	,70	-7,60	3,1
	36-50	-5,50	1,9	,05	-11,1	,06

Correlation Between Vaccine Hesitancy Scores and Personality Trait Scores

As shown in Table 4, there was a weak positive correlation between the participants' total scores on the scale of vaccine hesitancy and their neuroticism scores (r = 0.10, p = .05), a very weak negative correlation between vaccine hesitancy and the conscientiousness scores (r = -0.11, p = .03), and a weak negative correlation between vaccine hesitancy and agreeableness scores (r = -0.20, p = .03). There was no significant relationship between the participants' total scores of vaccine hesitancy and their extraversion and openness to experience scores (p = .48, p = .56, respectively) (Table 4).

Table 4.

Correlation Coefficients Between Vaccine Hesitancy Scores and Personality Traits Scores

Variables	**1**	**2**	**3**	**4**	**5**	**6**
1. Vaccine Hesitancy						
2. Extraversion	-.04					
3. Neuroticism	.10*	-.19**				
4. Conscientiousness	-.11*	.30**	-.37**			
5. Agreeableness	-.20**	.34**	-.36**	.43**		
6. Openness to Experience	.03	.38**	-.13**	.24**	.22**	

*p < .05
**p < .01

Multiple Linear Regression Analysis Results of Variables Predicting the Total Score of Vaccine Hesitancy

While the multiple linear regression analysis was conducted to determine the predictors of the vaccine hesitancy level, sociodemographic variables and personality traits were included in the equation. Marital status and age, the only demographic variables significantly related to the outcome variable, included the regression model along with the Big-Five personality traits. Since the sociodemographic variables included in the analysis were categorical, the analysis was carried out by arranging the dummy variable. The age variable, which has more than two categories, was arranged into two categories: those between 36-50 and others. The effect of being married for the marital status variable and the effect of being in the 36-50 age group for the age variable was examined. It was observed that the final model explained 8% of the total variance in vaccine hesitancy scores and the model was significant [$FModel(7, 396) = 4.79, p = .001$]. Agreeableness ($\beta = -.16,\ p = .004$) and age ($\beta = .13,\ p = .02$) contributed significantly to the model; however, openness to experience ($\beta = .09, p = .07$), level of conscientiousness ($\beta = -.08,\ p = .14$), marital status ($\beta = .08,\ p = .16$), level of neuroticism ($\beta = .05,\ p = .30$), and extraversion level ($\beta = -.01,\ p = .90$) had no significant contribution to the model (Table 5).

Table 5.

Multiple Linear Regression Analysis Results of Variables Predicting the Total Vaccine Hesitancy Score

Variable	*B*	Standard Error	*β*	*t*	*p*	Paired *r*	Partial *r*
Constant	65.10	5.91	-	11.02	.000	-	-
Age	3.21	1.35	.13	2.38	.02	.14	.12
Marital Status	1.7	1.22	.08	1.39	.17	.10	.07
Extraversion	-.01	.10	-.007	-.12	.90	-.04	-.006
Neuroticism	.10	.09	.06	1.04	.30	.10	.05
Conscientiousness	-.16	.11	-.09	-1.5	.14	-.11	-.07
Agreeableness	-.34	.12	-.17	-2.90	.04	-.20	1.14
Openness to Experience	.16	.09	.10	1.8	.07	.03	.09

$R = .280$ $R^2 = .078$

F (7-396) = 4.797, $p = 0.000$

Discussion

The Relationship Between Vaccine Hesitancy and Demographics

Marital status and age, which are sociodemographic factors, were associated with vaccination opposition. It was observed that the total scores of married people on the vaccine hesitancy scale were higher than those of single people. Studies indicate mixed results regarding the relationship between marital status and vaccine hesitancy (Özceylan et al., 2020; Roshchina et al., 2022). Although there was a significant association between these two variables in our study, the effect size was small, as stated above. The situation brings up the existence of potential confounding variables. Roshchina et al. (2022) determined that marriage was significant only for the female sample in the context of anti-vaccination. So, gender may be one of the confounding variables that should be considered in further studies.

The analysis of age, another factor associated with vaccine hesitancy, indicated that people aged 51-65 had lower vaccine hesitancy scores than those aged 36-50. Based on this result, it is conceivable that the opposition to vaccination decreases with increasing age. Numerous studies in the literature showed that vaccine hesitancy is greater among young individuals (Fisher et al., 2020; Lazarus et al., 2021; McElfish et al., 2021). A recent study conducted in the United Kingdom and Ireland found that the younger ages are significantly associated with COVID-19 vaccine opposition (Murphy et al., 2021). In another study conducted in Japan, the COVID-19 anti-vaccine scores of young participants were higher than those of older participants (Okubo et al., 2021). Consistent with the studies listed, another study conducted in Australia found that older individuals were less resistant and less hesitant to the COVID-19 vaccine (Edwards et al., 2021). Although young participants have similar drawbacks regarding vaccines' possible adverse effects and safety as older participants, their higher vaccine hesitancy level is explained by their low probability of having the disease (Okubo et al., 2021).

We found that gender, income level, education level, and occupation were not associated with anti-vaccination. In parallel with our findings, several studies found no significant relationship between education and income level, and vaccine hesitancy (Roshchina et al., 2022). Besides, existing studies showed a significant relationship between education level and vaccine hesitancy, but with mixed results regarding the direction of the relationship. While some studies have found that higher education is associated with less resistance and hesitancy to vaccines (Edwards et al., 2021; Roshchina et al., 2022); Özceylan et al. (2020), others reported that higher education level is associated with higher rates of vaccine hesitancy. Studies showing a significant relationship between gender and vaccine hesitancy specified that

women are more resistant to vaccines (Edwards et al., 2021; Murphy et al., 2021; Okubo et al., 2021; Özceylan et al., 2020). Unlike our findings, it was found that there is a significant relationship between vaccine hesitancy and income level; vaccine hesitancy increases as the income level decreases (Edwards et al., 2021; Murphy et al., 2021; Okubo et al., 2021; Özceylan et al., 2020).

The Relationship Between Vaccine Hesitancy and Personality Traits

The current study found a weak significant relationship between vaccine hesitancy and agreeableness, conscientiousness, and neuroticism. It was found that as individuals' anti-vaccination scores increased, their agreeableness and, conscientiousness scores decreased. However, neuroticism scores increased. It was observed that there was no statistically significant relationship between extraversion and openness to experience and vaccine hesitancy. When the studies investigating the relationship between vaccine hesitancy and personality traits are explored, it has been found that there are results consistent with our findings. Murphy et al. (2021) reached essential conclusions regarding this relationship in their study conducted on two separate samples in the United Kingdom and Ireland. In the Irish sample, the agreeableness personality trait scores of individuals who were against the COVID-19 vaccine were lower than those who accepted the COVID-19 vaccine. Besides, in the UK sample, individuals against the COVID-19 vaccine had lower scores for agreeableness and conscientiousness personality traits and higher scores for neuroticism than those who were not against the vaccine. Another study conducted with university students in Italy revealed that participants who scored higher on the agreeableness sub-dimension had lower vaccine hesitancy (Salerno et al., 2021). In addition, the findings of a study conducted in Russia indicated that high vaccine hesitancy was associated with lower levels of openness to experience, conscientiousness, and agreeableness (Roshchina et al., 2022). Lin and Wang (2020), in their study executed in the United States, demonstrated that individuals with high agreeableness and conscientiousness scores evaluated vaccination as more beneficial for their health. On the other hand, Howard (2022) found that the increase in individuals' hesitations about vaccination is associated with a decrease in openness to experience and extraversion and an increase in their level of conscientiousness.

Studies in the literature demonstrate that although vaccine-hesitant individuals' social, economic, cultural, political, and geographical characteristics differ, their psychological profiles are similar. People against the COVID-19 vaccine differed from those who accepted the vaccine by being more self-interested, distrustful of experts and authority figures (i.e., scientists, health professionals, government agencies), and skeptical. It has also been observed

that they are more likely to believe that their life is primarily under their control. Finally, it has been found that these individuals are more prone to impulsive thinking, and accordingly, they display maladaptive, emotionally unstable, and irresponsible character traits (Aarøe et al., 2017; Murphy et al., 2021). In addition to these, narcissism, psychopathy, and disgust sensitivity were also associated with vaccine hesitancy (Howard, 2022). Lastly, in other studies about the indecision about COVID-19 vaccines; it is associated with many factors such as a low sense of collective responsibility, altruism, perceived risk of illness, high self-confidence, low responsiveness to stress, and cognitive biases (Barello et al., 2021; Karlsson et al., 2021; Salali & Uysal, 2022; Salerno et al., 2021).

Our study examined the relationship between vaccine hesitancy and personality traits, a psychological determinant of anti-vaccination. In addition to this association, our country's social determinants of vaccine hesitancy are also an influential element affecting our findings. In the literature, there is no empirical study investigating the relationship between personality traits and vaccine hesitancy in a Turkish sample; however, as a result of descriptive analysis, it was specified that individuals with high vaccine hesitancy have investigative and interrogative personality traits (Yiğit et al., 2020). This result provides support for the negative correlation between agreeableness and vaccine hesitancy reported in the current study.

On the other hand, the findings of vaccine hesitancy are not only for the COVID-19 vaccine (Sarı et al., 2017; Kurçer et al., 2005), despite the most recent investigations focusing on this subject. In a study examining the perspectives of people on COVID-19 vaccine hesitancy in a Turkish sample, have been identified as; not trusting the companies producing vaccines, thinking that the vaccine cannot protect against COVID-19, not seeing themselves in the risk group against COVID-19, and having the idea that the virus is artificial (Yılmaz et al., 2021). Researchers have suggested that the content also feeds these factors that cause vaccine hesitation on social media. Furthermore, intriguing findings were reached in a study investigating the main reasons for vaccine hesitancy in the Turkish sample through Twitter content. Suspicions about the reality of COVID-19, beliefs that vaccines are produced to control social life, distrust of vaccine developers, and hesitations about the compatibility of vaccines with religion have come to the fore as the reasons for anti-vaccination (Şahin, 2022). In another study, it was seen that people in our country were vaccine-hesitant due to reasons such as the lack of protection of vaccines, concern about side effects, foreign production, lack of adequate experimental studies on vaccines, and being against religious belief (Tekin et al., 2022). As a result of the research, these perceptions formed in society's viewpoint about vaccines may have contributed to vaccine hesitancy. Therefore, we suppose that the thoughts about vaccines in our country may have impacted the results we specified in our research.

Research findings should be interpreted considering various limitations. Initially, this research was conducted as a cross-sectional study. In addition, the presence of possible confounding variables can be predicted in the statistical analysis process. Despite the assurance of anonymity in the answers during the data collection process, the participants may have answered the questions far from reality due to social desirability. Also, the majority of respondents were university students, thus, our sample may not have comprehensively represented the general population. Besides, since the data collection process was organized during the COVID-19 period, the participants may have answered the questions based on COVID-19 vaccines. At last, the sample sizes of the compared age and gender groups were unequal. At this point, it should be considered that the groups are not homogeneously distributed while interpreting the research results. For future work, ANCOVA could also be considered as an alternative analysis if the gender variable is found to be confounding. Despite all these limitations, our findings reveal a relationship between vaccine hesitancy and personality traits.

Conclusion

Identifying the psychological processes that drive individuals to vaccine hesitancy not only helps explain why vaccine-hesitant individuals hold certain beliefs but can also provide an opportunity to modify public health messages to be consistent with these individuals' psychological dispositions (Hornsey et al., 2018; Hornsey & Fielding, 2017; Siddiqui et al., 2013). The results of our research showed that there is a relationship between vaccine hesitancy and personality traits in the Turkish sample. Individuals with higher neurotic personality levels have heightened vaccine hesitancy levels. Similarly, as the agreeableness and conscientiousness levels of the individuals decreased, an increase in vaccine hesitancy levels followed. The hypothesis that extraversion and openness to experience are negatively related to vaccine hesitancy was not supported while the other hypotheses were supported. We believe that our findings will help determine individuals who are more prone to be vaccine-hesitant based on their personality traits and identify the target groups in vaccine persuasion studies. At the same time, the findings of our study showed that socioeconomic variables such as gender, income level, education level, and occupation were not associated with vaccine hesitancy in Turkey. In our country, it has been observed that personality traits and age factors are associated with vaccine hesitancy. We think that these factors should be integrated into the vaccine persuasion studies.

Public health messages are primarily delivered by governments, scientists, and medical professionals (Murphy et al., 2021). It is assumed that scientific consensus among

academicians, psychologists, and health care professionals and the communication of these ideas to the public in an open, direct, and repetitive manner will positively affect the indecision about vaccination. As a result of our findings, we believe that sociodemographic risk factors should be taken into account when giving public health messages about vaccine hesitancy. Young adults and, married individuals with higher vaccine hesitancy may be particularly targeted.

In a study comparing those who did and did not have the Covid-19 vaccine in our country, the fact that the vaccinated people have higher life satisfaction and lower levels of depression and anxiety shows that the vaccine has a protective function in terms of mental health as well as physical health for individuals (Bilge et al., 2022). Due to the rapid increase in vaccine hesitancy in our country recently, the Ministry of Health has created a website called "asi.saglik.gov.tr" to provide practical information about vaccines and raise awareness about vaccination in society (Gür, 2019). In addition to this initiative, it is critical to develop educational programs for the young population of society by using the basic principles of cognitive and social psychology and preparing educational videos and posters that explain the possible effects of vaccine-preventable diseases and the benefits of vaccines. Lastly, it is thought that practices such as ensuring that healthcare professionals establish efficient communication with the individuals and parents to be vaccinated and controlling the unscientific propaganda made by anti-vaccine people on various social media platforms will also be effective in reducing anti-vaccination opposition in society.

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Aşı Karşıtlığı ve Kişilik Özellikleri Arasındaki İlişkinin İncelenmesi

Özet

Aşı hizmetlerinin bulunmasına rağmen aşıların kabulünde gecikme veya aşıların uygulanmasını reddetme olarak tanımlanan aşı karşıtlığı; bireysel bir tavır olsa da toplumun bütününü etkileme gücüne sahiptir ve toplumsal bağışıklığın kazanılmasını olumsuz yönde etkilemektedir. Aşıların içeriğinde bulunan kimyasal maddelerin insan sağlığına zararlı olduğu, aşıyı üreten firmaların maddi menfaatleri bulunduğu, alternatif doğal yollarla hastalıklardan korunmanın mümkün olduğu ve risk altında olunmadığı gibi inanışlar aşı karşıtlığında ileri sürülen argümanların başında gelmektedir. Aşı karşıtlığı ile ilgili literatürün büyük bir kısmı bireylerin aşı karşıtı olmalarının açık nedenlerine odaklanmaktadır. Aşı karşıtlığının açık nedenleri hakkında elde edilen bilgiler birçok açıdan yararlıdır ancak bireyleri bu konuda dirençli olmaya iten psikolojik süreçleri belirlemek de büyük önem taşımaktadır. Çalışmamızın amacı aşı karşıtlığı ile bireyleri bu konuda dirençli olmaya iten psikolojik süreçlerden biri olan kişilik özellikleri arasındaki ilişkinin incelenmesidir. Çalışma, ilişkisel tarama ve karşılaştırma yöntemleri ile yürütülmüştür. Örneklemin belirlenmesinde ulaşılabilirlik–elverişlilik ilkesine göre kolay ve kartopu örnekleme yöntemi kullanılmıştır. Çalışmaya 18-65 yaş arası 404 gönüllü kişi katılmıştır. Katılımcılara cinsiyet, yaş, medeni durum, eğitim, meslek, gelir düzeyi gibi tanımlayıcı bilgileri içeren sosyodemografik veri formu, Aşı Karşıtlığı Ölçeği [AKÖ] ve Beş Faktör Kişilik Envanteri [BFI-44] uygulanmıştır. Çalışma için Sağlık Bilimleri Üniversitesi Etik Kurulundan onay alınmıştır. Katılımcılardan elde edilen veriler kodlandıktan sonra SPSS 26.0 paket programı aracılığı ile analiz edilmiştir. Yapılan analizler sonucunda katılımcıların AKÖ-toplam puanları ile nevrotiklik puanları arasında pozitif yönlü ilişki olduğu (p = .045; r = 0.100), sorumluluk puanları arasında negatif yönlü çok zayıf ilişki olduğu (p = .025; r = -0.112) ve uyumluluk puanları arasında negatif yönlü zayıf ilişki olduğu (p = .025; r = -0.202) tespit edilmiştir. Çalışmaya katılanların AKÖ-toplam puanları ile dışa dönüklük ve deneyime açıklık puanları arasında anlamlı ilişki olmadığı (p = .475, p = .557 sırasıyla) görülmüştür. Aşı karşıtlığı düzeyinin yordayıcılarını belirlemek için yapılan çoklu doğrusal regresyon analizi incelendiğinde, eşitliğe sosyodemografik değişkenler ve kişilik özellikleri dahil edilmiştir. Medeni durum değişkeni için evli olmanın etkisi, yaş değişkeni için ise 36-50 yaş grubunda olmanın etkisi incelenmiştir. Oluşan modelin, aşı karşıtlığı düzeyine ilişkin toplam varyansın %8'ini açıkladığı ve modelin anlamlı olduğu görülmektedir [$FModel(7, 396) = 4{,}79$, p = .001]. Yaşın (β = .131; p = .05) ve uyumluluk düzeyinin (β = -.167; p = .06) modele anlamlı katkılarının olduğu ancak medeni durumun (β = .080; p = .05), dışa dönüklük düzeyinin (β = -.007; p = .05), nevrotiklik düzeyinin (β = .056; p

= .05), sorumluluk düzeyinin (β = -.086; p = .05) ve deneyime açıklık düzeyinin (β = .096; p = .05) modele anlamlı bir katkısının olmadığı belirlenmiştir Çalışmamızın sonuçları aşı karşıtlığında kişilik faktörlerinin ilişkili olduğunu göstermektedir. Nevrotik kişilik düzeyleri yüksek olan bireylerin aşı karşıtlığı düzeylerinde artış olduğu görülmektedir. Benzer biçimde bireylerin uyumluluk ve sorumluluk puanları düştükçe aşı karşıtlığı düzeylerinde artış gözlemlenmiştir. Bireyleri aşı kararsızlığına iten psikolojik süreçleri belirlemek, aşılara karşı kararsız olan bireylerin neden belirli inançlara sahip olduklarını açıklamaya yardımcı olmakla kalmaz, aynı zamanda halk sağlığı mesajlarını bu bireylerin psikolojik eğilimleriyle tutarlı olacak şekilde uyarlama fırsatı da sağlayabilir. Bulgularımız neticesinde aşı karşıtlığı için ortak sosyodemografik risk faktörlerine dayanarak halk sağlığı mesajları; genç yetişkinler ve evli bireyler dahil olmak üzere, aşı karşıtı olma olasılığı daha yüksek olan grupları hedef alabilir. Araştırma bulgularının kişilik özelliklerine göre hangi bireylerin aşı karşıtlığına eğilimli olduğunu öngörmede ve gerekli aşı ikna çalışmalarında hedefleyeceği grubu tespit etme konusunda yardımcı olacağına inanılmaktadır.