Sociodemographic and Psychological Correlates of COVID-19 Vaccine Hesitancy and Resistance in the Young Adult Population in Italy

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1. Introduction

Since its outbreak in late 2019, the COVID-19 pandemic has caused over 5 million deaths across the globe and still represents a major public health concern [1,2]. Although conclusive empirical evidence is available on the safety and effectiveness of COVID-19 vaccines and mass vaccination campaigns have progressed substantially [3,4], many people are still reluctant or reject COVID-19 vaccine uptake, therefore compromising the achievement of 'herd immunity' [5]. Previous research suggests that this phenomenon is more frequent among young adults (18-40 years) [6,7], posing a threat to older people who are more vulnerable to the virus and facilitating the spread of new COVID-19 variants. Thus, identifying the factors that more strongly influence acceptance of COVID-19 vaccines in young adults is paramount to tailor communication strategies, fight misinformation, and improve vaccination coverage in this segment of the population [6], especially in light of the recent resurgence of infections and the consequent decision of many countries to accelerate administration of third doses of COVID-19 vaccines [8].

Vaccine hesitancy, defined as "delay in acceptance or refusal of vaccination despite availability of vaccination services" [9, p. 4161], is a multidetermined phenomenon involving individual, group, and contextual factors as well as vaccine-specific influences. Recent studies have investigated people's hesitancy in receiving a COVID-19 vaccine, highlighting a large variation in prevalence rates across countries [10,11]. Among the most relevant predictors of COVID-19 vaccine hesitancy, researchers have identified socio-demographic factors (e.g., age, gender, educational level, income), trust in several entities (e.g., scientists, government, medical system), perceived threat and risk of the coronavirus disease, and political ideologies [12]. However, the majority of extant studies addressing COVID-vaccine hesitancy has been conducted at a time when no COVID-19 vaccine was publicly available, therefore limiting the generalizability of results. Indeed, the availability of COVID-19 vaccines has been shown to

impact on people's behavioral intentions related to vaccine uptake, although the evidence is mixed. For example, some studies have found that the availability of multiple COVID-19 vaccines is linked to less compliance with safety measures (e.g., social distancing) and to refusal of specific vaccines based on their reported side effects and efficacy [13]. However, other studies also documented an increased vaccination uptake, especially in low- and middle-income countries [14,15]. Furthermore, large-scale surveys mostly comprise broad age ranges (e.g., from 18 to over 65 years), failing to address the specificities which characterize the period of young adulthood (18-40 years). This period involves the exploration of options in education and work as well as changes in personal values and beliefs, social relationships, and health concerns, all of which may affect individuals' compliance with preventive behaviors [16].

In line with recent calls for research focusing on the factors that influence COVID-19 vaccine hesitancy in different cultural contexts and populations [17], the current study aimed to expand existing knowledge by investigating the sociodemographic profiles and psychological characteristics of young adults who are hesitant/resistant to the uptake of a COVID-19 vaccine in the midst of a mass vaccination campaign. In doing so, we included measures tackling personality, mental health, social support, beliefs, and socio-political attitudes to characterize individuals expressing hesitancy and resistance vs. acceptance of a COVID-19 vaccine. The study was conducted in Italy, the first country after China being hit by the pandemic and which suffered a large number of fatalities during the first and second waves [18]. Italy was also among the first European countries to sign contracts for COVID-19 vaccines. The vaccination campaign started on December 27th 2020 and, despite some initial problems with vaccine supplies, it proceeded at a relatively fast pace until reaching 37% vaccination coverage at the time this study was conducted (June 2021). To date (29 November), the country has one of the highest vaccination rates in Europe, with over 80% of

the population aged 12+ being fully vaccinated against COVID-19 [19]. Yet, heavy protests of anti-vaccination movements as well as delays in anti-COVID-19 immunization due to hesitant individuals continue to represent a major concern for public authorities. Thus, understanding the psychological factors involved in young adults' reluctance or refusal of COVID-19 vaccines is essential to improve communication strategies, increase immunization uptake, and ultimately prevent the spread of new coronavirus variants that can have devastating effects at all levels of society.

2. Method

2.1 Sample

The study was approved by the Ethics Committee of the University of [blinded] (protocol n. [blinded]).

Data collection took place between June 21st and 28th, 2021. Participants were recruited via an ISO-certified international survey company (respondi.com) based on the following inclusion criteria: (1) being aged between 18 and 40 years, (2) residing in Italy, and (3) being able to complete the survey in Italian. Quota-based sampling ensured that the sample was representative of the country's population in terms of age, gender, and geographic region (North vs South). The final sample comprised 1200 participants.

Respondents were directed via a study link to the Qualtrics platform and provided informed consent prior to completing the survey, which took about 10 minutes to complete.

2.2 Measures

COVID-19 vaccine hesitancy was measured via the following questions: "Did you receive a COVID-19 vaccine?" and "If not, do you intend to receive one?" [20,21]. Participants were classified as 'vaccine accepting' if they responded 'yes' or 'I intend to get is as soon as possible', 'vaccine hesitant' if they responded 'I intend to wait to see how it affects

76 others in the community before I get it' or 'I do not intend on getting it soon, but might
77 sometime in the future', and 'vaccine resistant' if they responded 'I do not intend to ever get
78 the vaccine'. Participants who chose the 'prefer not to answer' response option were excluded
79 from data analysis (see Results section).
80 The personality trait of Environmental Sensitivity was assessed via the 12-item Highly
81 Sensitive Person Scale-Brief Version (e.g., "Do changes in your life shake you up?";
82 Cronbach's α= 84) [22] using a seven-point Likert scale ranging from 1 (*not at all*) to 7
83 (*completely*). Depressive symptoms were measured with the Hopkins Symptom Checklist-25
84 (e.g., "During the past seven days, I have felt low in energy, slowed down"; Cronbach's α=
85 .96) [23] using a four-point Likert scale ranging from 1 (*not at all*) to 4 (*very much*).
86 Perceived social support from family and friends was assessed through the 8-item
87 Multidimensional Scale of Perceived Social Support (e.g., "I can count on my friends when
88 things go wrong"; Cronbach's α = .92) [24] using a seven-point Likert scale ranging from 1
89 (*strongly disagree*) to 7 (*strongly agree*). Negative attitudes toward vaccines were assessed
90 via the 12-item Vaccination Attitudes Examination (e.g., "Vaccines make a lot of money for
91 pharmaceutical companies, but do not do much for regular people"; Cronbach's α= .91) [25]
92 using a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*),
93 while the endorsement of conspiracy beliefs was measured with 4 items (e.g., "The
94 government is misleading the public about the cause of the Coronavirus"; Cronbach's α= .87)
95 [26] using a five-point Likert scale ranging from 1 (*disagree*) to 5 (*totally agree*). With regard
96 to socio-political attitudes, perceptions of a just government were evaluated with a 4-item
97 measure (e.g., "In Italy you have an equal chance no matter where you are coming from";
98 Cronbach's α= .75) [27] using a seven-point Likert scale ranging from 1 (*strongly disagree*)
99 to 7 (*strongly agree*), and perceived identification and commitment to country of residence
100 was measured via the 8-item Attachment subscale of the Measure of Identification with the

National Group (e.g., "It is important to me to contribute to Italy"; Cronbach's α = .94) [27,28] using a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Demographic questions were asked at the end of the survey. Specifically, participants reported on their gender, age, region of residence, educational level, annual income, employment status, religion, as well as exposure to COVID-19, i.e., "To your knowledge, have you or anyone around you (in your family, community, neighborhood, group of friends, etc.) been diagnosed with COVID-19?". Response options for all these questions are presented in Table 1 (left column).

2.3 Data analysis

First, we calculated the proportion of people classified as 'vaccine accepting', 'vaccine hesitant', and 'vaccine resistant'. Next, we conducted multinomial logistic regression analysis (MLRA) to identify the sociodemographic characteristics associated with vaccine hesitancy and resistance, using the vaccine acceptance group as the reference category. The model was then re-estimated using the vaccine hesitant group as the reference category to analyze the sociodemographic characteristics differentiating the resistant from the hesitant group. In these analyses, all associations between the predictor and criterion variables are represented as adjusted odds ratios with 95% confidence intervals. Second, a multivariate analysis of variance (MANOVA) was conducted to compare the three groups (i.e., accepting, hesitant, and resistant) on the psychological variables, with eta squared (η^2) being used as a measure of effect size.

3. Results

3.1 Study participants and characteristics

Complete data were obtained from 1200 participants. Of these, 73% were classified as 'vaccine accepting', 17.6% as 'vaccine hesitant', 7.5% as 'vaccine resistant', whereas 1.9%

chose the 'prefer not to answer' option. To ascertain whether the latter respondents (n = 23) differed from those who did not (n = 1177), we conducted attrition analysis using binary logistic regression, with all sociodemographic and psychological characteristics included as independent variables, and group (i.e., preferring not to answer vs. answering the COVID-19 vaccine-related question) as the outcome variable. No significant associations were detected (all ps > .05), with one exception: those who preferred not to answer the COVID-19 vaccine hesitancy measure were also more likely to choose the 'prefer not to answer' response option in the exposure to COVID-19 related question (p < .05). Hence, we excluded the 'prefer not to answer' group from subsequent analyses, resulting in a sample of N = 1177. Table 1 (left column) reports the sociodemographic characteristics of the sample.

3.2 Sociodemographic variables associated with COVID-19 vaccine hesitancy and resistance

Given the complexity of the models, we reduced the number of subcategories of the predictors (see Table 1, right column) to ensure the validity of results and facilitate interpretation. Specifically, we excluded participants who chose the category 'Other' in relation to gender (n = 3, 0.2%), and those who preferred not to answer the exposure to COVID-19 question (n = 15, 1.3%). Attrition analysis revealed no significant associations of these variables with the sociodemographic and psychological characteristics (all ps > .05), except for perceived social support (p < .05), which was lower among those who preferred not to respond to the exposure to COVID-19 related item. Thus, the final sample for the two MLRAs consisted of 1159 participants.

Sociodemographic variables were entered simultaneously in the MLRA, with 'vaccine acceptance' initially used as the reference category. The likelihood ratio test of the final model (with all the predictors) against the null model (with intercept only) was statistically significant, $\chi^2(20) = 136.60$, p < .001, meaning that the final model outperformed the null

model and at least one predictor had influence on COVID-19 vaccine acceptance/hesitancy/resistance. Pearson's chi-square statistic suggested that model fit was adequate, $\chi^2(594) = 606.05$, $p = .36$. Pseudo R^2, which indicates the variance explained by the model, was acceptable, Cox & Snell $R^2 = .11$, Nagelkerke $R^2 = .15$, and McFadden's $R^2 = .08$.

Table 2 shows odd ratios (OR) with 95% confidence intervals (CIs) for each category of the dependent variable for each predictor. All ORs > 1 with CIs > 1 at both lower and upper bounds were statistically significant at $p <. 05$. Those who were hesitant, compared to those who were vaccine accepting, were more likely to be aged between 30 and 40 years (OR = 1.52, 95% CI = 1.09, 2.12), to have a lower educational level than a graduate degree (OR = 4.15, 95% CI = 2.23, 7.73, for 'no qualification to middle school' and OR = 1.87, 95% CI = 1.46, 3.74 for 'finished vocational or high school'), to have a lower income level (OR = 2.34, 95% CI = 1.46, 3.74), and to have not been exposed to COVID-19 (OR = 1.62, 95% CI = 1.17, 2.25). Those who were resistant, compared to those who were vaccine accepting, were more likely to reside in North Italy (OR = 1.76, 95% CI = 1.09, 2.86), to have a lower educational level than vocational or high school (OR = 3.05, 95% CI = 1.28, 7.27), to have a lower income level (OR = 2.86, 95% CI = 1.31, 6.26), to be unemployed (OR = 2.27, 95% CI = 1.36, 3.80), and to have not been exposed to COVID-19 (OR = 3.15, 95% CI = 1.98, 5.02).

When re-estimating the same model with the vaccine hesitant group as the reference category to identify which factors distinguished vaccine resistant from vaccine hesitant respondents, two variables emerged as differentiating the two groups: the vaccine resistant group reported higher rates of unemployment (OR = 1.87, 95% CI = 1.05, 3.32) and less exposure to COVID-19 (OR = 1.94, 95% CI = 1.16, 3.26).

3.3 Comparison of vaccine accepting/hesitant/resistant groups on psychological variables

175 The MANOVA revealed significant multivariate effects of group membership (i.e.,
176 accepting/hesitant/resistant) on the psychological variables, Wilks' Lambda = .71, $F(14, 2334) = 31.36$, $p < .001$, $\eta^2 = .16$. Follow-up univariate analyses indicated that all dependent
178 psychological variables differed significantly across groups, except for environmental
179 sensitivity and depressive symptoms (see Table 3). Specifically, post-hoc Bonferroni-adjusted
180 comparisons indicated that individuals in the vaccine hesitant and resistant groups reported
181 significantly less perceived social support, higher levels of negative attitudes toward vaccines,
182 and more endorsement of conspiracy beliefs compared to the vaccine accepting group.
183 Moreover, the resistant group scored significantly lower on perception of a just government
184 and attachment to country than the accepting group (with hesitant young adults scoring in
185 between), and reported more negative attitudes toward vaccines as well as endorsement of
186 conspiracy beliefs than the hesitant group. These findings are further illustrated in Figure 1.
187
188 **4. Discussion**
189 Understanding the specific sociodemographic and psychological correlates of COVID-
190 19 vaccine hesitancy and resistance in the young adult population amid a mass immunization
191 campaign is crucial to ensure vaccination uptake and tailor public health messaging to this
192 specific age group. Our study revealed that 25% of the surveyed sample expressed hesitancy
193 or refusal of a COVID-19 vaccine. This finding is consistent with prior research conducted in
194 the United States and several European countries (including Italy) before COVID-19 vaccines
195 were available, showing that prevalence rates of hesitancy/resistance among college students
196 and adults ranged between 26% and 46% [17,29,30,31,32]. Thus, Italian young adults'
197 intention concerning vaccination seems to be relatively unaffected by the actual availability of
198 these vaccines, and recommendations based on prior literature around the need to use
199 effective communication strategies for promoting COVID-19 vaccine acceptance still apply in

this case [33]. Although public health authorities have tried to provide clear and empirically-based information on the development, safety, and effectiveness of COVID-19 vaccines, the results suggest that official messaging has not reached, or convinced, a significant group of youth, requiring more efforts from policymakers and professional organizations.

Our study also indicated that several sociodemographic characteristics were associated with COVID-19 vaccine hesitancy and resistance. Specifically, individuals with lower levels of education and income and who did not know any friend or relative diagnosed with COVID-19 were less likely to be vaccine accepting. This pattern broadly aligns with other research indicating that impoverished educational and socioeconomic conditions may negatively affect people's ability to discern fake news, access medical sources of information, and trust institutions and government [10]. Furthermore, less exposure to COVID-19 is often linked to fewer concerns about contracting the infection which, in turn, lead to greater vaccine hesitancy and resistance [34]. However, we also found some interesting differences between the two groups. In particular, hesitant (vs. accepting) individuals were more likely to belong to the 30-40 years age group, a finding that is in contrast with most of the COVID-19 literature reporting greater hesitancy among younger people [7]. An explanation refers to the specific features of the Italian context, whose population is characterized by the largest proportion of older adults in Europe (23% aged 65+), a strong emphasis on family connectedness, and the tendency of young adults to live at home with their parents until their early thirties [35,36]. These factors, together with a desire to return to normal life, may have resulted in less hesitancy among individuals aged 18-29 years [37]. The vaccine-resistant group was more likely to reside in North Italy (compared to the acceptance group) and to be unemployed (compared to the other two groups). These results mirror the higher presence of anti-vax movements in the northern regions of the country [38], and the fact that not having an occupation is frequently associated with a number of stressors which impede to prioritize

health-related behaviors such as immunization [39]. Furthermore, media coverage of vaccine-skeptic politicians belonging to right-wing, populist parties that are highly supported in this geographical region may have contributed to fueling antivaccination attitudes [40].

In terms of psychological variables characterizing the three groups, our study revealed both communalities and differences between vaccine-hesitant and resistant young adults in comparison to their accepting counterparts. For instance, hesitant individuals reported significantly higher levels of conspiracy theories related to the origins and spread of COVID-19 and negative attitudes toward vaccines in general than vaccine accepting individuals, but these scores were also significantly lower than those found in the resistant group. However, hesitant and resistant young adults perceived similar levels of social support that were significantly lower than those reported by their accepting counterparts. Thus, social support from family and friends seems to play a relevant role in shaping young adults' attitudes toward COVID-19 vaccines, possibly because a sense of connectedness to one's social network facilitates information gathering, feelings of self-efficacy, and engagement in preventive action [41]. This underlines the importance of taking care of social dimensions during a health emergency that forces the population to keep a physical distance for safety reasons. Public health prevention and intervention efforts should aim at finding and supporting alternative ways to maintain and restore social connections and networks that may have been eroded among young adults because of social distancing and confinement measures in place during the pandemic [42].

As regards government-related variables, resistant individuals reported significantly lower levels of attachment to country and perceptions of a just government compared to accepting ones, with hesitant young adults scoring in between. This finding resembles prior research indicating that perceptions that the government does not operate fairly may contribute to beliefs that the state cannot ensure protection, leading to less compliance with

social norms and prescriptions [27]. In a similar vein, the less young adults identify with and commit to their own nation, the more they endorse antisocial beliefs and behaviors [43]. This is especially true in conditions of impoverished social capital, which may exacerbate feelings of exclusion and lead to social polarization phenomena that have also been observed during the current pandemic [44].

Overall, our study supports the idea that young adults with a hesitant attitude toward COVID-19 vaccines show a more nuanced and somewhat less extreme psychological profile than their resistant counterparts, and that further differentiating within this age group is necessary to take the complexities characterizing this developmental phase into account. Specifically, the lower propensity to accept a COVID-19 vaccine found among 30-40 year-olds is attributable – at least in part - to a constellation of factors, including heightened concern about possible side effects of pharmacological treatments, worries about the effects of vaccines on one's own and other family member's health, and the achievement of a relatively stable social position (along with a specific ideology) that may lead invididuals to become less receptive to change [45]. Public health communication efforts during the COVID-19 vaccination campaign should use research-based messages addressing these specificities by facilitating identification with a relevant social group, presenting real-life experiences of this demographics, and emphasizing collective responsibility in addition to personal benefits to boost COVID-19 vaccination uptake.

Limitations of this study include a cross-sectional design, which does not allow to establish the directionality of effects; the use of a convenience sample that was not representative of the general young adult population in Italy, which may possess different characteristics from those who respond to an online survey; and the lack of differentiation among available COVID-19 vaccines, as some studies have shown that attitudes toward immunization differ according to the type of vaccine (i.e., viral vector vs. mRNA) [46].

Furthermore, other sociodemographic (e.g., ethnic minority status, underlying health conditions) and psychological variables (e.g., altruism, problematic social media use) than those considered in this work might be involved in explaining young adults' COVID-19 vaccine hesitancy and resistance. Future studies are also needed to tackle time-related changes in attitudes toward vaccines given the large number of factors (e.g., pandemic situation, restrictions, scientific information on vaccine safety and long-term effectiveness) involved in the evolution of this public health crisis [34]. Yet, our study provides novel evidence concerning the sociodemographic and psychological variables characterizing COVID-19 vaccine hesitant and resistant young adults during a mass vaccination campaign in one of the countries that was hit hardest at the early stages of the pandemic. In particular, the findings highlight the need to use a holistic approach when designing strategies to optimize participation in COVID-19 immunization campaigns by considering the specific developmental period of these individuals, their socioeconomic conditions, as well as the importance of social connectedness dimensions (i.e., family and friend support, attachment to country). This is particularly important in the current historical period marked by increasing socioeconomic disparities, structural racism, and mistrust in governmental institutions [47], as well as by a massive resurgence of infections that is leading many countries to offer booster doses of COVID-19 vaccines in order to reduce infection rates.

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452 Table 1. *Sample Characteristics*

Variable with initial response options *(N = 1177)*	%	Final variables and categories used in MLRA *(N = 1159)*	%
Gender		*Gender*	
Male	50.6	Male	50.7
Female	49.2	Female	49.3
Other	0.2		
Age		*Age*	
To be directly filled in (range 18-40 years)	100	18-29 years	46.3
		30-40 years	53.7
Regional area		*Regional area*	
North Italy	54.9	North Italy	55.0
South Italy	45.1	South Italy	45.0
Highest education		*Highest education*	
No qualification	0.2	No qualification to middle school	6.3
Finished primary school	0.1	Finished vocational or high school	51.6
Finished middle school	5.9	Graduate degree	42.1
Finished vocational school	6.1		
Finished high school	45.7		
Graduate degree	42.0		
2020 income		*2020 income*	
€ 0,000 - € 4,999	12.3	€ 0,000 - € 19,999	46.4
€ 5,000 - € 19,999	34.2	€ 20,000 - € 34,999	31.0
€ 20,000 - € 34,999	31.1	€ 35,000 +	22.6
€ 35,000 - € 49,999	15.0		
€ 50,000 +	7.4		

Employment status		*Employment status*	
Unemployed	21.1	Unemployed	21.0
Employed	52.1	Employed or student	79.0
Student	26.8		
Religion		*Religion*	
Buddhist	1.1	Christian and other	66.7
Christian (Catholic, Protestant, etc.)	62.0	No religion	33.3
Hindu	0.3		
Muslim	1.7		
Jewish	0.2		
Sikh	0.2		
No religion	33.2		
Other	1.3		
Exposure to COVID-19		*Exposure to COVID-19*	
No	34.7	No	35.1
Yes	64.0	Yes	64.9
Prefer not to answer	1.3		

Note. MLRA = Multinomial logistic regression analysis.

Table 2. *MLRA Performed to Identify the Key Sociodemographic Indicators Associated with Vaccine Hesitancy and Resistance (N = 1159)*

	Reference group (RG) = vaccine accepting						**RG = vaccine hesitant**		
	Vaccine hesitant			Vaccine resistant			Vaccine resistant		
	OR	95% CIs		OR	95% CIs		OR	95% CIs	
Gender									
Male	1.00	0.73	1.38	0.94	0.59	1.49	0.94	0.56	1.57
Female (RG)									
Age									
30-40 years	**1.52**	**1.09**	**2.12**	1.08	0.67	1.73	0.71	0.42	1.20
18-29 years (RG)									
Regional area									
North Italy	1.18	0.85	1.65	**1.76**	**1.09**	**2.86**	1.49	0.87	2.54
South Italy (RG)									
Highest education									
No qualification to middle school	**4.15**	**2.23**	**7.73**	**3.05**	**1.28**	**7.27**	0.73	0.29	1.84
Finished vocational or high school	**1.87**	**1.29**	**2.70**	1.51	0.88	2.59	0.81	0.44	1.49
Graduate degree (RG)									
2020 income									
€ 0,000 - € 19,999	**2.34**	**1.46**	**3.74**	**2.86**	**1.31**	**6.26**	1.23	0.52	2.91
€ 20,000 - € 34,999	1.01	0.60	1.68	1.92	0.86	4.25	1.90	0.77	4.70
€ 35,000 + (RG)									
Employment status									
Unemployed	1.21	0.82	1.80	**2.27**	**1.36**	**3.80**	**1.87**	**1.05**	**3.32**
Employed or student (RG)									
Religion									
Christian and other	1.24	0.87	1.76	1.28	0.77	2.12	1.03	0.58	1.82
No religion (RG)									
Exposure to COVID-19									
No	**1.62**	**1.17**	**2.25**	**3.15**	**1.98**	**5.02**	**1.94**	**1.16**	**3.26**
Yes (RG)									

Note. Chi-square test for improvement over the null model, $\chi^2(20) = 136.60$, $p < .001$. Pearson chi-square statistic to test the goodness-of-fit, $\chi^2(594) = 606.05$, $p = .36$. Cox & Snell $R^2 = .11$. Nagelkerke $R^2 = .15$. McFadden's $R^2 = .08$. Statistically significant associations ($p < .05$) are highlighted in bold. MLRA = multinomial logistic regression analyses. OR = odds ratios. CIs = confidence intervals for odds ratios.

Table 3. *Post-hoc Bonferroni-adjusted univariate analysis for vaccine acceptance/hesitance/resistance groups*

	Vaccine accepting (n = 876, 74.4%)	Vaccine hesitant (n = 211, 17.9%)	Vaccine resistant (n = 90, 7.7%)		
	Mean (SD, SE)	Mean (SD, SE)	Mean (SD, SE)	$F(2, 1174)$	η^2
Environmental Sensitivity (scored 1 to 7)	4.60 (0.95, 0.03)	4.57 (0.94, 0.07)	4.52 (0.97, 0.10)	0.27	0.00
Depressive symptoms (scored 1 to 4)	1.91 (0.64, 0.02)	1.92 (0.62, 0.04)	1.82 (0.73, 0.07)	0.80	0.00
Perceived social support (scored 1 to 7)	**4.87**^{a} (1.24, 0.04)	**4.53**^{b} (1.25, 0.09)	**4.46**^{b} (1.48, 0.13)	9.05***	0.02
Negative attitudes toward vaccines (scored 1 to 7)	**3.38**^{a} (1.06, 0.04)	**4.22**^{b} (0.86, 0.07)	**5.40**^{c} (1.00, 0.11)	194.99***	0.25
Endorsement of conspiracy beliefs (scored 1 to 5)	**1.94**^{a} (0.96, 0.03)	**2.28**^{b} (0.92, 0.07)	**3.29**^{c} (1.07, 0.10)	86.04***	0.13
Perceptions of a just government (scored 1 to 7)	**3.24**^{a} (1.20, 0.04)	**3.16**^{ab} (1.14, 0.08)	**2.84**^{b} (1.25, 0.13)	4.67*	0.01
Attachment to country (scored 1 to 7)	**4.94**^{a} (1.19, 0.04)	**4.80**^{ab} (1.29, 0.08)	**4.61**^{b} (1.42, 0.13)	3.70*	0.01

Note. A group mean is significantly different (p <. 05) from another mean within the same row if they have different superscripts. Statistically significant comparisons are in bold. $^{*}p < .05$, $^{***}p < .001$.

Figure 1. *Z-scores of environmental sensitivity, depressive symptoms, perceived social support, negative attitudes toward vaccines, endorsement of conspiracy beliefs, perceptions of a just government, and attachment to country for vaccine acceptance/hesitance/resistance groups*