

RESEARCH ARTICLE

Post-Decisional Regret in COVID-19 Vaccination Decisions: Psychological Correlates in a Greek-Speaking Sample

Marilena MOUSOULIDOU ¹ ✉, Loukia TAXITARI ², Andri CHRISTODOULOU ¹,
and Nektarios-Alexandros DAMIANOU ²

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Affiliations

¹ C.E.L.L. Lab, Department of Psychology, Neapolis University Pafos, Paphos, Cyprus

² Department of Psychology, Neapolis University Pafos, Paphos, Cyprus

✉ Correspondence

Marilena MOUSOULIDOU

C.E.L.L. Lab, Department of Psychology, Neapolis University Pafos, Paphos, Cyprus

2 Danais Avenue, 8042, Paphos, Cyprus

Email: marilena.mousoulidou@nup.ac.cy

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Introduction: Health-related decisions made during crises, such as the COVID-19 pandemic, can elicit strong emotional responses, including post-decisional regret. Understanding regret as a psychological response to such decisions may inform public health strategies and support individuals' adjustment.

Aim: This study examined post-decisional regret in COVID-19 vaccination decisions and its associations with decision-making styles, conspiracy mentality, and personality traits in a Greek-speaking sample.

Methods: 325 adults (83.1% vaccinated, 16.9% unvaccinated) completed an online questionnaire assessing post-decisional regret, decision-making styles, conspiracy mentality, personality traits, and demographics. A pooled hierarchical regression examined associations between demographics, vaccination status, decision-making styles, conspiracy mentality, and post-decisional regret. Personality traits were examined separately using Spearman rank-order correlations due to multicollinearity among dimensions.

Results: Vaccinated individuals reported significantly higher levels of regret than unvaccinated participants. The association between dependent decision-making and regret differed by vaccination status, with greater reliance on others associated with greater regret only among unvaccinated participants. A marginal interaction suggested that stronger conspiracy beliefs may be associated with greater regret among vaccinated participants. Personality traits showed modest associations with regret. Among vaccinated participants, higher scores on all Big Five traits were associated with greater regret, whereas among unvaccinated participants, higher Agreeableness was associated with lower regret.

Conclusions: Post-decisional regret appears to be a psychologically meaningful response to health-related decisions and is associated with individual differences in decision-making styles and belief systems. These findings suggest that emotional responses may be an important aspect of health-related decision-making.

Keywords: Post-decisional regret, COVID-19 vaccination, decision-making styles, conspiracy mentality, personality traits

Introduction

Decision-making is a fundamental psychological process whereby individuals evaluate available options and select an appropriate course of action, particularly in contexts characterized by uncertainty, urgency, or high personal significance. This process facilitates adaptation to environmental demands and has been associated with various cognitive and emotional factors (Morelli et al., 2022). Although many decisions in daily life are routine, health-related choices often require individuals to critically evaluate complex, ambiguous, or conflicting information, particularly during times of crisis. The COVID-19 pandemic presented a significant challenge, compelling individuals to make swift decisions about vaccination amid rapidly changing scientific evidence, shifting social expectations, and heightened emotional strain. While public health campaigns portrayed vaccination as a means of controlling viral spread and reducing mortality, individual reactions varied significantly. Some individuals accepted the vaccine readily, while others hesitated or refused, and many reported making their decision under emotional stress, uncertainty, or perceived pressure. In the aftermath, feelings of doubt and regret were not uncommon (Brera et al., 2024; Caruso et al., 2025; Cerda & García, 2021; Tayhan et al., 2025). Understanding the factors that are associated with post-decisional regret in this context may enhance our knowledge of individual psychological responses to health-related decisions and may offer practical insights for developing future health communication strategies and behavioral interventions during health crises. The present study investigates how decision-making styles, personality traits, and conspiracy mentality are associated with regret regarding individuals' COVID-19 vaccination choices.

Decision-making is a psychological process that involves evaluating options, anticipating outcomes, and selecting an appropriate response, often under conditions of uncertainty or time pressure (Squire et al., 1993; Wang & Ruhe, 2007). This process is influenced by cognitive strategies, emotional states, prior experiences, and contextual factors (Morelli et al., 2022). According to Crisis Decision Theory (Sweeny, 2008), individuals facing threatening situations first assess the severity of the event, consider possible responses, and evaluate these responses based on expected costs and benefits. In such scenarios, people may rely on heuristics—mental shortcuts that reduce cognitive load but can lead to bias when information is ambiguous or incomplete (Gigerenzer & Gaissmaier, 2011). COVID-19 created such a decision environment, characterized by evolving evidence, public health messaging, and social expectations (Cerda & García, 2021; Morelli et al., 2022). These factors may have contributed to both cognitive biases and emotional reactions, potentially influencing not only individuals' vaccination choices but also their post-decisional emotional responses to those choices.

Beyond situational influences, individuals tend to adopt stable decision-making styles, which are characteristic tendencies in how they approach choices (Scott & Bruce, 1995). These styles include rational analysis, intuitive judgment, avoidance, and dependence on others and have been linked to both the quality of choices and emotional outcomes, including regret (Diotaiuti et al., 2022; Scott & Bruce, 1995). For example, rational decision-makers engage in structured evaluation, whereas avoidant individuals may delay or defer decisions (Scott & Bruce, 1995). These styles have also been associated with post-decisional regret, although findings are not consistently uniform. Some studies suggest that rational styles are associated with lower levels of regret, possibly because they facilitate more informed choices (Simonson, 1992), while others propose that individuals who engage in more effortful processing may experience greater regret if outcomes fail to meet their expectations (Diotaiuti et al., 2022; Han et al., 2023). Taken together, these findings suggest that the relationship between decision-making styles and regret may be more complex, with previous studies reporting inconsistent patterns across contexts. This contradiction suggests that context and perceived control may influence the relationship between decision-making style and regret, particularly in high-stakes scenarios such as pandemic decision-making.

Regret is a cognitive-emotional response arising from comparing actual outcomes with imagined alternatives (Zeelenberg & Pieters, 2007). In health contexts, regret may arise when decisions lead to adverse effects or conflict with personal values. Similar patterns have been observed in other critical healthcare decisions, such as end-of-life treatment choices, where nearly one in five substitute decision-makers reported moderate-to-high regret when deciding about life support (Andersen et al., 2023). During the pandemic, some individuals who chose to be vaccinated reported experiencing regret, often linked to perceived coercion, evolving information, or mistrust of health authorities (Bayar et al., 2026; Brera et al., 2024; Luo et al., 2022; Tayhan et al., 2025). In some cases, unresolved post-decisional regret has been associated with dissatisfaction, reduced well-being, or psychological distress, especially when individuals ruminate over their decision or perceive it as inconsistent with their values or available information (Luo et al., 2022; Zeelenberg & Pieters, 2007). These experiences suggest that regret not only reflects emotional reactions but also may be associated with future behavior, including adherence to medical advice or vaccine uptake (Brehaut et al., 2003; Brewer et al., 2016; Luo et al., 2024; Tayhan et al., 2025). Viewing regret as a post-decisional psychological response offers insight into how individuals process health decisions emotionally and mentally under uncertainty.

Conspiracy mentality, the tendency to believe that powerful groups secretly manipulate events (Bruder et al., 2013), has been associated with vaccine attitudes during the COVID-19 pandemic (Imhoff & Lamberty, 2020; Maftai & Petroi, 2022; Romer & Jamieson, 2020). Such beliefs have been associated with differences in risk perceptions, lower trust in scientific authorities, and greater vaccine hesitancy (Imhoff & Lamberty, 2020; Mosconi et al., 2025), often reinforced by misinformation and social media (Mousoulidou, Siakalli, et al., 2023; Romer & Jamieson, 2020). For some individuals, receiving the vaccine despite holding such beliefs may create a discrepancy between beliefs and behavior, potentially influencing how the decision is evaluated retrospectively. This tension between conspiracy beliefs and the act of vaccinating can be explained by cognitive dissonance — the psychological discomfort that arises when one's actions conflict with deeply held beliefs (Festinger, 1957). Consequently, conspiracy beliefs may be associated with both initial choices and retrospective psychological evaluations (Bayar et al., 2026).

Among the psychological factors associated with post-decisional regret, individual differences in personality have received increasing attention. Within the Five-Factor Model (McCrae & Costa Jr., 2008), neuroticism and conscientiousness are two personality dimensions that may be relevant to how individuals approach and evaluate health-related decisions. Recent studies have shown that personality traits are associated with vaccination attitudes, hesitancy, and uptake, including during the COVID-19 pandemic (Baker & Merkley, 2023; Condie et al., 2024). These findings suggest that personality may influence how individuals approach vaccination-related decisions and respond to health-related uncertainty. Another psychological factor that may be relevant to vaccination decisions is religiosity. Religiosity can influence vaccine attitudes by shaping trust and perceived moral responsibility (Martens & Rutjens, 2022; Tiwana & Smith, 2024). Although its role varies across settings, previous research suggests that religiosity may promote vaccine acceptance through prosocial values, while in some contexts it may contribute to hesitancy when scientific recommendations are perceived as conflicting with religious beliefs (Koenig, 2020; Martens & Rutjens, 2022; Tiwana & Smith, 2024). Taken together, these findings suggest that religiosity may be relevant to understanding how individuals approach and evaluate vaccination-related decisions.

Much of the existing literature has focused on anticipated regret, the emotion people expect to experience if a decision turns out badly, and found that it is associated with vaccine intentions (Myrick & Bilandzic, 2025; Wolff, 2024). However, fewer studies have explored post-decisional (experienced) regret and its psychological connections (Stanley et al., 2026). This distinction is important: anticipated regret may influence intentions, whereas post-decisional regret reflects actual emotional responses and psychological adjustment following the decision (Brehaut et al., 2003). Consequently, the factors associated with experienced regret remain largely underexplored in the literature, despite emerging evidence linking regret to conspiracy beliefs, trust, and future vaccination intentions (Bayar et al., 2026). Moreover, although recent research has increasingly examined broader psychological characteristics associated with vaccination attitudes, including conspiracy mentality, spirituality, and distrust in science (Mosconi et al., 2025), considerably less is known about how individual differences, such as decision-making style, personality traits, and conspiracy beliefs, are associated with post-decisional regret. The current study contributes to this literature by examining associations between post-decisional regret and individual psychological characteristics in the context of COVID-19 vaccination decisions. Building on previous research in Greek-speaking populations (Constantinou et al., 2021; Mousoulidou, Christodoulou, et al., 2023), the study explores the psychological factors associated with post-decisional regret, focusing on the following variables: (a) post-decisional regret regarding COVID-19 vaccination decisions, (b) demographic characteristics, including religiosity, (c) decision-making styles, (d) conspiracy mentality, and (e) personality traits. Based on the aims and the existing literature, the following research questions were formulated:

Research Question 1 (RQ1). Are demographic characteristics (i.e., age, gender, and religiosity) associated with post-decisional regret? Given the limited literature on these associations, they will be examined in an exploratory manner.

Research Question 2 (RQ2). Are decision-making styles associated with post-decisional regret? Previous research suggests that individual differences in how decisions are approached may influence how those decisions are evaluated retrospectively.

Research Question 3 (RQ3). Is conspiracy mentality associated with post-decisional regret? Previous literature suggests that individuals high in conspiracy thinking often distrust health authorities and vaccine information. Therefore, conspiracy beliefs may influence how vaccination decisions are evaluated retrospectively and may be associated with post-decisional regret.

Research Question 4 (RQ4). Are personality traits associated with post-decisional regret? Previous research has linked personality traits to vaccination attitudes and behaviors, suggesting that personality may also be relevant to understanding post-decisional regret.

Methods

Procedure

Following approval from the Cyprus National Bioethics Committee, study measures were compiled into a single Google Forms questionnaire. Data were collected through convenience and snowball sampling between November 3, 2024 and January 11, 2025. Recruitment occurred through social media (e.g., Viber, Instagram), messaging apps, and email invitations distributed within personal and professional networks. Participants were informed of the study's purpose and duration and assured of their anonymity as well as the voluntary nature of their participation. Informed consent was obtained electronically by requiring participants to select a mandatory "Consent" option before accessing the questionnaire. The survey took approximately 10 minutes to complete and remained open until at least 300 valid responses were received.

Sample

Eligibility for participation was limited to Greek-speaking adults aged 18 and older. The final sample comprised 325 participants, including 236 women (72.6%) and 89 men (27.4%). No participants selected the "Other" gender category. Participants ranged in age from 18 to 72 years ($M = 37.06$, $SD = 14.25$). Regarding educational attainment, 20.9% had completed secondary education, 49.8% held a bachelor's degree, 26.2% held a master's degree, and 3.1% held a doctoral degree. Most participants were from Greece (74.8%), whereas the remainder were from Cyprus. The majority (83.1%) had received the COVID-19 vaccine.

Tools and Measures

Demographic Information

Data were collected on participants' age and gender. Participants were also asked to indicate whether they had received the COVID-19 vaccine (Yes/No) and rate how religious they consider themselves on a 7-point Likert-type scale ranging from 1 (Not at all) to 7 (Extremely).

Decision Regret Scale (DRS)

Post-decisional regret was assessed using the Decision Regret Scale (DRS; Brehaut et al., 2003). The Greek version by Mousoulidou and Christodoulou (2024), a five-item self-report questionnaire designed to evaluate regret following a health-related decision, was used in this study. Participants were asked to consider their decision to receive or decline the COVID-19 vaccine and rate five statements (e.g., "It was the right decision"). Responses were rated on a five-point Likert-type scale ranging from 1 (Strongly Agree) to 5 (Strongly Disagree), with higher scores indicate greater regret. Internal consistency in the present sample was excellent ($\alpha = .89$, $\omega = .92$).

General Decision-Making Styles (GDMS)

Participants' decision-making processes were examined using the General Decision-Making Styles (GDMS; Scott & Bruce, 1995) scale. The Greek version by Mousoulidou and Siakalli (2024) was employed in the current study. The GDMS is rated on a five-point Likert-type scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The scale captures five decision-making styles: (a) rational, (b) dependent, (c) spontaneous, (d) intuitive, and (e) avoidant. The Greek version of the GDMS comprises 24 items, with five items assessing each decision-making style, except for the spontaneous style, which has four items due to the removal of one item during the adaptation of the tool into Greek. Mean scores were calculated for each style. Internal consistency was good to very good across subscales (Rational: $\alpha = .83$, $\omega = .89$; Dependent: $\alpha = .81$, $\omega = .87$; Avoidant: $\alpha = .86$, $\omega = .90$; Intuitive: $\alpha = .73$, $\omega = .84$; Spontaneous: $\alpha = .77$, $\omega = .87$).

Conspiracy Mentality Questionnaire (CMQ)

Conspiracy beliefs were measured using the Conspiracy Mentality Questionnaire (CMQ; Bruder et al., 2013). The Greek version by Mousoulidou and Christodoulou (2024) was administered. The CMQ is a five-item self-report measure that assesses individuals' general tendency to believe in conspiracy theories, regardless of specific content. Responses are rated on a probability scale ranging from 0% (Not At All Likely) to 100% (Absolutely Certain). A total score is calculated by averaging item responses, with higher scores indicating stronger conspiracy beliefs. Internal consistency in the present sample was good ($\alpha = .84$, $\omega = .89$).

Five-Item Personality Inventory

Personality traits were measured using the Five-Item Personality Inventory (FIPI; Gosling et al., 2003). The current study used the Greek version by Swami et al. (2020), a brief self-report questionnaire measuring the Big Five dimensions: (a) Openness, (b) Conscientiousness, (c) Extraversion, (d) Agreeableness, and (e) Neuroticism. Each trait is represented by a single item rated on a five-point Likert-type scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). While single-item measures have limitations, the FIPI demonstrates reliable test-retest results over a two-week period and acceptable convergent validity with longer Big Five assessments (Swami et al., 2020). Given the ordinal nature of these single-item scales, Spearman rank-order correlations were used to examine associations between FIPI traits and DRS.

Data Analysis

To compare regret between vaccinated and unvaccinated individuals, a preliminary univariate ANOVA was conducted with DRS scores as the dependent variable and vaccination status as the fixed factor. Preliminary group comparisons were also conducted to examine whether vaccinated and unvaccinated participants differed by demographic characteristics. Independent-samples *t*-tests were used for continuous variables (age, religiosity) and a chi-square test for gender. To examine Research Questions 1, 2, and 3, a pooled hierarchical linear regression model was fitted to the full sample, with the total DRS score as the dependent variable. All continuous predictors were standardized (*z*-scored) prior to analysis to facilitate interpretation of interaction terms and reduce multicollinearity. Vaccination status was coded as a binary variable (0 = unvaccinated, 1 = vaccinated). Predictors were entered in five theory-driven blocks: demographic variables (age, gender, religiosity) in Block 1; vaccination status in Block 2; the five GDMS subscales (Rational, Dependent, Spontaneous, Intuitive, Avoidant) in Block 3; CMQ in Block 4; and three interaction terms (vaccination status $\times$ CMQ, vaccination status $\times$ Rational, vaccination status $\times$ Dependent) in Block 5. Prior to the pooled regression, exploratory Pearson correlations between DRS and the key predictors (GDMS subscales and CMQ) were computed separately for vaccinated and unvaccinated participants to identify predictors showing differential associations across groups (presented in [Appendix Table 1](#)). These preliminary analyses revealed that rational decision-making, dependent decision-making, and CMQ showed the largest differences in their associations with DRS across groups, providing the empirical basis for selecting these three interaction terms. The selection of interaction terms was therefore data-informed rather than arbitrary. Skewness and kurtosis of the DRS were also examined; the distribution was approximately normal (skewness = 0.18, kurtosis = -0.85) with no evidence of severe departure from normality. Model improvement was evaluated via ΔR^2 and *F*-change. Standardized betas (β), unstandardized coefficients (*B*), standard errors (*SE*), and 95% CIs are reported for the final model. Variance inflation factors (VIFs) were examined to assess multicollinearity for the final regression model. All VIF values were below 7 (range: 1.07–6.66), indicating acceptable levels of multicollinearity, although the interaction terms and their constituent predictors showed somewhat elevated VIF values (5.47–6.66). This pattern was expected, as the binary moderator (vaccination status) was highly unbalanced. Consequently, the interaction products remained highly correlated with their respective main effects despite the *z*-standardization of the continuous predictors, a form of structural multicollinearity that may reduce the statistical power to detect interaction effects. Where significant interactions were identified, simple slopes analyses were conducted to examine the association between the focal predictor and DRS at each level of the moderator (vaccinated vs. unvaccinated), with standard errors derived from the variance-covariance matrix of the final model. To examine Research Question 4, given that preliminary analyses indicated substantial multicollinearity among the FIPI personality dimensions, personality traits were examined separately using bivariate Spearman rank-order correlations with DRS scores, reported separately for vaccinated and unvaccinated participants.

Results

Preliminary analyses indicated that vaccinated participants reported significantly higher post-decisional regret than unvaccinated participants, $F(1, 323) = 5.34, p = .021, \eta^2 = .02$. Mean DRS scores were higher among vaccinated participants ($M = 13.33, SD = 5.53$) than unvaccinated participants ($M = 11.40, SD = 6.14$). Vaccinated and unvaccinated participants also differed significantly by age, $t(323) = 3.19, p = .002$, with vaccinated participants being significantly older ($M = 38.19, SD = 13.85$) than unvaccinated participants ($M = 31.55, SD = 15.03$), as well as religiosity, $t(323) = -4.86, p < .001$, with unvaccinated participants reporting significantly higher religiosity ($M = 5.22, SD = 1.66$) than vaccinated participants ($M = 3.97, SD = 1.75$). Groups did not differ in regard to gender distribution, $\chi^2(1) = 0.65, p = .419$.

To address Research Questions 1, 2, and 3, a pooled hierarchical linear regression model was estimated for the full sample ($N = 325$). Table 1 presents the model summary across all five blocks. Block 1 (demographics) was statistically significant, $R^2 = .036, F(3, 321) = 4.04, p = .008$. Block 2 (vaccination status) explained significant additional variance, $\Delta R^2 = .026, F\text{-change}(1, 320) = 8.80, p = .003$. Block 3 (GDMS subscales) added further significant variance, $\Delta R^2 = .037, F\text{-change}(5, 315) = 2.59, p = .026$. The addition of CMQ in Block 4 did not produce a statistically significant increase in explained variance over Block 3, $\Delta R^2 = .010, F\text{-change}(1, 314) = 3.68, p = .056$. The addition of the three interaction terms in Block 5 yielded a significant increment in explained variance, $\Delta R^2 = .030, F\text{-change}(3, 311) = 3.63, p = .013$, bringing the total variance explained to $R^2 = .140$. The coefficients for the final model are presented in Table 2, whereas the regression coefficients for all five blocks of the hierarchical model are provided in Appendix Table 2 of the Supplementary Material.

Table 1. Model Summary for Pooled Hierarchical Regression Predicting Post-Decisional Regret (DRS)

Block	Predictors entered	R^2	Adj R^2	ΔR^2	$F\text{-change}$	p
1	Age, Gender, Religiosity	.036	.027	—	$F(3,321) = 4.04$	.008
2	Vaccination Status	.062	.050	.026	$F(1,320) = 8.80$	.003
3	GDMS subscales (5)	.099	.073	.037	$F(5,315) = 2.59$	.026
4	CMQ	.110	.081	.010	$F(1,314) = 3.68$	.056
5	Vacc $\times$ CMQ, Vacc $\times$ Rational, Vacc $\times$ Dependent	.140	.104	.030	$F(3,311) = 3.63$	.013

Note. $N = 325$. GDMS = General Decision-Making Style subscales; CMQ = Conspiracy Mentality Questionnaire; Vacc = Vaccination Status (0 = unvaccinated, 1 = vaccinated). All continuous predictors were z-scored. * $p < .05$; ** $p < .01$.

Table 2. Unstandardized (B) and Standardized (β) Regression Coefficients for the Final Model (Block 5)

Predictor	B	SE	β	t	p	95% CI LL	95% CI UL
(Constant)	10.59	0.92	—	11.54	.000	8.79	12.40
Age	-0.46	0.32	-.08	-1.42	.158	-1.09	0.18
Gender	1.05	0.69	.08	1.52	.130	-0.31	2.40
Religiosity	0.43	0.32	.08	1.35	.178	-0.20	1.05
Vaccination Status	2.12	0.89	.14	2.38	.018*	0.37	3.87
GDMS Rational	-1.35	0.70	-.24	-1.94	.053†	-2.73	0.02
GDMS Dependent	2.24	0.77	.39	2.90	.004**	0.72	3.75
GDMS Spontaneous	-0.29	0.42	-.05	-0.68	.499	-1.12	0.55
GDMS Intuitive	-0.21	0.36	-.05	-0.82	.414	-0.99	0.41
GDMS Avoidant	0.46	0.39	.08	1.16	.246	-0.32	1.23
CMQ	-0.43	0.73	-.08	-0.59	.558	-1.85	1.00
Vacc $\times$ CMQ	1.46	0.82	.23	1.80	.073†	-0.14	3.07
Vacc $\times$ Rational	0.77	0.76	.12	1.01	.315	-0.73	2.26
Vacc $\times$ Dependent	-1.98	0.83	-.33	-2.40	.017*	-3.60	-0.35

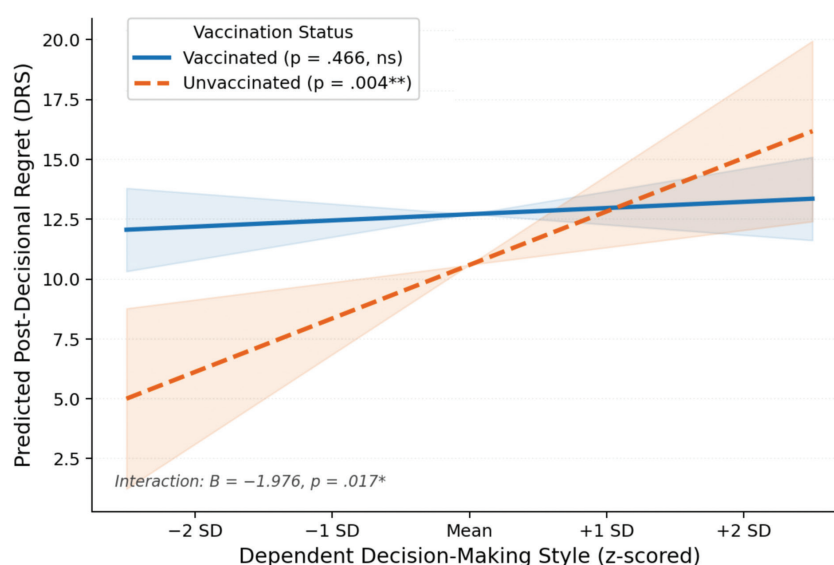
Note. $N = 325$. SE = standard error; CI = confidence interval; LL = lower limit; UL = upper limit. All continuous predictors were z-scored. Vaccination Status: 0 = unvaccinated, 1 = vaccinated. † $p < .10$; * $p < .05$; ** $p < .01$.

Across the hierarchical models, the pattern of significant predictors changed as additional variables were entered. In Block 1, age and gender were significant predictors of regret, whereas religiosity was not. Specifically, older individuals reported lower regret ($B = -0.76$), and women reported higher regret than men ($B = 1.47$). After vaccination status was added in Block 2, age remained significant, with older individuals reporting lower regret ($B = -0.92$); vaccination status emerged as a significant positive predictor, with vaccinated participants reporting higher regret than unvaccinated participants ($B = 2.56$). The effect of gender was reduced to marginal significance, with women reporting higher regret than men ($B = 1.28$). In Block 3, vaccination status remained significant, while both rational and dependent decision-making approached significance: greater rational decision-making was associated with lower regret ($B = -0.62$), whereas greater dependent decision-making was associated with higher regret ($B = 0.64$). In Block 4, vaccination status remained significant, rational decision-making became significant, with greater rational decision-making associated with lower regret ($B = -0.71$). CMQ approached significance, with higher conspiracy mentality associated with higher regret ($B = 0.61$). In the final model (Block 5), vaccination status was a significant positive predictor of regret, $B = 2.12$, $SE = 0.89$, $\beta = .14$, $t(311) = 2.38$, $p = .018$, 95% CI [0.37, 3.87], indicating that vaccinated participants reported higher regret than unvaccinated participants after controlling for all other variables. Among the GDMS subscales, dependent decision-making was a significant positive predictor of regret, $B = 2.24$, $SE = 0.77$, $\beta = .39$, $t(311) = 2.90$, $p = .004$, 95% CI [0.72, 3.75], whereas rational decision-making showed a trend toward significance, $B = -1.35$, $SE = 0.70$, $\beta = -.24$, $t(311) = -1.94$, $p = .053$, 95% CI [-2.73, 0.02]. The remaining GDMS subscales (Spontaneous, Intuitive, Avoidant) and CMQ were not significant as main effects in the final model (all p values $\geq .25$). None of the demographic predictors (age, gender, religiosity) reached significance (all p values $\geq .13$).

Regarding the interaction terms (Block 5), the vaccination status and dependent decision-making interaction was significant, $B = -1.98$, $SE = 0.83$, $\beta = -.32$, $t(311) = -2.40$, $p = .017$, 95% CI [-3.60, -0.35]. The vaccination status and CMQ interaction was marginal, $B = 1.46$, $SE = 0.82$, $\beta = .228$, $t(311) = 1.80$, $p = .073$, 95% CI [-0.14, 3.07]. The vaccination status and rational decision-making interaction was non-significant, $B = 0.77$, $SE = 0.76$, $p = .315$. Simple slopes analyses were conducted for the two interactions reaching or approaching significance.

For the vaccination status and dependent decision-making interaction, simple slopes analysis revealed that dependent decision-making was significantly and positively associated with regret among unvaccinated participants, $B = 2.24$, $SE = 0.77$, $t(311) = 2.90$, $p = .004$, 95% CI [0.73, 3.74], but was not significantly associated with regret among vaccinated participants, $B = 0.26$, $SE = 0.36$, $t(311) = 0.73$, $p = .466$, 95% CI [-0.44, 0.96]. Inspection of the interaction plot (Figure 1) revealed that the key between-group difference was observed at low levels of dependent decision-making: among individuals who tended to make decisions independently (low Dependent scores). Vaccinated participants reported substantially higher regret than unvaccinated participants. At high lev-

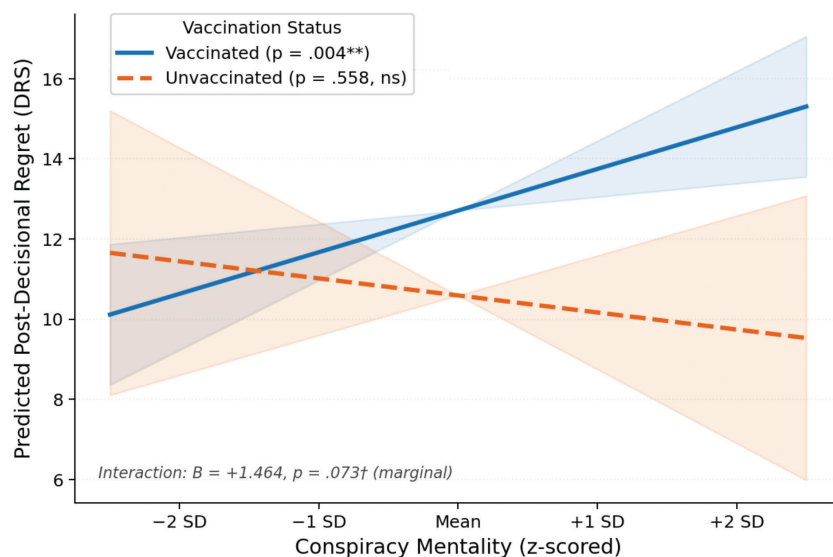
Figure 1. Simple Slopes for the Interaction Between Vaccination Status and Dependent Decision-Making Style Predicting Post-Decisional Regret (DRS).



Note. Shaded bands represent 95% confidence intervals. The slope for unvaccinated participants is significant ($p = .004$); the slope for vaccinated participants is non-significant ($p = .466$).

els of dependent decision-making, the two groups converged and their confidence intervals overlapped considerably, indicating no meaningful difference in regret between vaccinated and unvaccinated participants at that level. For the marginal vaccination status and CMQ interaction, simple slopes analysis indicated that CMQ was significantly and positively associated with regret among vaccinated participants, $B = 1.04$, $SE = 0.36$, $t(311) = 2.90$, $p = .004$, 95% CI [0.34, 1.74], but was not significantly associated with regret among unvaccinated participants, $B = -0.43$, $SE = 0.73$, $t(311) = -0.59$, $p = .558$, 95% CI [-1.85, 1.00]. This interaction is illustrated in Figure 2. Given that the overall interaction term was only marginal ($p = .073$), the simple slopes for CMQ should be interpreted with caution and treated as exploratory.

Figure 2. Simple Slopes for the Interaction Between Vaccination Status and Conspiracy Mentality (CMQ) Predicting Post-Decisional Regret (DRS).



Note. Shaded bands represent 95% confidence intervals. The slope for vaccinated participants is significant ($p = .004$); the slope for unvaccinated participants is non-significant ($p = .558$). The overall interaction term was marginal ($p = .073$); these slopes should be interpreted with caution.

To examine Research Question 4, Spearman rank-order correlations between the five personality traits and DRS were computed separately for vaccinated and unvaccinated participants. Table 3 presents the Spearman rank-order correlations between DRS and personality traits for vaccinated (upper triangle) and unvaccinated (lower triangle) participants. Several positive intercorrelations were observed among the FIPI personality traits in both groups. Among vaccinated participants, DRS showed significant positive correlations with all five traits: Openness ($\rho(268) = .12$, $p = .048$), Conscientiousness ($\rho(268) = .15$, $p = .017$), Extraversion ($\rho(268) = .20$, $p = .001$), Agreeableness ($\rho(268) = .20$, $p = .001$), and Neuroticism ($\rho(268) = .17$, $p = .005$), indicating that higher scores on all Big Five traits were associated with higher regret among vaccinated participants. Among unvaccinated participants, only Agreeableness was significantly and negatively correlated with DRS ($\rho(53) = -.32$, $p = .016$), indicating that higher agreeableness was associated with lower post-decisional regret. No significant associations were observed for the remaining personality traits.

Table 3. Spearman Rank-Order Correlations Between Post-Decisional Regret (DRS) and Personality Traits (FIPI) by Vaccination Status

Variable	1	2	3	4	5	6
1. DRS	—	.12*	.15*	.20**	.20**	.17**
2. Openness	-.22	—	.67**	.40**	.42**	.44**
3. Conscientiousness	-.15	.81**	—	.45**	.43**	.41**
4. Extraversion	-.21	.16	.22	—	.70**	.54**
5. Agreeableness	-.32*	.47**	.58**	.54**	—	.72**
6. Neuroticism	-.15	.53**	.60**	.27*	.76**	—

Note. Upper triangle (white) = vaccinated participants ($n = 270$, Spearman's ρ); lower triangle (orange, italics) = unvaccinated participants ($n = 55$, Spearman's ρ). * $p < .05$; ** $p < .01$.

Discussion

This study provides new insights into post-decisional regret by examining how decision-making styles, personality traits, conspiracy beliefs, and demographic characteristics are associated with individuals' psychological responses to a significant health-related decision. In response to growing interest in understanding how cognitive and dispositional factors are associated with the assessment of past choices under uncertainty, this research examined how these variables are associated with feelings of regret following vaccination decisions. Findings showed that vaccinated participants reported significantly more regret than unvaccinated participants. The findings also suggested that some associations between psychological characteristics and post-decisional regret varied by vaccination status. In particular, dependent decision-making and conspiracy beliefs showed different patterns of association between vaccinated and unvaccinated participants. Personality traits showed generally weak associations with regret, although several significant relationships were observed among vaccinated participants.

First, the current findings indicate that vaccinated participants experienced significantly higher post-decisional regret than unvaccinated participants. This finding is consistent with previous research showing that some individuals who received the COVID-19 vaccine later reported regret, often related to perceived pressure, evolving information, mistrust, or concerns about their decision (Bayar et al., 2026; Brera et al., 2024; Luo et al., 2022; Tayhan et al., 2025). In the context of COVID-19, this pattern may reflect changes in how individuals evaluate their vaccination decisions over time as new information becomes available and perceptions of risk evolve. These findings align with evidence that individuals revise their vaccine attitudes over time as perceptions of risk, trust, and social norms evolve (Bayar et al., 2026; Kroese et al., 2024; Okuhara et al., 2023). Even without new information, individuals may revisit past decisions, reassessing them in light of changing expectations or internal conflict (Atiya et al., 2020).

Second, the current study suggests that the association between decision-making style and post-decisional regret may vary by vaccination status. Dependent decision-making, which reflects a tendency to seek advice, guidance, and reassurance from others when making decisions (Scott & Bruce, 1995), showed different patterns of association across vaccination groups. Follow-up analyses indicated that the key difference between vaccination groups was observed among individuals with low levels of dependent decision-making, that is, those who tend to make decisions more independently. Within this group, vaccinated participants reported substantially higher regret than unvaccinated participants. In contrast, at higher levels of dependent decision-making, regret scores converged, and there was no meaningful difference between vaccinated and unvaccinated participants. Although the mechanisms underlying this interaction cannot be determined from the current data, it is possible that individuals who tend to make decisions more independently retrospectively evaluate their vaccination decisions differently than individuals who rely more heavily on others when making decisions. In situations characterized by uncertainty and ambiguity, individuals often draw on external sources of information and support when making decisions (Sweeny, 2008). Consequently, reliance on others in decision-making may attenuate differences in post-decisional regret between vaccination groups.

Third, the current findings suggest that the association between conspiracy beliefs and post-decisional regret may differ according to vaccination status. Although the interaction between vaccination status and conspiracy mentality was marginally significant, follow-up analyses indicated that stronger conspiracy beliefs were associated with higher regret among vaccinated participants but not among unvaccinated participants. Given the marginal interaction effect, this finding should be interpreted cautiously and treated as exploratory. This finding is broadly consistent with previous research (Bayar et al., 2026; Imhoff & Lamberty, 2020), suggesting that individuals who vaccinate despite distrusting authorities may later experience regret, especially when they have lingering doubts or face adverse effects. One possible explanation is that individuals who hold stronger conspiracy beliefs may continue to experience uncertainty or conflict when retrospectively evaluating their vaccination decision. The present findings suggest that conspiracy beliefs may be related not only to vaccination decisions themselves but also to how those decisions are retrospectively evaluated. The current results may also be considered in light of Cognitive Dissonance Theory (Festinger, 1957), which proposes that individuals are motivated to maintain consistency between their beliefs and actions. Individuals whose vaccination decisions are perceived as inconsistent with their underlying beliefs may therefore experience greater psychological discomfort when reflecting on those decisions. These findings may also be considered within the framework of Crisis Decision Theory (Sweeny, 2008), which suggests that post-decisional responses may be shaped not only by the context in which decisions are made but also by individuals' beliefs and interpretations of those decisions.

Finally, personality traits showed small but consistent positive associations with regret among vaccinated par-

ticipants. Using Spearman rank-order correlations, higher scores on all five Big Five traits were associated with greater regret in the vaccinated group. Among unvaccinated participants, only Agreeableness was significantly associated with regret, with higher Agreeableness associated with lower regret. Overall, these findings provided partial support for Research Question 4, though effect sizes were small. Although previous studies have linked personality traits to vaccination attitudes and behaviors (Baker & Merkley, 2023; Condie et al., 2024), considerably less is known about their association with post-decisional regret. The present findings suggest that personality may also be associated with how vaccination decisions are evaluated retrospectively, although these associations were modest and may vary by vaccination status. Given the small sample of unvaccinated participants, these findings should be interpreted cautiously. Additional research is needed before firm conclusions can be drawn about the role of personality in post-decisional regret.

It is also noteworthy that gender did not significantly predict regret in the final regression model. However, preliminary analyses indicated that vaccinated and unvaccinated participants differed significantly in both age and religiosity, suggesting these characteristics may be relevant to understanding group differences in regret. Despite these group-level differences, neither age nor religiosity emerged as significant predictors in the pooled regression model, indicating that they were not independently associated with post-decisional regret after accounting for the other variables included in the model.

Strengths and Limitations

A key strength of this study is its examination of psychological factors associated with post-decisional regret among both vaccinated and unvaccinated participants. While it offers valuable insights, several limitations should also be acknowledged. First, the sample included relatively few unvaccinated participants, which may have reduced statistical power and limited the ability to detect nuanced patterns within that group. The unequal sample sizes of the vaccinated and unvaccinated participants may also have influenced the precision of subgroup-specific analyses. Consequently, analyses conducted separately by vaccination status should be interpreted with caution. The sample was also predominantly female, young, and Greek-speaking, restricting its generalizability to broader populations. Second, the cross-sectional design limits causal inferences and prevents analysis of changes over time. Third, personality traits were analyzed separately using Spearman rank-order correlations, as preliminary analyses indicated substantial multicollinearity among the FIPI dimensions. As a result, the analytical strategy applied to personality differed from that used for the other predictors, limiting direct comparability across the analyses conducted to address the research questions. Fourth, although the study focused on decision-making styles, personality, and conspiracy mentality, other relevant variables such as risk perception and trust were not included. Additionally, health status was not assessed in the present study and may be relevant to vaccination decisions and post-decisional regret. Future research incorporating these factors could provide a more comprehensive understanding of post-decisional regret in health-related contexts. Finally, findings from studies using self-report measures should be interpreted with caution.

Conclusion, Implications, and Future Directions

In conclusion, this study offers new insights into the psychological factors associated with individuals' responses to their COVID-19 vaccination choices. The results suggest that post-decisional regret is not solely a reaction to outcomes but may also be associated with personal differences in decision-making styles, belief systems, and personality traits. Vaccinated participants reported greater regret than unvaccinated participants. The findings also suggested that some associations between psychological characteristics and post-decisional regret may differ according to vaccination status. Particularly, the association between dependent decision-making and post-decisional regret varied by vaccination status. The difference between vaccinated and unvaccinated participants was observed among individuals with low levels of dependent decision-making, whereas little difference was evident at higher levels. Exploratory analyses further suggested that stronger conspiracy beliefs may be associated with greater regret among vaccinated participants, although this finding should be interpreted with caution and requires further investigation. Personality traits showed modest associations with post-decisional regret, particularly among vaccinated participants, providing partial support for a relationship between personality and post-decisional regret. Taken together, the findings suggest that individual psychological characteristics may be relevant

to understanding post-decisional responses during periods of uncertainty. Future research may further examine how psychological characteristics relate to individuals' evaluations of health-related decisions. This study adds to ongoing research at the intersection of cognition, belief, and decision-making, providing a more nuanced understanding of how individuals reflect on significant decisions in complex, emotionally charged contexts. Future research could examine whether public health messages that account for individual decision-making styles and belief orientations may support psychological adjustment and reduce negative emotional responses, such as regret.

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Author contribution

Marilena MOUSOULIDOU: conceptualization, design, methodology, investigation, project administration, interpretation, supervision, writing original, writing review and editing.

Loukia TAXITARI: methodology, investigation, data management, formal analysis, interpretation, writing review and editing.

Andri CHRISTODOULOU: design, methodology, investigation, writing review and editing.

Nektarios-Alexandros DAMIANOU: investigation, interpretation, writing original draft, writing review and editing.

Declaration of interest statement

The authors have no relevant financial or non-financial interests to disclose.

Ethical statement

This manuscript is the authors' original work.

All participants engaged in the research voluntarily and anonymously. Informed consent was obtained from all participants involved in the study. Their data are stored in coded materials and databases without personal data.

The study was conducted in accordance with the guidelines of the Declaration of Helsinki. Ethical approval was received from the Cyprus National Bioethics Committee (ref no: EEBK/EII/2024.01.251, 12 September 2024).

Data availability statement

The original data presented in the study are openly available in the Open Science Framework repository at <https://osf.io/ypqr6/>

Declaration on using artificial intelligence in research and manuscript preparation

The authors used AI technologies in the preparation of the manuscript, but not in the research. ChatGPT was used for manuscript preparation, specifically for language editing, clarity improvement, and minor rephrasing. All content was reviewed, edited, and approved by the authors, who take full responsibility for the final manuscript.

ORCID

Marilena MOUSOULIDOU  <https://orcid.org/0000-0002-3549-2522>

Loukia TAXITARI  <https://orcid.org/0000-0002-6782-7534>

Andri CHRISTODOULOU  <https://orcid.org/0000-0002-3281-3327>

Nektarios-Alexandros DAMIANOU  <https://orcid.org/0009-0009-7738-8086>

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Appendix

Table 1. Pearson Correlations Among DRS, GDMS Subscales, and CMQ by Vaccination Status

Variable	1	2	3	4	5	6	7
1. DRS	—	-.10	.11	.01	-.07	.12*	.21**
2. Rational	<i>-.31*</i>	—	.07	-.36**	.07	-.20**	.09
3. Dependent	<i>.32*</i>	<i>.21</i>	—	+.19**	.11	.34**	.20**
4. Spontaneous	<i>.37**</i>	<i>-.16</i>	<i>.32*</i>	—	.40**	.55**	.12*
5. Intuitive	<i>.09</i>	<i>.53**</i>	<i>.24</i>	<i>+.33*</i>	—	.18**	.20**
6. Avoidant	<i>.25</i>	<i>-.32*</i>	<i>.38**</i>	<i>+.68**</i>	<i>.06</i>	—	-.33*
7. CMQ	<i>-.22</i>	<i>.36**</i>	<i>-.03</i>	<i>-.28*</i>	<i>.11</i>	<i>-.33*</i>	—

Note. Upper triangle (white) = vaccinated participants ($n = 270$, Pearson's r); lower triangle (grey, italics) = unvaccinated participants ($n = 55$, Pearson's r). DRS = Decision Regret Scale; GDMS = General Decision-Making Styles subscales; CMQ = Conspiracy Mentality Questionnaire. * $p < .05$; ** $p < .01$.

Table 2. Unstandardised (*B*) and Standardised (β) Regression Coefficients for All Blocks of the Hierarchical Regression Model

Predictor	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>
Block 1 $R^2 = .036$, Adj $R^2 = .027$, $F(3, 321) = 4.04$, $p = .008$					
(Constant)	11.94	0.60	—	20.03	<.001
Age	−0.76	0.31	−.13	−2.43	.016*
Gender	1.47	0.70	.12	2.09	.037*
Religiosity	0.16	0.31	.03	0.52	.604
Block 2 $R^2 = .062$, Adj $R^2 = .050$, $\Delta R^2 = .026$, $F\text{-change}(1, 320) = 8.80$, $p = .003$					
(Constant)	9.95	0.89	—	11.15	<.001
Age	−0.92	0.31	−.16	−2.94	.004**
Gender	1.28	0.70	.10	1.84	.066†
Religiosity	0.41	0.32	.07	1.28	.203
Vaccination Status	2.56	0.86	.17	2.97	.003**
Block 3 $R^2 = .099$, Adj $R^2 = .073$, $\Delta R^2 = .037$, $F\text{-change}(5, 315) = 2.59$, $p = .026$					
(Constant)	10.08	0.89	—	11.30	<.001
Age	−0.64	0.32	−.11	−1.96	.051†
Gender	1.19	0.70	.09	1.71	.089†
Religiosity	0.51	0.32	.09	1.58	.115
Vaccination Status	2.47	0.86	.16	2.88	.004**
GDMS Rational	−0.62	0.36	−.11	−1.74	.083†
GDMS Dependent	0.64	0.33	.11	1.92	.056†
GDMS Spontaneous	−0.25	0.43	−.04	−0.58	.564
GDMS Intuitive	−0.24	0.36	−.04	−0.67	.503
GDMS Avoidant	0.59	0.40	.10	1.49	.139
Block 4 $R^2 = .110$, Adj $R^2 = .081$, $\Delta R^2 = .010$, $F\text{-change}(1, 314) = 3.68$, $p = .056$					
(Constant)	9.98	0.89	—	11.21	<.001
Age	−0.58	0.32	−.10	−1.78	.076†
Gender	1.08	0.70	.09	1.55	.121
Religiosity	0.48	0.32	.09	1.51	.131
Vaccination Status	2.69	0.86	.18	3.12	.002**
GDMS Rational	−0.71	0.36	−.13	−1.98	.048*
GDMS Dependent	0.58	0.33	.10	1.74	.082†
GDMS Spontaneous	−0.24	0.43	−.04	−0.56	.575
GDMS Intuitive	−0.32	0.36	−.06	−0.89	.375
GDMS Avoidant	0.56	0.39	.10	1.43	.153
CMQ	0.61	0.32	.11	1.92	.056†
Block 5 $R^2 = .140$, Adj $R^2 = .104$, $\Delta R^2 = .030$, $F\text{-change}(3, 311) = 3.63$, $p = .013$					
(Constant)	10.59	0.92	—	11.54	<.001
Age	−0.46	0.32	−.08	−1.42	.158
Gender	1.05	0.69	.08	1.52	.130
Religiosity	0.43	0.32	.08	1.35	.178
Vaccination Status	2.12	0.89	.14	2.38	.018*
GDMS Rational	−1.35	0.70	−.24	−1.94	.053†
GDMS Dependent	2.24	0.77	.39	2.90	.004**
GDMS Spontaneous	−0.29	0.42	−.05	−0.68	.499
GDMS Intuitive	−0.29	0.36	−.05	−0.82	.414
GDMS Avoidant	0.46	0.39	.08	1.16	.246
CMQ	−0.43	0.73	−.08	−0.59	.558
Vacc × CMQ	1.46	0.82	.23	1.80	.073†
Vacc × Rational	0.77	0.76	.12	1.01	.315
Vacc × Dependent	−1.98	0.83	−.32	−2.40	.017*

Note. *N* = 325. All continuous predictors were z-scored. Vaccination Status: 0 = unvaccinated, 1 = vaccinated. *B* = unstandardised regression coefficient; β = standardised regression coefficient. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.