COVİD-19 Vaccine Hesitancy:The Mediating Role of Psychological and Political Factors

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Abstract

The aim of this study is to investigate the psycho-political factors (i.e., the sense of control loss, trust in authorities, conspiracy mentality, dichotomous thinking, and intolerance of uncertainty) underlying the vaccine hesitancy that may adversely affect the fight against pandemics such as COVID-19. The sample consisted of 209 university students (75.12%) and staff (24.88%). Participants completed a package of questionnaires, including Vaccine Hesitancy Scale, Dichotomous Thinking Inventory, Conspiracy Mentality Questionnaire, alongside with questions aimed to measure Trust in Authorities, and Loss of Control during pandemic. The results of serial mediational analysis showed that the sense of control loss during pandemic led to vaccine hesitancy via distrust in authorities, conspiracy mentality, and dichotomous thinking. These results indicate the need to take measures to reduce ambiguity in public communications and to build trust between the authorities and the public in order to maintain a psychologically and politically healthy environment.
Keywords: conspiratorial mindset, distrust in authorities, Manichean view, sense of control, post-truth
Jel Codes: C01, C23, K12

COVID-19 Aşı Kararsızlığı: Psikolojik ve Siyasi Faktörlerin Aracı Rolü

Özet

Bu çalışmanın amacı, COVID-19 gibi pandemilerle mücadeleyi olumsuz etkileyebilecek aşı kararsızlığının altında yatan kontrol kaybı hissi, otoritelere güven, komplo zihniyeti, ikili düşünme ve belirsizliğe tahammülsüzlük gibi psiko-politik faktörleri araştırmaktır. Örneklem 209 üniversite öğrencisi (%75,12) ve personelinden (%24,88) oluşmaktadır. Katılımcılar, Aşı Kararsızlığı Ölçeği, İkili Düşünme Envanteri, Komplo Zihniyeti Anketi'nin yanı sıra Otoritelere Güven ve Pandemi Sırasında Kontrol Kaybını ölçmeyi amaçlayan soruları içeren bir anket paketini doldurmuştur. Seri aracılık analizi sonuçları, pandemi sırasında kontrol kaybı hissinin otoritelere güvensizlik, komplo zihniyeti ve ikili düşünme yoluyla aşı tereddütüne yol açtığını göstermiştir. Bu sonuçlar, psikolojik ve siyasi açıdan sağlıklı bir ortamın sürdürülebilmesi için kamu iletişiminde belirsizliği azaltacak ve yetkililer ile kamuoyu arasında güven tesis edecek önlemlerin alınması gerektiğine işaret etmektedir.
Anahtar kelimeler: komplo zihniyeti, otoritelere güvensizlik, Maniheist görüş, kontrol hissi, post-truth
Jel Kodu: C01, C23, K12

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1. INTRODUCTION

From November 2019 to May 2023, the COVID-19 pandemic had infected over 750 million people and killed nearly 7 million, at which point World Health Organization (WHO) declared the global emergency over (Gregory, 2023), causing a worldwide health crisis, alongside with psychological distress. Inevitably, with every variant the pandemic got stronger, its effects on public health became more concerning (Torjesen, 2021). Due to its highly infectious nature, and with worldwide precautions, such as social distance, mask use, quarantines, COVID-19 had caused fear and anxiety throughout the world, thus, severely impacting well-being (e.g., Alzueta et al., 2020; Brahmi et al., 2020; Mahamid et al., 2023; Morgado-Toscano et al., 2023; Vaterlaus et al., 2021; Vilca et al., 2023).

According to terror management theory (Greenberg et al., 1986; Pyszczynski et al., 2015), humans are well aware of the inevitability of the death as a result of their sophisticated cognitive abilities; hence, a potential for existential terror. Therefore, as Pyszczynski (2021) suggests, a defense mechanism minimizing the threat can be formed in order to cope with it such that claiming the virus is not as contagious as health experts suggest (Srikanth, 2020), viewing the virus as politically motivated conspiracy (Romano, 2020), or believing in vaccine-related conspiracies (Islam et al., 2021). Despite the misinformation on the safety and efficacy of the COVID-19 vaccines, WHO (2020) urged herd immunity should be achieved through vaccination in order to combat with this global crisis. Yet, vaccine hesitancy among young adults caused by several reasons, such as concerns about safety and side effects or an underestimation of the importance of vaccination (Adams et al., 2021) led to large anti-vaccination protests on COVID-19 vaccines all around the world (Hellmeier, 2023).

A number of studies have shown that conspiracy mentality (Goertzel, 1994) is related to vaccine hesitancy in general. For instance, Goldberg and Richey (2020) showed that anti-vaccination beliefs correlated with the belief in vaccine-unrelated conspiracy theories, such as Birtherism (Warner & Neville-Shepard, 2014) and flat earth (Fernbach & Bogard, 2023). In another study with a wide range of participants from 24 countries also found that anti-vaccination attitudes were high among those who had higher scores in vaccine-unrelated conspiracy statements (Hornsey et al., 2018). Jolley and Douglas (2014) further suggest that exposure to conspiracy theories related to the vaccine itself reduces the vaccination intentions. Other researchers examined how anti-vaccination ideas spread, and the roles of social media and the Internet in relation to anti-vaccination (e.g., Chiou & Tucker, 2018; Kata, 2012). These studies suggest that conspiracy statements, which may spread within a couple of hours to millions of people all over the world through social media increases anti-vaccination attitude.

Today, however accurate, each post and online content continues to be shared, reacted to, and commented on, thus fostering unpredictable and hardly stoppable 'cybercascades' (Varis & Blommaert, 2015). Many researchers, studying conspiracy mentality, claimed that the Internet age alongside with the 'post-truth era' that we live in, social trust has emerged as the foundation for narratives whose verification does not depend on proven facts, but rather depends on narratives from other narratives (e.g., Erdmann, 2016). Consequently, conspiracy theories may also be seen as symptoms of more fundamental societal problems, such as distrust in other people or distrust in government authorities, and as well as scientific communities. In fact, research suggests that a lack of interpersonal trust is one of the important factors that leads to believe in conspiracy theories (e.g., Goertzel, 1994). Thus, people who believe in conspiracy statements are also prone to distrust others, especially government officials (Davies et al., 2002; Miller et al., 2016) and medical authorities (Jolley & Douglas, 2014). Similarly, one study found that websites supporting anti-vaccination states claim that a coalition among physicians, pharmaceutical companies, researchers, and public health bureaucrats are the driving force behind the denial of supposedly vaccine harm (Davies et al., 2002).

Kata (2010) argues that distrust to medical experts might be a result of postmodernism in which people act in suspicion to scientific knowledge, which is not static and continually changes with new developments (Limoges, 1993). This results in a failure to meet the criteria for 'authority' as it was conceptualized in modernism. Aupers (2012) further suggests that modern institutions and social structures have started to be implausible for ordinary people since 1960s; and as a result, there is an appeal to 'paranoid' worldview through narratives in the media. Some scholars have shifted away from characterizing individuals as 'paranoid personalities' or pathologizing society as a 'paranoid worldview' as a means of explaining conspiracy mentality (e.g., Butter & Knight, 2020). However, the perception of authorities' credibility is emerging as a significant public health concern, particularly in the context of vaccine acceptance.

Mixed messages from government agencies or health officials might also cause public confusion, uncertainty, and fear (Han et al., 2018). Moreover, the uncertainty and fear of the pandemic was driven by the sense of losing control, since the trajectory of the epidemic had been constantly changing, and so too was the advice on what to do to stop the spread of the pandemic (Usher et al., 2020). Thus, it would be plausible to link vaccine hesitancy derived from conspiracy theories with a sense of control loss, fear and anxiety, and as well as uncertainty. In fact, research on conspiracy mentality suggest that individuals who feel powerless or lack of socio-political control are more likely to believe in conspiracy theories (Abalakina-Paap et al., 1999; Bruder et al., 2013; Van Prooijen & Acker, 2015; Whitson & Galinsky, 2008). Since states from different regions of the world enforced compulsory vaccination during COVID-19 pandemic (Buchholz, 2022), it is plausible to expect a collective sense of control loss.

Between January and June 2021, vaccination was made available to all citizens aged 18 and over in Türkiye[1] (Yagıcı Çiftçi & Karaahmetoğlu, 2022), although it was not mandatory. In addition to vaccines, the Turkish state employed various methods to combat COVID-19, including implementing lockdowns, restricting travel, and promoting distance education. Furthermore, individuals were required to present their HES code (Hayat Eve Sığar - Life Fits into Home), an online vaccine card proving vaccination or negative PCR test results, in order to access public spaces and travel. Although vaccination was not compulsory, efforts had been made by both official institutions and civic initiatives to encourage vaccination (Azak and Wigen, 2022). In their dual-motive model, Rothschild et al. (2012) suggest that finding the guilty in an outgroup might be a compensation for personal loss of control; hence, an existential function similar to terror management theory mentioned above. It is therefore plausible to expect that a sense of control loss during pandemic might affect conspiracy mentality and vaccine hesitancy. Therefore, both individual and society-level factors might play a role in vaccine hesitancy during pandemic.

In the post-truth era, political extremism from both right- and left-wing has been raising (Lewandowsky et al., 2017), which in turn leads to increase belief in conspiracy theories (Van Prooijen et al., 2015); yet, it is unclear what the causal order between these two is. One candidate to explain this relationship is dichotomous thinking (often called Manichean worldview; e.g., Mudde, 2004), which is an important part of populist politics. In populist discourse, Manichean view of society refers to an opposition between people and others/outsiders. Within this discourse there is a simplistic view of 'evil' or 'bad' actors, such as global elites, who always conspire to the harm of the society and for their own interests (Albertazzi & McDonnell, 2015). Similarly, evidence suggest that conspiracy believers consider the world as a political battlefield between two camps: absolute good and evil (Green & Douglas, 2018; Oliver & Wood, 2014). Moreover, populist politicians often use

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[1] At the request of Turkey in 2022, the United Nations changed the country's name in foreign languages from 'Turkey' to 'Türkiye'; therefore, in this study, Türkiye is preferred.

conspiracy theories, which often includes such a worldview of dichotomy (Fenster, 2008). For instance, while Donald Trump addresses "deep state" conspiracy theories to explain COVID-19, European politicians from Alternative for Germany or the League Party in Italy claim that the virus could be a bioweapon created by the US (Langguth et al., 2023). Importantly, Eberl et al. (2021) showed a negative relationship between populist attitudes and trust in political and scientific institutions, which in turn, was associated with a higher belief in COVID-19 conspiracy theories.

Given the literature above, the aim of this study is to examine psycho-political factors such as a sense of control loss during pandemic, trust in authorities, dichotomous thinking, intolerance of uncertainty, and conspiracy mentality impacting vaccine hesitancy. First, we predicted that loss of control during pandemic will indirectly affect vaccine hesitancy via the mediating effects of distrust in authorities, conspiracy mentality, dichotomous thinking, and intolerance of uncertainty. Specifically, we expect a serial mediational effects on vaccine hesitancy such that feeling of losing control in life (i.e., pandemic-specific factors) will lead to distrust in authorities (i.e., political factor); and this will in turn enhance conspiracy mentality; and finally conspiracy mentality will further enhance vaccine hesitancy through dichotomous thinking and intolerance of uncertainty (see Figure 1).

2. METHOD

2.1 Participants

The sample consisted of 209 students (78.5%) and staff members at the Nevşehir Hacı Bektaş Veli University in Türkiye. The study was conducted after obtaining the required permissions from the university's ethics committee. A general rule for the sample size using Structural Equation Modeling (SEM) is considered to have approximately 10 times as many observations as the number of observed variables (see Figure 1) to be analyzed (Hair et al., 2009); hence at least 160 was acceptable for this study. The convenient sampling method was employed and data was collected electronically via Google Forms. The study was advertised and a survey link was sent by university emails and by personal communications between 24th March and 4th April 2021.

2.2 Materials

2.2.1 Demographic Information

In order to explore the socio-demographics of the sample, we asked participants' age, gender, educational and occupational status, perceived income, religious/spiritual beliefs, and political view (see Table S1 in Supplementary File)[2]. We also asked participants health-related questions: perceived health (from 1-extremely poor to 9-extremely well), whether they diagnosed with any chronic illness or psychiatric disorder. Furthermore, we asked some questions related to COVID-19 experience; which they indicated how much they think they had been affected by pandemic (from 1-extremely negative to 5-positively affected). Also, they were indicated whether they had yet been caught up COVID-19 (No; Yes: mild at home; severe at home; hospitalized), and as well as whether a family member, an extended family member, a friend or a neighbor had been caught up COVID-19 (No; Yes: mild at home; sever at home; hospitalized; hospitalized with the need of intensive care; and death).

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[2] Data, analyses files, and supplementary file, including additional tables and figures can be found at https://doi.org/10.17605/OSF.IO/EWB9Q

2.2.2 Loss of Control Scale

In order to measure how much participants have felt losing control of their lives during pandemic, we asked 4 items with 5 point Likert scale (1-never; 5-always), including how frequently they felt they cannot live their lives the way they want to due to the state rules during pandemic; how frequently they felt like their freedom has been restricted; how frequently they think that none of their actions can stop the negative impacts of pandemic; and how frequently they think they cannot escape from getting caught up COVID-19.

2.2.3 Trust in Authorities Scale

In order to measure participants' sense of trust to government officials and to health professionals (2 sub-scales) during pandemic, we asked them to indicate how much they agree with the sentences (3 items in each sub-scale) with 5 point Likert scale (1-completely disagree; 5-completely agree), including reliable guidance and support from these two authorities (see Table S3 in Supplementary File). The higher scores obtained from the scale indicated trust in authorities during pandemic.

2.2.4 Conspiracy Mentality Questionnaire (CMQ)

This scale was developed and validated in a Turkish sample in a cross-cultural study by Bruder et al. (2013). It consists of 5 items and participants indicated 11 point Likert scale on how likely they thought each conspiracy statement to be true (0: 0% - certainly not; 10: 100% - certain) (Cronbach's α = .72).

2.2.5 Dichotomous Thinking Inventory (DTI)

This scale originally developed by Oshio (2009) and previously validated in a Turkish sample (Aliyev, 2018). It consists of 3 sub-dimensions (preference for dichotomy, dichotomous belief, and profit-and-loss thinking) and 15 items, with a 6 point Likert scale (from 1-completely disagree to 6-completely agree). The factor loadings of the scale in this validation study ranged from .40 to .82; Cronbach's alpha internal consistency coefficient was .85 for the whole scale.

2.2.6 Intolerance of Uncertainty Scale (IUS)

We used the Short Version of the Intolerance of Uncertainty Scale (IUS-12) developed by Carleton et al. (2007), and adapted and validated to a Turkish sample in a previous study (Sarıçam et al., 2014). It consists of 3 sub-dimensions and 12 items, with 5 point Likert scale (from 1-not at all characteristic of me to 5-entirely characteristic of me). The factor loadings of the scale in the validation study ranged from .55 to .87 and Cronbach's alphas were ranged between .77 and .88.

2.2.7 Vaccine Hesitancy Scale – short form (VHS)

This scale was developed by Kilincarslan et al. (2020) and validated in a Turkish sample (Cronbach's alpha = .86). The original 5 point Likert scale consists of 12 items and 3 sub-dimensions: benefit and protection of the vaccine, vaccine repugnance, and solutions for non-vaccination. For the purpose of this study, we asked participants to respond to the items considering COVID-19 vaccines available in Türkiye at that moment. Therefore, we did not include the third sub-scale (3 items) as these items were irrelevant to COVID-19 vaccines, which were about vaccination in childhood and obligatory issues. We excluded those items since the COVID-19 vaccines were only available for people over 60 years of age at the time of the data collected (i.e., irrelevant to childhood vaccination) and the COVID-19 vaccines have not been a legal obligation in Türkiye, at that time, yet. Thus, we ended up with two subscales of 9 items (Cronbach's α = .88; see Results).

3. RESULTS

3.1. Demographics of the Sample

More than half of the participants were female (62.1%), aged between 18-33 (82.5%) and students (74.4%). Almost half of the sample reported that they have adequate income, followed by below adequate income (33.6%). Most of the sample believed in God and afterlife (87.2%). Political views in the sample varied among social democrats, liberals, conservatives, and socialists. Approximately 85% reported that they had been negatively affected by the pandemic. However, only 13.9% had caught up COVID-19 at that time of the data collection. Most of the COVID-19 patients whom they had known came from either extended family or friends rather than close family members (see Table S2 in Supplementary file).

3.2. Results of Validity and Reliability Analyses

3.2.1. Loss of Control and Trust in Authorities Scales

In order to test construct validity of the loss of control, and trust in authorities, data were examined by both EFA and Confirmatory Factor Analysis (CFA) using IBM SPSS 23.0 software and AMOS Graphics tool. KMO and Bartlett's Sphericity Test X2 Statistic confirmed a fit for factor analysis (KMO > .60, p < .001; see a recent review by Howard et al., 2016). By excluding items of low equivalence value (factor load < .50; Hulland, 1999; Merenda, 1997) for Trust in Authorities Scale, the same analyses were reiterated. Furthermore, two items from loss of control were omitted because of low regression weight, suggested by CFA results (see Confirmatory factor analysis section below). Table S3 in Supplementary File exhibits factor loads of all items alongside with the Reliability results, which was better than the threshold limit (>.70; Cortina, 1993).

3.2.2. Confirmatory Factor Analyses for CMQ, IUS, DTI, and VHS

We also conducted CFA to test the construct validity of other scales for our data. Results confirmed the original (i.e., for CMQ and VHS) or Turkish validation (i.e., for IUS and DTI) factor structures of these scales. Scores to all scales had normal distribution (see Table S4 in Supplementary File). However, following inspection of the estimates, items of low regression coefficients (< .50; Kline, 2016) were omitted and the same analyses were reiterated (see Table S4 in Supplementary File) for Intolerance of Uncertainty (2 sub-dimension; 11 items), Dichotomous Thinking Inventory (3 sub-dimension; 12 items) and Vaccine Hesitancy (2 sub-dimension; 9 items).

Furthermore, model fit statistics must provide acceptable values as a precondition to conduct SEM. Multiple fit indices (i.e., Comparative Fit Index (CFI), Goodness-of-fit Index (GFI), Tucker-Lewis Index (TLI), Standardized Root Mean Square Residual (SRMR), and Root Mean Squared Error of Approximation (RMSEA) along with its 90% confidence interval (90%-CI)) were examined to explore the strength of the model structure, except for the loss of control since the model was just-identified (df = 0) due to the small number of items; however, this does not prevent from testing the whole model (i.e., ≤3; Kline, 2016). Overall, the final goodness of fit values of the constructs tested were good (see Table 1 below and also see Table S5 and Figures S1-S6 in Supplementary File).

Table 1. Goodness of Fit for The Scales, Measurement Model and SEM

Scales and SEM models	χ² (CMIN)	df	χ²/df (CMIN/ df)	GFI	TLI	CFI	RMSEA	SRMR
Trust in Authorities	10.25	4	2.56	.982	.973	.989	.087	.029
Conspiracy Mentality	3.147	4	.787	.994	1.01	1.00	.000	.015
Dichotomous Thinking	115.122	49	2.349	.917	.908	.932	.081	.071
Intolerance of Uncertainty	88.333	42	2.103	.933	.941	.955	.073	.052
Vaccine Hesitancy	41.634	18	2.313	.953	.960	.975	.079	.043
Measurement Model	203.48	89	2.29	.893	.870	.904	.079	.078
Revised Measurement Model	179.074	98	1.83	.910	.906	.932	.067	.074
Final SEM Model	161.091	81	1.99	.905	.903	.925	.069	.083
*Goodness model fit**			*≤3*	*≥0.95*	*≥0.92*	*≥0.92*	*≤0.05*	*≤.08*
*Acceptable model fit**			*≤4-5*	*≥0.90*	*≥0.90*	*≥0.90*	*≤0.08*	*<.09*

*Recommended values by Hair et al. (2009), *ps* < 0.05.

3.3. Preliminary Analyses

Table 2 provides the means and SDs of the measurements, and correlations among seven variables. These results indicate that the dependent variable, which is vaccine hesitancy, was associated with all variables. Specifically, vaccine hesitancy was negatively correlated with trust in authorities whereas it positively correlated with loss of control during pandemic, intolerance of uncertainty, dichotomous thinking, and conspiracy mentality (*r*s ranged from .21 to .38).

Table 2 Correlations among variables

	1	2	3	4	5	6
1.Loss of control	-					
2.Trust in authorities	-.28***	-				
3.Conspiracy mentality	.231**	-.33***	-			
4.Dichotomous thinking	.08	.07	.22**	-		
5.Intolerance of uncertainty	.10	-.08	.26***	.56***	-	
6.Vaccine hesitancy	.21**	-.38***	.38***	.30***	.25***	-
Mean	3.88	2.87	7.22	4.49	3.68	2.61
Standard Deviation	1.19	.96	1.69	.84	.80	.89

*p < 0.05; **p<0.01; ***p<0.001

3.4. Measurement model

As the first step of SEM model, it is necessary to specify the indicators for each construct and assess the construct validity of the inner model (Hair et al., 2009; p. 607). For this purpose, measurement model (see Figure S7 in Supplementary File) was tested with 6 latent variables and 16 observed variables: loss of control (represented by two items), trust in authorities (represented by two sub-dimensions: trust in government officials and trust in health professionals), intolerance of uncertainty (represented by two sub-dimensions: prospect anxiety and inhibiting anxiety), conspiracy mentality (represented by its 5 items), dichotomous thinking (represented by three sub-dimensions: preference for dichotomy, dichotomous beliefs, and profit and loss thinking), and vaccine hesitancy (represented by two sub-dimensions: benefit and protective value of vaccine, and vaccine repugnance). The goodness of fit of this initial model was evaluated using several indices,

which suggested that the model to be improvable (i.e., GFI and TLI < .90, CFI <.92). Therefore, modification indices were inspected and suggested an error term to be added between an item related to government involvement in conspiracies in Conspiracy Mentality Scale and the Trust in Government Authorities sub-scale. However, Bollen and Lennox (1991) cautioned that errors are generally independent of one another although correlated errors are possible among items using similar wordings or appearing near to each other on the questionnaire. Thus, we have decided not to allow correlation between these two different construct and deleted that item in Conspiracy Mentality Scale. The final measurement model proved to be an acceptable-good fit with data (see Table 1). Besides, all regression weights between latent variables and their observed variables were significant (p < .001) and standardized regression weights of the observed variables ranged between .50 and .96.

3.5. Main Analyses

Following the inspection of the goodness of fit of the suggested model, SEM analysis conducted and found that the model had acceptable-good fit with the data (see Table 1 and Figure 1; also see Figure S8 in Supplementary File). The path analyses of direct effects revealed that loss of control had a negative effect on trust in authorities (β = -.30, p < .01). Trust in authorities had negative effects on conspiracy mentality (β = -.46, p < .001), intolerance of uncertainty (β = -.23, p < .01), and vaccine hesitancy (β = -.71, p < .001). Conspiracy mentality had a positive effect on dichotomous thinking (β = .21, p < .05); however, it did not directly affect vaccine hesitancy (p > .10). Dichotomous thinking had positive effects on intolerance of uncertainty (β = .65, p < .001) and vaccine hesitancy (β = .29, p < .01). Finally, intolerance of uncertainty did not directly affect vaccine hesitancy (p > .08). These results indicated that trust in authorities, conspiracy mentality, dichotomous thinking, and intolerance of uncertainty were mediators between loss of control and vaccine hesitancy. However, this analysis neither give us specific indirect effects of two variables on one dependent variable (e.g., the specific indirect effect of trust in authorities on the relationship between loss of control and conspiracy mentality) nor serial mediational effects of three or more variables on dependent variable.

Figure 1 The results of SEM. The values are standardized estimates. I = Item of the scale; S = Sub-dimension of the scale. The dashed line path depicts the significant serial mediation.
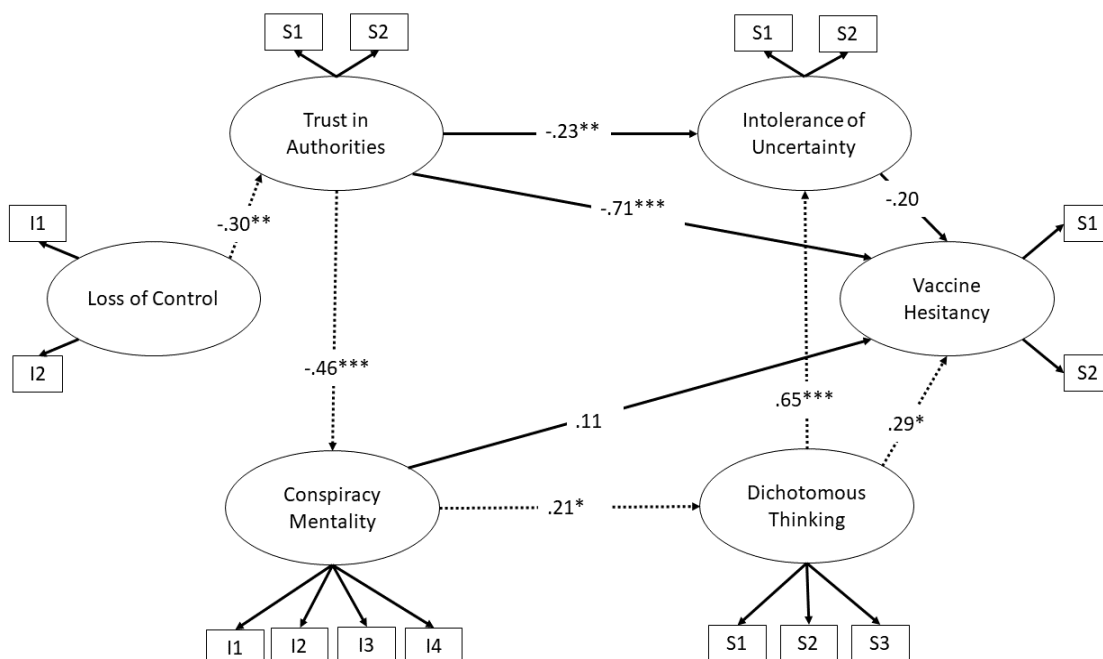
In order to test all possible specific indirect effects and serial mediational effects, we used 5,000 bootstrap samples and determined the mediating effect of the 95% confidence interval (Preacher & Hayes, 2008). Overall, results revealed that trust in authorities, conspiracy mentality, and dichotomous thinking mediated between the effect of loss of control and vaccine hesitancy. However, intolerance of uncertainty did not mediate this effect (see Table 3).

Table 3 Serial mediation results for indirect effects predicting vaccine hesitancy

The Serial Mediational Path Tested	Estimate	SE	LL 95% CI	UL 95% CI	*p*
1. The effect of loss control on conspiracy mentality via trust in authorities	.241	.133	.052	.564	< .01
2. The effect of loss control on dichotomous thinking via trust in authorities and conspiracy mentality	.013	.010	.002	.045	< .05
3. The effect of loss control on intolerance of uncertainty via trust in authorities	.034	.021	.006	.094	< .01
4. The effect of loss of control on intolerance of uncertainty via trust in authorities, conspiracy mentality and dichotomous thinking	.009	.007	.001	.032	< .05
5. The effect of loss control on vaccine hesitancy via trust in authorities, conspiracy mentality	.012	.017	-.009	.058	> .10
6. The effect of loss control on vaccine hesitancy via trust authorities and intolerance of uncertainty	-.011	.011	-.049	.000	> .05
7. The effect of loss control on vaccine hesitancy via trust in authorities, conspiracy mentality and dichotomous thinking	.007	.006	.001	.029	< .05
8. The effect of loss control on vaccine hesitancy via trust in authorities, conspiracy mentality, dichotomous thinking, and intolerance of uncertainty	-.003	.003	-.017	.000	< .05*

Note: LL 95% CI = lower limit of the confidence interval; UL 95% CI = upper limit of the confidence interval

*Although the *p* value was around .04, it is recommended that if the null of 0 falls between the upper and lower bound of confidence intervals, the effect is considered to be not-significant.

4. DISCUSSION

In this study, we examined mediating role of trust in authorities in terms of handling with COVID-19 pandemic, conspiracy mentality in general, dichotomous thinking, and intolerance of uncertainty between the sense of losing control in life because of pandemic (i.e., lockdowns, mask wearing rules etc.) and vaccine hesitancy towards COVID-19 vaccines available in Türkiye at the time of data collection. In line with our expectations derived from terror management theory (e.g., Pyszczynski et al., 2015), the serial mediational effect revealed that a sense of losing control in life due to pandemic restrictions predicted vaccine hesitancy towards COVID-19 vaccines via distrust in authorities (see negative values in related paths in Figure 1), conspiracy mentality, and dichotomous thinking. Although conspiracy mentality did not directly predict vaccine hesitancy, our results called attention to a more psycho-socio-political factor, i.e., distrust in authorities, which mediated this relationship. Trust in authorities was also directly and negatively predicted conspiracy mentality, intolerance of uncertainty, and dichotomous thinking. We interpret these results in terms of negative effects of

post-truth political sphere on the dynamic between politicians and public.

Overall, our analysis shows a mediational link between conspiratorial thinking and vaccine hesitancy, which is consistent with the relevant findings (e.g., Goldberg & Richey, 2020; Gulle et al., 2023; Hornsey et al., 2018; Pertwee et al., 2022). Although we have not specifically asked for conspiracies about vaccines, the link between conspiratorial mindset and vaccine hesitancy (towards COVID-19 vaccines available at the time of the study conducted) suggested by our data is striking and supports the findings that people who believed at least one conspiracy theory, regardless of being vaccine-related or not, would also believe in others (Goertzel, 1994; Swami et al., 2011; Wood et al., 2012). During Türkiye's vaccination campaign, various anti-vaccine conspiracy theories circulated online, including claims that the AstraZeneca/Oxford COVID-19 vaccine alters DNA, rumors about BioNTech CEO Uğur Şahin not receiving the vaccine, unfounded assertions of COVID-19 vaccines causing internal organ damage, and a conspiracy theory about Bill Gates aiming to reduce the population through vaccination (Gülarslan Değer, 2022; Satıl, 2021). However, the extent of the exposure and the direct effects of these conspiracy theories are not the focus of this study. On the other hand, our data clearly showed that individuals with a conspiratorial mindset did experience vaccine hesitancy towards COVID-19 vaccines available in Türkiye (i.e., The Sinovac-CoronaVac COVID-19), which was only available to risk groups at the time of the study.

The rise in anti-vaccination conspiracy theories, as well as others, is a significant problem as it not only affects individuals but also public health. It is the responsibility of states and institutions, rather than individuals per se, to ensure public health. As our data urges, it is important to create an environment that discourages a conspiratorial mindset. However, it is increasingly challenging to do so in the post-truth era (McIntyre, 2018), which is shaping the current zeitgeist. Moreover, a tendency to believe in conspiracies in our data did not directly affect vaccine hesitancy, but the dichotomous thinking mediated the link between conspiratorial thinking and vaccine hesitancy. In fact, in the post-truth era, historically superseded dichotomies such as rational-emotional, facts-values are brought back to the agenda by framing them to choose either one or the other (Braun, 2019). Thus, the distinction between scientific findings and philosophical reasoning on one hand, and personal opinions and comments on the other, is becoming blurred (Arendt, 2005). Our finding that conspiratorial mindset indirectly affects vaccine hesitancy via distrust in authorities and dichotomous thinking confirms and expands these ideas. Therefore, cautions of negative effects of post-truth era on public health needs more attention in both psychological and political sciences emphasizing the role of transparent communication built by government officials and health professionals, especially during nation-wide or world-wide catastrophes such as pandemic (Chon & Kim, 2022).

As demonstrated in previous studies (Bruder & Kunert, 2022; Einstein & Glick, 2014; Miller et al., 2016), our study also highlights that distrust in authorities contributes to conspiracy mentality. People from all over the world frequently question the reliability of official institutions such as the Ministry of Health and vaccine-producing companies (Ball, 2020), which may have further influenced their tendency towards conspiratorial thinking. Our study confirms that distrust in authorities contributed to conspiratorial thinking during the COVID-19 pandemic, which then also affects dichotomous thinking leading to vaccine hesitancy. It is important to acknowledge the impact of this distrust on public perception and address it accordingly. In fact, a qualitative data collected throughout pandemic suggests that trust can function as a primary emotion, particularly during crises (Foley et al, 2023). Our data also confirm and expand these results suggesting that the sense of control loss during such times as pandemic (e.g., Pyszczynski et al., 2015) contributed to distrust in authorities leading vaccine hesitancy in the end. Thus, transparency at both political and societal levels may be better suited to tackle such problem in order to soothe the fear raised in public. Supporting this idea, recent studies from Türkiye showed that low fear of COVID-19 would result in

less hesitation about vaccination (e.g., Nazlı et al., 2021). One recent study also highlights that a lack of effective government communications during natural disasters such as 2023 earthquakes in Türkiye could result in increased chaos, impeded relief efforts, and diminished public trust (Hoştut et al., 2024). Therefore, it can be argued that the implementation of democratic and transparent policies by states during local and global disasters could positively influence individuals' psychological health, which in turn, may lead to less terror and more rational decision-making, particularly in matters related to public health.

Perhaps the most important finding in our data is that individuals with conspiratorial thinking tend to have dichotomous thinking, resulting in a higher likelihood of vaccine hesitancy among those who see the world in black and white. As previously mentioned, populist politics is often associated with dichotomous thinking, and politicians frequently employ conspiracy theories as part of their discourse in populist politics (e.g., Plenta, 2020). Political discourses that construct the world in such a way that it is absolute good and evil are evident and growing day by day. Simultaneously, it can be argued that politicians, opinion leaders, social media influencers, and societal groups, whether they are aware of that or not, reproduce political discourses that revolve around conspiracy theories in their speeches. These narratives oversimplify complex issues and present a binary worldview, leading to unverifiable and illogical conclusions, such as the notion that COVID-19 is a global elite conspiracy. Therefore, as our data shows, the dichotomous world-view played a role in contributing to anti-vaccination, which became a public health problem (World Health Organization, 2020). Our research has clearly shown that participants with dichotomous thinking also have concerns about vaccination. Furthermore, the direct effects in our model showed that distrust in authorities and as well as dichotomous thinking affects intolerance of uncertainty, which is somewhat related to individual's anxiety (for a review, see Vander Haegen & Etienne, 2016). Thus, it can be argued that the dichotomous discourse used by public figures might raise fear and anxiety in the public. In fact, our model confirming that distrust in authority led to dichotomous thinking via conspiracy mentality, proposes that politicians who adopt dichotomous style of politics may actually be damaging interpersonal trust in societies and as well as their own credibility while also eroding trust in authority. Our findings suggest that a practical implication for addressing these issues is that authorities should prioritize transparency and honesty in their public communications. To build and maintain trust with the public, it is crucial for authorities to present information in a clear, accurate, and reliable manner.

5. STRENGHTS, LIMITATIONS AND CONCLUSION

Finally, when discussing the strengths and limitations of this study, it is important to note that previous literature has primarily focused on the psychological factors of conspiracy theories, such as paranoia. However, in the current era of post-truth and global pandemics, as our results showed, there are other socio-political factors contributing to the rise in conspiracy beliefs, and hence, vaccine hesitancy. Our study is unique in exploring these additional factors using an interdisciplinary approach (i.e., psychology and political sciences). Furthermore, conspiracy mindset is known to be driven by epistemic, existential, and social motives whereas little research investigated the consequences of conspiracy belief (Dougles et al., 2017). Thus, this research potentially will serve to fulfill this gap.

However, this study has limitations due to the use of online data collection tools, a relatively small sample size, and the correlational nature of the study. In future work, a larger sample size and the inclusion of qualitative methods could be considered. Ultimately, the findings of this thesis may have significant implications for future practices. This study and the methods employed therein could serve as a model for other global disasters, such as earthquakes, forest fires, and the study of conspiracy theories and public opinion about them, including the potential global pandemic of the monkeypox virus in 2024. Furthermore, it is important to be cautious when evaluating the data,

which had been collected in March-April 2021 as it may not reflect a general trend towards vaccines, but rather the attitudes of individuals during heated discussions about pandemic restrictions. Confirming this idea, a systematic review conducted in Türkiye found that vaccine hesitancy decreased from 40% to 20% before and after the initiation of nationwide vaccination (Gulle et al., 2023). However, collecting data during times of heightened emotions can provide valuable insights into public opinions. Our research has the potential to offer useful perspectives on the importance of trust in state officials and scientific communities in dealing with disasters, despite its limitations. Additionally, exploring interpersonal trust in the post-truth era within and between societies would be a fruitful area for further research.

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