The Role of Personality, Conspiracy Mentality, REBT Irrational Beliefs, and Adult Attachment in COVID-19 Related Health Behaviors

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There is evidence that different types of irrational thinking and beliefs are significant predictors of questionable and maladaptive COVID-19 related health practices. In this study, we investigated the role of two under-researched types of irrational thinking, more typical for a clinical setting: irrational beliefs defined in Rational Emotive Behavior Therapy (REBT) and attachment anxiety and avoidance. We investigated whether REBT irrational beliefs, attachment dimensions, and conspiracy mentality mediated the relationship between personality traits, on the one side, and COVID-19 health behaviors, on the other. We proposed that HEXACO personality traits, and especially Disintegration (proneness to psychotic-like experiences) predicted irrational thinking and beliefs, which in turn predicted higher susceptibility to questionable health practices. Structural equation modeling on a sample of 287 participants from the general population, showed that Disintegration was related to REBT irrational beliefs, attachment dimensions, and conspiracy mentality, highlighting the important effect of Disintegration on irrational thinking and beliefs. Conspiracy mentality mediated the effects of Disintegration to low adherence to recommended health behaviors – RHB, and greater use of pseudoscientific practices – PSP. Attachment anxiety mediated the relationship between high Disintegration, high Emotionality (E), and low Honesty (H), and lower adherence to RHB. REBT irrational beliefs and attachment avoidance did not mediate the relationship between personality traits and COVID-19 health behaviors.

Key words: HEXACO, Disintegration trait, conspiracy mentality, adult attachment, REBT, irrational beliefs, COVID-19 health behaviors

Background

During the COVID-19 pandemic, the World Health Organization tried to motivate people to adhere to recommended health behaviors (RHB) aimed to reduce the spread of the virus, such as wearing masks, physical distancing, and getting vaccinated against the virus (WHO, 2020). However, people were also ex-

posed to a large amount of pseudoscientific advice on how to prevent the infection (Mian & Kahn, 2020). Recent empirical evidence suggested that low adherence to RHB and the use of pseudoscientific practices (PSP) during the COVID-19 pandemic is predicted by psychological predispositions encompassing various types of irrational thinking and beliefs. These are conspiratorial beliefs, cognitive intuition, and cognitive biases (Teovanović et al., 2020), experiential thinking style, and Disintegration personality trait – D (proneness to psychotic-like experiences/behaviors) (Lazarević et al., 2021). Building on existing data, we focus on two constructs which are tightly related to irrational thinking and which have so far been underexplored in relation to COVID-19 health behaviors. First is a set of irrational beliefs defined by rational emotive behavior therapy (REBT) and second is adult attachment. We aim to explore the relation of attachment anxiety and avoidance, and REBT irrational beliefs with COVID-19 health behaviors, alongside conspiracy mentality as an already established predictor of both RHB and PSP. We start from the general assumption that various types of irrational thinking and beliefs, rooted in personality traits as basic psychological dispositions, and especially Disintegration (D), contribute to lower susceptibility to RHB and higher frequency of PSP.

REBT Irrational Beliefs and Health Behaviors

REBT irrational beliefs are beliefs about the self, others, and the world that were named "irrational" because they are "rigid and/or extreme, inconsistent with reality, illogical or not sensible, and largely detrimental to the person" (Dryden, 2003, p. 12). These beliefs have been shown to predict a range of maladaptive behaviors and individual outcomes, but we lack studies on their role in health behaviors in general (Schnur et al., 2010), as

well as those COVID-19 related. We have only limited knowledge that irrational beliefs can be regarded as vulnerability factors for noncompliance with RHB in the domain of pain (Mogoaşe et al., 2016). Based on REBT theory, we could expect REBT irrational beliefs to be related to lower compliance with COVID-19 related RHB. For example, discomfort intolerance beliefs could be relevant because compliance with social distancing and mask-wearing guidelines require self-control, and the ability to tolerate prolonged physical and psychological discomfort in order to achieve long-term health gains for oneself and others. Typical discomfort intolerance beliefs are "I must have a pleasant, comfortable life most of the time", "I can't stand hassles in my life", etc. Irrational beliefs regarding fair treatment and entitlement could be implicated as well ("I cannot stand being treated unfairly"), given that both entitlement and perceptions of unfairness have been linked with noncompliance with COVID-19 related RHB (Li, 2021). Research relating REBT irrational beliefs to the endorsement of complementary and alternative health practices is lacking, and there are no existing or readily made hypotheses about this relation.

Adult Attachment and Health Behaviors

The central notion in the attachment theory is the existence of the two cognitive-affective schemata/working models – one that regards the self and the other that regards other people. Insecure attachment has an irrational cognitive basis consisting of rigid and unsubstantiated, mostly negative images of self and/or others (Bartholomew & Horowitz, 1991; Cassidy, 2016; Mikulincer & Shaver, 2017). These are appraisals that are not adequate representations of reality and are not updated and revised according to new information. What sustains them are defensive processes such

as denial, self-deception, and distortion, and consequently various cognitive biases, such as interpretation and memory biases. Thus, although this is often not a highlighted aspect, irrational thinking and beliefs are an integral part of insecure attachment. This is why we included insecure attachment as a mediator together with other types of irrational thinking and beliefs. Studies also show that insecure attachment is related to other forms of irrational beliefs like paranormal beliefs, and conspiracy beliefs (Leone et al., 2018; Rogers, 2012/3).

While insecure attachment is usually considered in the context of close relationships, there is an emerging area of research connecting attachment to health and health-related outcomes, among which health behaviors specifically (Mikulincer & Shaver, 2017; Pietromonaco et al., 2015). Indeed, both attachment anxiety and attachment avoidance have been shown to predict lower adherence to RHB (different preventive behaviors, medical regimen, behaviors that keep oneself and others safe) and greater engagement in behaviors that pose health risks (for review of existing research see Pietromonaco et al., 2015). Several mechanisms have been suggested as links between insecure attachment and lower RHB (Pietromonaco et al., 2015), which are also highly relevant for COVID-19 related RHB such as mask-wearing and social distancing. First is the lower ability for self-regulation of behavior in order to achieve goals, which characterizes both anxious and avoidant attachment (Mikulincer & Shaver, 2007). The other is specific affect regulation strategies – anxiously attached people respond to threat by seeking physical proximity of other people, while avoidantly attached people tend to downplay and minimize their response to threat. Both seeking proximity and downplaying threats can be obstacles for COVID-19 related RHB.

We found only one study that investigated the role of attachment in COVID-19 related health behavior showing that attachment avoidance negatively affected adherence to RHB, while attachment anxiety had both a negative direct and positive indirect effect through fear of COVID-19 (Segal et al., 2021). We seek to provide further data on the relationship between attachment dimensions and COVID-19 related RHB. While we have no data on attachment and PSP, there are indices that people high in anxious attachment are more prone to adopt new-age orientation – a set of beliefs related to PSP use (Granqvist & Hagekull, 2001).

Conspiracy Mentality and Health Behaviors

Conspiratorial beliefs are irrational beliefs that explain major political and societal events by referring to secret malevolent agendas of powerful groups. People differ in their general propensity to endorse conspiratorial beliefs of different content (Swami et al., 2010). Believing in conspiracy theories, both COVID-19 related and general was shown to be related to lower adherence to official guidelines in the pandemic (Karić & Međedović, 2021; Lazarević et al., 2021; van Mulukom et al., 2021). Conspiratorial beliefs have also been shown to be related to the use of non-evidence-based health practices during the pandemic and in general (Lazarević et al., 2021; Oliver & Wood, 2014; Teovanović et al., 2020).

Personality Traits and Health Behaviors

HEXACO personality space will be complemented by the Disintegration (D) trait. Due to the novelty of the construct, it will be briefly discussed here; an extended description can be found elsewhere (e.g., Knežević et al., 2017, 2019, 2022). Disintegration represents a recently proposed reconceptualization of the

proneness to psychotic-like experiences and behaviors. Based on a series of factor analyses of a large pool of items capturing a wide spectrum of psychotic-like phenomena, the hierarchical structure of the domain – consisting of nine subdimensions and a strong higher-order factor – was revealed. These subdimensions are Perceptual Distortions, General Executive/Cognitive Impairments, Paranoia, Magical Thinking, Flattened Affect, Somatoform Dysregulations, Apathy/Depression, Mania, and Enhanced Awareness. D was found to be separate from both FFM (Knežević et al., 2017) and HEXACO (Knežević et al., 2022). This finding was replicated across informant types, units of analyses (items/scales), the way D items were presented to the subjects (grouped separately from other personality items or mixed with them), samples, and cultures. Regarding the subdimensions most frequently included in the various models of the domain (e.g., Kemp et al., 2019), Positive symptoms (the exclusive content of the PID-5 P scale, Krueger et al., 2012) are represented by Perceptual Distortions, Magical Thinking, and Enhanced Awareness in the D model; Negative symptoms are represented by Flattened Affect only; Disorganization is represented mostly by General Executive/Cognitive Impairments. Paranoia, Apathy/Depression, and Mania represent similar constructs suggested by some models of schizotypy (e.g., Serretti & Olgiati, 2004; Stuart et al., 1999), but not all. Physical Anhedonia is entirely excluded from the D model due to unrelatedness to the domain. Although related to the domain, Social Anhedonia was found to primarily indicate low Extraversion, and consequently, it was also excluded from the model. D has little in common with Eysenck's P, the measure whose validity was repeatedly questioned (Costa & McCrae, 1992; Knežević et al., 2019). To conclude, we suggest that Disintegration represents a reconceptualization of the domain of psychotic-like experiences and behaviors, which closely correspond to what the factor analysis of a set of representative indicators of the domain – using the general population - would most likely reveal.

Findings on the relation of personality traits with COVID-19 RHB are inconsistent, but taken together indicate some relevance of all basic personality traits in predicting compliance with COVID-19 official guidelines. Higher Neuroticism (N), Openness (O), Conscientiousness (C), and Agreeableness (A) tend to predict greater compliance with official guidelines regarding social distancing, while higher Extraversion (X) generally predicts lower compliance with guidelines (Abdelrahman, 2020; Aschwanden et al., 2021; Götz et al., 2021; Han, 2021; Nofal et al., 2020; Wright & Fancourt). Using a large-scale international dataset, Han (2021) found that the best regression model predicting compliance with RHB includes all traits among the Big Five. Low Honesty (H) (Lazarević et al., 2021) and antisocial traits (psychopathy, disinhibition, meanness, callousness, deceitfulness, risk-taking, and low empathy) (Blagov, 2020; Miguel et al., 2021) have been shown to predict lower compliance with official COVID-19 guidelines.

Several studies showed that the effect of personality traits on RHB[1] varies depending on the strictness of the epidemiological measures that countries introduced throughout the COVID-19 pandemic (Götz et al., 2020; Wright & Fancourt, 2020). As the measures became more lenient some personality traits (O, C, X, N) exerted a bigger effect on compliance with guidelines. It was even found that traits can have an opposite effect on RHB in different phases of the pandemic – Extraversion had a positive relation with RHB in the very beginning of the pandemic, and a

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[1] The term "effect" is used in a strictly statistical sense throughout the manuscript.

negative one in the later phase of the pandemic (Wright & Fancourt, 2020). In the first wave of the pandemic in Serbia, while stringent measures and curfew were imposed in the country, Lazarević and colleagues (2021) showed that only higher H and lower D exerted effects on RHB. H had a direct effect on RHB, while D had both a direct and an indirect effect through a conspiracy mentality. The current study would provide additional data on personality effects on RHB, in the context of the third wave of the pandemic, when less stringent measures were imposed in the country.

Factors related to the utilization of complementary and alternative medicine in the COVID-19 pandemic are less researched than factors related to RHB. Lazarević et al. (2021) found that D was the only personality trait related to the use of PSP, while HEXACO traits were not. The effect of D on PSP was indirect, through high experiential and low rational thinking styles. In research unrelated to COVID-19, Honda and Jacobson (2005) found that O and X were positively related to the use of certain types of complementary and alternative medicine. In a systematic review, Galbraith et al. (2018) found reliable evidence only for the relationship between O and alternative medicine use.

Our previous findings emphasized the importance of individual differences in the proneness to psychotic-like experiences/behavior to understand health-related beliefs and behavior above the established personality taxonomies (Lazarević et al., 2021). With the cognitive, motivational, and emotional mechanisms/processes it entails, Disintegration might add further explanatory paths (and suggest novel ideas to be tested) to the conceptual framework connecting basic personality tendencies with characteristic adaptations, beliefs, and behaviors that are health-related.

Personality and REBT Irrational Beliefs, Attachment and Conspiracy Mentality

Both REBT irrational beliefs and attachment anxiety and avoidance were so far studied mostly in relation to the Big Five model of personality. Among basic personality traits, N is the strongest and most consistent predictor of REBT irrational beliefs (Blau, 2006; Samar et al., 2013; Sava, 2009). Unlike N, which positively predicts irrational beliefs, the other four Big Five traits are negatively related to specific sets of irrational beliefs (Blau, 2006; Samar et al., 2013; Sava, 2009). Anxiety and avoidance attachment dimensions are generally predicted with high N, and low X, A, and C (Noftle & Shaver, 2006). A strong predictor of anxiety attachment is N, while low O tends to characterize people with avoidant attachment. Although not investigated in relation to D, insecure attachment was positively associated with schizotypal personality style (Sherry et al., 2007). High D and low H are shown to be related to conspiracy beliefs, both COVID-19 related and general (Lazarević et al., 2021; van Mulukom et al., 2021). The current study will be the first to examine the relationship between the seven personality traits (HEXACO traits complemented with D), with both REBT irrational beliefs and attachment dimensions. We expect D to be positively related to REBT irrational beliefs and anxiety and avoidant attachment dimensions.

The Current Study

This study aims to investigate REBT irrational beliefs and attachment dimensions as mediators of the relationship between personality traits and COVID-19 health behaviors. We also included a third mediator – conspiracy mentality, as an already established predictor of both nonadherence to RHB and PSP. Our

theoretical position is that a system of irrational thinking and beliefs can make people less prone to adhere to recommended health practices and behaviors and more prone to endorse pseudo-scientific beliefs and practices. Irrational thinking and beliefs can manifest in different forms, e.g., cognitive (thinking styles, biases, etc.), personal (about the self and interpersonal relations), social (e.g., conspiratorial thinking and beliefs). Our previous work (Lazarevic et al., 2021) showed that cognitive irrational beliefs (thinking styles) mediated the relationship between personality traits and health-related behaviors. Here, we extended the study by exploring the role of personal and social irrational beliefs as mediators of the relationship between personality traits and health-related behaviors.

Our main hypothesis is that irrational thinking and beliefs have an important role in mediating the relationship between seven personality traits (HEXACO and D) and COVID-19 health-related behaviors. Based on previous findings showing that a disposition to psychotic-like experiences and behaviors is a significant positive predictor of irrationality (Lazarević et al., 2021), we expect D to be positively related to all mediator variables: REBT irrational beliefs, attachment anxiety and avoidance, and conspiracy mentality. In line with previous findings, we expect that conspiracy mentality will be related to lower adherence to RHB (Karić & Međedović, 2021; Lazarević et al., 2021; van Mulukom et al., 2021) and greater use of PSP (Lazarević et al., 2021; Oliver & Wood, 2014). We also expect attachment anxiety and avoidance to be related to lower adherence to RHB (Segal et al., 2021). Because of the lack of data, we will not formulate specific hypotheses for REBT irrational beliefs, but we do expect REBT irrational beliefs to be related to lower compliance with RHB. The exploratory part of the study is investigating the relationship between both adult attachment and REBT irrational beliefs, and PSP.

Method

Sample and Procedure

The minimum sample size was determined based on previous findings showing that irrational beliefs and health-related behavior correlate between .16 and .20. The sample size we collected enables detection of correlations of .17 with the power of .80 at the .05 alpha error (Faul et al., 2009). The online survey was conducted during the third wave of the COVID-19 pandemic in Serbia (between December 2020 and March 2021). Out of 519 respondents who started the survey, 315 completed the study. Respondents were recruited from the general population. Participants were recruited via snowball procedure and through social networks. No specific inclusion criteria were imposed. The exclusion criterion was if they were not fluent in Serbian. We included three attention check items in the questionnaires (see Supplementary materials at https://osf.io/z95f6/). After excluding the participants that failed at least two attention check items, the final sample consisted of 287 participants (N = 80.1% female[2]). The average age of the respondent was 31.86 years, ranging from 19 to 74 (SD = 13.79). The educational level of participants was as follows: 0.3% of participants completed only elementary school, 5.2% had high school education, 4.8% were pursuing or had a college degree, and 64.4% were pursuing or had a Bachelor university degree, while 25.1% were pursuing or holding postgraduate degrees (MA or Ph.D.). Respondents participated on a voluntary basis and were not compensated for their participation in the study.

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[2] The larger percentage of females, compared to males, is in line with usual trends in data collection when samples are convenient (Yetter & Capaccioli, 2010).

Measures

For measurement of basic personality traits according to the HEXACO model, we used the *Brief HEXACO Inventory* (BHI, De Vries, 2013; Dinić, 2018), which consists of 24 items. The BHI has internal consistency ranging between .40 and .70 (De Vries, 2013; Dinić, 2018), but adequate levels of test-retest stability and validity (De Vries, 2013). The D trait was measured with the *DELTA short form* (Knežević et al., 2017), a 10-item measure. It typically has adequate internal consistency (Lazarević et al., 2021). Both BHI and DELTA have a 5-point Likert-type scale ranging from 1 (*completely disagree*) – 5 (*completely agree*).

The *shortened General Attitude and Belief Scale* (SGABS, Lindner et al., 1999) consists of 26 items assessing 6 types of REBT irrational beliefs (demand for success, demand for approval, demand for comfort, demand for fairness, self-downing, and other-downing), and one subscale refers to rational thinking. Answers are given on a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*strongly agree*). In this study, we used the total irrationality score calculated as the average score of 6 irrationality subscales.

The *short form of Experience in Close Relationships* (ECR-RD12, Brenk-Franz et al., 2018) was used to assess two adult attachment dimensions: attachment anxiety and attachment avoidance. This is a short version of ECR-R (Fraley et al., 2000), created for use in primary medical settings. It consists of two subscales with 6 items each, and the answers are given on a 7-point Likert-type scale from 1 (*disagree completely*), 4 (*neither agree nor disagree*) to 7 (*agree completely*).

The *Conspiracy Mentality Questionnaire* (CMQ, Bruder et al., 2013; Lukić et al., 2019) is a 5-item measure of a general tendency to engage in conspiracist beliefs. The answers are giv-

en on a 5-point Likert-type scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

Adherence to COVID-19 recommended health behaviors (RHB) was assessed with 13 items created for this study, based on the official COVID-19 guidelines of the WHO and Serbian Ministry of Health. 11 items referred to mask-wearing and social distancing in the past two months (e.g., wearing a mask in closed spaces outside your household; keeping a distance, at least one meter, from other people outside one's household), and with two items we assessed the behaviors and intentions regarding COVID-19 vaccination. At the time when data collection started, the vaccine was available to health workers, but by the end of March 2021 the vaccine was available to the majority of citizens, and a significant number of people got it (by the end of March 2021 Serbia was ranked 2nd in Europe after the UK in the vaccination rate). The use of *Pseudoscientific practices* for protection from COVID-19 was assessed with 8 items referring to alternative and traditional medicine (e.g., use of homeopathic or Ayurvedic remedies to boost your immunity; praying or meditating). Respondents gave answers for RHB and PSP on a Likert-type scale from 1 (*never*) to 5 (*very often*), while the answers for the two vaccination items were also given on a 5-point Likert-type scale ranging from 1 (*certainly no*) to 5 (*certainly yes*). Sociodemographic measures that were collected included sex (coded as 1-male, 2-female, 3 do not want to say), age (in years), and education level.

The full list of variables and instruments is provided in the Supplement (https://osf.io/z95f6/).

Analytic Procedure

We explored the role of personal and social irrational beliefs as mediators of the relationship between personality traits and health-related behaviors. Thus, we tested a model in which

personality traits are hypothesized to be related to REBT irrational beliefs, attachment anxiety and avoidance, and conspiracy mentality. Conspiracy mentality is expected to be related to lower adherence to RHB and higher PSP. Attachment anxiety and avoidance and REBT irrational beliefs are expected to be related to lower adherence to RHB. The exploratory part of model testing is related to the relationship between adult attachment and REBT irrational beliefs on one side and PSP, on the other, for which we do not postulate specific hypotheses nor expectations.

We explored the simultaneous relationship between measured constructs, rather than just simple correlations that could be highly misleading (in terms of suggesting a non-existing relationship due to correlations shared with third variables that are not controlled for). To investigate the relationship between basic personality traits, irrational beliefs and attitudes, and health behavior we used Structural Equation Modeling,

in Mplus software version 7 (Muthen & Muthen, 2010). Sociodemographic variables (age, sex, and education) were also included in the model. We first tested the model with specific REBT irrational beliefs. Given that none of the REBT irrational beliefs showed significant associations with any of the health behaviors, we used the total score in the final model, for reasons of clarity. To evaluate the goodness-of-fit (GoF) of the model, several indices assessing misspecification in both the structural (Standardized Root Mean Square Residual – SRMR) and the measurement aspects of a model (Root Mean Square Error of Approximation – RMSEA, and Comparative Fit Index – CFI) were examined. The tested model is given in Figure 1.

Results

The descriptive statistics and scale reliabilities obtained in this study for all variables are provided in Table 1. All measures

Table 1 *Descriptive statistics of the measured variables (N =287)*

Variable	Min	Max	*M*	*SD*	Skew	Ku	α/ω
H	1.50	5.00	3.89	0.64	-0.66	0.82	.43/.45
E	1.00	4.75	3.09	0.67	-0.07	-0.22	.40/.43
X	1.50	5.00	3.90	0.63	-0.56	0.29	.60/.62
A	1.00	4.25	2.83	0.57	-0.28	0.03	.36/.41
C	1.50	5.00	3.65	0.67	-0.39	0.10	.56/.56
O	1.75	5.00	3.98	0.60	-0.73	0.73	.52/.54
D	1.00	4.60	2.23	0.71	0.50	-0.23	.81/.81
IB	1.00	4.79	2.71	0.69	0.10	-0.12	.92/.92
Anx	1.00	7.00	2.92	1.42	0.54	-0.53	.87/.87
Avoid	1.00	5.67	2.72	0.90	0.79	-0.00	.74/.76
CM	1.00	5.00	3.44	0.87	-0.35	-0.35	.85/.86
RHB	1.31	5.00	3.76	0.73	-0.63	-0.06	.88/.89
PSP	1.00	3.50	1.77	0.54	0.79	0.25	.68/.70

Note. H – Honesty; E – Emotionality; X – Extraversion; A – Agreeableness; C – Conscientiousness; O – Openness to experience; D – Disintegration; IB – REBT Irrational Beliefs; Anx – attachment anxiety; Avoid – attachment avoidance; CM – conspiracy mentality; RHB – Recommended Health Behaviors; PSP – Pseudoscientific Practices; M – Mean; SD – Standard deviation; Skew – Skewness; Ku – Kurtosis; α – Cronbach's alpha; ω – McDonald's omega (Single-factor model fit).

showed an acceptable internal consistency. The internal consistencies of the BHI subscales are comparable to those obtained by De Vries (2013).

The intercorrelations between studied variables are shown in Table 2. Correlations between personality traits are in the expected range (Lazarević et al., 2021; Međedović,

Table 2 *Correlations of measured variables (N = 287)*

Variable	H	E	X	A	C	O	D	IB	Anx	Avoid	CM	RHB
H												
E	-.01											
X	.05	-.27**										
A	.03	-.15*	.24**									
C	.15*	-.17**	.19**	.12*								
O	-.01	.09	.13*	.09	.07							
D	-.23**	.37**	-.26**	-.06	-.43**	.09						
IB	-.24**	.47**	-.26**	-.26**	-.17**	.02	.47*					
Anx	-.29**	.32**	-.25**	-.10	-.32**	.06	.46**	.43**				
Avoid	-.14*	.06	-.25**	-.07	-.12*	-.15*	.16**	.02	.24**			
CM	-.05	.03	-.05	-.02	-.09	-.04	.31**	.28**	.10	-.12*		
RHB	.08	.24**	-.12*	-.12*	.13*	.11	.01	.05	-.10	.01	-.18**	
PSP	-.04	.07	.20**	.12*	.08	.00	.12*	.03	-.09	-.05	.21**	-.10

Note. H – Honesty; E – Emotionality; X – Extraversion; A – Agreeableness; C – Conscientiousness; O – Openness to experience; D– Disintegration; IB – Irrational Beliefs; Anx– attachment anxiety; Avoid– attachment avoidance; CM– conspiracy mentality; RHB – Recommended Health Behaviors; PSP – Pseudoscientific Practices.

** $p < .01$; * $p < .05$.

2014). The associations of HEXACO traits with REBT irrational beliefs and attachment dimensions are also in line with previous research using the Big Five model (Noftle & Shaver, 2006; Samar et al., 2013; Sava, 2009). Additionally, H showed negative correlations with both anxiety and avoidance attachment, and REBT irrational beliefs. Besides the expected positive correlation with conspiracy mentality (Lazarević et al., 2021), D showed positive correlations of moderate size with REBT irrational beliefs and attachment anxiety, and a small positive correlation with avoidance, confirming the irrationality components in REBT irrational beliefs and attachment dimensions.

RHB was positively related to E, C, and negatively related to X and A. Except for A,

the findings are in line with those previously obtained in other countries (Abdelrahman, 2020; Aschwanden et al., 2021; Götz et al., 2021; Han, 2021; Nofal et al., 2020; Wright & Fancourt, 2020). Use of PSP was positively correlated with X and D, and negatively with A. The finding for X is consistent with Honda & Jacobson's (2005) study. Conspiracy mentality was related to all outcome variables, as expected (Lazarević et al., 2021). REBT irrational beliefs, attachment avoidance, and anxiety were not significantly related to any of the outcome variables.

The tested mediation model (Figure 1) showed very good fit indices: χ^2 (40) = 67.47, RMSEA [CI90%] = .049 [.027-.069], CFI = .935, SRMR = .039. The only variable that did not
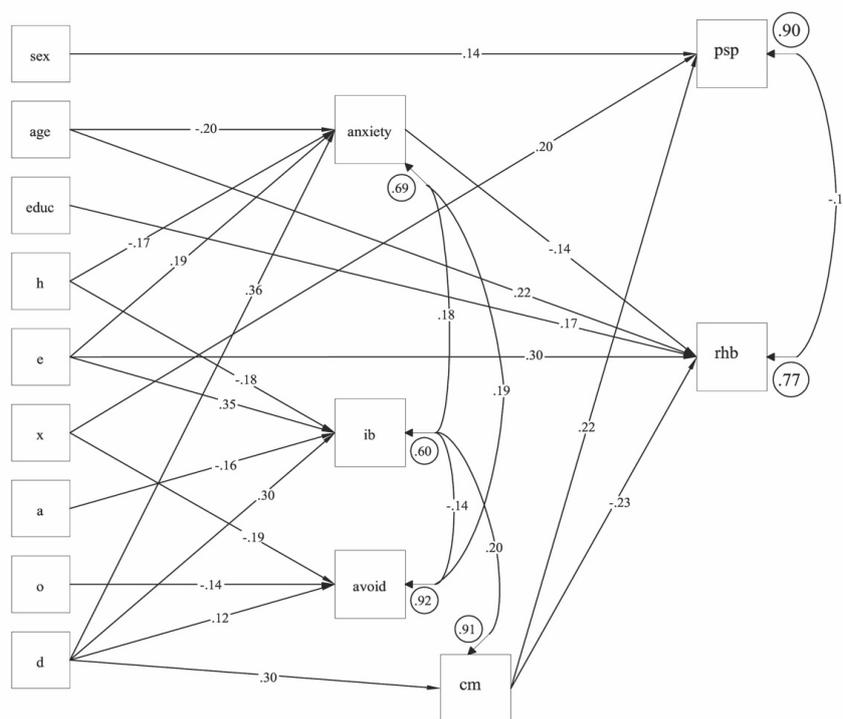

Figure 1 Model testing the mediating role of REBT irrational beliefs, attachment dimensions, and conspiracy beliefs in the relationship between personality traits and COVID-19 related health-behaviors.

show significant effects on mediator and outcome variables was C, and it is thus absent from the final model.

Our findings show that among personality traits, D is the only trait related to a set of irrational beliefs: two irrational attachment dimensions, REBT irrational beliefs, and conspiracy mentality, which confirms our expectations. Both REBT irrationality and attachment anxiety were also predicted with low H. The predictive importance of high E and low A for REBT irrational beliefs, high E for attachment anxiety, and low X and O for attachment avoidance is consistent with previous findings

(Noftle & Shaver, 2006; Samar et al., 2013). In accordance with our hypotheses, conspiracy mentality mediated the effect of personality traits on both outcome variables, and attachment anxiety mediated the effect of personality on RHB (see Table 3). The use of PSP was predicted by D through conspiracy mentality. Additionally, X had a significant positive direct effect on this outcome. COVID-19 RHB was negatively predicted by D through conspiracy mentality and attachment anxiety, and by E and H, through attachment anxiety. Higher E also had a significant positive direct effect on the RHB. Contrary to our hypotheses, REBT

Table 3 *Direct and indirect effects of socio-demographic and personality variables on health-related behaviors*

Path		Effect	Mediator	Estimation	Est./S.E.	*p*
from Educ	to RHB	total		.17	2.99	.003
		direct		.17	2.99	.003
from Age	to RHB	total		.25	4.12	.000
		direct		.22	3.67	.000
		indirect	via Anx	.03	1.99	.047
from H	to RHB	total		.02	2.03	.043
		indirect	via Anx	.02	2.03	.043
from E	to RHB	total		.27	5.04	.000
		direct		.30	5.46	.000
		indirect	via Anx	-.03	-2.10	.035
from D	to RHB	total		-.12	-4.27	.000
		indirect	via Anx	-.05	-2.30	.021
		indirect	via CM	-.07	-3.43	.001
from Sex	to PSP	total		.14	2.84	.005
		direct		.14	2.84	.005
from X	to PSP	total		.20	3.20	.001
		direct		.20	3.20	.001
from D	to PSP	total		.07	3.00	.003
		indirect	via CM	.07	3.00	.003

Note. Sex – sex; Age – age; Educ – Educational level; H – Honesty; E – Emotionality; X – Extraversion; D – Disintegration; Anx – attachment anxiety; CM – conspiracy mentality; RHB – Recommended Health Behaviors; PSP – Pseudoscientific Practices.

irrational beliefs and avoidance attachment dimension were not mediators between personality traits and RHB. As for the exploratory part of the study, REBT irrational beliefs and both attachment dimensions did not mediate the effect of personality on PSP.

Among sociodemographic variables, sex was related to PSP, with women more prone to alternative medicine use. Greater age predicted more adherence to COVID-19 guidelines (both directly and through lower attachment anxiety). Higher education also predicted greater RHB.

Discussion

This research explored attachment dimensions and REBT irrational beliefs as potential mediators of the effect of personality traits on COVID-19 related health behaviors, alongside an already established mediator – conspiracy mentality. We specifically chose these variables because of their irrationality aspect and expected them to mediate the effect of the D trait (proneness to psychotic-like experiences) on RHB. Our study finds support for the relation between D and higher scores on two mediators, i.e., attachment anxiety and conspiracy mentality, but also REBT irrational beliefs and attachment avoidance. Besides conspiracy mentality, attachment anxiety was found to be a significant mediator between personality traits and RHB – it predicted lower adherence to recommended health behaviors. Contrary to our predictions, REBT irrational beliefs and attachment avoidance were not related to RHB. None of the irrational thinking and beliefs variables except for the conspiracy mentality predicted PSP use.

The finding that D was the only trait related to all irrational thinking and beliefs variables corroborates our previous results on the importance of D in irrational beliefs and attitudes (e.g., Lazarević et al., 2021). While this

is already an established finding for conspiracy beliefs, this is, to our knowledge, the first time that both D and HEXACO were investigated in relation to REBT irrational beliefs and attachment dimensions. That D was among the most important predictors of attachment anxiety and avoidance, as well as REBT irrational beliefs, confirms strong irrational components of these constructs. This personality trait is suggested to stem from a neural tendency to see relations where there are none (Knežević et al., 2017). It was already shown to be related to intuitive thinking style and to inhibit rational analytical and logical style of processing information (Lazarević et al., 2021). Now we see that it is also related to REBT irrational beliefs and anxiety and avoidance attachment, independently of other personality traits.

As expected, results show that conspiracy mentality mediates the role of D in low adherence to RHB (Lazarević et al., 2021). In line with our expectations, attachment anxiety was negatively related to adherence to official COVID-19 related guidelines. Attachment anxiety mediated the relationship between personality traits (D, E, H) and lower adherence to RHB. This suggests anxiously attached people have trouble self-regulating their behavior and keeping social distance even though they are prone to stronger fear of COVID-19 (Segal et al., 2021). Anxious attachment was shown to be a risk factor for psychological distress in the time of COVID-19 (Moccia et al., 2020), and seeking the close company of others is one of the main emotion-regulation strategies of anxiously attached people. The finding that attachment anxiety mediates the effect of D on RHB implies that irrational thinking could be one of the mechanisms that sustain anxiously attached peoples' lower adherence to RHB in face of evidence that it is harmful to oneself and others. COVID-19 related RHB is specific because compliance leads not only

to health gains for oneself but other people as well, including close people and strangers. This means that engaging in social distancing and mask-wearing requires consideration for other people and their wellbeing besides one's own. In our study, attachment anxiety was predicted with low H, suggesting anxiously attached individuals tend to put self-interest above the interests of others. This is in line with studies showing anxiously attached people exhibit less prosocial behavior than securely attached individuals because of their self-focus (Shaver et al., 2016, 2019).

Consistent with most previous findings, E also had a positive direct relationship with RHB confirming the importance of fear for compliance with official measures (Abdelrahman, 2020; Blagov, 2020; Götz et al., 2020; Oljača et al., 2020; Wright & Fancourt, 2020). However, we see that E has indirect and direct effects of the opposite direction, which could explain the inconsistent and insignificant findings in some of the existing studies (Aschwanden et al., 2021; Bogg & Milad, 2020; Nofal et al., 2020). This is in line with the conclusion that N has two opposite types of health-related outcomes in general (Friedman, 2000). The mediators and moderators of this relationship are yet to be fully understood. Our study indicates that attachment anxiety is one of the mediators of the negative effect of E on COVID-19 related RHB.

Compared to the first wave of the COVID-19 in Serbia, with strict governmental measures/lock-down, we see that E exerted the effect on RHB only in the period of more lenient measures. This is consistent with previous findings (Götz et al., 2020; Wright & Fancourt, 2021). Lower RHB both in the first and in the third wave of the pandemic in Serbia were related to D and H. In addition, our findings suggest that older and more educated people are more prone to adhere to RHB.

As expected, the conspiracy mentality mediated the relationship between high D and practicing PSP (Lazarević et al., 2021). Other mediating variables did not have a significant role in predicting PSP use. Practicing PSP was also directly predicted by high X and female sex. Findings about sex differences are completely in line showing that women are more prone to practicing PSP (e.g., Alwhaibi & Sambamoorthi, 2016; Rhee et al., 2016; Zhang et al., 2015). This could be the consequence of women being more focused and diligent about their health and higher utilization of health care services than men (e.g., Bertakis et al., 2000). A small negative correlation between RHB and PSP in our study suggests that the use of PSP in the pandemic was not necessarily incompatible with adherence to official guidelines, which would support the idea of "using all available means to keep oneself healthy". However, this pattern of results remains to be studied thoroughly.

Contrary to our expectations, REBT irrational beliefs and attachment avoidance were not found to be significant mediators of the relationship between personality traits and COVID-19 recommended health behaviors. We see that REBT irrational beliefs were related primarily to E (apart from being related to D), implying a higher tendency of people endorsing these irrational beliefs to also experience fear, and presumably fear of infecting oneself or others with COVID-19. This could be the reason that these beliefs were not shown to be a risk factor for lower RHB in the pandemic context, unlike the social and cognitive irrational beliefs, containing mostly disintegrative components. Unlike attachment anxiety, attachment avoidance did not predict low adherence to official guidelines. This could suggest that irrational thinking is not that salient in avoidantly attached individuals. It is also reasonable to assume that the relationship between avoidant attachment and COVID-19 related RHB is a complex one, where some aspects of avoidant attachment

are a risk factor for maladaptive COVID-19 behavior, but others are actually facilitating social distancing and mask-wearing, such as self-reliance and avoidance of intimacy. To the very least, avoidant individuals should be more comfortable with keeping physical and social distance than securely or anxiously attached individuals. The difference between the findings of Segal et al. (2015) and in our study might have to do with different contexts of the pandemic in Israel and Serbia at the time of data collection, e.g., the phase of the pandemic.

Our finding that C is not predicting health-related behaviors is not in line with some previous findings (see Bogg & Roberts, 2004), but there are studies that did not document this relation as well (e.g., Modersitzki et al., 2020; several countries in AL-Omiri et al., 2021). In our study, when we partialled out the education, the correlation between C and RHB ceased to exist, which suggests that this relationship is not as robust and straightforward as it might be seen.

Regarding the lack of relationship between A and health-related behaviors, it is consistent with our previous findings (Lazarević et al., 2021). Our results suggest that H is more relevant for adherence to officially recommended health behaviors than A and that this could stem from the fact that A is operationalized differently within the HEXACO model compared to Big Five models (Ashton et al., 2014).

Limitations

There are several limitations of the current research. One of the limitations of the study was the use of a convenience sample, which was predominantly female and better educated than the general population in Serbia. The measures of RHB were self-report measures of social distancing and not observed behavior. However, the existing data points to the validity of the self-report measures (Gollwitzer et al., 2020). Additionally, we used short forms of all measures, except for the conspiracy mentality. Because of the timing of the study, we did not have a better proxy measure of vaccination behavior than intention. In the first period of data collection, vaccination was not yet available to all citizens, but rather to specific groups like medical workers, so we could not ask the participants whether they had taken the vaccine (but we did ask if they were vaccinated or if they would get the vaccine when it is available to them). Regarding PSP, our items reflected the most commonly described practices in the general public and media, and the main alternative medicine practices present in our country. However, given that we do not have data on the actual use of PSP, it is possible that the choice of practices is not the most representative of the general population in Serbia.

Conclusions and Implications

Our findings once again confirm the importance of conspiracy mentality for low adherence to RHB and greater use of PSP. This is the only mediator variable in our study predicting higher PSP use. Among personality traits, higher D and X were risk factors for PSP use. Regarding RHB, attachment anxiety was also found to be a risk factor for lower compliance, suggesting problems with keeping social distance for anxiously attached individuals. Among personality traits, D and H were psychological predispositions negatively affecting RHB compliance, while E had opposite direction effects on adherence with official health guidelines. Findings from this study, taken together with previous results, highlight the importance of an irrational mindset for lower engagement in recommended health-related behaviors. In managing a health crisis such as the COVID-19 pandemic, health authori-

ties and other stakeholders tailoring health communication messages could benefit from focusing on debunking irrational beliefs to increase compliance with RHBs. In addition, more personalized health-related prevention strategies might include strengthening emotion-regulation capacities and promoting common interest and prosocial behavior to help with alleviating psychological distress in times of crisis and increased insecurity.

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References

Abdelrahman, M. (2020). Personality traits, risk perception, and protective behaviors of Arab residents of Qatar during the COVID-19 pandemic. *International Journal of Mental Health and Addiction*, 1–12. Advance online publication. https://doi.org/10.1007/s11469-020-00352-7

Al-Omiri, M. K., Alzoubi, I. A., Al Nazeh, A. A., Alomiri, A. K., Maswady, M. N., & Lynch, E. (2021). COVID-19 and personality: A cross-sectional multicenter study of the relationship between personality factors and COVID-19-related impacts, concerns, and behaviors. *Frontiers in Psychiatry*, *12*, 608730. https://doi.org/10.3389/fpsyt.2021.608730

Alwhaibi, M., & Sambamoorthi, U. (2016). Sex differences in the use of complementary and alternative medicine among adults with multiple chronic conditions. *Evidence-Based Complementary and Alternative Medicine*, *2016*, 2067095. https://doi.org/10.1155/2016/2067095

Aschwanden, D., Strickhouser, J. E., Sesker, A. A., Lee, J. H., Luchetti, M., Stephan, Y., Sutin, A. R., & Terracciano, A. (2020). Psychological and behavioural responses to coronavirus disease 2019: The role of personality. *European Journal of Personality*. Advance online publication. https://doi.org/10.1002/per.2281

Ashton, M. C., Lee, K., & de Vries, R. E. (2014). The HEXACO Honesty-Humility, Agreeableness, and Emotionality Factors: A review of research and theory. *Personality and Social Psychology Review*, *18*, 139–152. https://doi.org/10.1177/1088868314523838

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*(2), 226–244. https://doi.org/10.1037/0022-3514.61.2.226

Bertakis, K. D., Azari, R., Helms, L. J., Callahan, E. J., & Robbins, J. A. (2000). Gender differences in the utilization of health care services. *Journal of Family Practice*, *49*(2), 147–147.

Blagov, P. S. (2021). Adaptive and dark personality in the COVID-19 pandemic: Predicting health-behavior endorsement and the appeal of public-health messages. *Social Psychological and Personality Science*, *12*(5), 697–707. https://doi.org/10.1177/1948550620936439

Blau, S., Fuller, J. R., & Vaccaro, T. P. (2006). Rational-emotive disputing and the five-factor model: Personality dimensions of the Ellis Emotional Efficiency Inventory. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 24*(2), 87–100. https://doi.org/10.1007/s10942-005-0020-z

Bogg, T., & Milad, E. (2020). Demographic, personality, and social cognition correlates of coronavi-

rus guideline adherence in a U.S. sample. *Health Psychology, 39*(12), 1026–1036. https://doi.org/10.1037/hea0000891

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin*, *130*(6), 887–919. https://doi.org/10.1037/0033-2909.130.6.887

Brenk-Franz, K., Ehrenthal, J., Freund, T., Schneider, N., Strauß, B., Tiesler, F., Schauenburg, H., & Gensichen, J. (2018). Evaluation of the short form of "Experience in Close Relationships" (Revised, German Version "ECR-RD12") – A tool to measure adult attachment in primary care. *PloS One*, *13*(1), e0191254. https://doi.org/10.1371/journal.pone.0191254

Bretherton, I., & Munholland, K. A. (2016). The internal working model construct in light of contemporary neuroimaging research. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications* (pp. 63–88). New York: The Guilford Press.

Bruder, M., Haffke, P., Neave, N., Nouripanah, N., & Imhoff, R. (2013). Measuring individual differences in generic beliefs in conspiracy theories across cultures: Conspiracy Mentality Questionnaire. *Frontiers in Psychology, 4,* 225. https://doi.org/10.3389/fpsyg.2013.00225

Cassidy, J. (2016). The nature of child's ties. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications* (pp. 3–24). New York: The Guilford Press.

Costa Jr, P. T., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and Individual Differences*, *13*(6), 653–665. https://doi.org/10.1016/0191-8869(92)90236-I

De Vries, R. E. (2013). The 24-item Brief HEXACO Inventory (BHI). *Journal of Research in Personality, 47*(6), 871–880. https://doi.org/10.1016/j.jrp.2013.09.003

Dinić, B. (2018). Comparison of three short six-factor personality instruments. *Primenjena psihologija, 11*(2), 189-206. https://doi.org/10.19090/pp.2018.2.189-206

Dryden, W. (2003). The cream cake made me eat it: An introduction to ABC theory of REBT. In W. Dryden (Ed.), *Rational emotive behaviour therapy: Theoretical developments* (pp. 1–21). New York: Brunner-Routledge.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item-response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology, 78,* 350–365. https://doi.org/10.1037/0022-3514.78.2.350

Friedman, H. S. (2000). Long-term relations of personality and health: Dynamisms, mechanisms, tropisms. *Journal of Personality*, *68*(6), 1089–1107. https://doi.org/10.1111/1467-6494.00127

Galbraith, N., Moss, T., Galbraith, V., & Purewal, S. (2018). A systematic review of the traits and cognitions associated with use of and belief in complementary and alternative medicine (CAM). *Psychology, Health & Medicine*, *23*(7), 854–869. https://doi.org/10.1080/13548506.2018.1442010

Gollwitzer, A., McLoughlin, K. L., Martel, C., Marshall, J., Höhs, J. M., & Bargh, J. A. (2020, May 5). Connecting self-reported social distancing to real-world behavior during the COVID-19 pandemic. *Social Psychological and Personality Science.* https://doi.org/10.31234/osf.io/kvnwp

Götz, F. M., Gvirtz, A., Galinsky, A. D., & Jachimowicz, J. M. (2021). How personality and policy predict pandemic behavior: Understanding sheltering-in-place in 55 countries at the onset of COVID-19. *The American Psychologist*, *76*(1), 39–49. https://doi.org/10.1037/amp0000740

Granqvist, P., & Hagekull, B. (2001). Seeking security in the new age: On attachment and emotional compensation. *Journal for the Scientific Study of Religion, 40*(3), 527–545. https://doi.org/10.1111/0021-8294.00075

Han, H. (2021). Exploring the association between compliance with measures to prevent the spread of COVID-19 and Big Five traits with Bayesian generalized linear model. *Personality and Individual Differences, 176,* 110787. https://doi.org/10.1016/j.paid.2021.110787

Honda, K., & Jacobson, J. S. (2005). Use of complementary and alternative medicine among United States adults: The influences of personality, coping strategies, and social support. *Preventive Medicine*, *40*(1), 46–53. https://doi.org/10.1016/j.ypmed.2004.05.001

Karić, T., & Međedović, J. (2021). COVID-19 Con-
spiracy beliefs and containment-related be-
haviour: The role of political trust. *Personality
and Individual Differences*, *175*, 110697. https://
doi.org/10.1016/j.paid.2021.110697

Knežević, G., Savić, D., Kutlešić, V., & Opačić, G.
(2017). Disintegration: A reconceptualization of
psychosis proneness as a personality trait sepa-
rate from the Big Five. *Journal of Research in Per-
sonality, 70,* 187–201. https://doi.org/10.1016/j.
jrp.2017.06.001

Knežević, G., Lazarević, L. B., Purić, D., Bosnjak, M.,
Teovanović, P., Petrović, B., & Opačić, G. (2019).
Does Eysenck's personality model capture psy-
chosis-proneness? A systematic review and
meta-analysis. *Personality and Individual Differ-
ences*, *143*, 155–164. https://doi.org/10.1016/j.
paid.2019.02.009

Kneževic, G., Lazarević, L., Bosnjak, M., & Keller, J.
(2022). Proneness to psychotic-like experiences
as a basic personality trait complementing the
HEXACO model – A preregistered cross-nation-
al study. *Personality and Mental Health*, 1–19.
https://doi.org/10.1002/pmh.1537

Krueger, R. F., Derringer, J., Markon, K. E., Watson, D.,
& Skodol, A. E. (2012). Initial construction of a mal-
adaptive personality trait model and inventory for
DSM-5. *Psychological Medicine, 42,* 1879–1890.
https://doi.org/10.1017/S0033291711002674

Lazarević, L. B., Purić, D., Teovanović, P., Lukić, P.,
Zupan, Z., & Knežević, G. (2021). What drives us
to be (ir)responsible for our health during the
COVID-19 pandemic? The role of personality,
thinking styles, and conspiracy mentality. *Per-
sonality and Individual Differences, 176.* https://
doi.org/10.1016/j.paid.2021.110771

Leone, L., Giacomantonio, M., Williams, R., & Mi-
chetti, D. (2018). Avoidant attachment style
and conspiracy ideation. *Personality and Indi-
vidual Differences, 134,* 329–336. https://doi.
org/10.1016/j.paid.2018.06.043

Li, H. (2021). Follow or not follow?: The relation-
ship between psychological entitlement and
compliance with preventive measures to the
COVID-19. *Personality and Individual Differ-
ences*, *174*, 110678. https://doi.org/10.1016/j.
paid.2021.110678

Lindner, H., Kirkby, R., Wertheim, E., & Birch, P.
(1999). A brief assessment of irrational thinking:
The shortened General Attitude and Belief Scale.
Cognitive Therapy and Research, 23(6), 651–
663. https://doi.org/10.1023/A:1018741009293

Lukić, P., Žeželj, I., & Stanković, B. (2019). How (ir)ra-
tional is it to believe in contradictory conspiracy
theories? *Europe's Journal of Psychology, 15*(1),
94. https://doi.org/10.5964/ejop.v15i1.1690

Međedović, J. (2014). Should the space of basic
personality traits be extended to include the dis-
position toward psychotic-like experiences? *Psi-
hologija, 47*(2), 169–184. https://doi.org/10.2298/
PSI1402169M

Mian, A., & Khan, S. (2020). Coronavirus: the spread
of misinformation. *BMC Med, 18,* 89. https://doi.
org/10.1186/s12916-020-01556-3

Mikulincer, M., & Shaver, P. R. (2017). *Attachment
in adulthood: Structure, dynamics, and change*.
New York: The Guilford Press.

Miguel, F. K., Machado, G. M., Pianowski, G., &
Carvalho, L. F. (2021). Compliance with contain-
ment measures to the COVID-19 pandemic over
time: Do antisocial traits matter? *Personality and
Individual Differences*, *168*, 110346. https://doi.
org/10.1016/j.paid.2020.110346

Moccia, L., Janiri, D., Pepe, M., Dattoli, L., Molinaro,
M., De Martin, V., Chieffo, D., Janiri, L., Fiorillo,
A., Sani, G., & Di Nicola, M. (2020). Affective tem-
perament, attachment style, and the psycholog-
ical impact of the COVID-19 outbreak: An early
report on the Italian general population. *Brain,
Behavior, and Immunity*, *87*, 75–79. https://doi.
org/10.1016/j.bbi.2020.04.048

Modersitzki, N., Phan, L. V., Kuper, N., & Rau-
thmann, J. F. (2021). Who is impacted? Per-
sonality predicts individual differences in
psychological consequences of the COVID-19
pandemic in Germany. *Social Psychological and
Personality Science*, *12*(6), 1110–1130. https://
doi.org/10.1177/1948550620952576

Mogoaşe, C., David, D., & Dumitraşcu, D. L. (2016).
Irrational beliefs and attention bias towards
symptoms-related stimuli in maintaining gastro-
intestinal symptoms: Results from a pilot study.
*Journal of Rational-Emotive & Cognitive-Be-
havior Therapy, 34*(2), 100–113. https://doi.
org/10.1007/s10942-015-0226-7

Muthen, L. K., & Muthen, B. O. (2010). *Mplus Us-
er's Guide.* Sixth Edition, Los Angeles, CA: Mu-
then & Muthen.

Noftle, E. E., & Shaver, P. R. (2006). Attachment dimensions and the Big Five personality traits: Associations and comparative ability to predict relationship quality. *Journal of Research in Personality, 40*(2), 179–208. https://doi.org/10.1016/j.jrp.2004.11.003

Oliver, J. E., & Wood, T. (2014). Medical conspiracy theories and health behaviors in the United States. *JAMA Internal Medicine*, *174*(5), 817–818. https://doi.org/10.1001/jamainternmed.2014.190

Oljača, M., Sadiković, S., Branovački, B., Pajić, D., Smederevac, S., Mitrović, D. (2020). Unrealistic optimism and HEXACO traits as predictors of risk perception and compliance with COVID-19 preventive measures during the first wave of the pandemic. *Primenjena Psihologija, 1*3(4), 405–425. https://doi.org/10.19090/pp.20.4.405-425

Pietromonaco, P. R., DeVito, C. C., Ge, F., & Lembke, J. (2015). Health and attachment processes. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and research: New directions and emerging themes* (p. 287–318). The Guilford Press.

Rhee, T. G., Bechtol, R. A., Harris, I. M., & Rodriguez, R. (2016). Gender differences in the use of complementary and alternative medicine in adults with migraines/severe headaches in the United States. *Value in Health*, *19*(3), A67. https://doi.org/10.1016/j.jval.2016.03.210

Rogers, P. (2012/13). Investigating the relationship between adult attachment style and belief in the paranormal: Results from two studies. *Imagination, Cognition and Personality*, *32*(4), 393–425. https://doi.org/10.2190/IC.32.4.e

Samar, S. M., Walton, K. E., & McDermut, W. (2013) Personality traits predict irrational beliefs. *Journal of Rational-Emotive Cognitive-Behavior Therapy, 31,* 231–242. https://doi.org/10.1007/s10942-013-0172-1

Sava, F. A. (2009). Maladaptive schemas, irrational beliefs, and their relationship with the Five-Factor Personality model. *Journal of Cognitive and Behavioral Psychotherapies, 9*(2), 135–147.

Schnur, J. B., Montgomery, G. H., & David, D. (2010). Irrational and rational beliefs and physical health. In D. David, A. J. Lynn, & A. Ellis (Eds.), *Rational and irrational beliefs: Research, theory and practice* (pp. 253–264). NY: Oxford University Press, Inc.

Segal, S., Sharabany, R., & Maaravi, Y. (2021). Policymakers as safe havens: The relationship between adult attachment style, COVID-19 fear, and regulation compliance. *Personality and Individual Differences*, *177*, 110832. https://doi.org/10.1016/j.paid.2021.110832

Serretti, A., & Olgiati, P. (2004). Dimensions of major psychoses: A confirmatory factor analysis of six competing models. *Psychiatry Research*, *127*(1-2), 101–109. https://doi.org/10.1016/j.psychres.2003.07.005

Shaver, P. R., Mikulincer, M., & Cassidy, J. (2019). Attachment, caregiving in couple relationships, and prosocial behavior in the wider world. *Current Opinion in Psychology*, *25*, 16–20. https://doi.org/10.1016/j.copsyc.2018.02.009

Shaver, P. R., Mikulincer, M., Gross, T. J., Stern, J. A., & Cassidy, J. (2016). A lifespan perspective on attachment and care for others: Empathy, altruism, and prosocial behavior. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications* (pp. 878–916). New York: The Guilford Press.

Sherry, A., Lyddon, W. J., & Henson, R. K. (2007). Adult attachment and developmental personality styles: An empirical study. *Journal of Counseling & Development, 85*(3), 337–348. https://doi.org/10.1002/j.1556-6678.2007.tb00482.x

Stuart, G. W., Pantelis, C., Klimidis, S., & Minas, I. H. (1999). The three-syndrome model of schizophrenia: Meta-analysis of an artefact. *Schizophrenia Research, 39,* 233–242. https://doi.org/10.1016/S0920-9964(99)00019-5

Swami, V., Coles, R., Stieger, S., Pietschnig, J., Furnham, A., Rehim, S., & Voracek, M. (2011). Conspiracist ideation in Britain and Austria: Evidence of a monological belief system and associations between individual psychological differences and real-world and fictitious conspiracy theories. *British Journal of Psychology*, *102*(3), 443–463. https://doi.org/10.1111/j.2044-8295.2010.02004.x

Teovanović, P., Lukić, P., Zupan, Z., Lazić, A., Ninković, M., & Žeželj, I. (2020). Irrational beliefs differentially predict adherence to guidelines and pseudoscientific practices during the COVID-19 pandemic. *Applied Cognitive Psychology*. Advance online publication. https://doi.org/10.1002/acp.3770

van Mulukom, V., Pummerer, L., Alper, S., Bai, H., Čavojová, V., Farias, J. E. M., … & Žeželj, I. (2020, November 14). A dual-inheritance model of COVID-19 conspiracy beliefs: A systematic review. https://doi.org/10.31234/osf.io/u8yah

Yetter, G., & Capaccioli, K. (2010). Differences in responses to Web and paper surveys among school professionals. *Behavior Research Methods*, *42*(1), 266–272. https://doi.org/10.3758/BRM.42.1.266

Wright, L., & Fancourt, D. (2020, November, 13). *Do predictors of adherence to pandemic guidelines change over time?* A panel study of 21,000 UK adults during the COVID-19 pandemic. https://doi.org/10.1101/2020.11.10.20228403

Zhang, Y., Leach, M. J., Hall, H., Sundberg, T., Ward, L., Sibbritt, D., & Adams, J. (2015). Differences between male and female consumers of complementary and alternative medicine in a national US population: A secondary analysis of 2012 NIHS data. *Evidence-based Complementary and Alternative Medicine: eCAM, 2015, 413173*. https://doi.org/10.1155/2015/413173