Check for updates

What drives us to be (ir)responsible for our health during the COVID-19 pandemic? The role of personality, thinking styles, and conspiracy mentality

Ljiljana B. Lazarević [a,*], Danka Purić [b], Predrag Teovanović [c], Petar Lukić [b], Zorana Zupan [a], Goran Knežević [b]

[a] Institute of Psychology and Laboratory for the Research of Individual Differences, Faculty of Philosophy, University of Belgrade, Čika Ljubina str. 18-20, 11000 Belgrade, Serbia
[b] Department of Psychology and Laboratory for the Research of Individual Differences, Faculty of Philosophy, University of Belgrade, Čika Ljubina str. 18-20, 11000 Belgrade, Serbia
[c] Faculty of Special Education and Rehabilitation and Laboratory for the Research of Individual Differences, Faculty of Philosophy, University of Belgrade, Visokog Stevana str. 2, 11000 Belgrade, Serbia

ARTICLE INFO

ABSTRACT

The study aimed to investigate the role of personality, thinking styles, and conspiracy mentality in health-related behaviors during the COVID-19 pandemic, i.e., recommended health behaviors according to COVID-19 guidelines and engagement in pseudoscientific practices related to COVID-19. Basic personality space was defined by the HEXACO model complemented by Disintegration, which represents psychotic-like experiences and behaviors reconceptualized as a personality trait. Mediation analyses conducted on a convenient sample from the general population recruited via social media and by snowballing (N = 417) showed that engagement in pseudoscientific behaviors was predicted by high Disintegration. However, this relationship was entirely mediated by high experiential and low rational thinking styles. Adherence to health practices recommended by COVID-19 guidelines was predicted by high Honesty traits, while low Disintegration had both direct and indirect effects through conspiracy mentality.

1. Introduction

With the long-lasting COVID-19 pandemic, societies try to motivate people to adhere to recommended health practices to restrain the spread of the virus and reduce infection rates. The World Health Organization (WHO) has developed prevention and control protocols aimed to hinder the spread of COVID-19 (WHO, 2020), such as frequent hand washing, following good respiratory hygiene (e.g., wearing facial masks), and maintaining a physical distance. We will refer to these practices as recommended health behaviors (RHB). In parallel to official guidelines, people are also "bombarded" with pseudo-scientific advice on how to prevent the infection, such as drinking alcohol, consuming garlic, colloidal silver, or antiviral essential oils (e.g., Mian & Khan, 2020). We will use the term pseudo-scientific practices (PSP) to refer to this category of behaviors. Pseudoscientific advice, which has no evidence-base,

is misleading and provides false hope to the user, and may come at the cost of non-adherence to official health guidelines. The problem with using pseudoscientific remedies has become so widespread that the WHO has addressed it with a "myth-busting" page on its COVID-19 website (WHO, 2020). Nonetheless, simple "debunking", or attempting to remove and replace misinformation with expert advice is rarely effective on its own (Lewandowsky et al., 2012). Thus, it is important to understand the predictors of these two types of health behaviors - adherence to RHBs and PSPs - in the current context of the global pandemic. Some factors that are likely to be predictive of health-related behavior are personality traits, thinking styles, and susceptibility to conspiracy theories. Understanding the potential drivers of these health behaviors may prove useful when designing policies aimed at halting or spreading the infection.

1.1. Personality and health-related behavior

Personality has been shown to affect health and has been related to adherence to health-promoting or pseudoscientific behaviors (Contrada et al., 1999). For example, evidence related to the COVID-19 pandemic suggests that Extraversion and Conscientiousness are relevant to people's engagement with the measures recommended for virus containment (Carvalho et al., 2020).

In the current study, we will measure the Big Five traits complemented by two additional traits: Honesty and Disintegration. The former trait is part of the HEXACO model - an influential model of personality based on the lexical paradigm (Lee & Ashton, 2018). The latter is a recent reconceptualization of proneness to psychotic-like experiences as a basic personality trait separate from Big Five and HEX-ACO traits (Knežević et al., 2017). Disintegration is a hierarchically organized, multidimensional behavioral disposition, i.e., a personality trait encompassing nine sub-dimensions: General Cognitive/Executive Impairment, Perceptual Distortions, Enhanced Awareness, Apathy/ Depression, Paranoia, Mania, Flattened Affect, Somatic Dysregulations, and Magical Thinking. The Disintegration model proposes that all its facets stem from a tendency to relate events among which there is no connection, that is, a tendency to make false-positive errors resulting in peculiar, distorted cognitions, emotions, and motivations (Knežević et al., 2017).

1.2. Thinking styles and health-related behaviors

The dominant theoretical model serving to explain individual differences in thinking styles is the Cognitive-experiential self-theory (CEST; Epstein, 2016). It proposes two different systems: the experiential (ES), which is preconscious, automatic, rapid, effortless, and associated with affect, and the rational system (RS) which is conscious, analytical, effortful, and independent from affect (Epstein, 2016). Regarding health-related behavior, ES positively predicts belief in Pseudoscientific Practices (PSP) (Lindeman, 2011), is positively related to PSP (Wheeler & Hyland, 2008), and negatively predicts children's vaccine uptake (Tomljenovic et al., 2019), while RS correlates positively with vaccine endorsement (Anderson, 2015) and negatively with PSP (Wheeler & Hyland, 2008).

1.3. Conspiratorial beliefs and health-related behavior

The rapid spread of the COVID-19 virus around the globe has fanned various speculations about the origin of the virus. A poll conducted in the US in March 2020 suggested that about half of Americans believed that the coronavirus is man-made, while 13% believed it was a hoax (Economist/YouGov, 2020).

Conspiratorial beliefs have been found to correlate negatively with many health-related behaviors, such as willingness to vaccinate children (Jolley & Douglas, 2014), going for regular medical check-ups (Oliver & Wood, 2014), adherence to prescribed therapy (Bogart et al., 2010), and positively with the use of alternative medicine (Oliver & Wood, 2014).

1.4. Personality, thinking styles, and conspiratorial beliefs

Studies investigating psychological mechanisms related to the tendency toward accepting false information and proneness to conspiracy theories suggest that this tendency may stem from other personality characteristics, such as schizotypy (Dagnall et al., 2015) and cognitive styles (Swami et al., 2014). Participants scoring high on ES are also more prone to superstition, prejudice, and biases in reasoning (Aarnio & Lindeman, 2005), while RS-dominant respondents are less prone to superstition (Fletcher et al., 2012). Thinking styles were found to be weakly related to basic personality traits. Specifically, if the Big Five model is considered, ES was found to be positively related to E, O, A, and C, while RS was negatively related to N, and positively to E, O, and C

(Pacini & Epstein, 1999; Teovanović, 2013). Another study, using the HEXACO personality model, found that the RS is positively related to X, C, and O, while none of the HEXACO traits were related to ES (Jokić & Purić, 2019).

Although Disintegration focuses on normal personality variations and delineates the domain of psychotic-like experiences differently, compared to the various models of schizotypy, there is a substantial conceptual overlap in their content. This conceptual overlap is relevant because schizotypy was found to be related to conspiracy beliefs (van der Tempel & Alcock, 2015), and thinking styles (Wolfradt et al., 1999). In addition, in a recent study investigating relationships between HEXACO complemented by Disintegration and socio-political attitudes mediated by conspiracy beliefs and thinking styles, Disintegration was found to correlate with high conspiracy beliefs, high ES, and low RS (Knežević & Keller, 2021). Thus, we expect that, of all personality traits, Disintegration will have the strongest relation with thinking styles and conspiracy mentality.

1.5. The current study

The main goal of this study is to relate personality to the two aforementioned health-related behaviors in the context of the COVID-19 pandemic, that is, health-promoting (RHB), and pseudoscientific practices (PSP). We postulate thinking styles and the conspiracy mentality to be of critical importance. Our main hypothesis is that thinking styles and general conspiracy beliefs will have an important mediation role in the relationships between Disintegration and PSP and RHB related to COVID-19.

In line with previous findings, we expect that conspiracy mentality will be related to greater use of PSP (Oliver & Wood, 2014) and lesser adherence to RHB (Bogart et al., 2010). We expect the same pattern of relationships for the ES (Lindeman, 2011), while the RS (Anderson, 2015) will be related to greater adherence to RHB and lesser use of PSP. We expect that the most important personality correlate of PSP and RHB will be Disintegration – in a positive direction in the case of the former and negative in the case of the latter. We also expect that Disintegration will be related to conspiracy mentality, greater use of an ES, and lesser use of an RS. To reiterate, we expect conspiracy mentality and thinking styles to be mediators of the relationships between Disintegration and PSP and RHB.

1.6. Disclosures

This study is based on the data collected as part of a larger project (https://osf.io/9njp3/). All materials, data, and analytic script are available at https://osf.io/9njp3/. Data were collected following the Declaration of Helsinki. The study design and data collection were approved by the Institutional Review Board of the Department of Psychology, University of Belgrade, Serbia.

2. Methods

2.1. Sample and procedure

The minimum sample size was determined based on previous findings. In the study of Wheeler and Hyland (2008), for example, the correlation between ES and PSP was 0.27, and 0.10 between ES and practitioner-prescribed PSP. To detect these effect sizes, the sample size should be between 102 and 779, respectively (if the desired power is fixed at 0.80 and alpha level at 0.05). In the case of RS-PSP correlations, the same study reported mostly larger effect sizes. The sample was recruited via a snowball procedure and through social networks. Data were collected online and all questionnaires were administered in the Serbian language. All respondents were volunteers from the general population and did not receive any compensation for their participation.

A total of N = 754 participants responded to the survey between 10

and 22 April 2020. Three attention check items were included in the questionnaires (see Supplementary materials at https://osf.io/9njp3/). After excluding participants who did not complete the study or failed to accurately respond to all attention check items, the sample included N = 417 participants, 76.7% female, average age *M* = 34.89 years, ranging between 18 and 76 (*SD* = 12.87). In the sample, 0.5% of participants completed elementary school, 48.6% had a high-school education, 24.3% completed college or university, and 26.6% held a master's or a doctoral degree. In our sample, 18% of participants reported that they are likely to be at higher risk for COVID-19, due to older age (over 65 years) and chronic disease (e.g., cardiovascular, diabetes, cancer). At the time of data collection, none of the participants were infected or have recovered from COVID-19.

2.2. Instruments and variables

The *10-item Big Five Inventory* (BFI-10; Rammstedt & John, 2007) assesses Big Five personality traits. We used the Serbian version of the BFI-10 (Pejić et al., 2014). The BFI-10 has acceptable test-retest reliability ranging from 0.49 for N to 0.62 for O (Rammstedt et al., 2014), and considerably smaller internal consistency ranging from 0.29 for A to 0.65 for E (Carciofo et al., 2016), but we should take into account that Cronbach alphas tend to underestimate the reliability of heterogeneous scales (Ziegler et al., 2014).

Additional two items were added to assess Honesty/Humility. These two items were selected from a short, 12-item version of HEXACO reproducing the postulated six-factor HEXACO structure based on a sample of 786 respondents from the student and general population in Serbia. The items belong to Fairness and Greed Avoidance HEXACO facets (Lee & Ashton, 2018), the second one being reverse keyed.

The *DELTA short form* (Knežević et al., 2017) is a 10-item measure of the Disintegration trait, created by employing the Ant Colony Optimization algorithm that proved suitable for developing short questionnaire forms (Olaru et al., 2015).

The *Rational-Experiential Inventory - short form* measures rational and experiential cognitive styles via 10 items. Items with the highest loadings on corresponding latent factors were selected (Pacini & Epstein, 1999).

All items assessing personality traits, thinking styles, and conspiracy mentality were assessed using a 5-point Likert-type scale ranging from 1 (completely disagree) to 5 (completely agree).

The *Conspiracy Mentality Questionnaire* (CMQ; Bruder et al., 2013; Lukić et al., 2019) consists of five items representing conspiratorial thinking without a specific content with a slider for expressing endorsement from 0 to 100. The scores for all scales were calculated as the average value of the scale items.

Adherence to COVID-19 guidelines, i.e., recommended health behaviors (RHB) were assessed via 12 items created for this study. All items were constructed based on the official guidelines from the WHO and the Serbian Ministry of Health. Five items assessed the frequency of following recommended behaviors in response to COVID-19 (e.g., washing hands, physical distancing, avoiding touching face) in the past two weeks on a 5-point Likert-type scale ranging from 1 (never) to 5 (very often). Another seven items assessed non-adherence to COVID-19 guidelines and required participants to report the frequency of specific risky behaviors in the past two weeks (e.g., visiting other households, participating in social events, direct physical contact with other people) by entering a number.

The use of pseudo-scientific practices related to COVID-19 (PSP) was assessed via 12 items created for this study. Participants rated how often they engaged in selected pseudoscientific practices (e.g., "consumed garlic", "inhaled a saline solution", "consumed colloidal silver") in the previous two weeks to prevent contracting COVID-19, on a 5-point Likert type scale ranging from 1 (never) to 5 (very often). Five items were developed based on the myths indicated on the WHO website (WHO, 2020), and the remaining seven items were based on

pseudoscientific practices against COVID-19 reported elsewhere online and in the media. The total scores for RHB and PSP were calculated as an average of the scale items.

We have also included other variables that could have impacted health-related behaviors in the context of the first COVID-19 lockdown in April 2020.

Personal risk factors of developing a severe form of COVID-19 were reported with a multiple choice question where participants indicated risk factors such as age and chronic disease (e.g., cardiovascular, diabetes, cancer). The responses were then transformed into a dichotomous variable where participants were assigned with an "at-risk" status if they reported older age and chronic disease or "not at risk" if they have not indicated any risk factor for developing a severe form of COVID-19.

Having family members/close others at risk of developing a severe form of COVID-19 was indicated via two questions: *having a household member with a chronic disease* (single item, "Yes" or "No"), and *taking care of someone outside of the household who is at risk of developing a severe form of COVID-19* (single item, "Yes" or "No").

COVID-19 status of family and friends was reported via two questions: 1) having a household member *that has been infected with COVID-19*; and 2) having *a friend or family member outside of the household that has been infected with COVID-19* (response options were: "Nobody had COVID-19", "Some members are infected by COVID-19", "Some members recovered from COVID-19", "I am not sure"). Responses to both questions were coded as "Yes" if the response was that somebody was or is currently infected, or "No" if nobody was infected or if the respondent was not sure.

The full list of variables and instruments is provided in the Supplement (https://osf.io/9njp3/).

2.3. Analytic procedure

For the measure of RHB, the seven items assessing non-adherence were transformed by multiplying with −1 so that higher scores would always correspond to higher adherence to guidelines. All item scores were standardized, and z-values that were 3.29 standard deviations above or below the mean were then winsorized (Fidell & Tabachnick, 2003) before calculating the summary score. For PSP, due to a low frequency of responses in categories 2 (rarely) to 5 (very often) for all items, scores were aggregated into a single category (i.e., binarized into categories 0 and 1) before calculating the summary score (details about data preparation and score calculation are available at https://osf. io/9njp3/).

In line with the postulated hypotheses, we tested mediation effects of thinking styles and conspiracy mentality on the relationship between Disintegration and health behaviors related to COVID-19 (RHBs and PSP), controlling for HEXACO traits, socio-demographic variables (gender, age, education), personal risk factors of developing a severe form of COVID-19, having family members/close others at risk of developing a severe form of COVID-19 and COVID-19 status of family and friends. For the mediation analysis, we used the *lavaan* package for R (Rosseel, 2012).

3. Results

Means, standard deviations, and scale reliabilities of all variables are provided in Table 1. All measures showed an acceptable level of internal consistency, except for Agreeableness, however, this result is in line with previous studies (Carciofo et al., 2016).

Table 2 shows the intercorrelations of the measured variables. The correlations between personality traits are in line with previous findings (e.g., Knežević et al., 2017; Pejić et al., 2014). As expected, the most prominent correlate of conspiracy mentality among personality traits was Disintegration. Furthermore, among personality traits, only Disintegration showed relations with pseudo-scientific practices aimed at preventing COVID-19 infection, and this correlation was positive. RHB

Table 1
Descriptive statistics of the measured variables (N = 417).

	Min	Max	M	SD	Skew	Kurt	α
H	1.00	5.00	3.16	0.98	−0.41	−0.52	0.37
E	1.00	5.00	3.27	0.99	−0.01	−0.78	0.64
X	1.00	5.00	3.43	0.96	−0.39	−0.65	0.75
A	1.00	5.00	3.01	0.78	0.00	−0.21	0.08
C	1.00	5.00	3.36	0.86	−0.24	−0.48	0.54
O	1.00	5.00	3.62	0.92	−0.43	−0.52	0.45
D	1.97	4.33	2.70	0.38	0.46	1.43	0.76
RS	1.60	5.00	3.79	0.72	−0.42	−0.32	0.75
ES	1.20	5.00	3.26	0.72	−0.20	−0.08	0.74
CMQ	13.00	100.00	68.37	18.54	−0.36	−0.10	0.81
PSP	0.00	0.92	0.40	0.21	0.06	−0.61	0.73
RHB	−1.48	0.61	0.02	0.40	−1.11	1.54	0.69

Note. H – Honesty; E – Emotionality; X – Extraversion; A – Agreeableness; C – Conscientiousness; O – Openness to experiences; D – Disintegration; RS – rational thinking style; ES – experiential thinking style; CMQ – Conspiracy mentality; PSP – Pseudo-Scientific Practices; RHB – Recommended Health Behaviors.
$SE_{Sk} = 0.12$, $SE_{Ku} = 0.2$.

correlated negatively with Disintegration, and positively with Honesty and Openness. The ES was positively related to Disintegration, Openness, Extraversion, and Emotionality as well as to conspiracy mentality.

The RS was negatively related to Disintegration, Emotionality, and conspiracy mentality, and positively to Openness, Extraversion, and Conscientiousness, in line with previous findings (Jokić & Purić, 2019; Teovanović, 2013). Consistent with previous findings, Big Five traits were not associated with PSP (Galbraith et al., 2018).

In line with our hypotheses, we tested two mediation models where Disintegration was used as the predictor, while PSP and RHB were criterion variables (Figs. 1 and 2, respectively). In both models, RS and ES and conspiracy mentality were mediators, and all remaining personality traits, socio-demographic variables, COVID-19 exposure factors, and health-risk factors were controlled for. As seen in Fig. 1, the relationship between Disintegration and PSP is mediated by a higher ES and lower RS - when mediators were included in the model, the direct path from Disintegration to PSP became essentially zero. All three paths from Disintegration to mediator variables were significant, as were two paths from mediator variables (ES and RS) to adherence to pseudo-scientific practices related to COVID-19. The path from conspiratorial thinking to PSP was somewhat weaker and not significant. The indirect effects were significant and positive for both RS ($ab1 = 0.025$, $p = .052$) and ES ($ab2 = 0.034$, $p = .017$), but not for CMQ ($ab3 = 0.030$, $p = .094$).

In the second model (Fig. 2), Disintegration positively predicted ES and conspiracy mentality, and negatively RS (as in the previous model) and there was a direct negative effect of Disintegration on RHB. However, only the path from the conspiracy mentality to RHB was
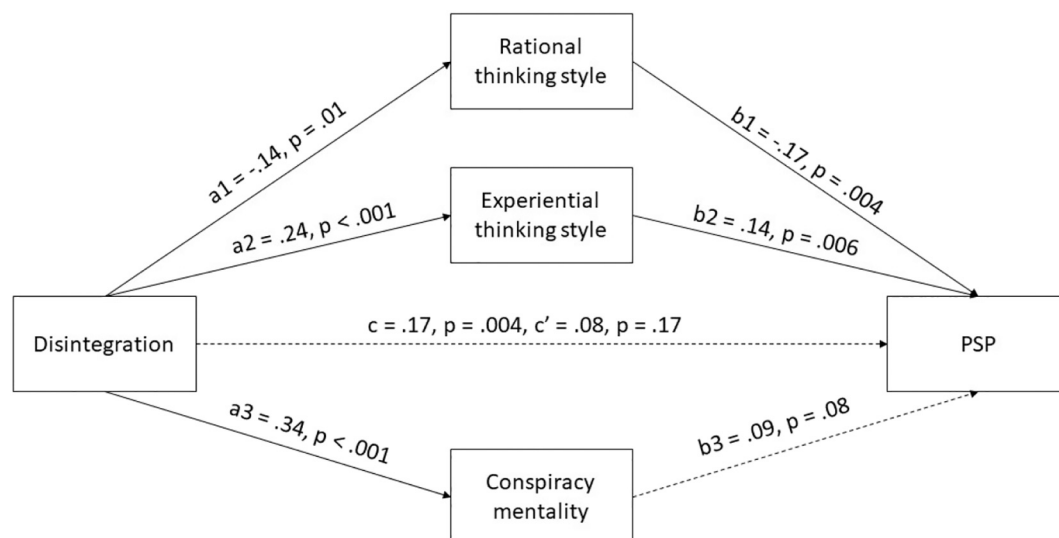
Table 2
Correlations of measured variables (N = 417).

	H	E	X	A	C	O	D	RS	ES	CMQ	PSP	RHB
H	–											
E	−0.13**	–										
X	−0.00	−0.19**	–									
A	0.13**	−0.13**	0.07	–								
C	0.20**	−0.25**	0.02	0.04	–							
O	0.02	−0.04	0.13**	0.04	−0.07	–						
D	−0.22**	0.39**	0.07	−0.07	−0.44**	−0.06	–					
RS	0.06	−0.25**	0.10*	−0.10*	0.22**	0.26**	−0.46**	–				
ES	−0.04	0.11*	0.13**	−0.01	−0.04	0.11*	0.26**	0.02	–			
CMQ	−0.12*	0.08	0.10*	−0.09	−0.05	−0.05	0.36**	−0.20**	0.26**	–		
PSP	0.03	0.04	0.07	0.09	0.02	0.02	0.12*	−0.18**	0.18**	0.18**	–	
RHB	0.17**	0.01	0.04	0.04	0.02	0.11*	−0.16**	0.05	−0.01	−0.15**	0.11*	–

Note. H – Honesty; E – Emotionality; X – Extraversion; A – Agreeableness; C – Conscientiousness; O – Openness to experiences; D – Disintegration; RS – rational thinking style; ES – experiential thinking style; CMQ – Conspiracy mentality; PSP – Pseudo-Scientific Practices; RHB – Recommended Health Behaviors.
** $p < .01$.
* $p < .05$.

Fig. 1. Mediation model of Disintegration and PSPs through RS and ES and conspiracy mentality.
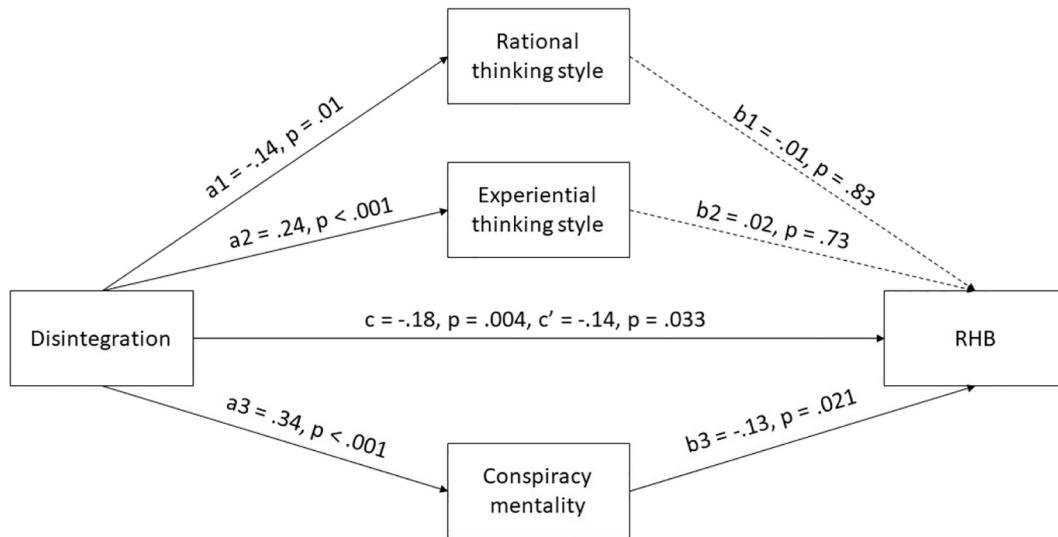
Fig. 2. Mediation model of Disintegration and RHBs through RS and ES and Conspiracy mentality.

significant, as was the corresponding indirect effect of Disintegration on RHB ($ab3 = -0.044$, $p = .028$). No other mediator - RHB paths or indirect effects were significant ($ab1 = 0.002$, $p = .846$; $ab2 = 0.005$, $p = .739$). Taken together, the results indicate a small mediation effect of conspiracy mentality on the relationship between Disintegration and RHB.

Correlation analysis (see Table 2) revealed that the strongest correlate of RHB among personality traits was Honesty. Therefore, on an exploratory basis, we tested the additional mediation model (Fig. 3), in which Honesty was the predictor and RHB the criterion variable. As in the previous models tested, RS, ES, and conspiracy mentality were mediators, and all remaining personality traits were controlled for.

There was a direct effect of Honesty on RHBs, and a significant path from conspiracy mentality to RHB, but no mediation was present (see Fig. 3). None of the paths from Honesty to conspiracy mentality and thinking styles were significant. No other mediator-criterion paths nor indirect effects were significant ($ab1 = -0.000$, $p = .963$; $ab2 = -0.001$, $p = .812$; $ab3 = 0.010$, $p = .196$).

4. Discussion

Our study finds support for the hypothesis that proneness to psychotic-like experiences - Disintegration - is related to greater use of PSP in preventing COVID-19, and to lesser use of RHB. Disintegration was related to all three mediators, the higher scores on the ES, lower scores on the RS, and greater presence of conspiratorial beliefs. Greater ES and lesser RS are related to greater use of PSP in preventing infection with COVID-19. The overall effect of Disintegration on PSP is mediated through thinking styles. Our findings suggest that Disintegration is related to PSP in preventing COVID-19 entirely through a cognitive style assuming facilitation of the automatic, affect-based, rapid, effortless thinking and inhibition of the analytical, reason-based, conscious, effortful style of thinking. However, future studies testing causal relationships are needed to give further support to our findings.

Our exploratory correlational analyses revealed that greater use of RHB is related to higher Honesty and (as predicted) lower Disintegration scores. Interestingly, neither the negative relationship of Disintegration nor the positive relationship of Honesty with RHB is mediated through thinking styles. However, conspiratorial beliefs seem to at least partially mediate the effect of Disintegration on RHB.
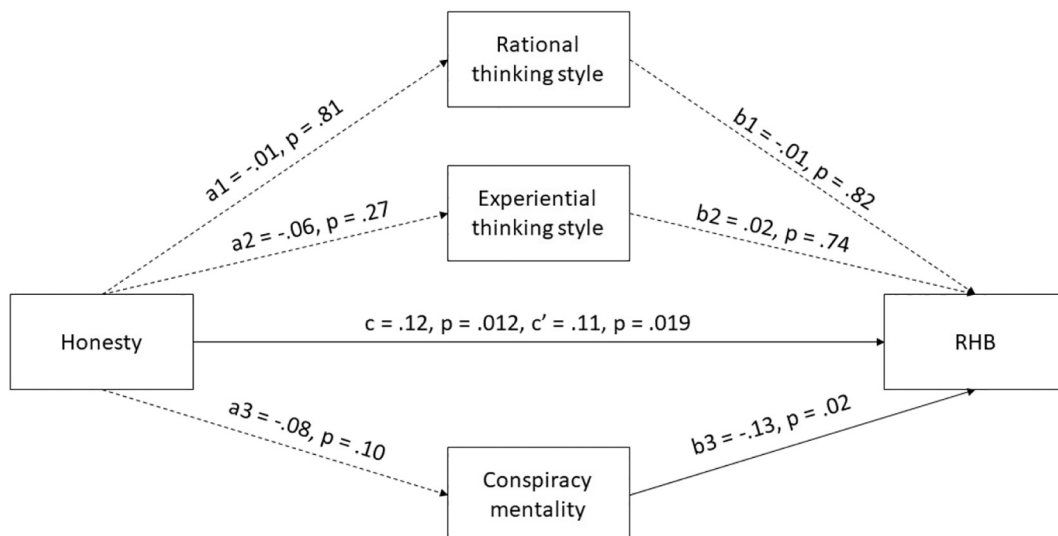

Fig. 3. Mediation model of Honesty and RHB through RS and ES and conspiracy mentality.

Individual differences in Disintegration are postulated to represent a consequence of a neural mechanism facilitating the tendency to relate unrelated phenomena, to see patterns in randomness (i.e., apophenia), that is, to make false-positive errors (Knežević et al., 2017). The Disintegration model captures the diverse range of consequences of that mechanism. However, a wide spectrum of phenomena that can be labeled irrational, magical thinking, and paranormal beliefs, leading to a wide spectrum of pseudoscientific practices of which those related to COVID-19 are just a subsample (Caulfield, 2020), can also be understood as stemming from the same underlying mechanism. Since the experiential processing system assumes automatic, preconscious, holistic, associationistic, primarily nonverbal processing of information that is intimately associated with emotions (Epstein, 2016), Disintegration appears to represent an ideal dispositional ground to enhance such an epistemological approach to reality. Moreover, the tendency to see and feel connections where there are none – which high Disintegration entails - can have only inhibitory effects on the rational, intentional, analytic, logical, primarily verbal, affect-free style of processing information. It seems that many aspects of irrational beliefs and behaviors of relevance at the individual (superstition, some cognitive biases), interpersonal (irrational expectations regarding the behavior of others), or social level (conspiracy, world beliefs) appear to be rooted in this broad and robust dispositional tendency and, related to it, in the high use of intuitive and low use of the analytical type of information processing.

For the reasons presented above, it is not surprising that PSPs aimed at preventing the COVID-19 contagion, such as drinking alcohol, consuming garlic, or colloidal silver, are satisfactorily explained by the sequence of antecedents: Disintegration, low RS + high ES. One might wonder about the importance of the relatively small correlations between the chosen antecedents and health-related behaviors related to COVID-19. We view the two types of health-relevant behaviors included in the present study – RHB and PSPs related to prevention of the COVID-19 contagion – as situational manifestations of a wider spectrum of health-promoting and pseudoscientific practices/behaviors that an individual regularly exercises in their everyday life. Understandably, the correlations with the behavioral indices in only one situation (i.e., COVID-19 pandemic) are inherently lower than if behavioral regularities were aggregated across many situations or events (Epstein, 1979).

The effects of low Disintegration and high Honesty on RHB are not conveyed via thinking styles. However, we detected a small but significant mediation effect of conspiracy mentality on the relationship between Disintegration and RHB. This finding is in line with our hypotheses, and it suggests that Disintegration may influence RHB at least partially through conspiracy mentality. Nevertheless, there may be some other mechanisms through which Disintegration and Honesty might influence adherence to RHB as well. As the combination of high Disintegration and low Honesty is related to various indices of criminal recidivism (Međedović et al., 2012) and psychopathy (Kujačić et al., 2015), it is possible that destructive or "dark aspects of personality" (Paulhus, 2014) might be implicated in non-adherence to recommended or imposed practices in a situation such as the COVID-19 pandemic.

The results of the current study can be utilized to enhance COVID-19 infection prevention measures, in particular for personalizing public health policies (e.g., Ruggeri et al., 2020). Understanding the personality traits that may render some individuals more susceptible to PSP and engage less in RHB could help tailor appropriate communication strategies to encourage adherence to evidence-based recommendations. Although individual personality data is not as readily available as demographic data, online proxies have been shown to successfully estimate personality traits based on digital behavior and may be used in place of traditional assessments (e.g., Kosinski et al., 2013; Lambiotte & Kosinski, 2014).

4.1. Limitations of the study

One of the limitations of the study is the use of a snowball convenience sample. Despite it being vulnerable to a community bias, we opted for it due to time- and resource constraints. Additionally, we used very short personality measures, which have optimized content validity at the expense of lower Cronbach alpha reliability (see Gosling et al., 2003; Rammstedt & John, 2007). Short scales are a promising tool for time-limited assessments, and when individual-level decisions are not the main purpose of the study (Ziegler et al., 2014). Moreover, short scales eliminate item-redundancy, fatigue, boredom, and frustration of the respondents (Robins et al., 2001; Saucier, 1994). Furthermore, as studies show (Credé et al., 2012), using short personality scales tends to underestimate the true test-criterion correlation compared to long scales; consequently, we can consider our results as a lower bound estimate of the role of Disintegration and Honesty in health-related behaviors. It might be that other personality traits also play a role in health-related behaviors, but because of the inherent low reliability of these ultrashort measures of personality, they may have been missed in the current study.

5. Conclusion

This study indicates that the roots of (ir)rationality and (ir)responsibility for our health may lie in the proneness to psychotic-like experiences and behaviors, i.e., the Disintegration personality trait. In the case of inclinations to engage in PSPs, this relationship is completely mediated by ES and RS. Furthermore, our findings accentuate the relevance of traits such as Disintegration and Honesty in adherence to RHB.

Data availability statement

All materials, data, and analytic script are available at https://osf.io/9njp3/.

CRediT authorship contribution statement

PT, PL, and ZZ designed the study. LBL and GK drafted the manuscript. DP, GK, and PT conducted the analyses. All authors contributed to writing. All authors revised and approved the manuscript.

Declaration of competing interest

The authors state that there is no conflict of interest.

References

Aarnio, K., & Lindeman, M. (2005). Paranormal beliefs, education, and thinking styles. *Personality and Individual Differences, 39*(7), 1227–1236. https://doi.org/10.1016/j.paid.2005.04.009.

Anderson, D. A. (2015). *Analytic thinking predicts vaccine endorsement: Linking cognitive style and affective orientation toward childhood vaccination* (unpublished doctoral dissertation, University honors theses, paper 215, full text).

Bogart, L. M., Wagner, G., Galvan, F. H., & Banks, D. (2010). Conspiracy beliefs about HIV are related to antiretroviral treatment nonadherence among African American men with HIV. *Journal of Acquired Immune Deficiency Syndromes, 53*(5), 648–655. https://doi.org/10.1097/QAI.0b013e3181c57dbc.

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.

Carciofo, R., Yang, J., Song, N., Du, F., & Zhang, K. (2016). Psychometric evaluation of Chinese-language 44-item and 10-item big five personality inventories, including correlations with chronotype, mindfulness, and mind wandering. *PLoS One, 11*(2), Article e0149963. https://doi.org/10.1371/journal.pone.0149963.

Carvalho, L. D. F., Pianowski, G., & Gonçalves, A. P. (2020). Personality differences and COVID-19: Are extroversion and conscientiousness personality traits associated with engagement with containment measures? *Trends in Psychiatry and Psychotherapy, 42*(2), 179–184. https://doi.org/10.1590/2237-6089-2020- 0029.

Caulfield, T. (2020). Pseudoscience and COVID-19 - we've had enough already. *Nature.* https://doi.org/10.1038/d41586-020-01266-z (published online: 27 April 2020).

Contrada, R. J., Cather, C., & O'Leary, A. (1999). Personality and health: Dispositions and processes in disease susceptibility and adaptation to illness. In L. A. Pervin, & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 576–604). Guilford Press.

Credé, M., Harms, P., Niehorster, S., & Gaye-Valentine, A. (2012). An evaluation of the consequences of using short measures of the Big Five personality traits. *Journal of Personality and Social Psychology, 102*(4), 874–888. https://doi.org/10.1037/a0027403.

Dagnall, N., Drinkwater, K., Parker, A., Denovan, A., & Parton, M. (2015). Conspiracy theory and cognitive style: A worldview. *Frontiers in Psychology, 6*, 206. https://doi.org/10.3389/fpsyg.2015.00206.

Economist/YouGov. (2020). Retrieved from https://www.docs.cdn.yougov.com/1ghnpqhhpu/econToplines.pdf.

Epstein, S. (1979). The stability of behavior: I. On predicting most of the people much of the time. *Journal of Personally and Social Psychology, 37*, 1097–1126. https://doi.org/10.1037/0022-3514.37.7.1097.

Epstein, S. (2016). *Cognitive-experiential theory: An integrative theory of personality*. New York, NY, USA: Oxford University Press. https://doi.org/10.1093/acprof:osobl/9780199927555.001.0001.

Fidell, L. S., & Tabachnick, B. G. (2003). Preparatory data analysis. *Handbook of Psychology*, 115–141. https://doi.org/10.1002/0471264385.wei0205.

Fletcher, J. M., Marks, A. D. G., & Hine, D. W. (2012). Latent profile analysis of working memory capacity and thinking styles in adults and adolescents. *Journal of Research in Personality, 46*(1), 40–48. https://doi.org/10.1016/j.jrp.2011.11.003.

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.

Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*(6), 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1.

Jokić, B., & Purić, D. (2019). Relating rational and experiential thinking styles with trait emotional intelligence in broader personality space. *Europe's Journal of Psychology, 15*(1), 140. https://doi.org/10.5964/ejop.v15i1.1692.

Jolley, D., & Douglas, K. M. (2014). The effects of anti-vaccine conspiracy theories on vaccination intentions. *PLoS One, 9*(2). https://doi.org/10.1371/journal.pone.0089177.

Knežević, G., & Keller, J. (2021). *Proneness to psychotic-like experiences: A neglected personality correlate of right-wing authoritarianism and prejudice*. Manuscript submitted for publication.

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

Kosinski, M., Stillwell, D., & Graepel, T. (2013). Private traits and attributes are predictable from digital records of human behavior. *Proceedings of the National Academy of Sciences, 110*(15), 5802–5805. https://doi.org/10.1073/pnas.1218772110.

Kujačić, D., Međedović, J., & Knežević, G. (2015). The relations between personality traits and psychopathy as measured by ratings and self-report. *Psihologija, 48*(1), 45–59. https://doi.org/10.2298/PSI1501045K.

Lambiotte, R., & Kosinski, M. (2014). Tracking the digital footprints of personality. *Proceedings of the IEEE, 102*(12), 1934–1939. https://doi.org/10.1109/JPROC.2014.2359054.

Lee, K., & Ashton, M. C. (2018). Psychometric properties of the HEXACO-100. *Assessment, 25*, 543–556. https://doi.org/10.1177/1073191116659134.

Lewandowsky, S., Ecker, U. K., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and its correction: Continued influence and successful debiasing. *Psychological Science in the Public Interest, 13*(3), 106–131. https://doi.org/10.1177/1529100612451018.

Lindeman, M. (2011). Biases in intuitive reasoning and belief in complementary and alternative medicine. *Psychology & Health, 26*(3), 371–382. https://doi.org/10.1080/08870440903440707.

Lukić, P., Žeželj, I., & Stanković, B. (2019). How (ir) rational 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., Kujačić, D., & Knežević, G. (2012). Personality-related determinants of criminal recidivism. *Psihologija, 45*(3), 277–294. https://doi.org/10.2298/PSI1203277M.

Mian, A., & Khan, S. (2020). Coronavirus: The spread of misinformation. *BMC Medicine, 18*(1). https://doi.org/10.1186/s12916-020-01556-3.

Olaru, G., Witthöft, M., & Wilhelm, O. (2015). Methods matter: Testing competing models for designing short-scale big-five assessments. *Journal of Research in Personality, 59*, 56–68. https://doi.org/10.1016/j.jrp.2015.09.001.

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.

Pacini, R., & Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology, 76*(6), 972–987. https://doi.org/10.1037/0022-3514.76.6.972.

Paulhus, D. L. (2014). Toward a taxonomy of dark personalities. *Current Directions in Psychological Science, 23*(6), 421–426. https://doi.org/10.1177/0963721414547737.

Pejić, M., Tenjović, L., & Knežević, G. (2014). Validacija upitnika ličnosti BFI10 - kratke forme inventara Velikih pet. *Primenjena psihologija, 7*(1), 45–62. https://doi.org/10.19090/pp.2014.1.45-92.

Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality, 41*(1), 203–212. https://doi.org/10.1016/j.jrp.2006.02.001.

Rammstedt, B., Kemper, C. J., Klein, M. C., Beierlein, C., & Kovaleva, A. (2014). Big Five Inventory (BFI-10). *Zusammenstellung sozialwissenschaftlicher Items und Skalen [The collection of Social Science Items and Scales]..* https://doi.org/10.6102/zis76.

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem scale. *Personality and Social Psychology Bulletin, 27*(2), 151–161. https://doi.org/10.1177/0146167201272002.

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1–36. http://www.jstatsoft.org/v48/i02/.

Ruggeri, K., Benzerga, A., Verra, S., & Folke, T. (2020). A behavioral approach to personalizing public health. *Behavioural Public Policy*, 1–13. https://doi.org/10.1017/bpp.2020.31.

Saucier, G. (1994). Mini-Markers: A brief version of Goldberg's unipolar Big-Five markers. *Journal of Personality Assessment, 63*(3), 506–516. https://doi.org/10.1207/s15327752jpa6303_8.

Swami, V., Voracek, M., Stieger, S., Tran, U. S., & Furnham, A. (2014). Analytic thinking reduces belief in conspiracy theories. *Cognition, 133*(3), 572–585. https://doi.org/10.1016/j.cognition.2014.08.006.

van der Tempel, J., & Alcock, J. E. (2015). Relationships between conspiracy mentality, hyperactive agency detection, and schizotypy: Supernatural forces at work? *Personality and Individual Differences, 82*, 136–141. https://doi.org/10.1016/j.paid.2015.03.010.

Teovanović, P. (2013). *Sklonost kognitivnim pristrasnostima [Susceptibility to cognitive biases]* (unpublished doctoral dissertation, Department of psychology, University of Belgrade, Serbia full text).

Tomljenovic, H., Bubic, A., & Erceg, N. (2019). It just doesn't feel right – The relevance of emotions and intuition for parental vaccine conspiracy beliefs and vaccination uptake. *Psychology & Health, 35*(5), 538–554. https://doi.org/10.1080/08870446.2019.1673894.

Wheeler, P., & Hyland, M. E. (2008). Dispositional predictors of complementary medicine and vitamin use in students. *Journal of Health Psychology, 13*(4), 516–519. https://doi.org/10.1177/1359105308088522.

Wolfradt, U., Oubaid, V., Straube, E. R., Bischoff, N., & Mischo, J. (1999). Thinking styles, schizotypal traits and anomalous experiences. *Personality and Individual Differences, 27*(5), 821–830. https://doi.org/10.1016/S0191-8869(99)00031-8.

World Health Organization. (2020). *Coronavirus disease (COVID-19) advice for the public* (internet publication, full text).

Ziegler, M., Kemper, C. J., & Kruyen, P. (2014). Short scales – Five misunderstandings and ways to overcome them. *Journal of Individual Differences, 35*, 185–189. https://doi.org/10.1027/1614-0001/a000148.