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Beliefs About the Nature of Knowledge Shape Responses to the Pandemic: Epistemic Beliefs, the Dark Factor of Personality, and COVID-19-related Conspiracy Ideation and Behavior

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Beliefs About the Nature of Knowledge Shape Responses to the Pandemic: Epistemic Beliefs, the Dark Factor of Personality, and COVID-19-related Conspiracy Ideation and Behavior

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Abstract

Objective: Global challenges such as climate change or the COVID-19 pandemic have drawn public attention to conspiracy theories and citizens' non-compliance to science-based behavioral guidelines. We focus on individuals' worldviews about how one can and should construct reality (epistemic beliefs) to explain the endorsement of conspiracy theories and behavior during the COVID-19 pandemic and propose the Dark Factor of Personality (D) as an antecedent of post-truth epistemic beliefs.

Method and Results: This model is tested in four pre-registered studies. In Study 1 (N = 321), we found first evidence for a positive association between D and post-truth epistemic beliefs (Faith in Intuition for Facts, Need for Evidence, Truth is Political). In Study 2 (N = 453), we tested the model proper by further showing that post-truth epistemic beliefs predict the endorsement of COVID-19 conspiracies and disregarding COVID-19 behavioral guidelines. Study 3 (N = 923) largely replicated these results at a later stage of the pandemic. Finally, in Study 4 (N = 513), we replicated the results in a German sample, corroborating their cross-cultural validity. Interactions with political orientation were observed.

Conclusion: Our research highlights that epistemic beliefs need to be taken into account when addressing major challenges to humankind.

Keywords: Post-Truth, Epistemic Beliefs, Dark Factor of Personality, Conspiracy Theories, COVID-19

Beliefs About the Nature of Knowledge Shape Responses to the Pandemic: Epistemic Beliefs, the Dark Factor of Personality, and COVID-19-related Conspiracy Ideation and Behavior

It is crucial for democratic societies that their members act upon evidence, not least when faced with global challenges such as climate change or the COVID-19 pandemic (Lewandowsky et al., 2020). The popularity of conspiracy theories and the widespread failure to follow behavioral guidelines informed by science has fueled academic research investigating the antecedents of such thinking and behavior (e.g., Boot et al., 2021; Pennycook et al., 2020). Individuals' convictions or worldviews about how one can and should develop a sense of what is true could be a key to understanding post-truth phenomena (Hyman & Jalbert, 2017; Lewandowsky et al., 2017; Scheufele & Krause, 2019). Our focus here is on individual differences in epistemic beliefs, that is, people's concepts about knowledge and evidence (Schommer, 1990). Among other aspects, epistemic beliefs refer to the validity of *truthiness* (Colbert, 2005) — the belief that truth rightfully derives from one's gut feeling rather than facts. Building upon a three-dimensional framework of epistemic beliefs (Garret & Weeks, 2017), we examined the Dark Factor of Personality as an antecedent to the endorsement of epistemic beliefs and COVID-19 conspiratorial thinking and the (non-)adherence to WHO health behavioral guidelines during the pandemic as consequences of epistemic beliefs. We start with a brief introduction on epistemic beliefs.

Epistemic Beliefs

Imagine reading the abstract of a recently published study on COVID-19. Further, imagine that you find the authors' results and conclusions intuitively plausible. Do you believe that you can trust your gut feeling – or do you rather find it necessary to take a closer look at the study before drawing any conclusions? Also, do you think that science provides objective facts or do you rather hold that scientific conclusions are influenced by those in power? These questions refer to your *epistemic beliefs*. Epistemic beliefs can be defined as beliefs about the nature and

generation of knowledge (Muis, 2007). The concept of epistemic beliefs emerged in educational psychology (see, e.g., Hofer & Pintrich, 1997; Kuhn et al., 2000; Schommer, 1990), but has since also been adapted to study the general public. In contrast to the concept of motivated reasoning (Kruglanski, 1996; Kunda, 1990), which is the process of producing justifications or decisions based on individual motives, goals, and attitudes instead of evidence, epistemic beliefs refer to one's general attitude toward the concept and generation of knowledge itself (Hornsey et al., 2020). It has been demonstrated that epistemic beliefs are related to the accuracy of peoples' opinions (Garrett & Weeks, 2017). What does that mean?

To capture the impact of epistemic beliefs on cognition and behavior, three different aspects need to be distinguished (see Garrett & Weeks, 2017). First, the degree to which people have *Faith in Intuition for Facts*, that is, the degree to which people believe that they can trust their gut feeling when evaluating information. Intuition can be an important source of knowledge (see, e.g., Damasio, 2005; Kahneman, 2011), especially when taken as a starting point for further careful and thorough consideration. If faith in one's intuition is not accompanied by analytic thinking however, people tend to ignore and disregard existing evidence, which can lead to severe misperceptions (e.g., Swami et al., 2014).

Second, the degree to which people have a *Need for Evidence*, that is, the degree to which people believe that their opinions need to be based on externally validated data. People with a high Need for Evidence will try to ensure that their opinions align with the known facts. On the contrary, people with a low Need for Evidence hold opinions that are driven by their ideological convictions, even if they know that these convictions conflict with the current scientific consensus (e.g., Garrett et al., 2016; Hindman, 2009).

Third, the degree to which people believe that "facts" are shaped by those in power, that is, the degree to which people believe that *Truth is Political*. In the social sciences, it has been emphasized that the generation of knowledge is always embedded in historical and societal circumstances (e.g., Hacking, 1999). Such a social constructionist perspective can easily be

misunderstood as entailing a disregard for the truth (Holtz, 2020). People who believe that facts do not exist independently from the political context tend towards this misunderstanding (Garrett & Weeks, 2017). Based on the observation that there are different interpretations of reality and that the scientific consensus shifts over time, it is concluded that "truth" is nothing but a matter of power.

To sum up, there is a distinct set of epistemic beliefs that we call *post-truth epistemic beliefs* because they shield individuals from questioning their opinions and from engaging in a rational discourse. In other words, people with a strong Faith in their Intuition for Facts, a low Need for Evidence and a strong conviction that Truth is Political will show little inclination to commit to "the unforced force of the better argument" (Habermas, 1996, p. 305). Instead, they will deliberately choose to believe what they want to be true. In the following, we argue that epistemic beliefs are closely connected to and an expression of a broader personality disposition, the Dark Factor of Personality.

The Dark Factor of Personality (D) and Epistemic Beliefs

The Dark Factor of Personality (D) is defined as "the general tendency to maximize one's individual utility — disregarding, accepting, or malevolently provoking disutility for others —, accompanied by beliefs that serve as justifications" (Moshagen et al., 2018, p.657). Utility refers to any form of material success or hedonistic feelings such as power or pleasure. The concept of D can be understood as an equivalent to G, the core factor of intelligence, explaining common variance between dark traits such as egoism, Machiavellianism, and psychopathy (Moshagen et al., 2018). Individuals high in D embrace a relativist and cynical worldview, which enables them to bend moral values and to refrain from injunctive norms, whenever it suits their agenda (e.g., Ajzen, 1991; Jonason et al., 2015; Moshagen et al, 2018; Moshagen et al., 2020; Zeigler-Hill et al., 2020).

Thus, it is to be expected that the stronger D, the stronger is the tendency to approve external information that justifies an individual's antagonistic, malevolent or socially aversive behavior while disregarding information criticizing it. We argue that epistemic beliefs serve as

tools to construct and maintain convictions that serve as justifications for this behavior. Further, we assume that individuals high in D use epistemic beliefs to fend off information contradicting their worldviews even if these worldviews are not directly linked to justifying antagonistic, malevolent or socially aversive behavior, as threats to any worldview may cause disutility. In addition, as individuals high in D are likely to hold positive, but fragile (e.g., Doerfler et al., 2021) self-concepts, epistemic beliefs serve as a means to shield these self-concepts from critical, self-threatening information.

In terms of the three aspects of epistemic beliefs, individuals with high levels in D are expected to trust their intuition when evaluating the accuracy of any information, implying a strong Faith in Intuition for Facts. As evidence bears the risk of contradicting one's worldview, we expect a negative association between D and Need for Evidence. The disregard of evidence can be supported by endorsing the idea that facts, including scientific evidence, are partially or completely constructed by society which allows for multiple perspectives on what is to be regarded as true (Kata, 2012). Accordingly, we expect that individuals with high levels in D tend to hold the belief that Truth is Political. To sum up, we argue that a pronounced Dark Factor of Personality should be linked to post-truth epistemic beliefs.

COVID-19 Conspiracy Theories and Protective Behavior

We assume that D and post-truth epistemic beliefs are associated with specific cognitions and behavior in response to societal and political phenomena such as the handling of the COVID-19 pandemic. Conspiracy theories attribute the actual cause of an event to the intrigues of several powerful actors who are working towards a common goal that is contrary to the interests of large sections of the population (Swami & Furnham, 2014). Conspiracy theories about COVID-19 range from downplaying its danger while suspecting others to profit from exaggerating the severity of the disease, to explicitly assuming that malevolent forces spread COVID-19 as a bioweapon (e.g., Imhoff & Lamberty, 2020). The central idea of conspiracy theories, namely powerful actors secretly working towards a common goal against the will of the majority of the

people, fits within the self-serving worldview of individuals high in D (Moshagen et al., 2018). Ruthlessly prioritizing one's individual utility as the core motif of individuals with high levels in D, could well lead to the assumption that others think and behave similarly. Accordingly, Machiavellianism has been linked to a tendency to believe in conspiracy theories and increased willingness to conspire (Douglas & Sutton, 2011). More recently, Machiavellianism, narcissism, and psychopathy were found to be associated with the endorsement of generic (Kay, 2021) and COVID-19 specific conspiracy theories (Ahadzadeh et a., 2021). Following our line of argument, individuals high in D should trust their intuition when confronted with conspiratorial ideas and refrain from relying on evidence. The idea that what is regarded as "true" is dependent on politics and society, could further enhance conspiratorial thinking (Garret & Weeks, 2017).

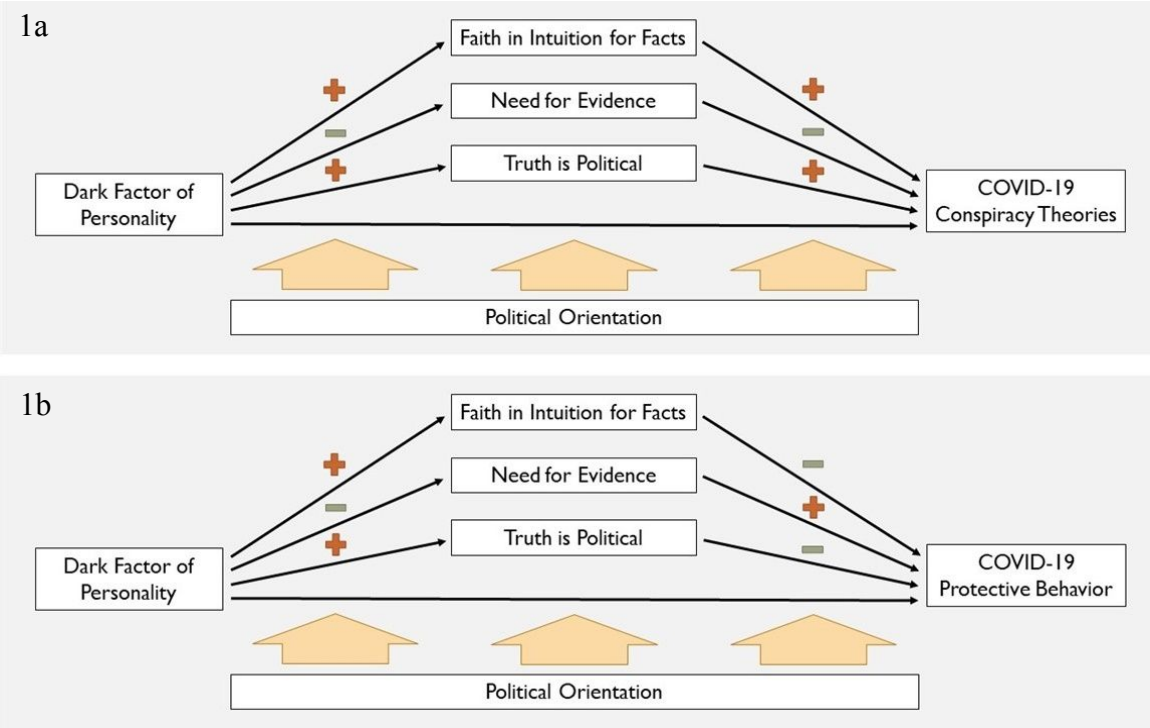
Compliance with countermeasures against COVID-19, including handwashing, wearing hygienic face masks and social distancing, is highly dependent on trust in government and science (Plohl & Musil, 2021). As described above, individuals high in D should only rely on evidence and hence trust scientific recommendations, if it suits their agenda. In the context of COVID-19, however, this seems highly unlikely, as countermeasures rely on the engagement in prosocial behavior (Anderson et al., 2020; Han et al., 2020), which is in stark contrast to the very definition of D (Moshagen et al., 2018). Research has linked D as well as individual dark traits such as Machiavellianism, narcissism and psychopathy to less protective behavior against COVID-19 (Blagov, 2021; Nowak et al., 2020; Ścigała et al., in press; Zettler et al., 2021). Again, following our line of argument, individuals high in D should rely on post-truth epistemic beliefs to neglect scientific evidence regarding COVID-19 and devalue it, for example by trusting their intuition about its accuracy. They could also assume that recommendations aiming at the implementation of countermeasures are merely the result of one of multiple (scientific) points of view.

Much of the available research has demonstrated that dark traits are more common in the right-wing political spectrum (Duspara & Greitemeyer, 2017; Jonason, 2015) and were linked to

traditionally conservative stands on major societal topics (Arvan, 2013). Not all studies, however, corroborated these relationships. It appears that these associations depend on various factors, such as the particular traits considered and the measures applied (see, e.g., Vize et al., 2018; Zeigler-Hill et al., 2020). In terms of epistemic beliefs, both Faith in Intuition for Facts and Truth is Political were linked to conservatism (Garret & Weeks, 2017). Additionally, conservatism has been shown to be associated with the endorsement of COVID-19 conspiracy theories as well as less protective behavior (e.g., de Bruin et al., 2020; Freeman et al., 2020). In addition to these associations, political orientation could moderate the paths between D, epistemic beliefs, and both COVID-19 variables. More specifically, the joint occurrence of high scores on D and a right-wing political orientation could provide particularly fertile ground for strong inclinations to endorse post-truth epistemic beliefs, conspiracy ideation, and harmful behavior. For left-leaning individuals high in D, such inclinations could be weaker, as their social environment is likely more critical towards these stands, thereby reducing their utility. Moreover, post-truth epistemic beliefs could relate to the outcome variables in different ways, with stronger links for individuals with a more right-leaning political orientation.

Figure 1

The Proposed Mediator Models with Endorsement of COVID-19 Conspiracy Theories (1a) and COVID-19 Protective Behavior (1b) as the Dependent Variables.



The Present Research

Despite its theoretical plausibility, the connection between dark traits and epistemic beliefs has not been investigated yet and empirical evidence for the link between epistemic beliefs and the endorsement of conspiracy theories rests on one study (Garret & Weeks, 2017). The latter authors showed that all three epistemic beliefs were associated with the score on a conspiracist ideation scale, but the results were somewhat mixed when relationships to conspiracy-related assertions about specific topics were examined (e.g., "Vaccines cause autism"). Although Machiavellianism and psychopathy have been linked to endorsing COVID-19 conspiracy theories (Hughes & Machan, 2021) and engaging in less protective behavior (Triberti et al., 2021), research on the characteristic handling of evidence associated with dark traits is still missing. Additionally, we intend to corroborate as well as to extend prior research using a measure of the core of dark traits. Our studies are not only the first to investigate the link between

dark traits and epistemic beliefs, but also to propose a model taking into account the complex interactions between dark traits, epistemic beliefs and political orientation as well as their collective effect on COVID-19-related cognitions and behavior (for an overview, see Figure 1). Four studies are presented: In Study 1, we investigated the relationship between D and epistemic beliefs, while in Studies 2-4 we included links to the endorsement of COVID-19 conspiracy theories and engagement in COVID-19 protective behavior, both inside and outside the United States over the course of the pandemic.

We expected D to be positively associated with Faith in Intuition for Facts and Truth is Political and negatively associated with Need for Evidence (Studies 1-4). We further expected D to be positively associated with the endorsement of COVID-19 conspiracy theories and negatively associated with COVID-19 protective behavior (Studies 2-4). We hypothesized that these associations would be mediated by Faith in Intuition for Facts, Need for Evidence and Truth is Political, with Faith in Intuition for Facts and Truth is Political being positively and Need for Evidence being negatively associated with the endorsement of COVID-19 conspiracy theories. For COVID-19 protective behavior, we expected the reverse pattern of correlations (Studies 2-4).

In Studies 2-4, we also investigated the potential moderating role of political orientation on the associations described above. Following preliminary results (Study 2), we expected that the associations between D and the endorsement of COVID-19 conspiracy theories and engagement in COVID-19 protective behavior would increase with a more conservative political orientation. We expected the same pattern for the association between D and Truth is Political. Additionally, we expected both the association between D and Need for Evidence and the association between Need for Evidence and the endorsement of COVID-19 conspiracy theories to increase with a more liberal political orientation (Studies 3 and 4).

For all studies presented in this article, we report how we determined our sample size, all data exclusions, and all measures in the study, and we follow the Journal Article Reporting Standards (JARS; Kaza, 2018). All data, analysis code, research materials are available at

https://osf.io/g3xkw/?view_only=4a7137cce68a4f3e964b3c746e347226. All studies were preregistered (Study 1: https://aspredicted.org/blind.php?x=bp5b3x; Study 2: https://aspredicted.org/blind.php?x=9mq4xn; Study 3: https://aspredicted.org/blind.php?x=962tn4; Study 4: https://aspredicted.org/blind.php?x=4262j3).

Study 1

In the first study, we explored the relationship between D and the epistemic beliefs subscales Faith in Intuition for Facts, Need for Evidence, and Truth is Political. A more detailed report of a confirmatory factor analysis can be found in the online supplement (S1).

Method

Participants

Our required sample size was based on a study by Wolf et al. (2013) who systematically varied major model properties to evaluate sample size requirements for commonly used structural equation models using Monte Carlo data simulation techniques. Note that, despite being an ancillary analysis in our case, confirmatory factor analysis demands greater sample sizes than the zero-order correlations presented below. Based on their results for similar models, we aimed for a final minimum sample size of 300 participants, and we recruited 407 participants via Mechanical Turk to account for exclusions and paid 1 USD. We excluded 55 participants because they failed to respond to our control question appropriately ("This is a control question. Please do not select any of the 7 options below."; for details on the exclusion criteria and wordings of the control questions in all four studies see S5.3). Further, 30 participants were excluded because they showed unreasonably low response times of less than 90 seconds and one participant because of an unreasonably high response time of more than 2700 seconds, indicating careless responding. The final sample consisted of 321 participants (M = 37.12, SD = 10.73, 20-78 years, 38% female). In terms of educational attainment, 38.3% had graduated from high school, 48.3% had a bachelor's degree, 9.0 % had a master's degree and 1.6 % had a Ph.D. or higher. The remaining 2.8 % completed some high school or trade school. Regarding ethnicity, 75.7% stated they were

White, 10.3% Black, 6.2 % Hispanic, 5.3% Asian or Asian American, and 0.6% Native American.

Measures

Epistemic beliefs were assessed with a 12-item questionnaire by Garret and Weeks (2017) capturing the three subscales Faith in Intuition for Facts (e.g., "I trust my gut to tell what's true and what's not", α = .92), Need for Evidence (e.g., "Evidence is more important than whether something feels true", α = .84) and Truth is Political (e.g., "Facts depend on their political context", α = .92) with four items per subscale. Items are answered on a 7-point scale, ranging from *strongly disagree* (1) to *strongly agree* (7).

The Dark Factor of Personality was assessed with the D16 short version (Moshagen et al., 2020). It consists of 16 items with a 7-point scale, ranging from *strongly disagree* (1) to *strongly agree* (7, e.g., "My own pleasure is all that matters", α = .90).

Table 1

Study 1: Means, Standard Deviations, and Zero-Order Correlations of the Continuous Variables

	M (*SD*)	(1)	(2)	(3)
(1) Dark Factor of Personality	2.43 (0.95)	-		
(2) Faith in Intuition for Facts	4.61 (1.36)	.27**	-	
(3) Need for Evidence	5.84 (0.93)	-.20**	-.34**	-
(4) Truth is Political	3.41 (1.57)	.50**	.35**	-.22**

Note. $N = 321$. ** $p < .001$.

Results and Discussion

Table 1 shows all zero-order correlations between the epistemic beliefs subscales and D as well as their means and standard deviations. As expected, Faith in Intuition for Facts and Truth is Political correlated positively with D, $r = .27$, $p < .001$ and $r = .50$, $p < .001$, respectively, and Need for Evidence was negatively correlated with D, $r = -.20$, $p < .001$. Study 1 provides first

evidence for the link between D and the epistemic beliefs subscales. Indeed, the higher the participants' tendency to maximize their individual utility, the less they were inclined to commit to "the unforced force of the better argument" in Habermas' terms (Habermas, 1996, p. 305). These results build the foundation for Studies 2-4 that investigated the effects of D and epistemic beliefs on the endorsement of COVID-19 conspiracy theories and the engagement in COVID-19 protective behavior.

Study 2

The study was conducted on March 21, 2020, 10 days after the World Health Organization declared the COVID-19 outbreak a pandemic (WHO, 2020a). At this time, there had been around 15,000 reported cases of COVID-19 infections in the United States and 201 registered COVID-19-related deaths (WHO, 2020b). The pandemic had started to dominate the public debate (McKinley, 2020).

Method

Participants

Based on an analysis with G*Power (Faul et al., 2009), the required sample size for identifying an association of $r = .15$, with $\alpha = .05$ and power = .90 is 462. Accordingly, we aimed for 550 participants to account for potential exclusions. Participants were recruited via Mechanical Turk and were paid 1.50 USD. In total, 550 participants completed the questionnaire. As we relied on U.S. participants, 56 participants were excluded because they either used a VPN/VPS or a proxy to mask their country and/or failed to provide an adequate description of the study in English implying they are not native speakers or bots or careless responders. Additionally, we excluded 26 participants because they failed to respond to at least one of our control questions appropriately (see Table S5.3). Further, 13 participants were excluded because they showed unreasonably low response times of less than 120 seconds and two participants because of unreasonably high response times of more than 2700 seconds, indicating careless

responding.[1] The final sample amounted to 453 participants (M = 40.37 years, SD = 12.23 years, 19-78 years, 42.4% female).[2] In terms of educational attainment, 29.6 % had graduated from high school, 53.2 % had a bachelor's degree, 13.7 % had a master's degree and 1.1 % had a Ph.D. or higher. The remaining 2.4 % completed some high school or trade school. Regarding ethnicity, 79.5 % stated they were White, 7.5 % Black, 7.5 % Asian or Asian American, 4.6 % Hispanic, and 0.5 % Native American.

Measures

In Study 2, we relied on the same measures for the epistemic beliefs and D that were used in Study 1. Again, reliabilities were excellent or good (Table S5.2). Further, we assessed participants' endorsement of COVID-19 conspiracy theories. The items were based on popular COVID-19 conspiracy theories circulating at the time of assessment and a prior instrument for assessing the endorsement of conspiracy theories regarding the Zika virus (Piltch-Loeb et al., 2019). On a 7-point scale, participants indicated the likelihood of six statements (e.g., "COVID-19 is a biological weapon originally developed by the Chinese government."). Options ranged from *not at all likely* (1) to *extremely likely* (7), α = .92.

The items for COVID-19 protective behavior were based on the COVID-19 pandemic behavior guidelines provided by the WHO (2020a). Participants indicated how much they complied with six statements referring to behaviors to slow the distribution of the coronavirus in the last three days (e.g., "In the last three days I have stayed home, unless required for my job, to buy groceries, or to help those in need."). A 7-point scale was provided, options ranged from *strongly disagree* (1) to *strongly agree* (7), α = .78.

[1] Note that we adjusted our low response time exclusion criterion from 90 seconds (Study 1) to 120 seconds (Studies 2, 3, and 4), because the number of items was substantially larger in the latter three studies. Some scholars (e.g., Paas & Morren, 2018; Read et al., 2021) recommend the exclusion of particularly long response times and we followed this advice. In addition to the analyses reported in the main text, we performed the analyses without applying the upper exclusion criterion. All major results remain virtually the same (see Supplement S5).

[2] The final sample size was a bit smaller than planned. Given α = .05, power = .90, and a sample size of 453, we were able to detect an association of r = .151, not r = .150 as originally planned (Faul et al., 2009).

Two additional items were used to measure the interference of social life during the past four weeks due to physical health or emotional problems (Hays et al., 1993). We used the mean of both items as a control variable for additional analyses that involved the behavioral dependent variable (Supplement S2). Political orientation was assessed with a 7-point scale (M = 3.58, SD = 1.84). Options ranged from *extremely left* (1) to *extremely right* (7). Please note that our sample's distribution of political orientation was somewhat right-skewed. In Studies 2-4, we further assessed the percentages of participants tested (positive) for SARS-CoV-2 (see Table S5.1). We included participants irrespective of their test results. The means, standard deviations, and zero order correlations of all focal variables are displayed in Table S2.1.

Results and Discussion

We used PROCESS version 3.4.1 (Hayes, 2018) for our main analyses. While D served as the independent variable, endorsement of COVID-19 conspiracy theories and COVID-19 protective behavior served as dependent variables, respectively. The epistemic belief scales were entered as simultaneous mediators. The data for D and epistemic beliefs were standardized prior to all mediation and moderation analyses. In this parallel multiple mediator model, antecedent variable D was modeled as influencing one dependent variable (endorsement of COVID-19 conspiracy theories or COVID-19 protective behavior) directly as well as indirectly through the three mediators, with the condition that no mediator causally influences another (Hayes, 2018).

The path coefficients, standard errors, and p-values are shown in Figure 2a. The first analysis yielded a total effect of D on the endorsement of COVID-19 conspiracy theories, B = .79, SEB = .06, 95%CI [.68; .90], $p < .001$, indicating that individuals high in D tend to endorse COVID-19 conspiracy theories. D was associated with all three epistemic beliefs in the expected directions. Also, in accordance with our predictions, Faith in Intuition for Facts and Truth is Political were associated with the endorsement of COVID-19 conspiracy theories. Need for Evidence was unrelated to the endorsement of COVID-19 conspiracy theories. We found a significant indirect effect for Faith in Intuition for Facts, B = .09, SEB = .02, 95%CI [.05; .13] as

a mediator, as well as for Truth is Political, B = .20, SEB = .03, 95%CI [.14; .27]. Need for Evidence did not serve as a mediator, B = .03, SEB = .02, 95%CI [-.02; .08]. These results show that the association between D and the endorsement of COVID-19 conspiracy theories can be partly explained by the epistemic beliefs held by individuals high in D.

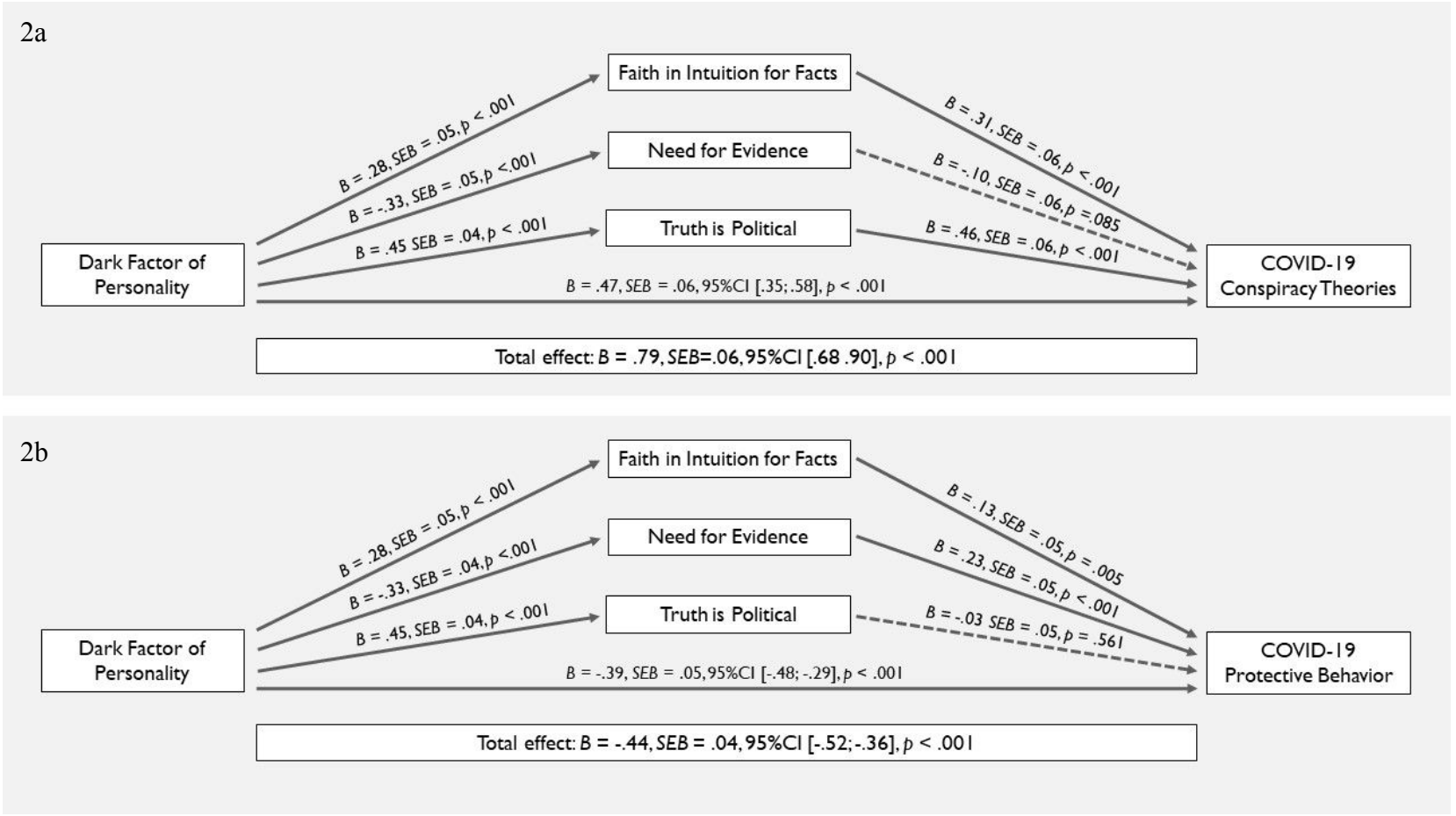
The second parallel mediation analysis yielded a significant total effect of D on COVID-19 protective behavior, B = -.44, SEB = .04, 95%CI [-.52; -.36], p < .001, indicating that individuals with high levels in D showed less COVID-19 protective behavior. Further, Faith in Intuition for Facts and Need for Evidence predicted COVID-19 protective behavior (Figure 2b). Note that although we expected a negative association between Faith in Intuition for Facts and COVID-19 protective behavior, the association was positive. Truth is Political was unrelated to the dependent variable in the joint model. As expected, we found a significant indirect effect of D on COVID-19 protective behavior, mediated by Faith in Intuition for Facts, B = .04, SEB = .01, 95%CI [.01; .06] and Need for Evidence, B = -.08, SEB = .02, 95%CI [-.11; -.04]. Truth is Political, B = -.01, SEB = .02, 95%CI [-.06; .03], did not serve as a mediator. These results show that the association between D and COVID-19 protective behavior can be partly explained by epistemic beliefs shown by individuals high in D.

Additionally, we performed two moderation analyses that included political orientation as a moderator variable of the mediation paths outlined above. Endorsement of COVID-19 conspiracy theories or COVID-19 protective behavior served as dependent variables. Political orientation was significantly associated with both endorsing COVID-19 conspiracy theories, B = .33, SEB = .05, 95%CI [.23; .44], p < .001, and COVID-19 protective behavior, B = -.12, SEB = .05, 95%CI [-.21; -.03], p = .010, indicating that a more right-wing political orientation was associated with a stronger endorsement of COVID-19 conspiracy theories and less engagement in COVID-19 protective behavior. In these models, D was positively associated with the endorsement of COVID-19 conspiracy theories, B = .39, SEB = .06, 95%CI [.28; .50], p < .001, and negatively

associated with the engagement in COVID-19 protective behavior, B = -.36, SEB = .05, 95%CI [-.45; -.27], $p < .001$.

Figure 2

Study 2: Main Results of the Parallel Mediator Models with Endorsement of COVID-19 Conspiracy Theories (2a) and COVID-19 Protective Behavior (2b) aas the Dependent Variables

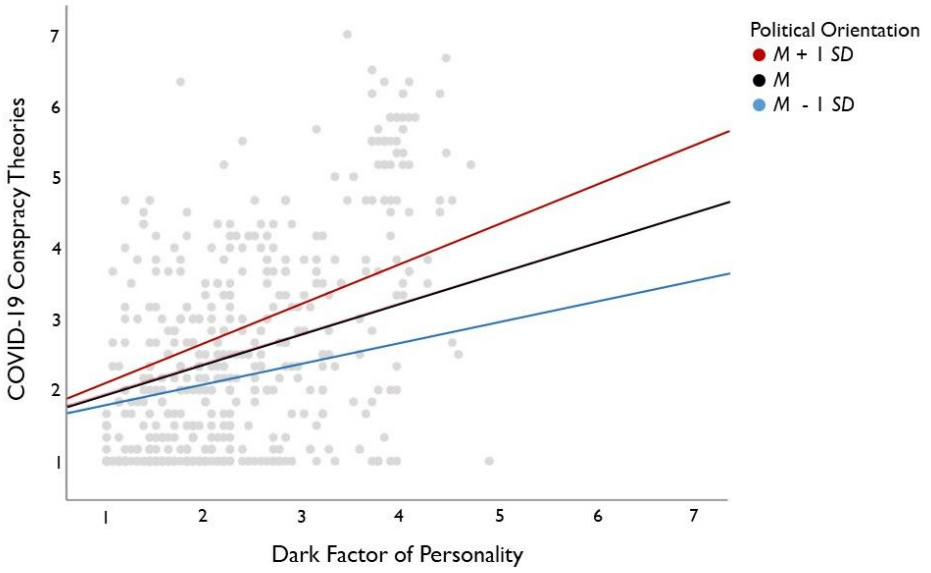


Note. Solid paths indicate significant associations ($p < .05$), dashed paths are non-significant.

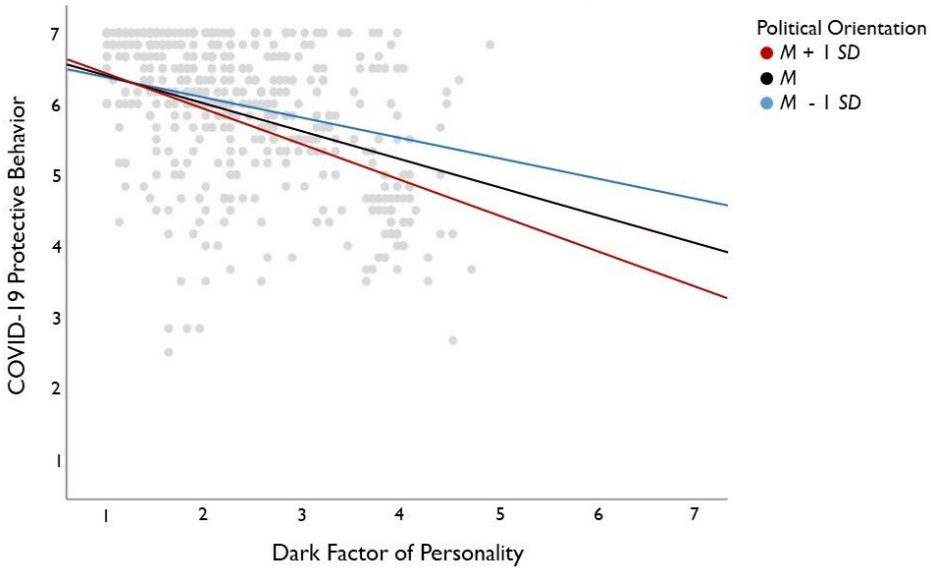
Figure 3

Graphical Representation of the Interaction Between D and Political Orientation with COVID-19 Conspiracy Theories (3a) and COVID-19 Protective Behavior (3b) as Criteria (Study 2).

3a



3b



Note. Higher scores in political orientation indicate a more right-leaning orientation. Semi-transparent scatterplots represent single data points.

Importantly, we found a significant overall interaction effect of political orientation: The positive association between D and the endorsement of COVID-19 conspiracy theories increased with a more right-wing political orientation, $B = .12$; $SEB = .05$, 95%CI [.02; .23], $p = .024$ (see Figure 3a). For individuals scoring more to the right of the political spectrum ($M + 1$ SD), the positive association between D and the endorsement of COVID-19 conspiracy theories was the strongest, $B = .52$; $SEB = .07$, 95%CI [.37; .66], $p < .001$, but it remained significant for individuals scoring more to the left of the political spectrum ($M - 1$ SD), $B = .27$; $SEB = .08$, 95%CI [.11; .43], $p = .001$.

We also found a moderating effect of political orientation on the effect of D on COVID-19 protective behavior, $B = -.10$, $SEB = .05$, 95%CI [-.19; -.01], $p = .033$ (Figure 3b). For individuals scoring more to the right of the political spectrum ($M + 1$ SD), the negative association between D and COVID-19 protective behavior was the strongest, $B = -.46$; $SEB = .06$, 95%CI [-.59; -.34], $p < .001$, but it remained significant for individuals scoring more to the left of the political spectrum ($M - 1$ SD), $B = -.26$; $SEB = .07$, 95%CI [-.40; -.13], $p < .001$.

Political orientation also moderated several additional paths of our mediation models, which will be outlined in the following (see Figure S2 for graphical depictions, and Tables S2.2-S2.4 for the complete regression results). There was a significant moderating effect on the association between D and Need for Evidence, $B = .11$, $SEB = .04$, 95%CI [.02; .20], $p = .017$. For individuals scoring more to the left of the political spectrum ($M - 1$ SD), the negative association between D and Need for Evidence was the strongest, $B = -.40$; $SEB = .07$, 95%CI [-.53; -.27], $p < .001$, but it remained significant for individuals scoring more to the right of the political spectrum ($M + 1$ SD), $B = -.19$; $SEB = .06$, 95%CI [-.30; -.07], $p = .001$. Political orientation further moderated the association between D and Truth is Political, $B = .10$, $SEB = .04$, 95%CI [.02; .19], $p = .012$. For individuals scoring more to the right of the political spectrum ($M + 1$ SD), the positive association between D and Truth is Political was the strongest, $B = .48$; $SEB = .06$, 95%CI [.37; .59], $p < .001$, but it remained significant for individuals scoring more to

the left of the political spectrum (M – 1 SD), B = .27; SEB = .06, 95%CI [.15; .40], p < .001. Political orientation also moderated the association between Need for Evidence and the endorsement of COVID-19 conspiracy theories, B = .14, SEB = .05, 95%CI [.03; .24], p = .010. For individuals scoring more to the left of the political spectrum (M - 1 SD), the negative association between Need for Evidence and the endorsement of COVID-19 conspiracy theories was the strongest, B = -.27; SEB = .09, 95%CI [-.44; -.10], p = .002, and it did not remain significant for individuals scoring more to the right of the political spectrum (M + 1 SD), B = .01; SEB = .07, 95%CI [-.12; .14], p = .911.

In sum, Study 2 supports our proposed model taking into account D, epistemic beliefs and political orientation as well as their interactive effect on COVID-19-related beliefs and behavior. We present evidence for the link between epistemic beliefs and COVID-19 related beliefs and behaviors. Our results build upon existing empirical evidence for the connection between dark traits and the endorsement of COVID-19 conspiracy theories and protective behavior. We find a tendency of individuals with high levels in D to endorse COVID-19 conspiracies as well as to neglect COVID-19 protective behavior. Our results show that the effect of D on the endorsement of COVID-19 conspiracy theories and the engagement in COVID-19 protective behavior can be explained by post-truth epistemic beliefs held by individuals high in D and that the strength of the associations increases with a more conservative political orientation.

Study 3

Due to constantly and rapidly changing circumstances during the COVID-19 pandemic, the need to replicate initial findings appeared to be of extraordinary importance. Thus, in Study 3 we aimed for a replication of Study 2 using a larger sample size to corroborate the results at a later stage of the pandemic. Study 3 was conducted six months after Study 2, on October 14 and 15, 2020. At the time, there were almost eight million reported cases of COVID-19 infections in the USA and around 214,000 registered COVID-19-related deaths (WHO, 2020b).

Before and during Trump's presidency, political polarization in the USA had increased (Abramowitz, 2018) and COVID-19 had become a partisan issue when Study 3 was conducted (Makridis & Rothwell, 2020; Druckman et al., 2021; Gollwitzer et al., 2020). The politicization of COVID-19 led to the crucial question whether individual differences in epistemic beliefs could still contribute to explaining the endorsement of COVID-19 conspiracy theories and engagement in protective behavior and whether the interactions with political orientation found in Study 2 could still be observed. Apart from minor adjustments to the scales used to assess COVID-19 protective behavior (see Measures), our hypotheses and methods remained identical to those in Study 2.

Method

Participants

We aimed for a substantially larger sample size than for our previous studies based on extant recommendations for powering replications and interaction effects (Giner-Sorolla, 2018; Simonsohn, 2015). A sample of 1156 Mechanical Turk participants was invited, and 1113 participants completed the questionnaire and were paid 1.10 USD. We excluded 164 participants that either used a VPN/VPS or a proxy to mask their country of access and/or failed to provide an adequate description of the study in English implying they were not native speakers or bots or careless responders (Kennedy et al., 2020). We excluded another 14 participants because they failed to answer at least one of our control questions correctly (see Table S5.3). Further, one additional participant was excluded because of an unreasonably low response time of less than 120 seconds and eight participants because of unreasonably high response times of more than 2700 seconds. Participants were asked to state both their current age as well as their year of birth. Three participants were excluded because there was a mismatch between the two pieces of information, which was another indicator of careless responding (Kennedy, et al., 2020). The final sample amounted to 923 participants (M = 39.43 years, SD = 11.64 years, 19-78 years, 44.9 % female). In terms of educational attainment, 29.6 % had graduated from high school, 51.1 %

had a bachelor's degree, 14.0 % a master's degree, and 2.0 % had a Ph.D or higher. The remaining 3.3 % completed some high school or trade school. Regarding ethnicity, 79.2 % stated they were White, 7.4 % Black, 7.3 % Asian or Asian American, 3.9 % Hispanic, and 0.1 % Native American.

Measures

In Study 3, we relied on the same measures for D, epistemic beliefs, the endorsement of COVID-19 conspiracy theories and political orientation that were used in Studies 1 and 2. Again, reliabilities were excellent or good (see Table S5.2 and Table S3.1 for the descriptive statistics and zero-order correlations) and political orientation scores were somewhat right-skewed (M = 3.57; SD = 1.76). As the WHO advice for the public had been updated since Study 2 (WHO, 2020a), we changed our items for COVID-19 protective behavior slightly in accordance with the WHO advice. The means, standard deviations, and zero order correlations of the focal variables are reported in Table S3.1.

Results and Discussion

We performed the same analyses as in Study 2. Path coefficients, standard errors, and p-values are shown in Figure 4. The first analysis yielded a total effect of D on the endorsement of COVID-19 conspiracy theories, B = .50, SEB = .04, 95%CI [.42; .57], p < .001, corroborating the result from Study 2. D was associated with Need for Evidence and Truth is Political in the expected directions, but D was not significantly correlated with Faith in Intuition for Facts. Further, the epistemic beliefs were associated with the endorsement of COVID-19 conspiracy theories in the expected directions. We found a significant indirect effect of D on the endorsement of COVID-19 conspiracy theories, mediated by Need for Evidence, B = .04, SEB = .01, 95%CI [.02; .07], and an indirect effect, mediated by Truth is Political, B = .12; SEB = .02; 95%CI [.09; .16]. Faith in Intuition for Facts did not serve as a mediator, B = .01; SEB = .01; 95%CI [-.01; .03]. These results, obtained at a later stage of the pandemic, corroborate the

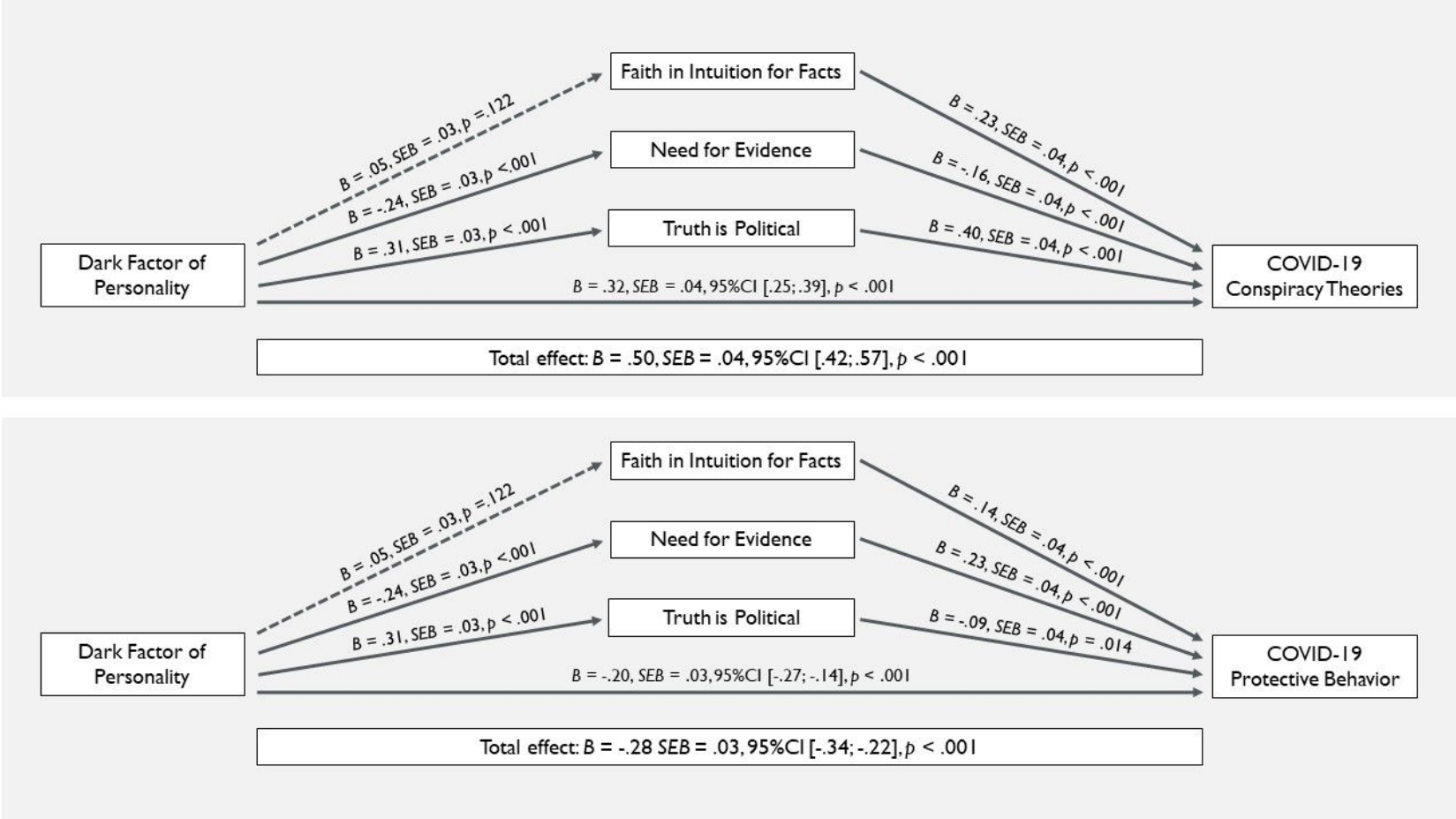
assumption that the association between D and the endorsement of COVID-19 conspiracy theories can be explained by the epistemic beliefs held by individuals high in D.

The second parallel mediation analysis yielded a significant total effect of D on COVID-19 protective behavior, B = -.28, SEB = .03, 95%CI [-.34; -.22], p < .001, replicating the finding that individuals with high levels in D tend to show less COVID-19 protective behavior. As expected, Need for Evidence and Truth is Political predicted COVID-19 protective behavior (Figure 4b). Faith in Intuition for Facts also predicted COVID-19 protective behavior, but not in the expected direction. In line with our hypotheses, we found a significant indirect effect of D on COVID-19 protective behavior, mediated by Need for Evidence, B = -.06; SEB = .01; 95%CI [-.08; -.03] and Truth is Political, B = -.03; SEB = .01; 95%CI [-.05; -.01]. Faith in Intuition for Facts, B = .01; SEB = .01; 95%CI [-.003; .02], did not serve as a mediator. These results further support the assumption that the association between D and COVID-19 protective behavior can be explained by the epistemic beliefs held by individuals high in D.

As in Study 2, we performed two moderation analyses including political orientation as a moderator variable and the endorsement of COVID-19 conspiracy theories and COVID-19 protective behavior as dependent variables respectively. Political orientation predicted both the endorsement of COVID-19 conspiracy theories, B = .35, SEB = .04, 95%CI [.28; .42], p < .001 and COVID-19 protective behavior, B = -.27, SEB = .03, 95%CI [-.33; -.20], p < .001. In these models, D was positively associated with the endorsement of COVID-19 conspiracy theories, B = .30, SEB = .04, 95%CI [.23; .37], p < .001, and negatively associated with the engagement in COVID-19 protective behavior, B = -.20, SEB = .03, 95%CI [-.26; -.13], p < .001. Deviating from the results of Study 2, political orientation did neither moderate the effects of D on the endorsement of COVID-19 conspiracy theories, B = .05, SEB = .03, 95%CI [-.02; .12], p = .148, nor on COVID-19 protective behavior, B = .01, SEB = .03, 95%CI [-.05; .07], p = .759.

Figure 4

Study 3: Main Results of the Parallel Mediator Models with Endorsement of COVID-19 Conspiracy Theories (4a) and COVID-19 Protective Behavior (4b) as the Dependent Variables



Note. Solid paths indicate significant associations ($p < .05$), dashed paths are non-significant.

However, we did find a moderating effect of political orientation on the association between D and Need for Evidence, $B = .11$, $SEB = .03$, 95%CI [.05; .17], $p < .001$ (Figure S3a). For individuals scoring more to the left of the political spectrum ($M - 1$ SD), the negative association between D and Need for Evidence was the strongest, $B = -.33$, $SEB = .05$, 95%CI [-.42; -.24], $p < .001$, but it remained significant for individuals scoring more to the right of the political spectrum ($M + 1$ SD), $B = -.11$, $SEB = .04$, 95%CI [-.20; -.03], $p = .006$. We also found a moderating effect of political orientation on the association between Faith in Intuition for Facts and COVID-19 protective behavior, $B = .07$, $SEB = .03$, 95%CI [.01; .13], $p = .028$ (Figure S3b). For individuals scoring more to the right of the political spectrum ($M + 1$ SD), the positive association between Faith in Intuition for Facts and COVID-19 protective behavior was the strongest, $B = .24$, $SEB = .05$, 95%CI [.15; .33], $p < .001$, but it remained significant for individuals scoring more to the left of the political spectrum ($M - 1$ SD), $B = .10$, $SEB = .05$, 95%CI [.01; .19], $p = .039$.

Study 3 largely corroborated our proposed model at a later stage of the pandemic at times of increased political polarization. We found support for the role of post-truth epistemic beliefs and respective links to D, to the endorsement of COVID-19 conspiracy theories, and to the engagement in COVID-19 protective behavior. Study 3 yielded an additional significant indirect effect of D on the endorsement of COVID-19 conspiracy theories, mediated by Need for Evidence that was not found in Study 2. We also found an additional significant indirect effect of D on COVID-19 protective behavior, mediated by Truth is Political. We did not replicate the indirect effect of D on the endorsement of COVID-19 conspiracy theories, mediated by Faith in Intuition for Facts (which involved an association that was reversed to what we had expected) as well as most of the moderating effects of political orientation. Nevertheless, the substantial main effects of political orientation on the dependent variables do speak for the pivotal role of political orientation as a

contributing factor to the endorsement of COVID-19 conspiracy theories and neglect of COVID-19 protective behavior.

Study 4

After having found largely consistent support for our proposed model focusing on the antecedents and consequences of post-truth epistemic beliefs over the course of the pandemic, we aimed to corroborate our results outside of the United States to provide support for their cross-cultural validity. Study 4 was conducted in Germany on December 22, 2020. At this time, around 1,500,000 people or 1.9% of the German population had reportedly been infected with SARS-CoV-2 and around 27,000 COVID-19-related deaths were registered for this country (WHO, 2020b).[3] There are certain differences between the US and Germany with regard to public trust in science and political polarization. In a study that was conducted in the years 2019 and 2020, 13% of the German population stated that they had little or no trust in science, whereas it was 21% in the USA (Funk et al., 2020). In addition, in the USA the degree of polarization regarding trust in science between people self-identifying as politically left or right was far more pronounced (Funk et al., 2020). In both countries, COVID-19 conspiracy theories are endorsed by a substantial part of the public (although the popularity of specific theories varies). In Germany, 17% of the population agreed to the notion that the government used COVID-19 as an excuse to restrict civil liberties (Infratest dimap, 2020), whereas 25% of U.S. citizens thought that the outbreak and dissemination of COVID-19 was planned (Schaeffer, 2020). In contrast to the inconsistent and multi-faceted assessment of COVID-19 by the US government and members of the Republican party, there was a major consensus among German parties (including the then ruling conservative party, Christlich Demokratische Union, CDU) in favor of science-based protective measures against COVID-19, such

[3] The infection rate is comparable to the infection rate of 2.4% of the U.S. population at the time of assessment of Study 3 (WHO, 2020b). However, there were only half as many reported COVID-19 related fatalities per 100,000 inhabitants in Germany (33 per 100,000 on December 22, 2020) than in the USA at the time of assessment of Study 3 (65 per 100,000 on October 15, 2020).

as wearing face masks, lockdowns, and social distancing (e.g., Dean et al., 2020; Deutsche Welle, 2020). Apart from minor adjustments to the scales used to assess the endorsement of COVID-19 conspiracy theories (see Measures), our hypotheses and methods remained unchanged.

Method

Participants

We used G*Power and point biserial correlations as our basis for determining our sample size a priori. Given $r = .20$, $\alpha = .05$ and power = .80, a sample size of 191 is required.[4] To add power for the interaction analyses, the required sample size was doubled, yielding 383 participants (Giner-Sorolla, 2018; Simonsohn, 2017). We aimed for 550 participants to account for potential exclusions. Participants were recruited online from the crowdworking site clickworker.de and paid 1.30 €.

In total, 550 participants were invited to participate in our study and 539 participants completed it. We excluded 11 participants because they failed to respond to at least one of our control questions appropriately (see Table S5.3). Further, three participants were excluded because of unreasonably low response times of less than 120 seconds and seven participants because of unreasonably high response times of more than 2700 seconds. Another four participants were excluded because they were under the age of 18. One participant did not indicate their political orientation and therefore had to be excluded. The final sample amounted to 513 participants ($M = 37.54$ years, $SD = 12.23$ years, 18-73 years, 40.7 % female). In terms of educational attainment, 32.4% had graduated from high school, 43.5 % had a bachelor's degree or master's degree. Another 24.0 % completed some high school and one participant had no degree.

Measures

[4] Note that in Study 2 we aimed for 90% power, as it was the first study in which we applied our newly developed model, 80% power appeared adequate for the subsequent studies. Furthermore, in Study 4 we relied on point biserial correlations as a basis for our sample size calculation because we also assessed a dichotomous dependent variable (the usage of a contact tracing app) but decided to move these analyses to the Online Supplement. Based on a Pearson correlation of $r = .20$, $\alpha = .05$, and power = .80, the required sample size would have amounted to 193 participants.

In Study 4, we relied on the same measures for D, the epistemic beliefs, COVID-19 protective behavior, and political orientation that were used in Studies 1-3. Reliabilities were good, close to excellent (Table S5.2), the distribution of political orientation was somewhat right-skewed (M = 3.62, SD = 0.99). Prior research showed that content of popular conspiracy theories in Germany differed somewhat from those in the USA. Thus, a set of items based on COVID-19 conspiracy theories circulating in Germany during the time of assessment was used (Imhoff & Lamberty, 2020). For the assessment of D, we used the German version of the scale we had used in the previous studies (Bader et al., 2021). All other scales were translated to German using the committee method.[5] Please refer to Table S4.1 for descriptive statistics (including zero order correlations) of all focal variables.

Results and Discussion

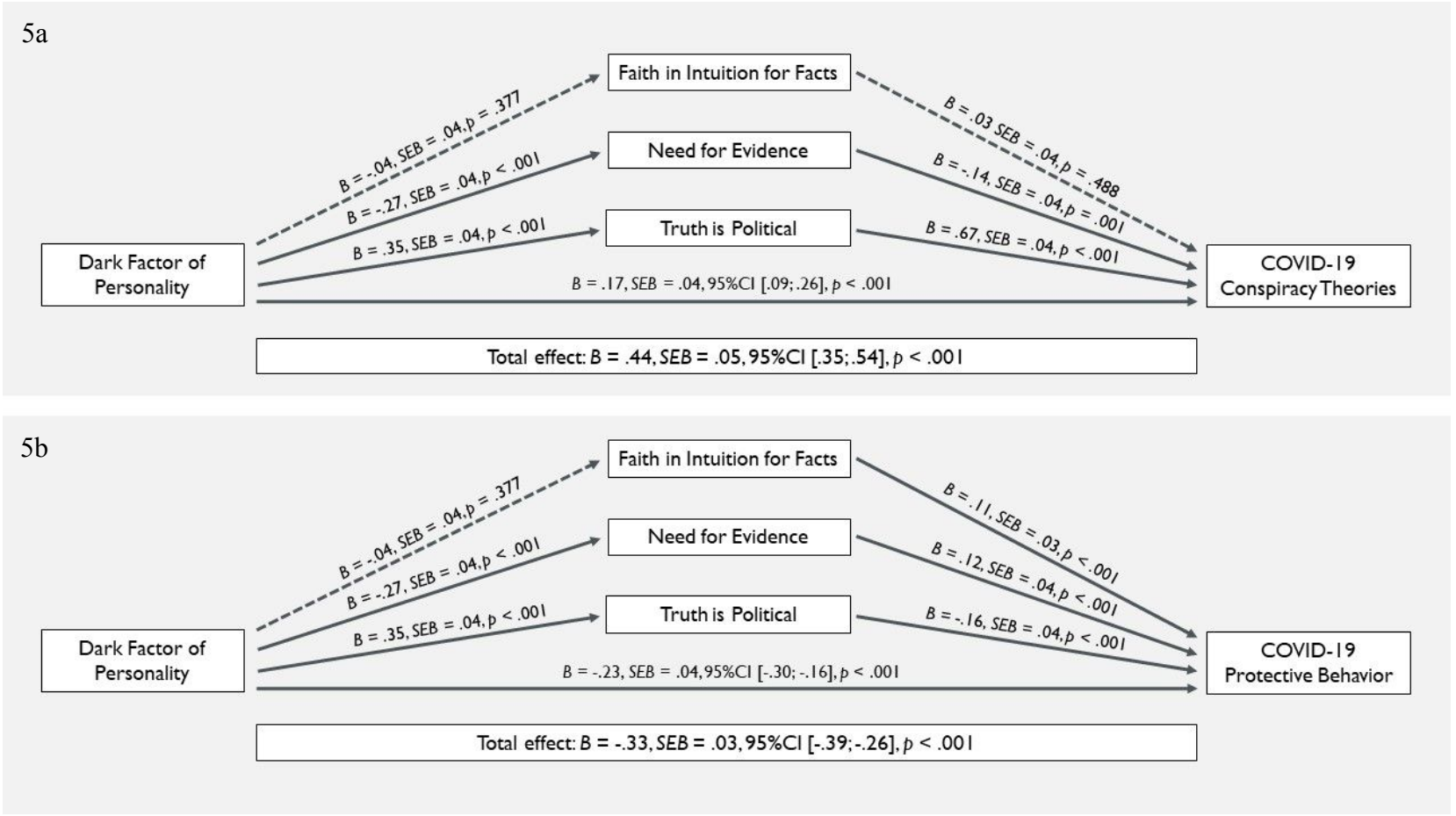
We performed the same analyses as in Studies 2 and 3. Path coefficients, standard errors, and p-values are shown in Figure 5. The first analysis yielded a total effect of D on the endorsement of COVID-19 conspiracy theories, B = .44, SEB = .05, 95%CI [.35; .54], p < .001, corroborating the results of Studies 2 and 3. D was associated with Need for Evidence and Truth is Political in the expected directions, but not significantly linked to Faith in Intuition for Facts. Further, Need for Evidence and Truth is Political were associated with the endorsement of COVID-19 conspiracy theories in the expected directions, while Faith in Intuition for Facts was not significantly associated with endorsing COVID-19 conspiracy theories. As expected, we found a significant indirect effect of D on the endorsement of COVID-19 conspiracy theories, mediated by Need for Evidence, B = .04; SEB = .02; 95%CI [.01; .07], as well as a significant indirect effect of D on the endorsement of

[5] Additionally, we expanded our research towards possible effects of D and epistemic beliefs on the use of contact tracing apps, more precisely the *Corona-Warn-App*. Given that at the time the study was conducted the utility of this app was questioned by government officials and many people who were following other behavioral advice (Kreder, 2020; Spiegel, 2020), we are cautious to interpret the data. A detailed report of the results pertaining to the use of the *Corona-Warn-App* as the dependent variable can be found in the Online Supplement S4.

COVID-19 conspiracy theories, mediated by Truth is Political, B = .24; SEB = .04; 95%CI [.17; .31]. Faith in Intuition for Facts did not serve as a mediator, B = -.001; SEB = .003; 95%CI [-.01; .004]. These results extend our empirical insights to Germany, corroborating the assumption that the association between D and the endorsement of COVID-19 conspiracy theories can be partly explained by post-truth epistemic beliefs held by individuals high in D.

Figure 5

Study 4: Main Results of the Parallel Mediator Models with Endorsement of COVID-19 Conspiracy Theories (5a) and COVID-19 Protective Behavior (5b) as the Dependent Variables



Note. Solid paths indicate significant associations ($p < .05$), dashed paths are non-significant.

The second parallel mediation analysis yielded a significant total effect of D on COVID-19 protective behavior, B = -.33, SEB = .03, 95%CI [-.39; -.26], p < .001, replicating the findings from Studies 2 and 3 that individuals with high levels in D tend to show less COVID-19 protective behavior. Further, Need for Evidence and Truth is Political predicted COVID-19 protective behavior in the expected directions (Figure 5b). As in Studies 2 and 3, Faith in Intuition for Facts was positively associated with COVID-19 protective behavior whereas we had expected an effect in the opposite direction. As expected, we found significant indirect effects of D on COVID-19 protective behavior, mediated by Need for Evidence, B = -.03, SEB = .02; 95%CI [-.07; -.01], and Truth is Political, B = -.06; SEB = .02; 95%CI [-.10; -.03]. Faith in Intuition for Facts did not serve as a mediator, B = -.004; SEB = .01; 95%CI [-.02; .01]. These results further support the assumption that the association between D and COVID-19 protective behavior can be partly explained by epistemic beliefs held by individuals high in D.

As in Studies 2 and 3, we performed two moderation analyses, in which we additionally included political orientation as a moderator variable. The endorsement of COVID-19 conspiracy theories and COVID-19 protective behavior served as dependent variables. Political orientation significantly predicted the endorsement of COVID-19 conspiracy theories, B = .14, SEB = .04, 95%CI [.06; .22], p < .001, but not COVID-19 protective behavior, B = -.05, SEB = .03, 95%CI [-.12; .02], p = .127. D was positively associated with the endorsement of COVID-19 conspiracy theories, B = .13, SEB = .04, 95%CI [.04; .21], p = .004, and negatively associated with the engagement in COVID-19 protective behavior, B = -.22, SEB = .04, 95%CI [-.29; -.15], p < .001. As in Study 3, we did not find any significant moderating effect of political orientation on the links between D and the endorsement of COVID-19 conspiracy theories, B = .02, SEB = .03, 95%CI [-.05; .09], p = .550, nor between D and COVID-19 protective behavior, B = .01, SEB = .03, 95%CI [-.04; .07], p = .625.

Political orientation moderated the association between D and Need for Evidence, B = .10, SEB = .03, 95%CI [.03; .17], p = .006 (Figure S4a). For individuals scoring more to the left of the

political spectrum (*M* - 1 *SD*), the negative association between D and Need for Evidence was the strongest, *B* = -.37, *SEB* = .06, 95%CI [-.49; -.26], *p* < .001, but it remained significant for individuals scoring more to the right of the political spectrum (*M* + 1 *SD*), *B* = -.18, *SEB* = .05, 95%CI [-.29; -.08], *p* < .001. In addition, political orientation moderated the association between Need for Evidence and COVID-19 protective behavior, *B* = -.09, *SEB* = .03, 95%CI [-.15; -.03], *p* = .002 (Figure S4b). For individuals scoring more to the left of the political spectrum (*M* – 1 *SD*), the positive association between Need for Evidence and COVID-19 protective behavior was the strongest, *B* = .21, *SEB* = .05, 95%CI [.12; .30], *p* < .001. There was no such relationship for individuals scoring more to the right of the political spectrum (*M* + 1 *SD*), *B* = .02, *SEB* = .05, 95%CI [-.07; .11], *p* = .639.

We also found a moderating effect of political orientation on the association between Truth is Political and COVID-19 protective behavior, *B* = -.10, *SEB* = .03, 95%CI [-.17; -.04], *p* = .002 (Figure S4c). For individuals scoring more to the right of the political spectrum (*M* + 1 *SD*), the negative association between Truth is Political and COVID-19 protective behavior was the strongest, *B* = -.25, *SEB* = .05, 95%CI [-.34; -.16], *p* < .001. There was no significant association for individuals scoring more to the left of the political spectrum (*M* - 1 *SD*), *B* = -.05, *SEB* = .05, 95%CI [-.15; .06], *p* = .383.

In sum, Study 4 largely corroborated the results found in the USA in a German sample. This speaks to the cross-cultural role of post-truth epistemic beliefs in shaping conspiracy ideation and behavior.

General Discussion

The complex challenges that our globalized, postmodern world faces, require evidence-based decision-making on a societal level, but also the individual willingness to follow "the unforced force of the better argument" (Habermas, 1996, p. 305) and to adjust one's behavior accordingly. However, not everyone shows this willingness: At least some people may deliberately choose to believe what they want to believe and to shield their opinions from the

rational discourse. Our studies, which were conducted in the context of the COVID-19 pandemic, are the first to investigate both the antecedents and the consequences of these kinds of epistemic beliefs (Garret & Weeks, 2017). In brief, our four studies demonstrate that individuals high in D, that is, individuals who show a general tendency to maximize their personal utility, are more likely to hold a set of epistemic beliefs that views truth as being shaped by those in power while having a comparably low Need for Evidence and a high Faith in one's Intuition for Facts (a set we labelled post-truth epistemic beliefs). In turn, these epistemic beliefs predict the endorsement of COVID-19 conspiracy theories and protective behavior.

The Dark Factor, Epistemic Beliefs, and COVID-19

In Study 1, we demonstrated that individuals high in D tend to hold a set of post-truth epistemic beliefs, that is, are less inclined to commit to reasoning and argument based on evidence. These preliminary results were supported and extended in Studies 2-4. In addition to the association between D and epistemic beliefs already identified in Study 1, we found that epistemic beliefs predict the endorsement of COVID-19 conspiracy theories as well as protective behavior. While Studies 2 and 3 were conducted at two different points of the pandemic and thus demonstrate the stability of the results over time, Study 4 provided support for the cross-cultural validity of our results. Apart from these general findings, several aspects need to be emphasized. First, although we consistently found indirect effects of D mediated by epistemic beliefs on both dependent variables, the link between D and endorsing COVID-19 conspiracy theories was somewhat stronger than between D and COVID-19 protective behavior across all studies. This could be a result of regulations set in place that mandated social distancing, wearing masks in public transportation, and so on. Thus, even if post-truth epistemic beliefs led to an opposition of the rules set in place, the link to overt behavior could have been somewhat weakened by these policies.

Second, although the core idea of the proposed model was supported across all studies, there were some differences in terms of indirect effects between Study 2 on the one hand and

Studies 3 and 4 on the other. The association between D and the endorsement of conspiracy theories was consistently mediated by Truth is Political. Whereas Faith in the Intuition for Facts served as a mediator in Study 2, indirect effects of mediator Need for Evidence were observed in both other studies. The association between D and engaging in COVID-19 protective behavior was consistently mediated by Need for Evidence. Whereas Faith in the Intuition for Facts served as a mediator in Study 2, indirect effects of mediator Truth is Political were observed in both other studies. In sum, the indirect effect pattern results of Study 3 are remarkably similar to the results of Study 4, which was conducted in a different country, but at a comparable point of the pandemic.

Third, deviating from our hypotheses, higher Faith in Intuition for Facts was associated with *more* protective behavior across all studies when considered in the joint model. When looking at the zero-order correlations, Faith in Intuition for Facts was not significantly correlated with protective behavior in Studies 2 and 3, and positively correlated in Study 4. This heterogeneity suggests that the way Faith in Intuition for Facts translates into protective behavior depends on various contextual factors. Possibly, the dissemination of scientific knowledge over the course of the pandemic has, on average, aligned judgments based on scientific evidence and individuals' intuitions, both speaking to protecting oneself against the virus.

Political Orientation

As our studies demonstrate, political orientation plays a role in explaining the endorsement of COVID-19 conspiracy theories and the neglect of protective behavior beyond epistemic beliefs and D. Both the endorsement of COVID-19 conspiracy theories and reduced protective behavior were related to a more right-wing political orientation, which is in line with prior research (Kim & Kim, 2021; Miller, 2020). Especially in the case of the US samples (Studies 2 and 3), this finding likely reflects that the Trump administration and the Republican party downplayed the danger of COVID-19 and the efficacy of countermeasures while focusing on economic issues (Haberman & Cooper, 2020; Smith, 2020). Interestingly, the main effect of

political orientation on COVID-19 conspiracy theories was weaker and the effect on protective behavior not significant in the German sample. It seems plausible to assume that this finding mirrors the fact that political polarization is less pronounced in Germany compared to the US (Boxell et al., 2020).

Note also that the influence of political orientation changed between Studies 2 and 3. While we found a main effect of political orientation on endorsing COVID-19 conspiracy theories and protective behavior in both studies, we found clear moderating effects of political orientation in Study 2, but not in Study 3. In other words, political orientation did no longer interact with individual differences in Study 3. We hypothesize that the difference is an effect of an increased politicization of COVID-19 over the course of the pandemic (Kuchler, 2020; Marsh, 2020): While holding certain beliefs and showing certain behavior with respect to COVID-19 was more of an individual matter in the beginning of the pandemic, it more and more became a matter of one's political affiliation over the course of time. This hypothesis is supported by the stronger main effect of political orientation on COVID-19 protective behavior in Study 3 compared to Study 2.

Limitations and Future Directions

Although the present set of studies provides evidence for our model on the antecedents and consequences of post-truth epistemic beliefs, there are several important limitations to be considered. First, the present studies are cross-sectional and non-experimental, which makes it difficult to conclude causality. Although it seems theoretically far more plausible to assume that stable personality characteristics (i.e., the Dark Factor of Personality) influence epistemic beliefs, which in turn influence conspiratorial thinking and protective behavior than vice versa, more research is needed to establish clear causal links.

Second, our focus here was exclusively on post-truth epistemic beliefs as predictors of conspiratorial thinking and the willingness to engage in protective behavior in the context of COVID-19. This does not rule out, but rather complements alternative perspectives, such as work

that has highlighted the role of individual differences in analytic thinking (e.g., Pennycook et al., 2021) or numeracy (Hutmacher et al., 2022).

Third, it remains to be examined how epistemic beliefs shape the processing and dissemination of information pertinent to challenging societal topics. We assume that individual differences in epistemic beliefs can explain how individuals deal with misinformation, including the processing of misinformation indicators and the spreading of misinformation.

Fourth, the present studies were conducted in a very specific context: the COVID-19 pandemic. We assume that our basic model, the nexus between D, post-truth epistemic beliefs, and conspiratorial thinking and behavior holds for other key challenges our society faces. More specifically, we hypothesize that the current model will replicate in the field of climate change: Post-truth epistemic beliefs, fueled by D, nourish conspiracy ideation and behavior that stands in contrast to science-based recommendations.

Conclusion

Post-truth phenomena such as conspiracy theories and related behavior are widely considered to be a major threat to individual and societal prospering. We present consistent and cross-cultural evidence for the pivotal role of post-truth epistemic beliefs, rooted in the Dark Factor of Personality, in explaining the endorsement of COVID-19 conspiracy theories and non-adherence to behavioral recommendations throughout the pandemic. Our research highlights that individuals' worldviews about how one can and should construct reality need to be taken into account when addressing major challenges to humankind.

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Online Supplement for the Manuscript

Beliefs About the Nature of Knowledge Shape Responses to the Pandemic: Epistemic Beliefs, the Dark Factor of Personality, and COVID-19-related Conspiracy Ideation and Behavior

Supplement S1: Confirmatory Factor Analysis, Study 1

We performed a confirmatory factor analysis[1] to test the factorial structure of the epistemic beliefs subscales using AMOS 25.0, a plug-in for SPSS (Arbuckle, 2019). Note that Garret and Weeks (2017) assumed that the covariance between Need for Evidence and Truth is Political equals zero. However, this is not founded in theory as doubt in the existence of political or scientific certainties (Truth is Political) should be linked to a lower need to base one's opinions on evidence (Need for Evidence). Therefore, we estimated the covariance rather than setting it to zero a priori.

According to Curran (1997, as cited by Kline, 2011), skewness absolute values greater than 3 and kurtosis absolute values greater than 8 indicate substantial deviation from normal distribution. All variables showed skewness absolute values below 1.5 and kurtosis absolute values below 3 indicating normal distribution. Accordingly, we chose maximum likelihood estimation.

Confirmatory factor analysis showed that our model suited the data better than the factorial structure proposed by Garret and Weeks (2017). Goodness of fit statistics were good or acceptable: CFI = .96; NFI = .94; RMSEA = .08, 90%CI [.07; .10]; IFI = .96; SRMR = .05 (χ^2 (51, N = 321) = 3.27, p < .001). We achieved a power of .93 to detect an RMSEA ≥ .050 (Jobst et al., 2021). Note that our model surpasses the alternative model postulated by Garret and Weeks (2017) in most goodness of fit statistics[2]. Factor loadings varied between .74 and .92, indicating good fit (see Figure S1). Faith in Intuition for Facts and Need for Evidence (*cov* = -.38, *SE* = .07, p < .001) as well as Need for Evidence and Truth is Political (*cov* = -.32, *SE* = .09, p < .001) showed negative covariances. Faith in Intuition for Facts and Truth is

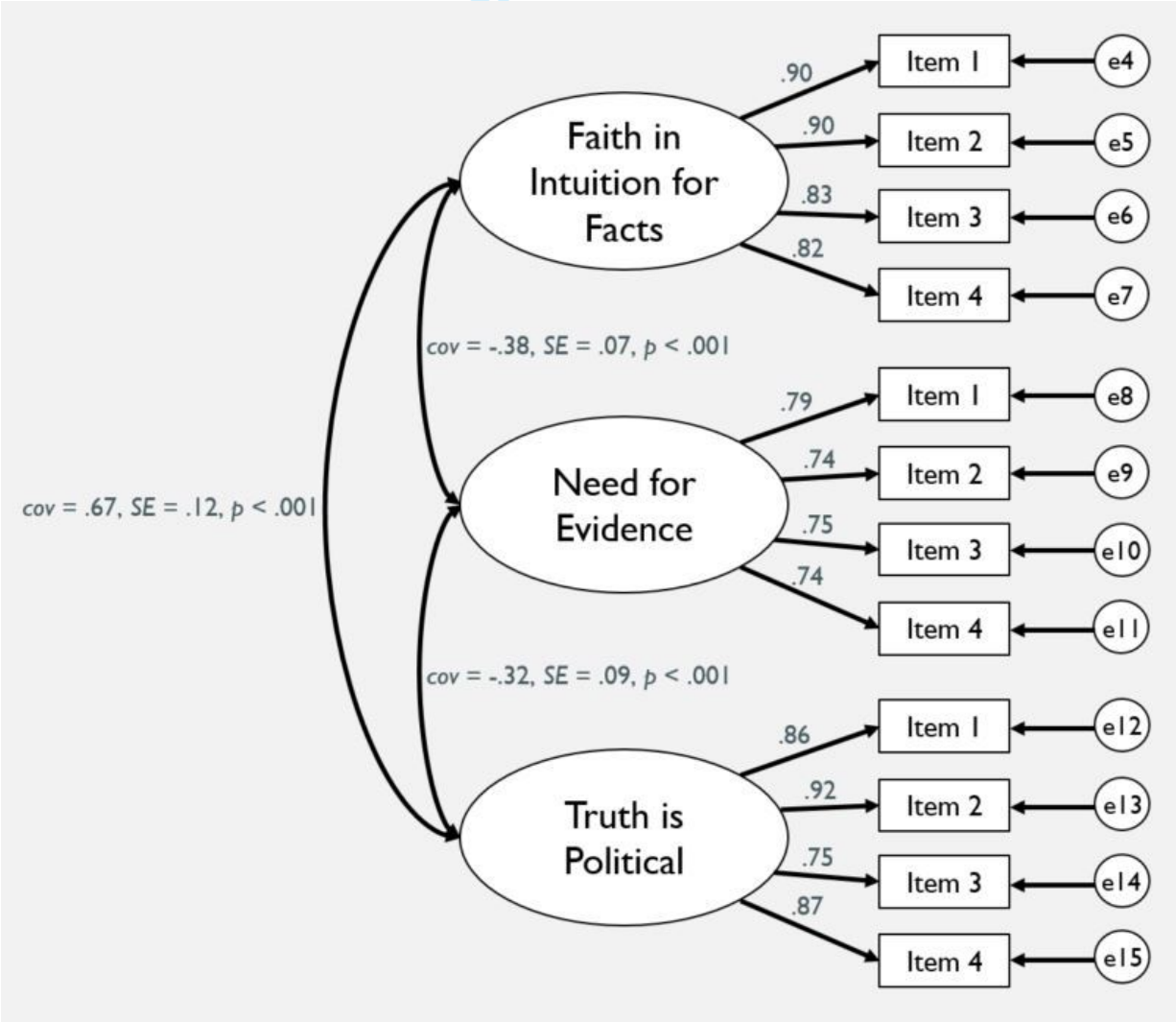
[1] Note that, although preregistered, we did not perform structural equation modeling to explore the link between the Dark Factor of Personality and epistemic beliefs and instead relied on bivariate correlations as reported in the manuscript (Study 1).

[2] Conventional goodness of fit statistics for the factorial structure model proposed by Garret and Weeks (2017): CFI = .95; NFI = .93; RMSEA = .09, 90%CI[.08; .10]); IFI = .95, SRMR = .10. The achieved power to detect an RMSEA ≥ .050 was .94.

Political (*cov* = .67, *SE* = .12, $p < .001$) covaried positively. Residual analysis did not indicate any major issues apart from the standardized residual covariance between two items (Need for Evidence: "I trust the facts, not my instincts, to tell me what is true" and Truth is Political: "What counts as truth is defined by power", $z_{cov} = -2.83$). According to Jöreskog and Sörbom (1993), standardized residual covariance values greater than 2.58 or less than -2.58 are deemed problematic. As this residual covariance presents the only problematic value and both items are of major importance for the hypothesized model, we did not exclude them.

Figure S1

Confirmatory Factor Analysis Showing Factor Loadings and Correlations Between the Epistemic Belief Subscales Faith in Intuition for Facts, Need for Evidence and Truth Is Political.



Supplement S2: Additional Results Pertaining to Study 2

Table S2.1

Study 2: Means, Standard Deviations, and Zero-Order Correlations of the Continuous Variables

	M (SD)	(1)	(2)	(3)	(4)	(5)	(6)
(1) Dark Factor of Personality	2.36 (0.92)	-					
(2) Faith in Intuition for Facts	4.35 (1.33)	.28**	-				
(3) Need for Evidence	5.98 (0.92)	-.33**	-.36**	-			
(4) Truth is Political	3.41 (1.56)	.45**	.31**	-.34**	-		
(5) COVID-19 conspiracy theories	2.56 (1.45)	.54**	.43**	-.36**	.55**	-	
(6) COVID-19 protective behavior	5.90 (0.99)	-.44**	-.07	.32**	-.24**	-.37**	-
(7) Political Orientation	3.58 (1.84)	.26**	.33**	-.26**	.30**	.46**	-.21**

Note. $N = 453$. * $p < .05$, ** $p < .001$.

Summary of the Results Controlled for Emotional and Physical Health

In order to account for effects of emotional and physical health on COVID-19 protective behavior, we performed the same mediation analysis including the standardized mean of both health-related items. All indirect effects reported in the main article remained significant.

Results of the Moderation Analyses Between D and Political Orientation, With Epistemic Belief Scales as the Criterion (Study 2)

Table S2.2

Study 2: Results of the Moderation Analysis Between D and Political Orientation. Faith in Intuition for Facts as the Criterion.

	Coefficient	**SE**	**95%CI LL**	**95%CI UL**	***p***
Constant					
Main Effect of D	.208	.046	.119	.298	< .001
Main Effect of Political Orientation	.279	.045	.191	.368	< .001
Interaction	.008	.044	-.079	.094	.858

Table S2.3

Study 2: Results of the Moderation Analysis Between D and Political Orientation. Need for Evidence as the Criterion.

	Coefficient	**SE**	**95%CI LL**	**95%CI UL**	***p***
Constant					
Main Effect of D	-.295	.046	-.384	-.205	< .001
Main Effect of Political Orientation	-.180	.045	-.269	-.091	< .001
Interaction	.106	.044	.019	.192	.017

Table S2.4

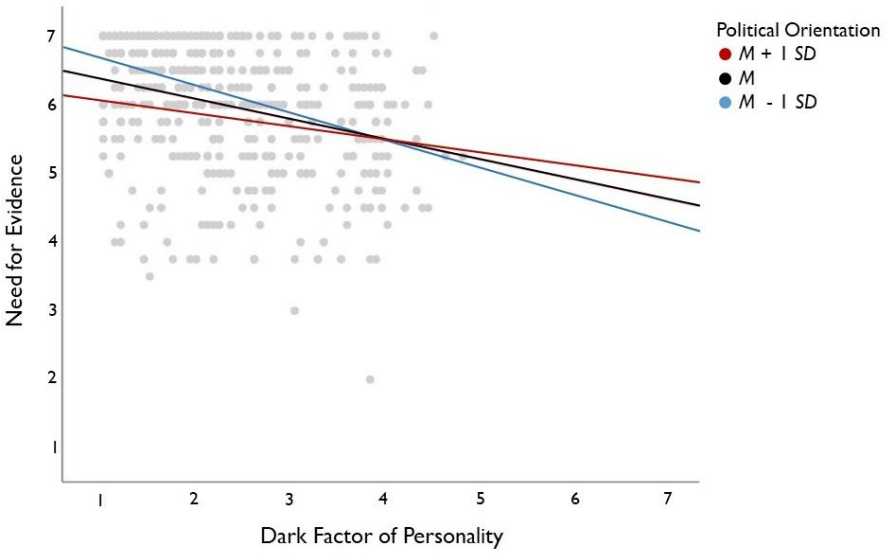
Study 2: Results of the Moderation Analysis Between D and Political Orientation. Truth Is Political as the Criterion.

	Coefficient	SE	95%CI LL	95%CI UL	*p*
Constant					
Main Effect of D	.378	.043	.294	.462	< .001
Main Effect of Political Orientation	.209	.043	.126	.293	< .001
Interaction	.105	.042	.023	.186	.012

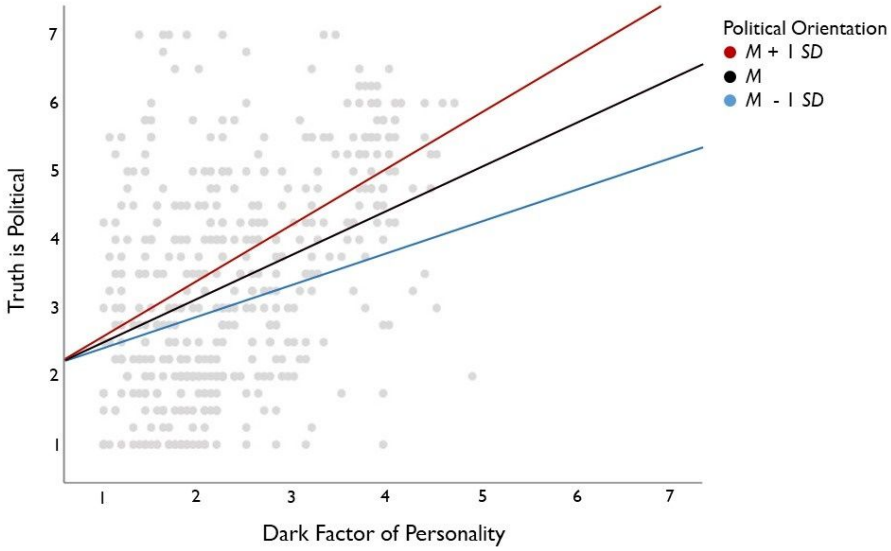
Figure S2

Study 2: Graphical Representation of Interactions Involving the Epistemic Belief Scales and Political Orientation

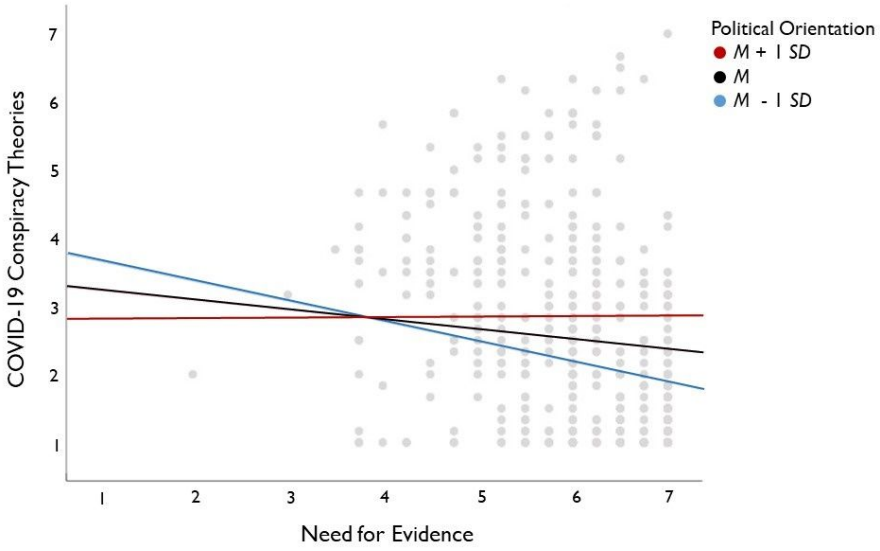
S2a



S2b



S2c



Note. Higher scores in political orientation indicate a more right-leaning orientation. Semi-transparent scatterplots represent single data points.

Supplement S3: Additional Results Pertaining to Study 3

Table S3.1

Study 3: Means, Standard Deviations, and Zero-Order Correlations of the Continuous Variables

	M (SD)	(1)	(2)	(3)	(4)	(5)	(6)
(1) Dark Factor of Personality	2.34 (0.91)	-					
(2) Faith in Intuition for Facts	4.56 (1.24)	.05	-				
(3) Need for Evidence	5.90 (0.98)	-.24**	-.39**	-			
(4) Truth is Political	3.28 (1.50)	.31**	.25**	-.28**	-		
(5) COVID-19 conspiracy theories	2.39 (1.30)	.38**	.32**	-.34**	.46**	-	
(6) COVID-19 protective behavior	6.08 (1.04)	-.27**	.01	.25**	-.18**	-.16**	-
(7) Political orientation	3.57 (1.76)	.14**	.22**	-.23**	.26**	.43**	-.30**

Note. $N = 923$. ** $p < .001$.

Results of the Moderation Analyses Between D and Political Orientation, With Epistemic Belief Scales as the Criterion (Study 3)

Table S3.2

Study 3: Results of the Moderation Analysis Between D and Political Orientation. Faith in Intuition for Facts as the Criterion.

	Coefficient	**SE**	**95%CI LL**	**95%CI UL**	***p***
Constant					
Main Effect of D	.019	.033	-.045	.083	.561
Main Effect of Political Orientation	.217	.033	.153	.281	< .001
Interaction	.017	.032	-.045	.079	.588

Table S3.3

Study 3: Results of the Moderation Analysis Between D and Political Orientation. Need for Evidence as the Criterion.

	Coefficient	**SE**	**95%CI LL**	**95%CI UL**	***p***
Constant					
Main Effect of D	-.222	.032	-.284	-.160	< .001
Main Effect of Political Orientation	-.193	.032	-.255	-.132	< .001
Interaction	.107	.031	.047	.167	< .001

Table S3.4

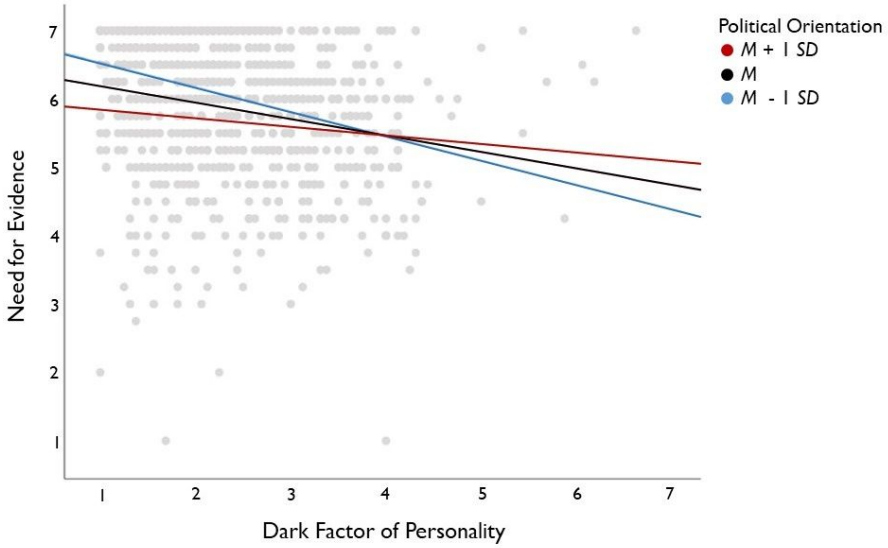
Study 3: Results of the Moderation Analysis Between D and Political Orientation. Truth Is Political as the Criterion.

	Coefficient	SE	95%CI LL	95%CI UL	*p*
Constant					
Main Effect of D	.279	.031	.219	.340	< .001
Main Effect of Political Orientation	.225	.031	.164	.285	< .001
Interaction	-.005	.030	-.063	.054	.875

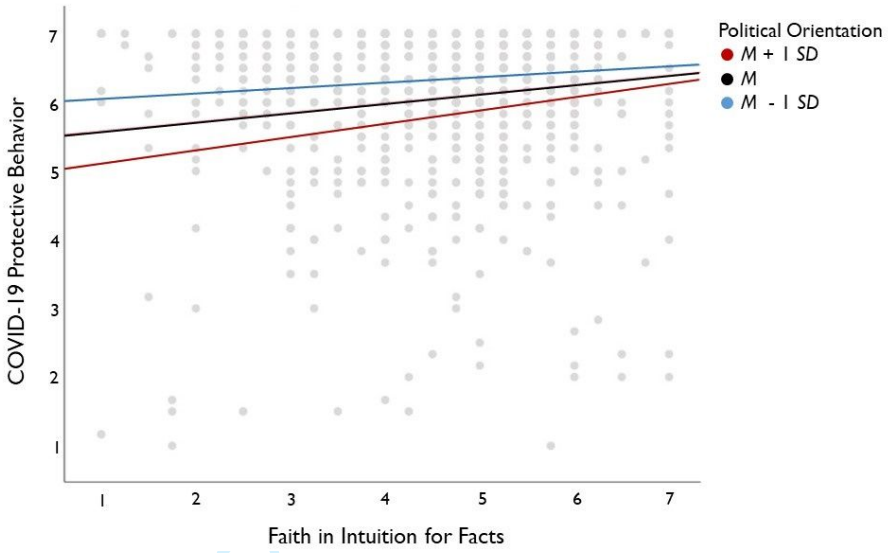
Figure S3

Study 3: Graphical Representation of Interactions Involving the Epistemic Beliefs Scales and Political Orientation

S3a



S3b



Note. Higher scores in political orientation indicate a more right-leaning orientation. Semi-transparent scatterplots represent single data points.

Supplement S4: Additional Results Pertaining to Study 4

Table S4.1

Study 4: Means, Standard Deviations, and Zero-Order Correlations of the Continuous Variables

	M (SD)	(1)	(2)	(3)	(4)	(5)	(6)
(1) Dark Factor of Personality	2.59 (.78)	-					
(2) Faith in Intuition for Facts	4.64 (.99)	-.04	-				
(3) Need for Evidence	5.74 (.87)	-.27**	-.19**	-			
(4) Truth is Political	3.40 (1.44)	.35**	.13**	-.32**	-		
(5) COVID-19 conspiracy theories	2.23 (1.19)	.37**	.11*	-.34**	.66**	-	
(6) COVID-19 protective behavior	6.22 (.83)	-.39**	.09*	.26**	-.33**	-.40**	-
(7) Political orientation	3.62 (.99)	.31**	.06	-.10*	.16**	.26**	-.18**

Note. $N = 513$. * $p < .05$, ** $p < .001$.

Results of the Moderation Analyses Between D and Political Orientation, With Epistemic Belief Scales as the Criterion (Study 4)

Table S4.2

Study 4: Results of the Moderation Analysis Between D and Political Orientation. Faith in Intuition for Facts as the Criterion.

	Coefficient	**SE**	**95%CI LL**	**95%CI UL**	***p***
Constant					
Main Effect of D	-.065	.047	-.157	.028	.169
Main Effect of Political Orientation	.073	.047	-.020	.165	.123
Interaction	.013	.036	-.059	.084	.732

Table S4.3

Study 4: Results of the Moderation Analysis Between D and Political Orientation. Need for Evidence as the Criterion.

	Coefficient	**SE**	**95%CI LL**	**95%CI UL**	***p***
Constant					
Main Effect of D	-.277	.045	-.365	-.189	< .001
Main Effect of Political Orientation	-.032	.045	-.121	.057	.481
Interaction	.097	.035	.028	.165	.006

Table S4.4

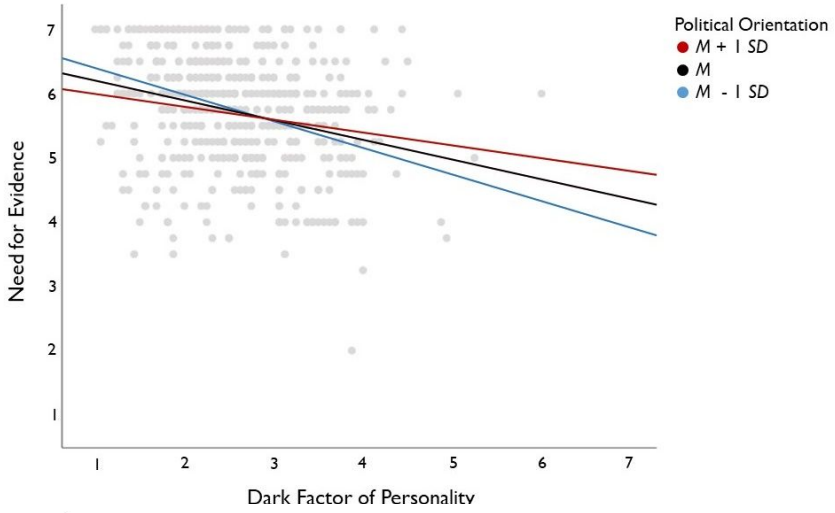
Study 4: Results of the Moderation Analysis Between D and Political Orientation. Truth Is Political as the Criterion.

	Coefficient	SE	95%CI LL	95%CI UL	*p*
Constant					
Main Effect of D	.340	.044	.254	.426	< .001
Main Effect of Political Orientation	.072	.044	-.014	.158	.102
Interaction	-.062	.034	-.129	.005	.069

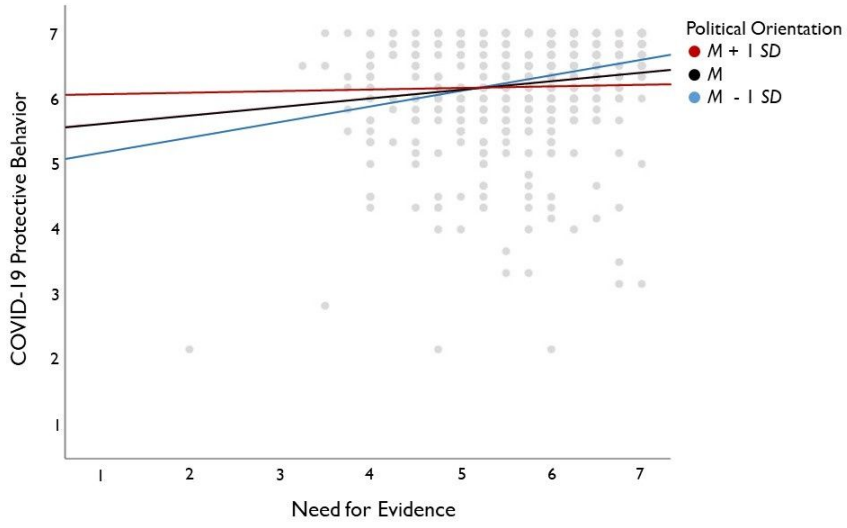
Figure S4.1

Study 4: Graphical Representation of Interactions Involving the Epistemic Beliefs Scales and Political Orientation

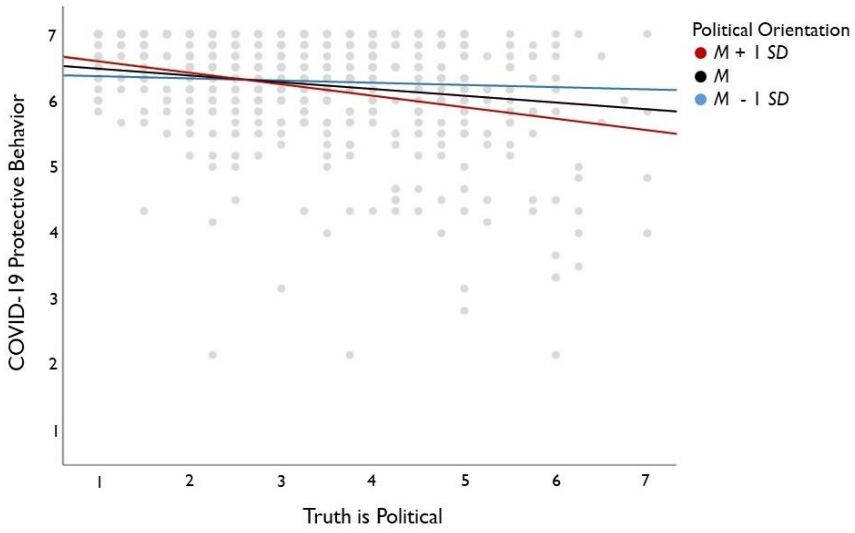
S4a



S4b



S4c



Notes. Higher scores in political orientation indicate a more right-leaning orientation. Semi-transparent scatterplots represent single data points.

Additional Results on Corona-Warn-App Usage

In the months leading to Study 4, contact tracing apps were strongly promoted in Europe as they seemed like an effective means for tracking infection chains (European Commission, 2020). Their effectiveness depends on peoples' willingness to engage in prosocial behavior, which led us to include the use of the *Corona-Warn-App* in our study. However, by the time of assessment it was already foreseeable that the app would not reach its potential as user numbers were stagnating far below the necessary threshold (Kreder, 2020; FAZ, 2020; Spiegel, 2020). At the time the utility of the app was questioned by government officials and many people who were following other behavioral advice, so we are cautious to interpret the data.

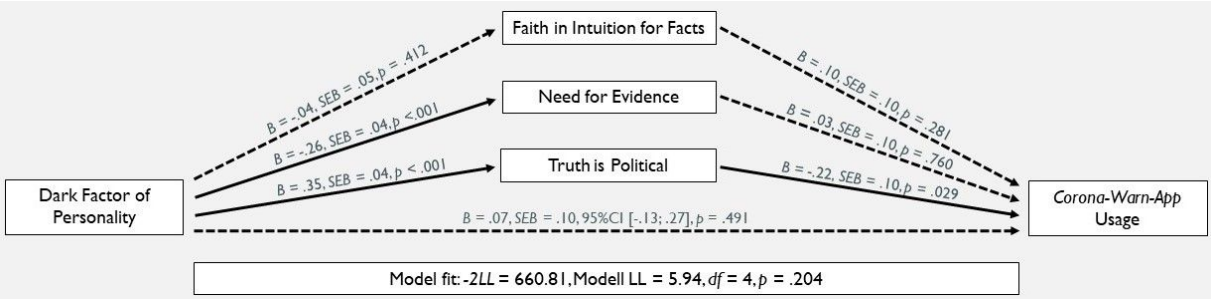
We excluded 32 participants who did not have a smartphone compatible with the requirements of the *Corona-Warn-App* or did not indicate whether they used the app (final N = 481). We first ran a logistic regression analysis to identify the association between D (the sole predictor in the model) and the use of the *Corona-Warn-App* (the criterion). D did not

significantly predict whether (1) or not (0) participants made use of the app, B = -.02; SEB = .09; Wald(1)= .05, p = .820, OR = .979. Next, we tested the mediation model and performed a parallel mediation analysis including D as a predictor variable, Faith in Intuition for Facts, Need for Evidence and Truth is Political as mediator variables and the use of the *Corona-Warn-App* as a binary dependent variable. The likelihood-ratio test was not significant, $-2LL$ = 660.81, Model LL = 5.94, df = 4, p = .204 (McFadden's R^2 =.01, Cox & Snell's R^2 =.01, Nagelkerke's R^2 = .02), indicating that the model as a whole did not significantly predict the usage of the *Corona-Warn-App*. Path coefficients, standard errors, and p-values are shown in Figure S4.2. D was associated with Need for Evidence and Truth is Political in the expected directions, but not significantly linked to Faith in Intuition for Facts. Further, Truth is Political was associated negatively with the usage of the *Corona-Warn-App*, while Faith in Intuition for Facts and Need for Evidence were not significantly associated with the usage of the *Corona-Warn-App*. We found a significant indirect effect of D on the usage of the *Corona-Warn-App*, mediated by Truth is Political, B = -.08; SEB = .04; 95%CI [-.16; -.01], but no significant indirect effects of D on the usage of the *Corona-Warn-App*, mediated by Faith in Intuition for Facts, B = -.004; SEB = .01; 95%CI [-.03; .01] and Need for Evidence, B = -.01; SEB = .03; 95%CI [-.07; .04].

In sum, the findings were mixed: Truth is Political was the only variable that predicted the use of the *Corona-Warn-App* in a sense that the endorsement of this post-truth epistemic belief aspect predicted a lower likelihood of using the *Corona-Warn-App.*

Figure S4.2

Main Results of the Parallel Mediator Model With Corona-Warn-App Usage as the Binary Dependent Variable.



Note. Solid paths indicate significant associations ($p < .05$), dashed paths are non-significant.

We also performed a moderation analysis including political orientation as a moderator variable for all paths of the parallel mediator model. The likelihood-ratio test was not significant, *-2LL* = 654.91, Model LL = 11.85, $df = 9$, $p = .222$ (McFadden's R^2 =.02, Cox & Snell's R^2 =.02, Nagelkerke's R^2 = .03), indicating that the model did not significantly predict the usage of the *Corona-Warn-App*. In this model, political orientation was no significant predictor of the usage of the *Corona-Warn-App*, $B = -.17$, *SEB* = .10, 95%CI [-.36; .03], $p = .101$.

We did not find a significant moderating effect of political orientation on the effect of D on the usage of the *Corona-Warn-App*, $B = -.02$, *SEB* = .08, 95%CI [-.19; .15], $p = .812$. Political orientation did not moderate any of the paths with *Corona-Warn-App* use as the criterion. In this model we found that political orientation moderated the association between D and Need for Evidence, $B = .12$, *SEB* = .04, $p = .001$, which means that the negative association between D and Need for Evidence increased with a more left-wing political orientation. For individuals scoring more to the left of the political spectrum (M - 1 SD) the negative association between D and Need for Evidence was the strongest, $B = -.39$, *SEB* = .06,

95%CI [-.51; -.27], $p < .001$, but it remained significant for individuals scoring more to the right of the political spectrum ($M + 1$ *SD*), $B = -.15$, *SEB* = .06, 95%CI [-.26; -.04], $p = .008$.

Also, political orientation moderated the association between D and Truth is Political, $B = -.07$, *SEB* = .04, $p = .046$, which means that the positive association between D and Truth is Political increased with a more right-wing political orientation. For individuals scoring more to the right of the political spectrum ($M + 1$ *SD*), the positive association between D and Truth is Political was the strongest, $B = .41$, *SEB* = .06, 95%CI [.29; .52], $p < .001$, but it remained significant for individuals scoring more to the left of the political spectrum ($M - 1$ *SD*), $B = .26$, *SEB* = .05, 95%CI [.16; .37], $p < .001$.

Supplement S5: Self-Reported SARS-CoV-2 Test Results, Scale Reliabilities, Additional Details on the Exclusion Criteria, and a Summary of Results When the Upper Exclusion Criterion Regarding Response Time Was Suspended

Table S5.1

Percentages of Participants Tested (Positive) For SARS-CoV-2 in Studies 2-4

	Study 2	Study 3	Study 4
Not tested	92.3%	80.8%	75.6%
Tested	7.7%	19.2%	24.4%
Negative result	5.3%	17.8%	23.2%
Positive result	2.4%	1.4%	1.2%

Table S5.2

Reliabilities (Cronbach's α) Of All Scales Used in Studies 1-4

	Study 1	Study 2	Study 3	Study 4
(1) Dark Factor of Personality	.897	.904	.907	.871
(2) Faith in Intuition for Facts	.921	.901	.903	.810
(3) Need for Evidence	.841	.843	.866	.829
(4) Truth is Political	.915	.906	.898	.896
(5) COVID-19 conspiracy theories	-	.918	.894	.851
(6) COVID-19 protective behavior	-	.777	.888	.858

Additional Information on the Exclusion Criteria for Studies 1-4

Study 1

In total, 407 participants completed the questionnaire. We excluded 55 participants because they failed to respond to our control question appropriately, which means they did not follow the instructions and did not select the requested option or no option at all depending on the wording of the control questions (see Table S5.3). Further, 30 participants were excluded because they showed unreasonably low response times of less than 90 seconds and one participant because of an unreasonably high response time of more than 2700 seconds. Both extremely low and high response times are indicative of careless responding (e.g., Paas & Morren, 2018; Read et al., 2021). The final sample consisted of 321 participants (M = 37.12, SD = 10.73, 20-78 years, 38% female).

Study 2

In total, 550 participants completed the questionnaire. As we relied on U.S. participants, 56 participants were excluded because they either used a VPN/VPS or a proxy to mask their country and/or failed to provide an adequate description of the study in English implying they are not native speakers or bots or careless responders. This procedure is recommended by Kennedy et al. (2020) as a countermeasure against declining data quality due to the use of virtual private servers to fraudulently gain access to studies conducted via MTurk. Additionally, we excluded 26 participants because they failed to respond appropriately to at least one of our attention check questions (see Table S5.3). Further, 13 participants were excluded because they showed unreasonably low response times of less than 120 seconds and two participants because of unreasonably high response times of more than 2700 seconds. The final sample amounted to 453 participants (M = 40.37 years, SD = 12.23 years, 19-78 years, 42.4% female).

Study 3

For Study 3, we implemented a screening procedure in accordance with recommendations by Kennedy et al. (2020). As we relied on U.S. participants, individuals who used a VPN/VPS or a proxy to mask their country of access or who failed to provide the English name of an *eggplant* after having been presented a picture of the latter or who failed to pass a CAPTCHA test, were automatically prevented from completing the study. In total, 1113 participants completed the questionnaire. We excluded 164 participants (that were not detected by the screening procedure) that either used a VPN/VPS or a proxy to mask their country of access and/or failed to provide an adequate description of the study in English and/or failed to provide the English name of an *eggplant* after having been shown a picture of it implying they are not native speakers or bots or careless responders. We excluded 14 participants because they failed to answer at least one of our control questions correctly (see Table S5.3). Further, one participant was excluded because of an unreasonably low response time of less than 120 seconds and eight participants because of unreasonably high response times of more than 2700 seconds. Participants were also asked to indicate both their year of birth and current age. Three participants were excluded because there was a mismatch between the two pieces of information, which was another indicator of careless responding (Kennedy, et al.. 2020). Another three participants were excluded because they failed to do so, which implies careless responding. The final sample amounted to 923 participants (M = 39.43 years, SD = 11.64 years, 19-78 years, 44.9 % female).

Study 4

Participants who failed to pass a CAPTCHA test, were automatically prevented from completing the questionnaire. In total, 539 participants completed the questionnaire. We relied on German participants, one control question was to describe the study in full sentences in German (Kennedy et al., 2020). All participants provided an adequate description of the study, so no one was excluded based on this criterion of careless responding or lack of

language proficiency. We excluded 11 participants because they failed to respond appropriately to at least one of our control questions (see Table S5.3). Further, three participants were excluded because of unreasonably low response times of less than 120 seconds and seven participants because of unreasonably high response times of more than 2700 seconds. Another four participants were excluded because they were under the age of 18. One participant did not indicate their political orientation and therefore had to be excluded. The final sample amounted to 513 participants (M = 37.54 years, SD = 12.23 years, 18-73 years, 40.7 % female).

Table S5.3

Exact Wordings of Attention Check Items Used in Studies 1-4

	Wording Attention Check Items
Study 1	"This is a control question. Please do not select any of the 7 options below."
Study 2	In Study 2, two attention check items were included: "This is a control item, please select "extremely likely"." and "This is a control question. Please select that you "strongly agree"."
Study 3	In Study 3, two attention check items were included: "This is a control item, please select "not at all likely"." and "This is a control question. Please select "strongly disagree"."
Study 4	"Dies ist eine Testfrage. Bitte wählen Sie "Starke Ablehnung" aus." ["This is a control question. Please select "strongly disagree"."]

Note. In Study 4 the attention check item was presented twice at two different places in the questionnaire. English-language translation of the item in parentheses (Study 4).

Table S5.4

Means and Standard Deviations for All Major Variables Without Applying the Upper Exclusion Criterion of a Response Time of More Than 2700 Seconds

	Study 1	Study 2	Study 3	Study 4
(1) Dark Factor of Personality	2.43 (0.95)	2.36 (0.92)	2.34 (0.91)	2.60 (0.79)
(2) Faith in Intuition for Facts	4.61 (1.37)	4.35 (1.33)	4.56 (1.24)	4.64 (1.00)
(3) Need for Evidence	5.84 (0.94)	5.98 (0.92)	5.90 (0.98)	5.74 (0.87)
(4) Truth is Political	3.42 (1.57)	3.41 (1.56)	3.28 (1.50)	3.41 (1.44)
(5) Political Orientation	-	3.58 (1.84)	3.57 (1.77)	3.63 (1.00)
(5) COVID-19 conspiracy theories	-	2.55 (1.45)	2.40 (1.30)	2.24 (1.19)
(6) COVID-19 protective behavior	-	5.89 (0.99)	6.08 (1.03)	6.21 (0.83)

Note. Study 1: $N = 322$; Study 2: $N = 455$; Study 3: $N = 931$; Study 4: $N = 520$.

Summary of Results When the Upper Exclusion Criterion Regarding Response Time Was Suspended

Some scholars (e.g., Paas & Morren, 2018; Read et al., 2021) recommend the exclusion of particularly long response times and we followed this advice. In addition to the analyses reported in the main text, we performed the analyses without applying the upper exclusion criterion. In the following tables, the main results are reported without excluding participants based on the upper response time limit of 2700 seconds. All major results remained virtually the same as in the analyses in the main manuscript.

Table S5.5

Study 2: Total Effects, Direct Effects of D and Indirect Effects of the Three Parallel Mediators Faith in Intuition for Facts, Need for Evidence and Truth Is Political for the Two Dependent Variables Without Applying the Upper Exclusion Criterion of a Response Time of More Than 2700 Seconds

	Effect	SEB	95%CI LL	95%CI UL
COVID-19 conspiracy theories				
Total Effect	.79	.06	.67	.90
Direct Effect of D	.46	.06	.35	.57
Faith in Intuition for Facts	.09	.02	.05	.13
Need for Evidence	.03	.02	-.02	.08
Truth is political	.21	.03	.14	.27
COVID-19 protective behavior				
Total Effect	-.44	.04	-.52	-.36
Direct Effect of D	-.39	.05	-.48	-.30
Faith in intuition for facts	-.04	.01	.01	.07
Need for evidence	-.08	.02	-.11	-.04
Truth is political	-.01	.02	-.05	.03

Note. $N = 455$, SEB = Standard Error (bootstrapped).

Table S5.6

Study 3: Total Effects, Direct Effects of D and Indirect Effects of the Three Parallel Mediators Faith in Intuition for Facts, Need for Evidence and Truth Is Political for the Two Dependent Variables Without Applying the Upper Exclusion Criterion of a Response Time of More Than 2700 Seconds

	Effect	SEB	95%CI LL	95%CI UL
COVID-19 conspiracy theories				
Total Effect	.50	.04	.42	.58
Direct Effect of D	.32	.04	.25	.40
Faith in Intuition for Facts	.01	.01	-.01	.03
Need for Evidence	.04	.01	.02	.06
Truth is political	.13	.02	.09	.17
COVID-19 protective behavior				
Total Effect	-.28	.03	-.34	-.21
Direct Effect of D	-.20	.03	-.27	-.13
Faith in intuition for facts	.01	.01	-.003	.02
Need for evidence	-.06	.01	-.08	-.03
Truth is political	-.03	.01	-.05	-.005

Note. $N = 931$, SEB = Standard Error (bootstrapped).

Table S5.7

Study 4: Total Effects, Direct Effects of D and Indirect Effects of the Three Parallel Mediators Faith in Intuition for Facts, Need for Evidence and Truth Is Political for the Two Dependent Variables Without Applying the Upper Exclusion Criterion of a Response Time of More Than 2700 seconds

	Effect	SEB	95%CI LL	95%CI UL
COVID-19 conspiracy theories				
Total Effect	.45	.05	.35	.54
Direct Effect of D	.18	.04	.09	.26
Faith in Intuition for Facts	-.001	.002	-.01	.005
Need for Evidence	.04	.01	.01	.07
Truth is political	.24	.03	.17	.31
COVID-19 protective behavior				
Total Effect	-.32	.03	-.39	-.26
Direct Effect of D	-.23	.04	-.30	-.16
Faith in intuition for facts	-.004	.01	-.02	.006
Need for evidence	-.03	.02	-.07	-.01
Truth is political	-.06	.02	-.10	-.03

Note. $N = 520$, SEB = Standard Error (bootstrapped).

Additional Moderating Effect of Political Orientation

Without applying the upper exclusion criterion of a response time of more than 2700 seconds, Study 4 yielded an additional moderating effect of political orientation on the association between Truth is Political and the endorsement of COVID-19 conspiracy theories, $B = .08$, $SEB = .04$, 95%CI [.002; .16], $p = .043$. For individuals scoring more to the right of the political spectrum ($M + 1\ SD$), the positive association between Truth is Political and endorsing COVID-19 conspiracy theories was the strongest, $B = .74$, $SEB = .05$, 95%CI [.64; .85], $p < .001$, but it remained significant for individuals scoring more to the left of the political spectrum ($M - 1\ SD$), $B = .58$, $SEB = .06$, 95%CI [.46; .70], $p < .001$.

Supplement References

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