Social Science & Medicine 341 (2024) 116526

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

To trust or not to trust in the thrall of the COVID-19 pandemic: Conspiracy endorsement and the role of adverse childhood experiences, epistemic trust, and personality functioning

Hanna Kampling [a,*], David Riedl [b,c], Nora Hettich [d], Astrid Lampe [b,e], Tobias Nolte [f,g], Sandra Zara [a], Mareike Ernst [d,h], Elmar Brähler [d,i], Cedric Sachser [j], Jörg M. Fegert [j], Stephan Gingelmaier [k], Peter Fonagy [f], Lina Krakau [d], Johannes Kruse [a,l]

[a] Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Giessen, Giessen, Germany
[b] Ludwig Boltzmann Institute for Rehabilitation Research, Vienna, Austria
[c] Department of Psychiatry, Psychotherapy, Psychosomatics and Medical Psychology, Medical University of Innsbruck, Innsbruck, Austria
[d] Department of Psychosomatic Medicine and Psychotherapy, University Medical Center of the Johannes Gutenberg-University Mainz, Mainz, Germany
[e] VAMED Rehabilitation Center, Schruns, Austria
[f] Anna Freud National Centre for Children and Families, London, United Kingdom
[g] Wellcome Trust Centre for Neuroimaging, Institute of Neurology, UCL, London, United Kingdom
[h] Department of Clinical Psychology, Psychotherapy and Psychoanalysis, Institute of Psychology, University of Klagenfurt, Klagenfurt Am Wörthersee, Austria
[i] Integrated Research and Treatment Center for Adiposity Diseases, Behavioral Medicine Research Unit, University Medical Center Leipzig, Germany
[j] Department of Child and Adolescent Psychiatry/Psychotherapy, Ulm University, Ulm, Germany
[k] Psychology and Diagnostics for Emotional and Social Development for the Emotionally Impaired, University of Education Ludwigsburg, Germany
[l] Department for Psychosomatic Medicine and Psychotherapy, Medical Center of the Philipps University Marburg, Marburg, Germany

ARTICLE INFO

Handling editor: Blair T. Johnson

Keywords:
Adverse childhood experiences
Child maltreatment
Conspiracy endorsement
Personality functioning
Epistemic trust
COVID-19
Mediation

ABSTRACT

Rationale: Conspiracy endorsement is a public health challenge for the successful containment of the COVID-19 pandemic. While usually considered a societal phenomenon, little is known about the equally important developmental backdrops and personality characteristics like mistrust that render an individual prone to conspiracy endorsement. There is a growing body of evidence implying a detrimental role of adverse childhood experiences (ACEs) – a highly prevalent developmental burden – in the development of epistemic trust and personality functioning. This study aimed to investigate the association between ACEs and conspiracy endorsement in the general population, specifically questioning a mediating role of epistemic trust and personality functioning.

Methods: Based on cross-sectional data from a representative German survey collected during the COVID-19 pandemic ($N = 2501$), we conducted structural equation modelling (SEM) where personality functioning (OPD-SQS) and epistemic trust (ETMCQ) were included as mediators of the association between ACEs and conspiracy endorsement. Bootstrapped confidence intervals (5000 samples, 95%-CI) are presented for all paths.

Results: ACEs were significantly associated with conspiracy endorsement ($\beta = 0.25$, $p < 0.001$) and explained 6% of its variance. Adding epistemic trust and personality functioning as mediators increased the explained variance of conspiracy endorsement to 19% while the direct association between ACEs and conspiracy endorsement was diminished ($\beta = 0.12$, $p < 0.001$), indicating an indirect effect of personality functioning and epistemic trust in the association between ACEs and conspiracy endorsement. Fit indices confirmed good model fit.

Conclusions: Establishing an association between ACEs and conspiracy endorsement further increases the evidence for early childhood adversities' far-reaching and detrimental effects. By including epistemic trust and personality functioning, these findings contribute to a deeper understanding of the underlying mechanisms in the way that ACEs may be associated with conspiracy endorsement.

* Corresponding author. Department of Psychosomatic Medicine and Psychotherapy Justus Liebig University Giessen Ludwigstraße 76, 35390 Gießen, Germany.
E-mail address: hanna.kampling@psycho.med.uni-giessen.de (H. Kampling).

https://doi.org/10.1016/j.socscimed.2023.116526
Received 22 June 2023; Received in revised form 27 November 2023; Accepted 16 December 2023
Available online 23 December 2023

1. Introduction

Conspiracy endorsement has gained much attention in the context of the COVID-19 pandemic as new and specific conspiracy narratives about the pandemic arose. More generally, conspiracy endorsement can be subdivided into conspiracy mentality and specific beliefs: While the first describes a general disposition, the latter refers to more specific sets of beliefs an individual holds (e.g., that the World Health Organization is secretly controlled by Bill Gates). The noted pandemic-specific conspiracy theories have recently gained support from more diverse political spectra and populations. This is also one of the reasons why conspiracy endorsement constitutes a major public health challenge as it is associated with reduced adherence to COVID-19 preventative measures (e.g., vaccination, mask-wearing, and social distancing), psychotic-like experiences, or maladaptive personality traits such as paranoia or schizotypy (Cosci and Guidi, 2021; Ferreira et al., 2022; Hartmann and Müller, 2022; Lincoln et al., 2022; Stasielowicz, 2022; Suthaharan et al., 2021; Winter et al., 2022). Even though the prevalence of personality disorders and different personality traits like Machiavellianism, narcissism, or psychopathy have been associated with stronger conspiracy endorsement, it might be more widespread than in such specific groups (Furnham and Grover, 2021; Magarini et al., 2021; van Mulukom et al., 2022). More specifically, different cross-sectional studies identified aspects of mistrust (e.g., in the health system, politics, and science) as relevant to vaccine hesitancy and rejection of public health measures via the mistrusting of medical experts combined with suspicion towards scientific evidence (Eshel et al., 2022; Hartmann and Müller, 2022; Jamieson, 2021; Lincoln et al., 2022).

While usually considered a societal phenomenon, little is known about the equally important backdrops that are linked to the development of mistrust and personality characteristics that render an individual prone to conspiracy endorsement. In psychotherapy research, there is a growing body of evidence regarding the impact of the transdiagnostic constructs of epistemic trust and personality functioning. Both characteristics develop based upon experiences made in infancy and early childhood where their healthy development is facilitated by secure attachments and interpersonal relationships alongside adequate experiences of being sensitively responded to (Beebe et al., 2010; Fonagy and Allison, 2014; Huang et al., 2020; Innamorati et al., 2017). However, a significant number of children are growing up facing adverse childhood experiences (ACEs). ACEs – including experiences of childhood maltreatment, neglect, or household dysfunction – are a global and highly prevalent phenomenon with over 55 million children affected in Europe alone (Ajilian Abbasi et al., 2015; Sethi et al., 2018). The exposure to ACEs – especially when occurring regularly and unremittingly – means children growing up in an environment characterized by overstressed, unreliable, or malevolent caregiving experiences. Such an environment can cause compromised learning about the social world and result in mistrust and underdevelopment or even breakdown of epistemic trust (Cicchetti and Doyle, 2016; McGuire and Jackson, 2018; Pfaltz et al., 2022). Mistrust may arise as people's motives are over-interpreted, their intentions assumed to deviate from those declared, and the source of the information perceived as not respected. In addition, epistemic hypervigilance and epistemic mistrust may prompt the individual to reject the content of the information, confuse its meaning, or even misinterpret it as being malignant (Fonagy et al., 2017). Therefore, disruptions of epistemic trust manifest as the misattribution of intention and the assumption of ill-intended motives behind another person's or institution's actions, hence, creating epistemic hypervigilance towards the information they impart (Fonagy et al., 2017; Tanzer et al., under review). A recent systematic review has synthesized empirical evidence regarding conspiracy indicating direct associations between conspiracy endorsement and mistrust in various knowledge-transmitting authorities (van Mulukom et al., 2022).

Alongside epistemic trust, personality functioning is a candidate mechanism to enhance our understanding of how ACEs impact psychological outcomes in adulthood in the general population. The concept of personality functioning – recently included in both DSM-5 and ICD-11 – describes a person's abilities directed towards others in forms of intimacy or empathy and the self in forms of self-regulation or identity perception (Bach and First, 2018; Ehrenthal and Benecke, 2019; Morey and Hopwood, 2019). The healthy development of personality functioning in childhood requires epistemic trust, i.e. the capacity for social learning where knowledge gained from one's interpersonal environment is considered trustworthy, relevant to the self, and generalizable to other contexts (Fonagy and Allison, 2014). Empirical findings indicate that several dimensions relevant to personality functioning such as the view of reality as well as specific domains such as low interpersonal trust, insecure attachment, and low self-esteem are related to higher degrees of conspiracy endorsement (Franks et al., 2017; Hettich et al., 2022; Lantian et al., 2020).

In this study, conspiracy endorsement is used as an umbrella term to include both conspiracy mentality and specific conspiracy beliefs. A general tendency to believe in conspiracies is referred to as conspiracy mentality. Conspiracy mentality is the fundamental willingness to believe that small, powerful groups of people act behind social and political phenomena. In contrast to this, specific conspiracy beliefs refer to the assumption that specific conspiracy narratives originated and disseminated in the context of the current situation (e.g., COVID-19 pandemic, vaccination campaigns, climate change, etc.) are true. Although there is substantial overlap between people with conspiracy mentality and people believing in specific conspiracy narratives it is important to analyze both phenomena separately and in conjunction as specific beliefs tend to be content-contaminated, meaning that they sometimes reflect a sentiment or negative evaluation towards the topic rather than a conspiracy related belief. Moreover, the temporal stability and variability of conspiracy mentality on the one hand and specific beliefs on the other is a topic of ongoing research (Imhoff et al., 2022). As previous studies linking adverse childhood experiences, personality functioning, and epistemic trust with conspiracy endorsement have been rare, examining both mentality and specific beliefs separately is important as they might be differently associated with the aforementioned aspects. COVID-19-related conspiracy narratives and believing in those should be considered as a third dimension since this study was conducted against the background of the pandemic.

In light of the results from recent research demonstrating the association between epistemic trust and personality functioning with ACEs (Freier et al., 2022; Kampling et al., 2022) as well as the associations between personality functioning and epistemic trust and conspiracy endorsement (Eshel et al., 2022; Hettich et al., 2022; Lincoln et al., 2022), we hypothesized: (1) that experiences of ACEs are associated with stronger conspiracy endorsement, with a more pronounced conspiracy mentality, and a stronger belief in specific conspiracy narratives both related and unrelated to the COVID-19 pandemic and (2) that more impairments in personality functioning and lower epistemic trust will mediate the aforementioned associations. Therefore, the current observational study aimed to investigate these associations between ACEs, personality functioning, epistemic stance, and conspiracy endorsement including conspiracy mentality and specific conspiracy beliefs both related and unrelated to the COVID-19 pandemic.

2. Methods

2.1. Study design and participants

Representative data on the German population was collected by the demography research institute USUMA Berlin between December 2020 and March 2021. By administering face-to-face interviews as well as self-report questionnaires to randomly selected persons within 258 predefined regions, a total of $N = 2519$ participants could be included. Inclusion criteria comprised sufficient German language skills, an age

greater than 16 years, and informed consent (for minors, informed consent was additionally obtained from a parent/legal guardian). The survey was conducted in accordance with the Declaration of Helsinki and fulfilled the ethical guidelines of the International Code of Marketing and Social Research Practice of the International Chamber of Commerce and the European Society of Opinion and Marketing Research. Adherence to all applicable hygiene regulations regarding the COVID-19 pandemic was given. Ethical approval was obtained by the Ethics Committee of the Medical Faculty of the University of Leipzig (no. 474/20-ek). This study was not preregistered.

2.2. Measures

2.2.1. Adverse childhood experiences questionnaire (ACE)

The Adverse Childhood Experiences Questionnaire is a widely used and well-established self-report measure to retrospectively evaluate various early childhood adversities. The ten items (to which participants respond with yes [1] or no [0]) of the ACE address emotional, physical, and sexual abuse, emotional and physical neglect, separation of a parent, violence against the mother as well as adversities of a household member (substance use, mental illness, and prison stay), resulting in a sum score between zero and ten (Wingenfeld et al., 2011). Sample items are displayed in Table e1 in supplement 1 in supplementary materials. The German version of the ACE questionnaire has shown good convergent validity compared to the Childhood Trauma Questionnaire (CTQ) ($r = 0.837$, $p < 0.001$) as well as acceptable internal consistency with Cronbach's $\alpha = 0.76$ (Wingenfeld et al., 2011). In our sample, a good internal consistency of the ACE items could be observed ($\alpha = 0.81$).

2.2.2. Personality functioning (OPD-SQS)

The Operationalized Psychodynamic Diagnosis Structure Questionnaire-Short Form (OPD-SQS) comprising the three subscales, 'self-perception', 'interpersonal contact', and 'relationship model', was used to assess the level of personality functioning. For the 12 items, response options range from zero ('fully disagree') to four ('fully agree'), resulting in a total score between zero and 48 (zero to 12 for each of the subscales respectively). Higher values indicate more severe impairments in personality functioning (Ehrenthal et al., 2015). Sample items are displayed in Table e1 in supplement 1 in supplementary materials. The OPD-SQS has repeatedly shown high correlations with psychopathology and proven good internal consistency across both clinical and population samples (e.g. McDonald's $\omega = 0.93$) (Ehrenthal et al., 2023). In our study, excellent internal consistency was observed for the OPD-SQS total score ($\alpha = 0.91$).

2.2.3. Epistemic trust (ETMCQ)

The Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ) is a rather newly developed questionnaire used to assess a person's capability of epistemic trust, meaning the level of trust in communicated knowledge. It consists of 15 items measuring the three subscales 'epistemic trust', 'epistemic mistrust', and 'epistemic credulity'. Response options for each item range from one ('strongly disagree') to seven ('strongly agree'), resulting in a sum score between 15 and 105. High trust reflects a person's ability to be open to opportunities for social learning in relationships, while high mistrust indicates a tendency to treat information sources as unreliable and avoid being influenced by communication from others. High credulity reflects a person's lack of clarity about their own position, which can lead to high vulnerability to misinformation and exploitation by others (Campbell et al., 2021). Sample items are displayed in Table e1 in supplement 1 in supplementary materials. While the German validation of the ETMCQ is currently in preparation and information regarding validity and reliability are not yet available (Nolte, under review), both the English and the Italian version have shown good validity and acceptable internal consistency, with Cronbach's α ranging from $\alpha = 0.71$ to $\alpha = 0.78$ for the full scale (Campbell et al., 2021; Liotti et al., 2023). In our sample, good internal consistency was observed for the subscales trust ($\alpha = 0.81$) and credulity ($\alpha = 0.81$), while the mistrust subscale showed a lower value ($\alpha = 0.66$).

2.2.4. Conspiracy endorsement

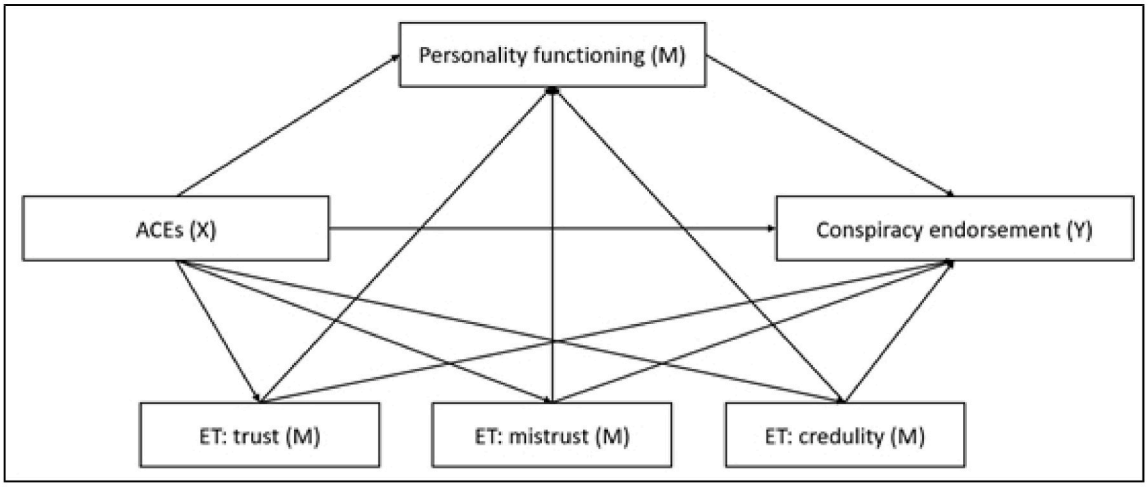
Items for conspiracy endorsement were compiled from two different sources: (1) Derived from Roose (2020), we used four items (four-point Likert scale: score 1–4) including one item regarding conspiracy mentality, two items focusing on specific conspiracy beliefs, and one item focusing on a COVID-19-related conspiracy belief. (2) In addition, we used three items (seven-point Likert scale: score 1–7) from the short version of the Conspiracy Mentality Scale measuring conspiracy mentality and two items (seven-point Likert scale: score 1–7) derived from Schliessler and colleagues focusing on COVID-19-related conspiracy beliefs (Decker and Brähler, 2020). All items used are displayed verbatim in Fig. 2a, b and c where their individual affiliations to conspiracy mentality, specific conspiracy beliefs, and COVID-19-related conspiracy beliefs are shown. We chose these items to measure conspiracy endorsement following the example of two important German representative studies during the COVID-19 pandemic. It is therefore possible to compare our prevalence findings within the German context. In this study, we considered partial agreement to conspiracy items if participants rated an item with a score of three ('probably right') on the four-point Likert scale or with a score of five or six on the seven-point Likert scale (total scale: fully disagree to fully agree), and full agreement if participants rated the items with the highest possible agreement (scores four or seven respectively). If participants partially or fully agreed with an item of at least one of the three subscales of (1) conspiracy mentality, (2) specific conspiracy beliefs, or (3) COVID-19-related conspiracy beliefs, they were assigned to the corresponding group. To calculate a total score, items were first normalized using z-transformation and then summed up. From the nine z-normalized items, a total score of conspiracy endorsement, as well as three subscales, were computed: (1) conspiracy mentality, (2) specific conspiracy beliefs, and (3) COVID-19-related conspiracy beliefs, with higher values indicating more pronounced conspiracy endorsement, mentality, and specific beliefs. The items showed an excellent internal consistency ($\alpha = 0.92$) and an exploratory factor analysis (maximum likelihood, oblimin direct) indicated a one-factor solution, which explained 59.9% of the variance.

2.3. Statistical analyses

Demographic information for the sample is presented with means (*M*) and standard deviations (*SD*). Participants with more than 50% missing items in the ACE, OPD-SQS, ETMCQ, or conspiracy items were excluded from the analysis. Due to the low number of individuals with a gender other than male or female, they were also excluded from the analyses. Mean differences for the overall conspiracy endorsement related to sociodemographic variables were investigated by calculation of Pearson correlation coefficients, independent sample t-tests, and analyses of variance (ANOVAs). Effect sizes were calculated using Hedges g and partial eta square (η^2). Values of $g < 0.2$ and $\eta^2 < 0.01$ were considered negligible, $g \geq 0.2$ and $\eta^2 \geq 0.01$ as small effects, $g \geq 0.5$ and $\eta^2 \geq 0.06$ as medium effects, and $g \geq 0.8$ and $\eta^2 \geq 0.14$ as large effects (Cohen, 1988; Ellis, 2010).

The associations between ACEs, epistemic trust, personality functioning, and conspiracy endorsement were investigated with structural equation modelling (SEM) as shown in Fig. 1. In the model, the influence of personality functioning (measured by the OPD-SQS total score) and epistemic trust (measured by the ETMCQ subscales) on the association between ACEs and conspiracy endorsement was tested. Based on our previous research, epistemic trust was also defined as a statistical predictor of personality functioning. The analysis was repeated for three outcomes: (1) conspiracy mentality, (2) specific conspiracy beliefs, and (3) COVID-19-related conspiracy beliefs.

To account for the data's non-normal distribution, bootstrapped



Note. Model A depicts the direct association of the independent variable ACEs (X) with the dependent variable conspiracy endorsement (Y). Model B depicts the model with personality functioning and the three epistemic trust subscales as mediators (M). (ACE = adverse childhood experiences; ET = epistemic trust).

Fig. 1. Structural equation models to test the mediating effect of epistemic trust and personality functioning on the relationship of ACEs with conspiracy endorsement in adulthood.

confidence intervals (5000 samples, 95%-CI) were calculated to evaluate the statistical significance of all included paths in the SEM. The model's goodness of fit was evaluated using Pearson's chi-squared test (χ^2), the comparative fit index (CFI), Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA) with lower and higher bounds of the 95% CI were calculated. To evaluate whether the empirical data closely fitted the theoretical model, the *p*-value of Close Fit (PCLOSE) was calculated based on the RMSEA values, with values of $p > 0.05$ indicating close fit and $p < 0.05$ indicating worse than close model fit. Acceptable goodness of fit was defined as RMSEA values of <0.08 and CFI/TLI values > 0.90 (Hu and Bentler, 1999). *P*-values <0.05 (two-sided) were considered statistically significant. The Bollen-Stine bootstrapping procedure was applied to evaluate the model fit under the assumption of non-normality, with values > 0.005 indicating a good fit. The assumptions of the SEM were validated by calculations of serial mediations using the SPSS macro 'PROCESS' (v4.1.) with bootstrapped 95% CI (5000 samples; PROCESS model 6) (Hayes, 2013).

For sensitivity analyses, all models were re-calculated with age, gender (i.e., male vs. female), relationship status (in a relationship vs. no relationship), level of education (high: over 13 years of schooling vs. low: 13 years or less of schooling), employment status, household income, migration background, and religious affiliation as covariates. Due to partially missing sociodemographic data, bootstrapping was not applicable in this step. Statistical analyses were performed with IBM SPSS (v22.0) and SPSS AMOS (v24.0). The underlying data are available upon request to the authors.

3. Results

A total of 2519 people participated in the study. Of these, $n = 26$ participants (1.0%) were excluded because of missing data in the ACE questionnaire, the OPD-SQS, the ETMCQ, or the conspiracy items. The remaining $n = 2493$ participants were included in the final analysis. Participants' mean age was 50.3 years (SD = 18.0). The majority were female (52.5%), married (45.4%), had no higher level of education (77.2%), and were employed (93.9%). Most participants earned a net monthly household income above 2500 € (46.2%). For more details on sociodemographic characteristics see Table 1.

3.1. Prevalence of conspiracy endorsement

Overall, 31.2% of the sample ($n = 777$) partially, and another 20.4% ($n = 508$) fully, agreed with at least one of the nine assessed conspiracy items. The highest prevalence of full agreement was found for COVID-19-related conspiracy beliefs as shown in Fig. 2a ($n = 375$, 15.0%), followed by conspiracy mentality as shown in Fig. 2b ($n = 257$, 10.3%), and other specific conspiracy beliefs as shown in Fig. 2c ($n = 123$, 5.0%).

Agreement between the conspiracy items ranged between $r = 0.35$ to 0.83. Higher levels of conspiracy endorsement were significantly associated with more ACEs ($r = 0.26$, $p < 0.001$), greater impairments in personality functioning ($r = 0.35$, $p < 0.001$), lower epistemic trust ($r = -0.35$, $p < 0.001$) as well as higher epistemic mistrust ($r = 0.28$, $p < 0.001$), and epistemic credulity ($r = 0.33$, $p < 0.001$).

Higher levels of conspiracy endorsement with medium effect sizes were found in unemployed participants ($t(2491) = 7.78$, $p < 0.001$, g = 0.65), and participants with a migration background ($t(377.1) = 3.33$, $p = 0.001$, g = 0.47), while small effect sizes were found for participants with lower educational background ($t(920.8) = 6.01$, $p < 0.001$, g = 0.28), participants from households with lower monthly income ($F(2, 2500) = 24.05$, $p < 0.001$, $\eta^2 = 0.019$), single or divorced participants ($F(3, 2489) = 12.45$, $p < 0.001$, $\eta^2 = 0.015$), male participants ($t(2487) = 2.21$, $p = 0.027$, g = 0.08), and younger participants ($r = 0.08$, $p < 0.001$). No significant association with religious affiliation was found ($p = 0.96$).

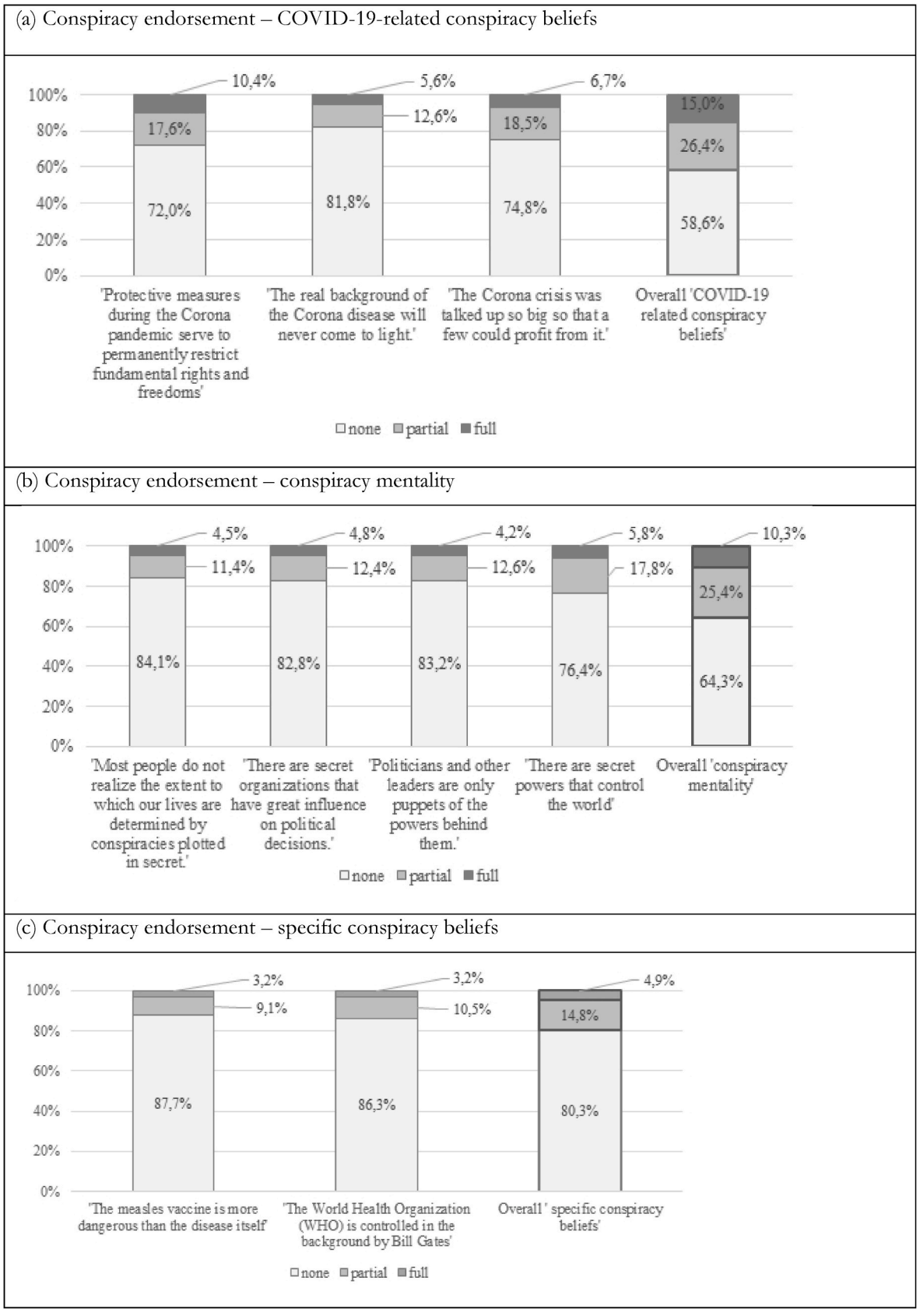


Fig. 2. Conspiracy endorsement: agreement with conspiracy items divided by COVID-19-related conspiracy beliefs, conspiracy mentality, and specific conspiracy beliefs.

Table 1
Sociodemographic characteristics and group comparisons according to conspiracy endorsement.

	Total (n = 2493)		No conspiracy endorsement (*n* = 1182)		Partial conspiracy endorsement (*n* = 777)		Full conspiracy endorsement (*n* = 508)			
	N	(%)	*N*	(%)	*N*	(%)	*N*	(%)	χ^2	*p*
Gender									8.374	0.079
Male	1181	47.4%	547	46.3%	374	31.%	260	22.0%		
Female	1308	52.5%	659	50.4%	403	30.8%	246	18.8%		
Diverse	4	0.2%	2	50.0%	–	–	2	50.0%		
Age									16.818	0.078
<30	434	17.4%	201	46.3%	141	32.5%	92	21.2%		
30-39	337	13.5%	154	45.7%	108	32.0%	75	22.3%		
40-49	393	15.8%	177	45.0%	139	35.4%	77	19.6%		
50-59	503	20.2%	245	48.7%	152	30.2%	106	21.1%		
60-69	420	16.8%	202	48.1%	126	30.0%	92	21.9%		
>70	406	16.3%	229	56.4%	111	27.3%	66	16.6%		
Education									26.725	<0.001
No higher education	1928	77.3%	883	45.8%	622	32.3%	423	21.9%		
Higher education	543	21.8%	313	57.6%	150	27.6%	80	14.7%		
Missing	22	0.9%	*12*		*5*	–	*5*	–		
Relationship									33.898	<0.001
Married/in a relationship	1132	45.4%	594	52.5%	335	29.6%	203	17.9%		
Single	749	30.0%	315	42.1%	260	34.7%	174	23.2%		
Divorced	366	14.7%	165	45.1%	115	31.4%	86	23.5%		
Widowed	238	9.5%	133	55.9%	64	26.9%	41	17.2%		
Missing	8	0.3%	*1*	–	*3*	–	*4*	–		
Employment status									30.359	<0.001
Employed	2342	93.9%	1161	49.6%	728	31.1%	453	19.3%		
Unemployed	151	6.1%	47	31.1%	49	32.5%	55	36.4%		
Monthly net household income									41.300	<0.001
<1250 €	373	15.0%	132	35.4%	125	33.5%	116	31.1%		
1250–2500 €	967	38.8%	485	50.2%	303	31.3%	179	18.5%		
> 2500 €	1153	46.2%	591	51.3%	349	30.3%	213	18.5%		
Religious affiliation									4.454	0.348
No	757	30.4%	356	47.0%	231	30.5%	170	22.5%		
Yes	1706	68.4%	834	48.9%	538	31.5%	334	19.6%		
Missing	30	1.2%	*18*	–	*8*	–	*4*	–		
Migration background									7.844	0.020
No	2186	87.7%	1081	49.5%	663	30.3%	442	20.2%		
Yes	307	12.3%	127	41.4%	114	37.1%	66	21.5%		

Note. N = 2493.

3.2. Association between ACEs and conspiracy endorsement – the mediating role of epistemic trust and personality functioning

In a first step, the direct associations of ACEs with conspiracy endorsement in adulthood were investigated by calculation of an SEM. ACEs significantly predicted conspiracy endorsement (β = 0.25, 95%-CI: 0.21–0.30, $p < 0.001$) and explained 6% of its variance. Since the number of distinct sample moments was equal to the number of distinct parameters to be estimated (i.e., resulting in zero degrees of freedom), no model fit indices could be calculated.

In the second step, the OPD-SQS total score and the ETMCQ subscales were added as mediators of the relationship between ACEs and conspiracy endorsement. The overall explained variance of conspiracy endorsement substantially increased (up to 19%) and the direct association of ACEs with conspiracy endorsement (β = 0.12, 95%-CI: 0.08 to 0.17, $p < 0.001$) was weakened. Lower epistemic trust (β = −0.18, 95%-CI: −0.22 to −0.14, $p = 0.001$), higher epistemic credulity (β = 0.16, 95%-CI: 0.11 to 0.20, $p < 0.001$), and more strongly impaired personality functioning (β = 0.17, 95%-CI: 0.12 to 0.22, $p < 0.001$) significantly predicted higher conspiracy endorsement, while no significant association was found for epistemic mistrust ($p = 0.14$). Fit indices indicated a good model fit ($\chi^2(1) = 2.43$, $p = 0.119$; CFI >0.99; TLI = 0.99; RMSEA = 0.024, 95%-CI: 0.00 to 0.06; PCLOSE = 0.83; Bollen-Stine bootstrap: $p = 0.140$). For details, see Fig. 3. The analysis of serial mediations indicated a significant indirect effect (95%-CI: 0.1109 to 0.1545).

For sensitivity analyses, the model was also calculated with potential confounders of the association of interest as covariates. A significant association of male gender (β = 0.09, $p < 0.001$), lower age (β = 0.002, $p = 0.001$), lower education (β = 0.11, $p < 0.001$), being unemployed (β = 0.19, $p < 0.001$), not living in a relationship (β = 0.08, $p = 0.004$), and having a migration background (β = 0.09, $p = 0.029$) was found with higher conspiracy endorsement, while no significant association was found for religious affiliation ($p = 0.29$), and household income ($p = 0.49$). However, the increase in explained variance (~1%) was negligible.

The model was repeated with conspiracy mentality, specific conspiracy beliefs, and COVID-19-related conspiracy beliefs yielding no substantial differences. Therefore, all models are displayed in in supplementary materials as supplement 2 'association between ACEs and conspiracy mentality', supplement 3 'association between ACEs and specific conspiracy beliefs', and supplement 4 'association between ACEs and COVID-19-related conspiracy beliefs.'

4. Discussion

Based on representative data of the German population collected during the COVID-19 pandemic, our findings indicate a significant association between ACEs and conspiracy endorsement, and that in this association, epistemic trust and personality functioning had a significant indirect effect. In our sample, conspiracy endorsement was common with about 31% of participants at least partially and with another 20% fully agreeing with at least one of the conspiracy items. More specifically, about 10% fully endorsed items of conspiracy mentality, 5% specific conspiracy beliefs, and 15% COVID-19-related conspiracy beliefs.

In line with our first hypothesis, we could demonstrate that more frequent ACEs were significantly associated with higher levels of

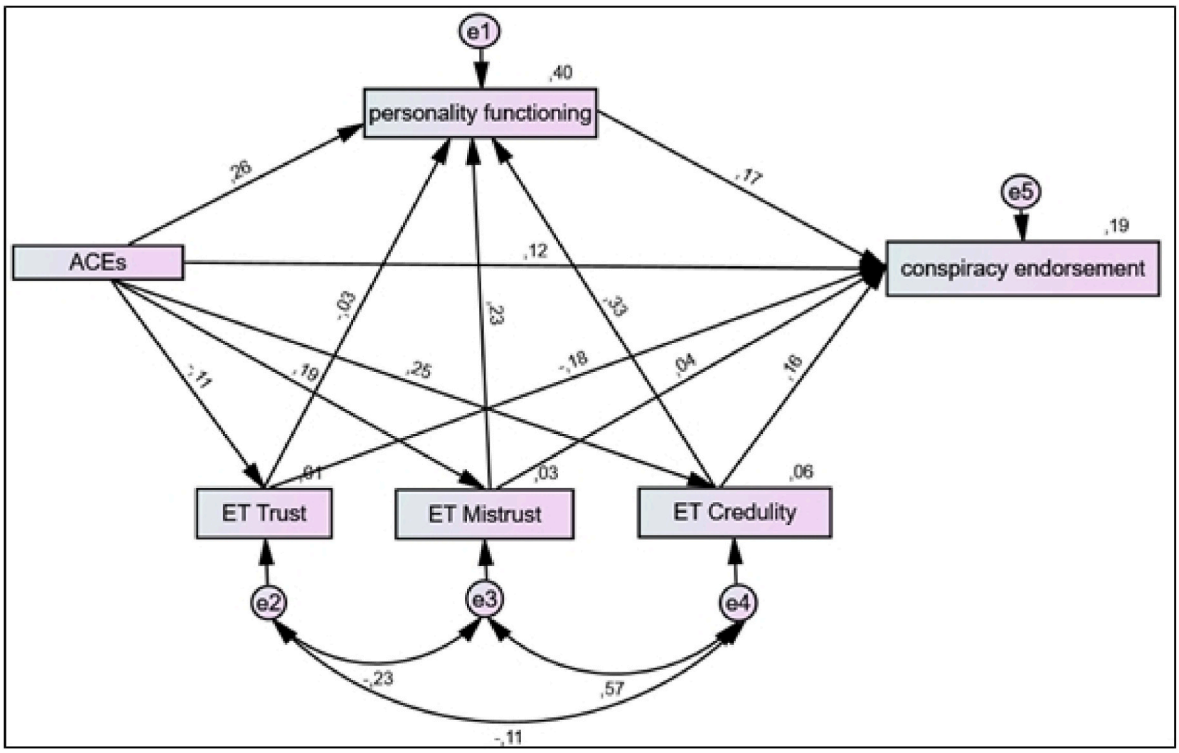


Fig. 3. Structural equation models for the mediating effect of epistemic trust and personality functioning on the relationship of ACEs with conspiracy endorsement. Note. *Rectangles represent variables (ACEs = Adverse Childhood Experiences measured by the ACE; personality functioning measured by the OPD-SQS; ET = epistemic trust measured by the ETMCQ; conspiracy endorsement measured by nine items from two questionnaires) and circles represent error terms (e). Numbers next to arrows in the model represent standardized estimates and numbers next to factors represent the unadjusted R^2, i.e., the explained variance. Statistically not significant paths are displayed in gray and italics.*

conspiracy endorsement. To our knowledge, this is the first study establishing an association between ACEs and conspiracy endorsement in adulthood. Given that ACEs are highly prevalent across the world (Ajilian Abbasi et al., 2015; Sethi et al., 2018) and already strongly associated with various negative mental health outcomes (Baldwin et al., 2023; Ehrlich, 2020; Nanni et al., 2012), they pose an inauspicious and relevant health risk in association with conspiracy endorsement, and in turn, unfavourable behaviours and attitudes associated with it (e.g., vaccination hesitancies during the COVID-19 pandemic (Bellis et al., 2022)). Our results add to the growing body of evidence regarding the highly detrimental impact of ACEs by showing that they are not only associated with physical and psychological health problems (Baldwin et al., 2023; Edwards et al., 2003; Ehrlich, 2020; Nanni et al., 2012; Riedl et al., 2020), but also with psychosocial aspects such as the epistemic stance towards information and endorsement of conspiracies.

To better understand this link, we focused on two psychological transdiagnostic constructs already linked to ACEs (Freier et al., 2022; Kampling et al., 2022). Both epistemic trust and personality functioning not only showed associations with ACEs but also with conspiracy endorsement. More specifically, greater impairments in personality functioning, higher epistemic credulity, as well as lower epistemic trust were associated with higher levels of conspiracy endorsement. Following our line of thinking that the underlying pathway of the association between ACEs and conspiracy endorsement might involve epistemic trust and personality functioning, we included both variables in a SEM. Compared to ACEs as a single predictor, adding personality functioning and the epistemic trust subscales as mediators to the SEM substantially increased the explained variance for conspiracy endorsement from six to 19%. These results suggest that disruptions of epistemic trust and personality functioning are highly relevant, and therefore, can help us understand the implications of ACEs in endorsing conspiracies. Interestingly, we found no differences between the conspiracy subscales (mentality, specific beliefs, COVID-19-related beliefs), suggesting that all aspects examined that contribute to conspiracy endorsement are equally relevant to the association with ACEs. The latter finding is in line with previous research suggesting a strong association between conspiracy mentality and specific beliefs. The question of whether conspiracy beliefs can be reduced to the general mentality to hold such beliefs, or whether specific beliefs constitute this mentality, is an ongoing topic of scientific debate. Future research would therefore need to investigate the malleability of beliefs and mentality and disentangle whether specific beliefs are held related to a conspiracy or a sentiment and negative evaluation of a specific situation (Imhoff et al., 2022).

The development of personality functioning requires a free flow of information within a social network that becomes compromised in cases of disrupted epistemic trust where an individual is less connected to their social network. Hence, it might be assumed that the risk of conspiracy endorsement increases. Research has already established an association between conspiracy endorsement and tendencies to mistrust certain societal aspects such as institutions, governments, or science at large (Hartmann and Müller, 2022). The issue of trusting, mistrusting, and credulity might be far more relevant by being related to an individual's general personality functioning and the ability to adapt to social challenges. The COVID-19 pandemic and corresponding prevention measures require trust in the government (McVeigh and MacLachlan, 2022) as well as trust and acceptance of a variety of decisions made by others. In cases of impaired personality functioning, updating knowledge about the self and others becomes a challenge, while, in contrast, individuals with high levels of personality functioning possess the capacity to develop a positive self-image which appears to have a protective effect against conspiracy endorsement (Leibovitz et al., 2021). Whether or not someone shows high levels of conspiracy mentality or partially or fully endorses specific conspiracy beliefs might – at least in part – be related to an individual's inner working model of their

epistemic stance and social learning, influenced by early experiences in life. In cases of violence, abuse, and neglect the development of basic psychological capacities can become inhibited and the ability to trust in socially transmitted information can become disrupted, possibly making these individuals more prone to endorse conspiracies by mistrusting epistemically transmitted information.

Moreover, we conducted sensitivity analyses to assess whether the observed associations remained stable after statistically controlling for the effects of sociodemographic characteristics. This was the case. Additionally, we found that conspiracy endorsement was most frequent in men, younger, single or divorced, and unemployed participants, and in those who had lower education, a migration background, or were from households with a low monthly income. We did not observe associations with religious affiliation. These findings are in line with previous research based on a sample of the German population where male gender, younger age, lower education, and lower income were also found to be associated with conspiracy endorsement (Hettich et al., 2022). Importantly, some of these factors map onto societal marginalization which indicates that the development of conspiracy mentality must be contextualized and not only be studied as an individual issue. Thus, societal marginalization is an important third variable that is relevant to the main association of interest in the present study. At the same time, lower educational attainment and income can also be understood as the far-reaching sequelae of ACEs in their own right (e.g. (Currie and Spatz Widom, 2010),) which indicates the complex ways in which early-life and later-life adversity are linked.

4.1. Strength and limitations

A major strength of this study was the availability of representative data from a face-to-face survey including comprehensive information about participants' psychological, personal, and socio-demographic characteristics. Further, examining conspiracy endorsement by addressing the aspects of conspiracy mentality, specific conspiracy beliefs, and COVID-19-related conspiracy beliefs allowed for a comprehensive assessment of conspiracy endorsement. However, there are potential limitations that should also be considered. Regarding conspiracy, only the assessment of conspiracy mentality is based on an established scale. While already used, the items assessing beliefs are not yet fully validated and some of the items do not include a specific statement of conspiracy (i.e., "the measles vaccine is more dangerous than the disease itself"). Strictly, items could therefore also represent a lack of knowledge rather than the belief of being misled. While the overall quality of the data is high (representative general-population-based data), the cross-sectional study design limits the interpretation of the results in terms of causality. Even though it cannot be ruled out that the use of self-report measures might also limit the interpretation of results in terms of content validity, e.g. a bias by recalling ACEs, it could be shown that psychopathology emerges as a function of subjective rather than objective experiences of ACEs, and thus, making self-report measures a valid tool to assess the impact of ACEs (Danese and Widom, 2020). Furthermore, empirical research indicated very low rates of false positives in the assessments of ACEs (Hardt and Rutter, 2004), and no biases in effects that could be traced back to prospective assessment versus retrospective recall (Hardt et al., 2010).

5. Conclusions

To our knowledge, this study is the first to examine empirically the association between the two worldwide highly prevalent phenomena of ACEs and conspiracy endorsement. We could demonstrate that more frequent ACEs were significantly associated with higher levels of conspiracy endorsement in adulthood. For a deeper understanding of this relation, we focused on two psychological transdiagnostic constructs already linked to ACEs, namely personality functioning and epistemic trust. We showed that greater impairments in personality functioning, higher epistemic credulity, as well as lower epistemic trust were associated with higher levels of conspiracy endorsement. Moreover, consistent with our hypothesized involvement of these constructs in the underlying pathways of ACEs and conspiracy endorsement, we found a mediating role of epistemic trust and personality functioning. These results suggest that disruptions of epistemic trust and personality functioning are highly relevant, and therefore, can help us understand the implications of ACEs in endorsing conspiracies. We add to the growing body of evidence regarding early childhood adversities' far-reaching and detrimental effects by not only being associated with physical and psychological health problems, but also with psychosocial aspects such as the epistemic stance towards information and endorsement of conspiracies.

Ethical statement

The survey was conducted in accordance with the Declaration of Helsinki and fulfilled the ethical guidelines of the International Code of Marketing and Social Research Practice of the International Chamber of Commerce and the European Society of Opinion and Marketing Research. Adherence to all applicable hygiene regulations with regard to the COVID-19-pandemic was given. Ethical approval was obtained by the Ethics Committee of the Medical Faculty of the University of Leipzig (no. 474/20-ek).

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Hanna Kampling: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. **David Riedl:** Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Nora Hettich:** Writing – review & editing. **Astrid Lampe:** Conceptualization, Supervision, Writing – review & editing. **Tobias Nolte:** Conceptualization, Writing – review & editing. **Sandra Zara:** Conceptualization, Writing – review & editing, Methodology. **Mareike Ernst:** Writing – review & editing. **Elmar Brähler:** Data curation, Methodology, Project administration. **Cedric Sachser:** Conceptualization, Data curation, Writing – review & editing. **Jörg M. Fegert:** Data curation, Writing – review & editing. **Stephan Gingelmaier:** Writing – review & editing. **Peter Fonagy:** Supervision, Writing – review & editing. **Lina Krakau:** Conceptualization, Writing – review & editing. **Johannes Kruse:** Conceptualization, Data curation, Project administration, Supervision, Writing – review & editing.

Data availability

Data will be made available on request.

Acknowledgements

We thank the staff of the USUMA GmbH involved in data retrieval and management as well as all participants who took the time to partake in our study.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2023.116526.

References

Ajilian Abbasi, M., Saeidi, M., Khademi, G., Hoseini, B.L., Emami Moghadam, Z., 2015. Child maltreatment in the world: a review article. Int. J. Pediatr. 3 https://doi.org/10.22038/ijp.2015.3753.

Bach, B., First, M.B., 2018. Application of the ICD-11 classification of personality disorders. BMC Psychiatr. 18, 351. https://doi.org/10.1186/s12888-018-1908-3.

Baldwin, J.R., Wang, B., Karwatowska, L., Schoeler, T., Tsaligopoulou, A., Munafò, M.R., Pingault, J.-B., 2023. Childhood maltreatment and mental health problems: a systematic review and meta-analysis of Quasi-experimental studies. Am. J. Psychiatr. 180, 117–126. https://doi.org/10.1176/appi.ajp.20220174.

Beebe, B., Jaffe, J., Markese, S., Buck, K., Chen, H., Cohen, P., Bahrick, L., Andrews, H., Feldstein, S., 2010. The origins of 12-month attachment: a microanalysis of 4-month mother-infant interaction. Am. J. Bioeth. 12, 3–141. https://doi.org/10.1080/14616730903338985.

Bellis, M.A., Hughes, K., Ford, K., Madden, H.C.E., Glendinning, F., Wood, S., 2022. Associations between adverse childhood experiences, attitudes towards COVID-19 restrictions and vaccine hesitancy: a cross-sectional study. BMJ Open 12, e053915. https://doi.org/10.1136/bmjopen-2021-053915.

Campbell, C., Tanzer, M., Saunders, R., Booker, T., Allison, E., Li, E., O'Dowda, C., Luyten, P., Fonagy, P., 2021. Development and validation of a self-report measure of epistemic trust. PLoS One 16, e0250264. https://doi.org/10.1371/journal.pone.0250264.

Cicchetti, D., Doyle, C., 2016. Child maltreatment, attachment and psychopathology: mediating relations. World Psychiatr. 15, 89–90. https://doi.org/10.1002/wps.20337.

Cohen, J., 1988. Statistical Power Analysis for the Behavioral Sciences, 2. edition. Taylor & Francis, New York, NY.

Cosci, F., Guidi, J., 2021. The role of illness behavior in the COVID-19 pandemic. Psychother. Psychosom. 1–4 https://doi.org/10.1159/000513968.

Currie, J., Spatz Widom, C., 2010. Long-term consequences of child abuse and neglect on adult economic well-being. Child. Maltreat. 15, 111–120. https://doi.org/10.1177/1077559509355316.

Danese, A., Widom, C.S., 2020. Objective and subjective experiences of child maltreatment and their relationships with psychopathology. Nat Hum Behav 4, 811–818. https://doi.org/10.1038/s41562-020-0880-3.

Decker, O., Brähler, E., 2020. Autoritäre Dynamiken: Alte Ressentiments – Neue Radikalität. f. Psychosozial-Verlag. https://doi.org/10.30820/9783837977714-13.

Edwards, V.J., Holden, G.W., Felitti, V.J., Anda, R.F., 2003. Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: results from the adverse childhood experiences study. Am. J. Psychiatr. 160, 1453–1460. https://doi.org/10.1176/appi.ajp.160.8.1453.

Ehrenthal, J., Benecke, C., 2019. Tailored treatment planning for individuals with personality disorders. In: Case Formulation for Personality Disorders. Elsevier, pp. 291–314. https://doi.org/10.1016/B978-0-12-813521-1.00015-1.

Ehrenthal, J.C., Dinger, U., Schauenburg, H., Horsch, L., Dahlbender, R.W., Gierk, B., 2015. Development of a 12-item version of the OPD-Structure Questionnaire (OPD-SQS) [Entwicklung einer Zwölf-Item-Version des OPD-Strukturfragebogens (OPD-SFK)]. Z. Psychosom. Med. Psychother. 61, 262–274. https://doi.org/10.13109/zptm.2015.61.3.262.

Ehrenthal, J., Kruse, J., Schmalbach, B., Dinger, U., Werner, S., Schauenburg, H., Brähler, E., Kampling, H., 2023. Measuring personality functioning with the 12-item version of the OPD-structure questionnaire: reliability, factor structure, validity, and measurement invariance in the general population. Front. Psychol. https://doi.org/10.3389/fpsyg.2023.1248992.

Ehrlich, K.B., 2020. How does the social world shape health across the lifespan? Insights and new directions. Am. Psychol. 75, 1231–1241. https://doi.org/10.1037/amp0000757.

Ellis, P.D., 2010. The Essential Guide to Effect Sizes: Statistical Power, Meta-Analysis, and the Interpretation of Research Results. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511761676.

Eshel, Y., Kimhi, S., Marciano, H., Adini, B., 2022. Conspiracy claims and secret intentions as predictors of psychological coping and vaccine uptake during the COVID-19 pandemic. J. Psychiatr. Res. 151, 311–318. https://doi.org/10.1016/j.jpsychires.2022.04.042.

Ferreira, S., Campos, C., Marinho, B., Rocha, S., Fonseca-Pedrero, E., Barbosa Rocha, N., 2022. What drives beliefs in COVID-19 conspiracy theories? The role of psychotic-like experiences and confinement-related factors. Soc. Sci. Med. 292, 114611 https://doi.org/10.1016/j.socscimed.2021.114611.

Fonagy, P., Allison, E., 2014. The role of mentalizing and epistemic trust in the therapeutic relationship. Psychotherapy 51, 372–380. https://doi.org/10.1037/a0036505.

Fonagy, P., Luyten, P., Allison, E., Campbell, C., 2017. What we have changed our minds about: Part 2. Borderline personality disorder, epistemic trust and the developmental significance of social communication. bord personal disord emot dysregul 4, 9. https://doi.org/10.1186/s40479-017-0062-8.

Franks, B., Bangerter, A., Bauer, M.W., Hall, M., Noort, M.C., 2017. Beyond "monologicality"? Exploring conspiracist worldviews. Front. Psychol. 8, 861. https://doi.org/10.3389/fpsyg.2017.00861.

Freier, A., Kruse, J., Schmalbach, B., Zara, S., Werner, S., Brähler, E., Fegert, J.M., Kampling, H., 2022. The mediation effect of personality functioning between different types of child maltreatment and the development of depression/anxiety symptoms – a German representative study. J. Affect. Disord. 299, 408–415. https://doi.org/10.1016/j.jad.2021.12.020.

Furnham, A., Grover, S., 2021. Do you have to be mad to believe in conspiracy theories? Personality disorders and conspiracy theories. Int J Soc Psychiatry. https://doi.org/10.1177/00207640211031614, 207640211031614.

Hardt, J., Rutter, M., 2004. Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. JCPP (J. Child Psychol. Psychiatry) 45, 260–273. https://doi.org/10.1111/j.1469-7610.2004.00218.x.

Hardt, J., Vellaisamy, P., Schoon, I., 2010. Sequelae of prospective versus retrospective reports of adverse childhood experiences. Psychol. Rep. 107, 425–440. https://doi.org/10.2466/02.04.09.10.16.21.PR0.107.5.425-440.

Hartmann, M., Müller, P., 2022. Acceptance and adherence to COVID-19 preventive measures are shaped predominantly by conspiracy beliefs, mistrust in science and fear - a comparison of more than 20 psychological variables. Psychol. Rep. https://doi.org/10.1177/00332941211073656, 332941211073656.

Hayes, A.F., 2013. Introduction to Mediation, Moderation, and Conditional Process Analysis - A Regression-Based Approach. Guildford Publications, Inc, New York, NY.

Hettich, N., Beutel, M.E., Ernst, M., Schliessler, C., Kampling, H., Kruse, J., Braehler, E., 2022. Conspiracy endorsement and its associations with personality functioning, anxiety, loneliness, and sociodemographic characteristics during the COVID-19 pandemic in a representative sample of the German population. PLoS One 17, e0263301. https://doi.org/10.1371/journal.pone.0263301.

Hu, L., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct. Equ. Model.: A Multidiscip. J. 6, 1–55. https://doi.org/10.1080/10705519909540118.

Huang, Y.L., Fonagy, P., Feigenbaum, J., Montague, P.R., Nolte, T., London Personality and Mood Disorder Research Consortium, 2020. Multidirectional pathways between attachment, mentalizing, and posttraumatic stress symptomatology in the context of childhood Trauma. Psychopathology 53, 48–58. https://doi.org/10.1159/000506406.

Imhoff, R., Bertlich, T., Frenken, M., 2022. Tearing apart the "evil" twins: a general conspiracy mentality is not the same as specific conspiracy beliefs. Current Opinion in Psychology 46, 101349. https://doi.org/10.1016/j.copsyc.2022.101349.

Innamorati, M., Imperatori, C., Harnic, D., Erbuto, D., Patitucci, E., Janiri, L., Lamis, D. A., Pompili, M., Tamburello, S., Fabbricatore, M., 2017. Emotion regulation and mentalization in people at risk for food addiction. Behav Med, wagner 43, 21–30. https://doi.org/10.1080/08964289.2015.1036831.

Jamieson, K.H., 2021. How conspiracists exploited COVID-19 science. Nat Hum Behav 5, 1464–1465. https://doi.org/10.1038/s41562-021-01217-2.

Kampling, H., Kruse, J., Lampe, A., Nolte, T., Hettich, N., Brähler, E., Sachser, C., Fegert, J.M., Gingelmaier, S., Fonagy, P., Krakau, L., Zara, S., Riedl, D., 2022. Epistemic trust and personality functioning mediate the association between adverse childhood experiences and posttraumatic stress disorder and complex posttraumatic stress disorder in adulthood. Front. Psychiatr. 13.

Lantian, A., Wood, M., Gjoneska, B., 2020. Personality traits, cognitive styles and worldviews associated with beliefs in conspiracy theories. In: Routledge Handbook of Conspiracy Theories. Routledge.

Leibovitz, T., Shamblaw, A.L., Rumas, R., Best, M.W., 2021. COVID-19 conspiracy beliefs: relations with anxiety, quality of life, and schemas. Pers Individ Dif 175, 110704. https://doi.org/10.1016/j.paid.2021.110704.

Lincoln, T.M., Schlier, B., Strakeljahn, F., Gaudiano, B.A., So, S.H., Kingston, J., Morris, E.M.J., Ellett, L., 2022. Taking a machine learning approach to optimize prediction of vaccine hesitancy in high income countries. Sci. Rep. 12, 2055. https://doi.org/10.1038/s41598-022-05915-3.

Liotti, M., Milesi, A., Spitoni, G.F., Tanzilli, A., Speranza, A.M., Parolin, L., Campbell, C., Fonagy, P., Lingiardi, V., Giovanardi, G., 2023. Unpacking trust: the Italian validation of the epistemic trust, mistrust, and credulity questionnaire (ETMCQ). PLoS One 18, e0280328. https://doi.org/10.1371/journal.pone.0280328.

Magarini, F.M., Pinelli, M., Sinisi, A., Ferrari, S., De Fazio, G.L., Galeazzi, G.M., 2021. Irrational beliefs about COVID-19: a scoping review. Int. J. Environ. Res. Publ. Health 18, 9839. https://doi.org/10.3390/ijerph18199839.

McGuire, A., Jackson, Y., 2018. A multilevel meta-analysis on academic achievement among maltreated youth. Clin. Child Fam. Psychol. Rev. 21, 450–465. https://doi.org/10.1007/s10567-018-0265-6.

McVeigh, J., MacLachlan, M., 2022. The macropsychology of COVID-19: psychological governance as pandemic response. Am. Psychol. 77, 100–110. https://doi.org/10.1037/amp0000909.

Morey, L.C., Hopwood, C.J., 2019. Expert preferences for categorical, dimensional, and mixed/hybrid approaches to personality disorder Diagnosis. J. Pers. Disord. 1–8 https://doi.org/10.1521/pedi_2019_33_398.

Nanni, V., Uher, R., Danese, A., 2012. Childhood maltreatment predicts unfavorable course of illness and treatment outcome in depression: a meta-analysis. Am. J. Psychiatr. 169, 141–151. https://doi.org/10.1176/appi.ajp.2011.11020335.

Nolte, T., under review. Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ).

Pfaltz, M.C., Halligan, S.L., Haim-Nachum, S., Sopp, M.R., Åhs, F., Bachem, R., Bartoli, E., Belete, H., Belete, T., Berzengi, A., Dukes, D., Essadek, A., Iqbal, N., Jobson, L., Langevin, R., Levy-Gigi, E., Lüönd, A.M., Martin-Soelch, C., Michael, T., Oe, M., Olff, M., Ceylan, D., Raghavan, V., Ramakrishnan, M., Sar, V., Spies, G., Wadji, D.L., Wamser-Nanney, R., Fares-Otero, N.E., Schnyder, U., Seedat, S., 2022. Social functioning in individuals affected by childhood maltreatment: establishing a research agenda to inform interventions. Psychother. Psychosom. 91, 238–251. https://doi.org/10.1159/000523667.

Riedl, D., Lampe, A., Exenberger, S., Nolte, T., Trawöger, I., Beck, T., 2020. Prevalence of adverse childhood experiences (ACEs) and associated physical and mental health problems amongst hospital patients: results from a cross-sectional study. Gen. Hosp. Psychiatr. 64, 80–86. https://doi.org/10.1016/j.genhosppsych.2020.03.005.

Roose, J., 2020. They are everywhere: A represantative survey of conspiracy endorsement. [Sie sind überall: Eine repräsentative Umfrage zu Verschwörungstheorien]. Konrad-Adenauer-Stiftung e. V, Berlin.

Sethi, D., Yon, Y., Parekh, N., Anderson, T., Huber, J., Rakovac, Meinck, 2018. European Status Report on Preventing Child Maltreatment.

Stasielowicz, L., 2022. Who believes in conspiracy theories? A meta-analysis on personality correlates. J. Res. Pers. 98, 104229 https://doi.org/10.1016/j.jrp.2022.104229.

Suthaharan, P., Reed, E.J., Leptourgos, P., Kenney, J.G., Uddenberg, S., Mathys, C.D., Litman, L., Robinson, J., Moss, A.J., Taylor, J.R., Groman, S.M., Corlett, P.R., 2021. Paranoia and belief updating during the COVID-19 crisis. Nat Hum Behav 5, 1190–1202. https://doi.org/10.1038/s41562-021-01176-8.

Tanzer, M., Campbell, C., Saunders, R., Luyten, P., Booker, T., Fonagy, P., under review. Acquiring knowledge: Epistemic trust in the age of fake news. https://doi.org/10.31234/osf.io/g2b6k.

van Mulukom, V., Pummerer, L.J., Alper, S., Bai, H., Čavojová, V., Farias, J., Kay, C.S., Lazarevic, L.B., Lobato, E.J.C., Marinthe, G., Pavela Banai, I., Šrol, J., Žeželj, I., 2022. Antecedents and consequences of COVID-19 conspiracy beliefs: a systematic review. Soc. Sci. Med. 301, 114912 https://doi.org/10.1016/j.socscimed.2022.114912.

Wingenfeld, K., Schäfer, I., Terfehr, K., Grabski, H., Driessen, M., Grabe, H., Löwe, B., Spitzer, C., 2011. Reliable, valide und ökonomische Erfassung früher Traumatisierung: erste psychometrische Charakterisierung der deutschen Version des Adverse Childhood Experiences Questionnaire (ACE). Psychother Psych Med 61, e10–e14. https://doi.org/10.1055/s-0030-1263161.

Winter, K., Pummerer, L., Hornsey, M.J., Sassenberg, K., 2022. Pro-vaccination subjective norms moderate the relationship between conspiracy mentality and vaccination intentions. Br. J. Health Psychol. 27, 390–405. https://doi.org/10.1111/bjhp.12550.