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Predicting Misinformation Beliefs Across Four Countries: The Role of Narcissism, Conspiracy Mentality, Social Trust, and Perceptions of Unsafe Neighborhoods

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Supplementary Materials: Code, Data, Materials [see Index of Supplementary Materials]

Abstract

There are differing perspectives on the roles that social-perceptual and individual-difference factors play in explaining susceptibility to misinformation. With quota-representative samples from the U.S. (n = 492), the U.K. (n = 600), Poland (n = 558), and Germany (n = 490), we ran a comprehensive test of four social-perceptual factors (i.e., social trust, institutional trust, relative deprivation, and perceived area unsafety) and six individual-difference factors (i.e., narcissism, conspiracy mentality, closed-mindedness, need for predictability, need for order, and perceived locus of control). In terms of the social-perceptual factors, social trust and perceptions of area unsafety were consistently related to higher misinformation susceptibility across countries. In terms of individual-difference factors, narcissism and conspiracy mentality were associated with increased susceptibility to misinformation in three of the four countries. Relative deprivation and external locus of control were related to misinformation susceptibility in the pooled sample. We discuss societal implications of these findings and highlight directions for future research.

Keywords

conspiracy mentality, COVID-19, misinformation, narcissism, social trust

Major societal events are often accompanied by the spread of false information, including conspiracy theories, disinformation, and commercial scams (e.g., Douglas et al., 2019; Mian & Khan, 2020; U.S. Food and Drug Administration, 2022). The COVID-19 pandemic has been no exception. We have witnessed misinformation about the origin, treatment, diagnosis, and prevention of the disease (Charquero-Ballester et al., 2021) propagated in the mass media, via text messages, and on social media, and by politicians, celebrities, and other public figures with large followings (Brennen et al., 2020). Belief in misinformation about COVID-19 has been linked to vaccine hesitancy (Roozenbeek et al., 2020) and lower intentions to engage in protective health behaviors (Bierwiaczonek et al., 2022; van Mulukom et al., 2022), the destruction of technological infrastructure (BBC News, 2020; Jolley & Paterson, 2020), and even the willingness to participate in violent anti-government protests (Šrol et al., 2022). These important societal implications have resulted in an increase in studies about belief in misinformation in the context of COVID-19.

The definition of misinformation can vary from one study to another. Whereas some have defined it broadly as an umbrella term for all types of false and misleading information (e.g., Altay, Berriche, & Acerbi, 2023; Wang et

al., 2019), others have defined it more strictly as information that is contradicting the scientific consensus about a given phenomenon (Swire-Thompson & Lazer, 2020). Given that misinformation about COVID-19 has consisted of both conspiracy theories and demonstrable false information, we draw on literature on misinformation in all forms. Conspiracy theories, specifically, are a subset of misinformation (Altay, Berriche, et al., 2023) characterized by the belief that a secret, malevolent force is responsible for an event or situation, often disregarding plausible explanations in favor of more nefarious, hidden actors (Douglas et al., 2017). Unlike general misinformation, which may simply be incorrect or misleading, conspiracy theories uniquely assert the involvement of a covert, malevolent group intentionally orchestrating events or situations.

Research on misinformation related to COVID-19 has among other things looked at predictors of believing in misinformation (Roozenbeek et al., 2020), its consequences (van Mulukom et al., 2022), and interventions to counter it (van der Linden, Dixon, et al., 2021; van der Linden et al., 2020). The existing research on predictors of susceptibility to misinformation has approached the issue from both individual-difference and social-perceptual perspectives, aiming to better understand this phenomenon of human judgment and decision-making. This study offers a comprehensive examination of how various social-perceptual and individual-difference factors influence susceptibility to misinformation, using quota-representative samples from four different countries.

In this context, individual-difference factors refer to personal traits or aspects of personality that distinguish one person from another (Aronson et al., 2013). These factors are considered to be relatively stable over time among adults, for instance when it comes to personality traits (Bleidorn et al., 2022) and generalized worldviews suspecting conspiracy at play (i.e., conspiracy mentality; Imhoff et al., 2022). On the other hand, social-perceptual factors involve how individuals perceive and interpret social cues in their environment to form judgements about social roles, relationships, contexts, or characteristics (e.g., interpersonal trust) of others (Aronson et al., 2013; McCleery et al., 2014). As such, these variables can be thought to be more socially and contextually malleable than individual differences. For example, experiential theories of trust formation (Dinesen, 2012; Glanville & Paxton, 2007) suggest that trust is formed and influenced by life experiences in localized settings, making it malleable. Furthermore, while core social-perceptual capacities, such as perceived trustworthiness, are predominantly shaped by a person's unique environment (Sutherland et al., 2020), individual differences are often considerably influenced by genetic factors (e.g., Sanchez-Roige et al., 2018). Although these concepts are often considered theoretically distinct, some variables from each category may overlap or intertwine. Despite this, we chose to use this dichotomous higher-order categorization to organize the manuscript, thereby enhancing clarity given the extensive number of variables included. We will return to a discussion of the limitations of this categorization later.

Individual-Differences Perspectives on Misinformation

A growing body of research has focused on individual-difference predictors of misinformation susceptibility (e.g., Ecker et al., 2022; Lobato et al., 2020; Pennycook & Rand, 2019; Roozenbeek et al., 2022). One of the most robust predictors of believing in conspiracy theories and other forms of misinformation is narcissism or the belief in one's supremacy, uniqueness, and entitlement, accompanied by threat sensitivity (Cichocka et al., 2022). Having narcissistic tendencies has also been associated with the dissemination of misinformation (Morosoli et al., 2022) and the belief in fake news (Piksa et al., 2022) and conspiracy theories about COVID-19 (Gligorić et al., 2021; Sternisko et al., 2023). One reason for why narcissists endorse conspiracy theories is their heightened paranoia (Cichocka et al., 2016). Paranoia and conspiracy beliefs share certain correlates, such as perceptions of threat from powerful people (van der Linden, Panagopoulos, et al., 2021). Hence, paranoid convictions held by narcissists may spill into beliefs that society in general is under threat by people with malicious intent (see, Cichocka et al., 2022). Moreover, narcissists' high need for uniqueness make conspiracy theories attractive in that they offer access to exclusive information that can make one feel special (Imhoff & Lamberty, 2017). People with narcissistic tendencies have also been found to be more gullible (Hart et al., 2021), that is, susceptible to manipulation and imperceptive to cues of untrustworthiness. Even though narcissists typically perceive themselves as extremely confident in their abilities and intelligence (Zajenkowski & Dufner, 2020), they have been found to engage less in cognitive reflection and to be more naïve (Littrell et al., 2020; Sternisko et al., 2023).

Another individual-difference factor that has been demonstrated to play a role in misinformation susceptibility is having a general conspiracy mentality, assessing the general tendency to believe that important societal events are caused by powerful and malicious individuals or groups who have conspired in secrecy (Bruder et al., 2013). It has been suggested that some people may have an underlying disposition to prefer conspiratorial explanations for societal events because they distrust official accounts and are biased against powerful groups and authorities (Imhoff & Lamberty, 2018; Wood et al., 2012). In line with this, research has shown that people with a conspiracy mentality are more likely to believe in misinformation about COVID-19 (Freeman et al., 2022), political fake news (Anthony & Moulding, 2019; Faragó et al., 2020), and to be more positive toward alternative treatment of the coronavirus (Bierwiaczonek et al., 2022).

Other individual predictors that have been found to be associated with misinformation susceptibility are factors concerned with perceptions of control and uncertainty. It has been suggested that a potential reason why some people believe in conspiracy theories is because of an epistemic motivation to reduce uncertainty and ambiguity (Douglas et al., 2019; Kossowska & Bukowski, 2015). For instance, need for closure, i.e., the individual disposition of preferring order, structure, and predictability while at the same time abhorring chaos, disorder, and ambiguity (Roets & Van Hiel, 2011; Webster & Kruglanski, 1994), has been linked to believing in fake news (Szebeni et al., 2021) and holding conspiracy beliefs (Marchlewska et al., 2018). Hence, it is possible that when people high in need for closure experience uncertainty and ambiguity they may be more likely to accept *any* available information that assures closure.

Regarding perceived control, it has been argued that people have a need to see the world as an ordered place that can be understood and hence we are motivated to preserve a sense of control in our lives (Landau et al., 2015). Thus, if control is lost, we are likely to start compensatory activities to regain our sense of control (Kay et al., 2009). One potential mechanism to regain control may be to endorse conspiracy theories, which can provide an explanation for the distressing societal event that caused the uncertainty and perceived lack of control. In line with this, research has shown that perceptions of external locus of control (i.e., lack of control over what happens to one's life) have been associated with conspiracy beliefs (van Prooijen & Acker, 2015) and endorsement of specific COVID-19 conspiracy theories (Šrol et al., 2021). Relatedly, feelings of powerlessness have also been associated with increased conspiracy beliefs (Abalakina-Paap et al., 1999; van Prooijen, 2020).

Social-Perceptual Perspectives on Misinformation

In contrast to these individualistic explanations, other studies have also included social-perceptual factors in their designs. A frequently discussed social factor related to misinformation is mistrust (e.g., Pierre, 2020). It has been argued that belief in misinformation such as conspiracy theories can result from mistrust of official and authoritative accounts. For instance, low levels of institutional trust has been associated with increased beliefs in specific conspiracy theories (Adam-Troian et al., 2021), misinformation, and having a general conspiratorial view of the world (Freeman et al., 2022; Mari et al., 2022).

General interpersonal (mis)trust has also been associated with believing in misinformation and conspiracy theories. The idea that mistrust underpins conspiracy beliefs is not new (Basham, 2006/2019; Hofstadter, 1964). It has been argued that interpersonal mistrust can vary on a continuum ranging from general skepticism to strong suspiciousness, and finally to an almost pathological rejection of conventional knowledge and accepted explanations (see, Pierre, 2020). Coinciding with this, people who show lower levels of interpersonal trust have been found to be more inclined to believe in conspiracy theories (e.g., Brotherton et al., 2013; Green & Douglas, 2018; Leman & Cinnirella, 2013). Moreover, people with a conspiracy mentality have been found to be quicker at perceiving others as untrustworthy (Frenken & Imhoff, 2023).

Other social-perceptual factors that have been associated with misinformation susceptibility concern perceptions of insecurity, and feelings of resentment and powerlessness (Douglas & Sutton, 2023; van Prooijen, 2020). People arguably have existential motives which includes motives to feel safe and to be in control (Douglas et al., 2017). When these motives are unsatisfied, one might resort to believe in false information as a way to compensate. Consistent with this reasoning, feelings of powerlessness (Abalakina-Paap et al., 1999; Jolley & Douglas, 2014) and deprived life-circumstances have been associated with increased conspiracy beliefs (van Prooijen, 2020). Moreover, it has been argued that feelings of deprivation can cause people to see sociopolitical systems as rigged, in turn leading to increased

conspiracy beliefs (van Prooijen et al., 2018). As Moscovici (1987) pointed out, "Whoever feels deprived of something instinctively looks for a cause of the deprivation" (p. 162).

The Present Research

While both individual and social-perceptual perspectives on misinformation susceptibility have been tested in psychological research, most studies have focused on only one perspective (typically the individual perspective; see e.g., Bronstein et al., 2019; Ecker et al., 2022; Pennycook & Rand, 2020). Therefore, our first major research question focused on examining the impact of a broader range of social-perceptual and individual-difference predictors on susceptibility to misinformation. In the present study, the predictors tapping into underlying personal dispositions regarding individual's beliefs, thoughts, and preferences were categorized as individual differences. Conversely, predictors focused on how individuals perceive their social and contextual environments were categorized as social-perceptual variables. The selection of variables was based on prior work that demonstrated their systematic relationships with misinformation susceptibility and beliefs in conspiracy theories (refer to the review above). Among the individual-difference factors, it was reasonable to anticipate that higher levels of narcissism, conspiracy mentality, need for closure, and an external perceived locus of control would correlate with increased susceptibility to misinformation. Similarly, concerning the social-perceptual factors, we hypothesized that lower social and institutional trust, and heightened perceptions of relative deprivation and neighborhood unsafety, would be associated with a greater susceptibility to misinformation.

Next, as most studies have investigated the influence of a set of factors in only one national context, it leaves uncertainty as to whether the effects generalize across countries. Hence, our second major research question addressed whether the observed effects were dependent on the national context or not. To test whether these effects were dependent on the national context or not, we conducted this research with quota-representative samples from Germany, Poland, the U.K., and the U.S. These countries are similar in that they have experienced a considerable impact from the COVID-19 pandemic (Johns Hopkins University CSSE COVID-19 Data, 2022), but they are dissimilar in COVID-19 vaccine uptake (Mathieu et al., 2021), institutional trust (OECD, 2022a), government response stringency (Hale et al., 2021), freedom of press (Reporters without Borders, 2021), and quality of democracy (Chair of Comparative Politics and German University of Würzburg, 2021). Therefore, by examining whether the effects of individual versus social-perceptual factors on misinformation susceptibility are comparable or not among the four countries, we obtain relevant information to assess the generalizability of effects.

Identifying the explanatory power of both individual-difference and social-perceptual factors on susceptibility to misinformation has important theoretical and practical implications. Theoretically, it can help bringing clarity to a field that has recently become crowded with different theoretical explanations and models that often are tested in single studies and societal contexts only. Practically, it can help identify the factors that large-scale interventions and cross-national policies can target to counter misinformation.

Method

Participants

A power simulation in R suggested that a total sample of 2,000 participants would yield close to perfect power (99%) to detect a small interaction effect (i.e., effect size of $\beta = .10$) between the independent variables and country in a linear regression model at an alpha of .05. Further, country-specific samples of $n = 500$ would result in a margin of error of 4%.

From June 16th until August 9th, 2021, we recruited a cross-national sample from four countries. After excluding a total of 16.8% participants who failed two attention checks (see below for a description), we ended up with a total sample of 2,140 participants from the U.S. ($n = 492$), the U.K. ($n = 600$), Poland ($n = 558$), and Germany ($n = 490$). To obtain samples that resembled their respective populations in terms of core demographics, they were quota sampled based on gender, age, education, and income (see Table 1 for descriptive statistics). The recruitment of participants was done through the ISO-certified survey platforms CloudResearch (for the U.S. and Poland) and Respondi (for the U.K. and Germany). These platforms are widely utilized by researchers for managing and executing online studies that demand

large participant samples and high data quality, while also offering the capability to selectively target participants with specific demographic backgrounds. ISO certification ensures that these platforms adhere to international standards for quality management and data security, enhancing the reliability and credibility of the research outcomes.

Table 1

Descriptive Statistics of Participants by Country

Variable	United States	United Kingdom	Poland	Germany	Total
N	492	600	558	490	2140
Male *n* (%)	242 (49.2)	298 (49.7)	270 (48.4)	243 (49.6)	1053 (49.2)
Female *n* (%)	247 (50.2)	301 (50.2)	287 (51.4)	245 (50.0)	1080 (50.5)
Other *n* (%)	3 (0.6)	1 (0.2)	1 (0.2)	2 (0.4)	7 (0.3)
Age, *M (SD)*	46.56 (18.39)	50.44 (16.84)	44.50 (17.06)	47.25 (17.70)	47.28 (17.59)
18 – 24 *n* (%)	74 (15.0)	44 (7.3)	67 (12.0)	60 (12.2)	245 (11.4)
25 – 54 *n* (%)	239 (48.6)	308 (51.3)	290 (52.0)	226 (46.1)	1063 (49.7)
55 – 64 *n* (%)	78 (15.9)	106 (17.7)	91 (16.3)	91 (18.6)	366 (17.1)
65 < *n* (%)	101 (20.5)	142 (23.7)	110 (19.7)	113 (23.1)	466 (21.8)
Education, *n* (%)					
Below upper secondary	35 (7.1)	126 (21.0)	13 (2.3)	64 (13.1)	238 (11.1)
Upper secondary	214 (43.5)	149 (24.8)	353 (63.3)	279 (57.0)	995 (46.5)
Tertiary	243 (49.4)	325 (54.2)	192 (34.4)	147 (29.9)	907 (42.4)
Income relative to median, *n* (%)					
Low	174 (35.4)	107 (17.8)	183 (32.8)	95 (19.4)	559 (26.1)
Middle	163 (33.1)	412 (68.7)	316 (56.6)	313 (63.9)	1204 (56.3)
High	155 (31.5)	81 (13.5)	59 (10.6)	82 (16.7)	377 (17.6)
Employment status, *n* (%)					
Employed full time	160 (32.5)	289 (48.2)	310 (55.6)	230 (46.9)	989 (46.2)
Employed part time	56 (11.4)	64 (10.7)	45 (8.1)	56 (11.4)	221 (10.3)
Unemployed, looking for work	55 (11.2)	13 (2.2)	25 (4.5)	7 (1.4)	100 (4.7)
Unemployed, not looking for work	37 (7.5)	34 (5.7)	15 (2.7)	17 (3.5)	103 (4.8)
Retired	112 (22.8)	150 (25.0)	128 (22.9)	120 (24.5)	510 (23.8)
Student	25 (5.1)	27 (4.5)	28 (5.0)	54 (11.0)	134 (6.3)
Disabled	47 (9.6)	23 (3.8)	7 (1.3)	6 (1.2)	83 (3.9)
Ethnicity, *n* (%)					
Majority members	388 (79.0)	524 (87.3)	524 (93.9)	446 (91.2)	1882 (88.0)
Minority members	103 (21.0) [a]	76 (12.7) [b]	34 (6.1) [c]	43 (8.8) [d]	256 (12.0)

[a]Black/African American (*n* = 44/9.0%); Asian (*n* = 19/3.9%); American Indian or Alaska native (*n* = 2/0.4%); Hispanic (*n* = 28/5.7%); Mixed (*n* = 7/1.4%); Other (*n* = 3/0.3%); Missing (*n* = 1/0.2%). [b]Black/African/Caribbean/black British (*n* = 15/2.5%); Asian/Asian British: Indian (*n* = 14/2.3%); Asian/Asian British: Pakistani (*n* = 11/1.8%); Mixed (*n* = 13/2.2%); Other (*n* = 23/3.8%). [c]Silesian (*n* = 20/3.6%); German (*n* = 3/0.5%); Ukrainian (*n* = 4/0.7%); Other (*n* = 7/1.3%). [d]Turkish (*n* = 5/1.0%); Polish (*n* = 6/1.2%); Other (*n* = 32/6.5%); Missing (*n* = 1/0.2%).

Procedure and Materials

The participants were presented with an informed consent, followed by the main questionnaire, demographics, and a debrief explaining the purpose of the study. All participants who completed the full survey were financially compensated. The complete survey with all measurement instruments were forward-back translated from English to German and Polish. All instruments were presented in random order. Given the cross-national comparisons, it was important to establish measurement invariance at least at the metric level to be able to compare covariation in a valid manner (Fontaine, 2005). Detailed information about these tests can be found in the Supplementary Materials (see Section 1, Table S1 and S2). Metric invariance was obtained in all cases. For some measures, items had to be dropped to achieve this invariance. Thus, the scales and item selections presented here are based on the invariant factor solutions (see Table

S3 for an overview of items and response options for each included measure). Please note that the RMSEA value of the conspiracy mentality questionnaire indicated a suboptimal model fit. However, we chose to retain the model since the other fit indices demonstrated a very close fit. The findings still have to be interpreted in light of this limitation. Unless stated otherwise, all instruments were computed by mean-averaging items belonging to their respective measures. The R code and dataset can be found in the Supplementary Material via OSF (see Gundersen, 2024S).

Susceptibility to COVID-19 Misinformation

To measure participants' susceptibility to misinformation about COVID-19, we presented them with eight statements regarding the virus adopted from Roozenbeek et al. (2020) and asked them to rate the reliability of each statement (1 *very unreliable* – 6 *very reliable*). Five statements were false (i.e., "The coronavirus is part of a global effort to enforce mandatory vaccination", "Being able to hold your breath for 10 seconds or more without coughing or discomfort is a good self-check test for whether you have the coronavirus", "Gargling salt water or lemon juice reduces the risk of infection from coronavirus", "The new 5G network may be making us more susceptible to the virus", "Breathing hot air through your mouth and nose [e.g., from a hair dryer] kills the coronavirus as it can only live in cool places"), two were factual (e.g., "Using hand sanitizer with at least 60% alcohol is effective in reducing risk of infection from coronavirus"), and one ambiguous ("Taking ibuprofen when you are infected could make your symptoms worse").[1] The ratings of the five misinformation items were averaged to create a measure of misinformation susceptibility (U.S.: α = .89; U.K.: α = .87; Poland: α = .83; Germany: α = .80; see Supplementary Table S4 for an overview of all items). Due to the low reliability (r = .15 – .32) of the true information items, we report results for each item separately in the Supplementary Materials (see Table S5 and Figure S1).

Narcissism

Narcissism was measured using the narcissism subscale from the Dark Triad measure (Jonason & Webster, 2010). The participants were presented with three statements regarding narcissistic tendencies (e.g., "I tend to want others to admire me"; U.S.: α = .89; U.K.: α = .87; Poland: α = .86; Germany: α = .80) and they were asked to indicate to what extent they agreed with them (1 *strongly disagree* – 5 *strongly agree*).

Conspiracy Mentality Questionnaire

The Conspiracy Mentality Questionnaire (Bruder et al., 2013) is an instrument designed to estimate a person's general tendency to engage in conspiracist thinking. The participants were presented with four items (e.g., "I think that there are secret organizations that greatly influence political decisions"; U.S.: α = .85; U.K.: α = .85; Poland: α = .86; Germany: α = .88) and indicated how likely they believed each of them to be on an 11-point scale (0% *certainly not* – 100% *certain*). Each scale point increased stepwise with 10 percentage points.

Need for Closure Scale

To measure participants' need for closure (NFC), we presented them with the brief 15-item NFC scale (Roets & Van Hiel, 2011). After adjusting the scale following the multi-group confirmatory factor analysis, the measure ended up consisting of three facet scales. The facet scales included "order", referring to an individual's preference for order and structure in their lives, despising disorder and chaos (e.g., "I enjoy having a clear and structured mode of life"; U.S.: α = .82; U.K.: α = .84; Poland: α = .80; Germany: α = .78). The "predictability" facet measures the desire for knowledge that is secure and stable, consistently reliable across different situations and not contradicted by any exceptions (e.g., "I dislike unpredictable situations"; U.S.: α = .72; U.K.: α = .74; Poland: α = .76; Germany: α = .70). Lastly, the "ambiguity/closed-mindedness" facet measured the extent to which one experiences discomfort with ambiguity, finding situations that lack closure to be distressing, and furthermore, whether they exhibit closed-mindedness, showing resistance to having their beliefs

1) This item could now be considered false given no evidence of ibuprofen risks (see Poutoglidou et al., 2021). However, at the time of data collection (i.e., June 16th and August 9th, 2021) it was still seen as ambiguous.

questioned by differing views (e.g., "I dislike questions which could be answered in many different ways"; U.S.: α = .73; U.K.: α = .72; Poland: α = .66; Germany: α = .70). The participants were asked to indicate their agreement with the items on 5-point Likert scales (1 *strongly disagree* – 5 *strongly agree*).

External Perceived Locus of Control

External perceived locus of control was measured by using a 4-item scale adopted from Sumarwan and Hira (1993). Participants were presented with the statements (e.g., "Many times I feel that I have little influence over the things that happen to me"; U.S.: α = .81; U.K.: α = .77; Poland: α = .76; Germany: α = .77) and asked to indicate to what extent they agreed or disagreed with them (1 *strongly disagree* – 5 *strongly agree*).

Relative Deprivation

In order to measure the participants' relative deprivation, we presented them with four statements adopted from Callan et al. (2011). The measure is designed to assess the participants' negative feelings and beliefs when they compare themselves to others (e.g., "I feel dissatisfied with what I have compared to what other people like me have"; U.S.: α = .73; U.K.: α = .81; Poland: α = .72; Germany: α = .80) on a 7-point Likert scale (1 *strongly disagree* – 7 *strongly agree*).

Perceived Area Unsafety

In order to assess the perceived safety of the participants' neighborhoods, we employed a measure from the World Value Survey (Haerpfer et al., 2020). The participants were presented with seven events (e.g., robberies, drug sales, street violence, sexual harassment; U.S.: α = .93; U.K.: α = .89; Poland: α = .84; Germany: α = .89) and asked to indicate how frequently they occurred in their neighborhood (1 *not at all frequently* – 4 *very frequently*).

Institutional Trust

A measure of institutional trust was created by combining items from the World Value Survey (Haerpfer et al., 2020) and the European Social Survey (2018). Here, we presented the participants with various groups of people and organizations (i.e., the health care system, the government, the legal system, mainstream media; U.S.: α = .84; U.K.: α = .68; Poland: α = .66; Germany: α = .77) and asked them to rate how confident they were in them (1 *none at all* – 4 *a great deal*).

Social Trust

Social trust was measured by an instrument adopted from the European Social Survey (2018). The participants read three questions and indicated their response on an 11-point scale (e.g., "Generally speaking, would you say that most people can be trusted or, that you can't be too careful in dealing with people?"; 1 *you can't be too careful* – 11 *most people can be trusted*). The internal consistency of the scale was satisfactory (i.e., U.S.: α = .86; U.K.: α = .87; Poland: α = .82; Germany: α = .82).

Attention Checks

Two attention checks were implemented in the survey within the other measures. The attention checks required the participants to select a specific response option (e.g., "It is important that you pay attention to the survey. Please select disagree"). Participants who failed both attention checks were excluded from the final sample.

Analyses

The analyses were conducted in IBM SPSS version 28 and R version 4.0.3. A hierarchical multiple regression analysis with two steps was conducted. In the first step, we tested to what extent susceptibility to COVID-19 misinformation was predicted by our independent variables. In the second step, we added interaction terms between the independent variables and country to test whether the effects on susceptibility to misinformation differed across the national contexts. The interactions (Long, 2019) package was used to extract country-specific regression coefficients from these interactions. We control for age, education, gender, and political orientation in all analyses as they have shown

relationships with beliefs in false information in previous work (see e.g., Roozenbeek et al., 2020; van Prooijen & Douglas, 2018). When run without control variables, the pattern of results remained the same (see Table S6). For all tests, we also report family-wise Holm-corrected *p*-values to establish the robustness of the analyses to multiple tests.

Results

We first tested for multicollinearity. Table 2 presents correlation coefficients between all study variables in the full sample weighted by country (see Table S7 and S8 for separate correlation matrices for each country). Only one correlation (between ambiguity/closed-mindedness and predictability) was high, suggesting that multicollinearity could be an issue. However, in the regression analyses, the collinearity statistics indicated an absence of multicollinearity (i.e., tolerance = .47; variance inflation factor = 2.15; O'brien, 2007; Oke et al., 2019).

Table 2

Correlations for Study Variables Weighted by Country

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	—														
2. Education[a]	-.05*	—													
3. Gender[b]	.02	.05*	—												
4. Political orientation[c]	.11***	-.01	.12***	—											
5. Narcissism	-.30***	.08***	.11***	.07***	—										
6. Conspiracy mentality	-.03	-.11***	-.05*	.07***	.05*	—									
7. Order	.10***	.02	-.02	.10***	.06**	.09***	—								
8. Predictability	.05*	-.07**	-.09***	.02	.08***	.16***	.46***	—							
9. Ambiguity/closed-mindedness	.01	-.08***	-.10***	.03	.21***	.17***	.40***	.68***	—						
10. External perceived locus of control	-.15***	-.13***	-.11***	-.03	.19***	.22***	.09***	.29***	.40***	—					
11. Perceived area unsafety	-.20***	-.04	-.03	-.01	.21***	.09***	.02	.04	.11***	.21***	—				
12. Institutional trust	.02	.14***	.10***	-.01	.19***	-.33***	.12***	-.05*	-.01	-.11***	-.01	—			
13. Social trust	.13***	.17***	.07**	.03	.12***	-.22***	-.03	-.17***	-.15***	-.20***	-.05*	.46***	—		
14. Relative deprivation	-.28***	-.09***	.01	-.01	.36***	.14***	.02	.24***	.34***	.55***	.24***	-.06**	-.17***	—	
15. Misinformation susceptibility	-.16***	.00	.05*	.22***	.40***	.22***	.04	.08***	.17***	.24***	.32***	.04	.11***	.30***	—

[a]Higher values indicate higher education – from 1 (*less than high school*) to 6 (*doctorate*). [b]1 = male; 0 = female/other. [c]Higher values indicate more right-leaning political orientation – from 1 (*very left-wing/liberal*) to 11 (*very right-wing/conservative*).
*$p < .05$. **$p < .01$. ***$p < .001$.

The result of the first step of the multiple regression analysis is presented in Table 3. Across all countries, participants showed relatively low susceptibility to COVID-19 misinformation (M_{pooled} = 1.94, *SD* = 1.06), however, the results indicated that the U.S. sample (*M* = 2.27, *SD* = 1.28) showed significantly more susceptibility to misinformation than both the U.K. (*M* = 1.77, *SD* = 0.98, *d* = .43, $p < .001$) and the German sample (*M* = 1.53, *SD* = 0.72, *d* = .71, $p < .001$). Likewise, the Polish sample (*M* = 2.19, *SD* = 1.01) also showed significantly more misinformation susceptibility than the U.K. (*d* = .42, $p < .001$) and German sample (*d* = .75, $p < .001$). There was no significant difference between the U.S. and Poland ($p = .709$), nor between the U.K. and Germany ($p = .567$). Given that only metric invariance was obtained for the misinformation instrument some caution should be exercised when interpreting these mean differences. The distribution of scores on the misinformation susceptibility measure and their residuals are displayed in Figure S2-S4.

Table 3

Regression Results for Susceptibility to COVID-19 Misinformation

Variable	*B*	95% CI for *B*		*SE B*	β	*p*	*p*[b]
		LL	*UL*				
Constant	**-0.93**	**-1.28**	**-0.57**	**.18**	**2.15**	**< .001**	**< .001**
U.K.[a]	**-0.41**	**-0.51**	**-0.30**	**.05**	**-0.41**	**< .001**	**< .001**
Poland[a]	-0.02	-0.13	0.09	.06	-0.02	.709	> .999
Germany[a]	**-0.44**	**-0.56**	**-0.32**	**.06**	**-0.44**	**< .001**	**< .001**
Age	0.00	0.00	0.00	.00	-0.02	.288	.865
Education	**0.05**	**0.01**	**0.08**	**.02**	**0.06**	**.008**	**.031**
Gender	0.00	-0.07	0.08	.04	0.00	.945	> .999
Political orientation	**0.09**	**0.07**	**0.11**	**.01**	**0.20**	**< .001**	**< .001**
Narcissism	**0.15**	**0.12**	**0.18**	**.02**	**0.23**	**< .001**	**< .001**
Conspiracy mentality	**0.08**	**0.06**	**0.09**	**.01**	**0.16**	**< .001**	**< .001**
Order	-0.02	-0.07	0.03	.03	-0.02	.451	.723
Predictability	-0.04	-0.10	0.03	.03	-0.03	.241	.723
Ambiguity/Closed-mindedness	0.05	-0.03	0.13	.04	0.04	.181	.723
External perceived locus of control	**0.09**	**0.04**	**0.14**	**.03**	**0.08**	**.001**	**.004**
Perceived area unsafety	**0.35**	**0.29**	**0.41**	**.03**	**0.22**	**< .001**	**< .001**
Institutional trust	0.05	-0.02	0.12	.04	0.03	.181	.723
Social trust	**0.07**	**0.05**	**0.09**	**.01**	**0.16**	**< .001**	**< .001**
Relative deprivation	**0.07**	**0.03**	**0.11**	**.02**	**0.09**	**< .001**	**.002**

Note. N = 2,015. R^2 = .35 (for the individual-difference factors, R^2 = .28; for the social-perceptual factors, R^2 = .28). CI = confidence interval; *LL* = lower limit; *UL* = upper limit. Significant estimates are presented in bold.

[a]Reference group here was the U.S. sample. [b]Holm-corrected *p*-values (covariates and predictors corrected separately).

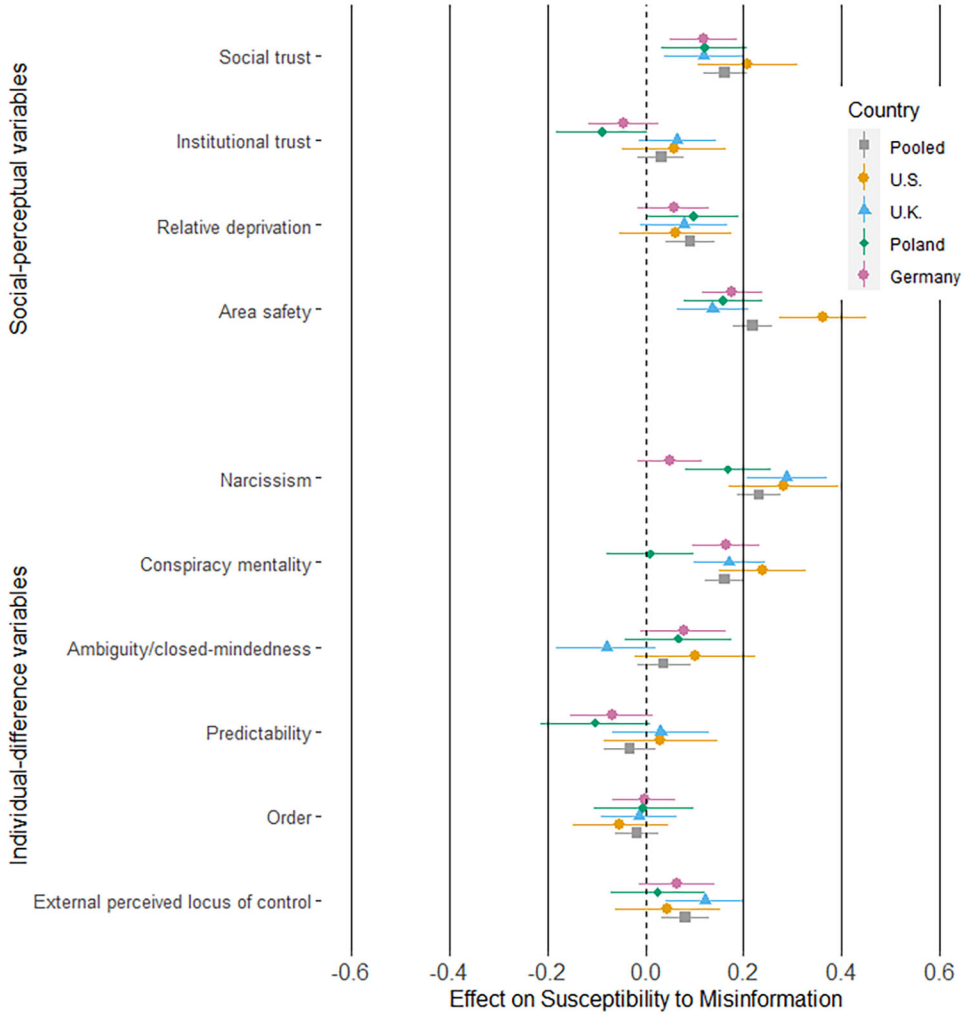
In terms of individual-difference factors, it was found that narcissism, conspiracy mentality, and external perceived locus of control significantly predicted susceptibility to COVID-19 misinformation (see Table 3 and Figure 1). No significant associations were found between the need for closure facets and misinformation susceptibility. When the individual-difference factors were entered separately in the regression model they explained 28% of the variance in misinformation susceptibility.

In terms of the social-perceptual factors, social trust, perceived area unsafety, and relative deprivation predicted misinformation susceptibility. By contrast, institutional trust was not significantly associated with susceptibility to misinformation. The results from the regression analysis are visualized in Figure 1. In terms of control variables, having higher education and being politically right-wing significantly predicted misinformation susceptibility. No significant associations with susceptibility to misinformation were found for gender and age. The social-perceptual factors explained 28% of the variance in misinformation susceptibility when the social-perceptual factors were excluded from the model.

Given the unexpected results concerning social trust, institutional trust, and education, we conducted additional exploratory analyses of their associations with misinformation susceptibility in separate bivariate models, controlling for country (see Table S9 in the Supplementary Materials). The pattern of results for education and social trust remained consistent with the results from the base model, giving us confidence in the findings. However, increased institutional trust was significantly associated with higher misinformation susceptibility in a bivariate analysis (p < .001). A follow-up single-item analysis of the institutional trust measure showed that while higher trust in government and mainstream media was significantly associated with greater susceptibility to misinformation (ps < .001), higher trust in the health care system was associated with lower susceptibility (p < .001).

Figure 1

Effect of Study Variables on Susceptibility to Misinformation by Country



Note. Effects are standardized. Increased susceptibility is indicated to the right of the dotted line. 95% confidence intervals are represented by error bars.

As we mention before, due to the low correlation between the true COVID-19 information items, we do not present these results in the main text but in the Supplementary Materials for interested readers (see Table S5 and Figure S1). Notably, an entirely different set of variables predicted belief in true information vs. misinformation. Thus, the factors identified in Table 3 and Figure 1 seem to be specific to misinformation susceptibility.

Two-Way Interactions With Country

In the second step of the regression, we added interaction terms between the independent variables and country to test whether the effects of the individual-difference and social-perceptual factors varied between countries. The results indicated that the effect of three of the individual-difference factors and two of the social-perceptual factors on misinformation susceptibility significantly differed between countries (see Figure 1 and Supplementary Table S10). All *p*-values displayed in the between-country comparisons are Holm-corrected.

First, narcissism was significantly positively associated with susceptibility to misinformation in the U.S., $\beta = 0.33$, 95% CI [0.24, 0.41], $p < .001$, the U.K., $\beta = 0.30$, 95% CI [0.22, 0.39], $p < .001$, and Poland, $\beta = 0.16$, 95% CI [0.08, 0.24], p

< .001, but not in Germany, β = 0.04, 95% CI [-0.05, 0.14], p = .381. Moreover, the effect was significantly stronger in the U.S. when compared to Poland, Δβ = -0.17, 95% CI [-0.29, -0.05], p = .020, and Germany, Δβ = -0.28, 95% CI [-0.41, -0.16], p < .001. The effect was also significantly stronger in the U.K. when compared to Germany, Δβ = -0.26, 95% CI [-0.38, -0.13], p < .001. No significant difference was found between the U.S. and the U.K., Δβ = -0.03, 95% CI [-0.14, 0.09], p = .651, between the U.K. and Poland, Δβ = -0.14, 95% CI [-0.26, -0.03], p = .052, nor between Poland and Germany, Δβ = -0.12, 95% CI [-0.24, 0.01], p = .156.

Second, the effect of conspiracy mentality on susceptibility to misinformation significantly differed between countries. Having a greater conspiracy mentality was significantly positively associated with susceptibility to misinformation in the U.S., β = 0.28, 95% CI [0.19, 0.37], p < .001, the U.K., β = 0.21, 95% CI [0.12, 0.31], p < .001, and Germany, β = 0.15, 95% CI [0.06, 0.23], p = .001. No significant effect was found in Poland, β = 0.02, 95% CI [-0.05, 0.09], p < .594. The effect was significantly greater in both the U.S., Δβ = 0.26, 95% CI [0.14, 0.37], p < .001, and the U.K., Δβ = 0.19, 95% CI [0.08, 0.31], p = .006, when compared to Poland. The effect did not significantly differ between the U.S. and the U.K., Δβ = -0.06, 95% CI [-0.19, 0.07], p = .602, between the U.S. and Germany, Δβ = -0.13, 95% CI [-0.25, -0.01], p = .126, between the U.K. and Germany, Δβ = -.07, 95% CI [-0.19, 0.06], p = .602, nor between Poland and Germany, Δβ = 0.13, 95% CI [0.02, 0.24], p = .101.

Third, the effect of ambiguity/closed-mindedness on susceptibility to misinformation significantly differed between the countries. However, none of the comparisons remained significant (all *ps* > .05) after Holm correction.

Fourth, the effect of perceived area unsafety on susceptibility to misinformation varied between countries. Perceptions of living in an unsafe area was significantly associated with an increased misinformation susceptibility in all countries: the U.S., β = 0.31, 95% CI [0.25, 0.38], p < .001, the U.K., β = 0.14, 95% CI [0.07, 0.22], p < .001, Poland, β = 0.17, 95% CI [0.09, 0.26], p < .001, and Germany, β = 0.20, 95% CI [0.10, 0.29], p < .001. However, the effect was significantly weaker in the U.K., Δβ = -0.17, 95% CI [-0.27, -0.07], p = .005, when compared to the U.S. No other differences were significant (all *ps* > .05).

Lastly, the effect of institutional trust on susceptibility to misinformation significantly differed between countries. However, none of the comparisons reached significance after Holm-adjusting the p-values (all *ps* > .05).

Discussion

Various social-perceptual and individual-difference variables have been proposed to explain susceptibility to misinformation, but their influence across national contexts have not often been assessed. In four quota-representative samples, we put a selection of variables that have been proposed as important predictors and/or supported by previous research to a comprehensive test. Whereas the social-perceptual factors of social trust and perceived area unsafety predicted susceptibility to COVID-19 misinformation across all countries, the effect of the individual-difference factors narcissism and conspiracy mentality depended on the national context. Additionally, perceptions of relative deprivation and external locus of control predicted misinformation susceptibility in the pooled sample.

With regard to the social-perceptual factors, social trust was *positively* associated with misinformation susceptibility across all countries. This result is inconsistent with prior research (e.g., Brotherton et al., 2013; Green & Douglas, 2018), which has identified social trust as a factor associated with reduced misinformation susceptibility. A possible explanation for this diverging, yet cross-nationally consistent finding may stem from how trust in others has been operationalized in this and other studies. Whereas previous research often relied on a measure of trust in specific others (e.g., neighbors, relatives; Goertzel, 1994), we utilized a widely-used measure from the European Social Survey (2018) that asked participants to indicate their general trust in *most others*. Hence, the conceptualization of social trust used in the current study may perhaps tap into a general tendency to be naïve or gullible, which in turn can make people more susceptible to misinformation. Thus, our findings suggest that a higher belief in misinformation may explain why general social trust in some settings predicted less adherence to pandemic-related measures in previous work (Woelfert & Kunst, 2020).

We found no significant association between misinformation susceptibility and distrust in institutions. This finding contrasts with previous studies that frequently documented such a relationship (e.g., Freeman et al., 2022; Mancosu

et al., 2021; Mari et al., 2022), including those using a similar trust measure with the same wording as in the present research (i.e., asking about *confidence* in institutions; Pummerer et al., 2022). However, when running the regression model with only the institutional trust measure and controlling for country, we found a significant positive association between institutional trust and misinformation susceptibility. Further probing this relationship, we tested the effects of individual institutional trust items (i.e., trust in the legal system, government, mainstream media, and health care system) on misinformation susceptibility. Our findings revealed contrasting effects: while trust in the government and mainstream media were associated with increased susceptibility, trust in the healthcare system was linked to decreased susceptibility. Given that the results concerning institutional trust can depend on the modelling approach—whether the measure was incorporated as a full scale or as individual items—we recommend caution in interpreting these findings but offer a tentative explanation. Arguably, the generalized trust component in public institutions (i.e., mainstream media, government) may elevate perceptions of external information's reliability. Analyses controlling for social trust —potentially a more direct measure of generalized trust—might isolate these general tendencies, thereby elucidating the previously non-significant association with institutional trust. We suggest that future studies on institutional and social trust should examine the effects using both aggregated and disaggregated measures to disentangle their relative influence (see also Jennings et al., 2023).

The other social-perceptual factor we found to be a cross-nationally robust predictor of misinformation susceptibility was the perceived safety of the participants' neighborhood. Here, the more frequently participants reported unsafe events happening in their neighborhood, the greater their susceptibility to misinformation. This finding converges with prior research showing that belief in conspiracy theories have been related to social inequality (Casara et al., 2022), deprived life-circumstances (van Prooijen, 2020), powerlessness (Abalakina-Paap et al., 1999), and lacking control over one's life (van Prooijen & Acker, 2015). Living in unsafe neighborhoods is likely indicative of a low socio-economic background and/or of living in a marginalized community (Department of Levelling up, Housing and Communities, 2020; National Equity Atlas, 2019). Marginalized minority members tend to believe more in conspiracy theories due to a belief that the sociopolitical system is rigged, which may explain their dire living conditions (van Prooijen et al., 2018). Moreover, experiments have shown that high levels of inequality predict a greater endorsement of conspiracy beliefs (Casara et al., 2022). This observation may also explain why the relationship between perceived area unsafety and misinformation susceptibility was strongest in the U.S. sample, which is the most socially inequal country in this study (OECD, 2022b). However, as we do not have objective information about the neighborhoods in which the participants resided, we cannot exclude the possibility that participants who believed in COVID-19 misinformation also were more likely to believe in misinformation regarding their neighborhood (e.g., spread by selective media accounts of crime incidence). As such, future research should assess the relative influence of objective and subjective neighborhood perceptions on misinformation susceptibility.

Echoing prior research (e.g., Cichocka et al., 2022; Cichocka et al., 2016; Morosoli et al., 2022), we show that narcissism is a robust individual-difference predictor of misinformation susceptibility. However, we find that the effect of narcissism depends on the national context. Specifically, we find that narcissistic tendencies significantly predict increased susceptibility to misinformation in the U.S., the U.K., and Poland, but not in Germany, although the effect trended in the same direction in the latter country. Unlike most Western countries, Germany experienced large-scale collective movements (e.g., the "Querdenker") that contested the official accounts of the pandemic by authorities and actively spread conspiracy beliefs (Morris & Beck, 2020; von Hammerstein, 2020). Arguably, belief in misinformation may in Germany therefore be more of a result of group-processes than individual traits such as narcissism. Nevertheless, it must be noted that Germany was not an exceptional case when it comes to the influence of any of the other factors.

Another variable that was moderated by the national context was the effect of having a conspiracy mentality. In the U.S., the U.K., and Germany, having a conspiracy mentality positively predicted misinformation susceptibility. However, we found no evidence for such a relationship in the Polish sample. Among the sampled countries, Poland has the highest level of corruption (Transparency International, 2021) and its government is trusted by less than 30% of its population (OECD, 2022a). Hence, believing that politicians and the government are conspiring and not sharing the true motives for their actions may be more accurate and less indicative of a conspiracy mentality in Poland than the other countries (see, Alper & Imhoff, 2023).

Given that some of the observed effects were cross-nationally consistent, they can guide stakeholders and policy-makers motivated to counter COVID-19 misinformation and conspiracy beliefs. For instance, the fact that area unsafety perceptions robustly predicted misinformation susceptibility suggests that strengthening citizens subjective experience of safety may be beneficial. Similarly, finding ways of restoring people's internal locus of control may be a potential avenue to reduce misinformation susceptibility. Moreover, efforts to counter misinformation may especially be needed among individuals characterized by high levels of social trust.

Some may interpret our study as giving an indication of the relative impact of the individual-difference versus social-perceptual factors on susceptibility to misinformation. When the two groups of variables were entered in the model separately, their impact was found to be equal (i.e., both models explained 28% of the variance). However, this finding needs to be interpreted with caution. As the explained variance is a direct function of the number and types of variables included, they can only speak to the impact of the particular selection of variables in the current research. As in any psychological study, it was unfeasible to include any possible variable in our research. Instead, we selected those for which existing evidence suggested a role in misinformation susceptibility. Moreover, it is important to note that the distinction between individual differences and social perceptions is not always clear cut (Freeman & Ambady, 2011). Although individual-difference factors pertain to a unique set of characteristics that distinguish one person from another, there is an interplay with social-perceptual factors which in turn shape a person's behavior and cognitive processes. For example, the individual-difference factor of conspiracy theorizing has been associated with the perceived trustworthiness of others (i.e., a social-perceptual factor), typically targeting powerful groups and authorities such as governments (Imhoff & Lamberty, 2018). Additionally, paranoia, a construct related to conspiracy theorizing (van der Linden, Panagopoulos, et al., 2021) that also can be seen as an individual difference is characterized by the social-perceptional, often indiscriminate tendency to mistrust others (Freeman, 2007). Moreover, cognitive rigidity, an individual-difference variable, have shown a bi-directional relationship with perceived contextual threats (e.g., Obaidi et al., 2023; Thórisdóttir & Jost, 2011), further influencing these dynamics. Hence, there are likely dynamic transactional relationships within individual difference variables as well as between these variables and social perceptions that contribute to susceptibility to misinformation.

Moreover, some of the factors in the current study could potentially be categorized differently. For instance, facets of the need for closure scale and perceived locus of control were framed on the individual level, given that need for closure typically is considered an individual difference, but both are influenced by social and contextual factors. Generally, the results of our cross-national study suggest that both types of factors exert an independent influence on misinformation susceptibility. Therefore, future research aiming to explain such susceptibility in different nations and/or social contexts should include both individual-difference and social-perceptual factors. These studies could build on and refine our categorization of variables.

We cannot establish the causal mechanisms underlying misinformation susceptibility (for a review on causes of beliefs in misinformation and conspiracy theories, see Uscinski, Enders, Klofstad, & Stoler, 2022). Since constructs such as conspiracy mentality are relatively stable over time (Imhoff et al., 2022; Uscinski, Enders, Klofstad, et al., 2022; Wang & van Prooijen, 2023), we suspect that it can motivate the belief in and potentially dissemination of misinformation. However, Samayoa et al. (2022) recently demonstrated that exposure to COVID-19 misinformation predicted increased conspiracy thinking over time, albeit with different instruments. Hence, we encourage future research to investigate potential feedback loops between conspiracy mentality and susceptibility to misinformation to disentangle the direction of causality. Generally, more experimental and longitudinal research is needed to address the causality of the observed relationships.

Although our results demonstrated relatively consistent associations between the measures of interest across the sampled countries, future studies need to test whether our results can be replicated in non-WEIRD contexts and with general and specific measures of misinformation susceptibility (e.g., in terms of climate change knowledge). Moreover, our measure of misinformation susceptibility utilized a combination of items related to conspiracy beliefs and information that is demonstrably false. Given that studies vary from one to another in their definition of misinformation, the pattern of results may have differed had another (e.g., stricter versus more lenient) conceptualization of misinformation been applied. Finally, while comprehensive, the selection of both individual-differences and social-perceptual factors in the present study was not exhaustive. Indeed, other factors not included here, such as numeracy skills, have shown

consistent cross-national associations to misinformation susceptibility (Roozenbeek et al., 2020). It should also be noted that we had to make adjustments to the different scales to achieve measurement invariance. As most of the used scales were developed in single countries, this can be expected in cross-cultural research. However, it limits the comparability to studies that used other scale versions.

Conclusion

The present study identified consistent associations of the social-perceptual variables of social trust and perceptions of area unsafety with misinformation susceptibility across four countries. Perceptions of relative deprivation and external locus of control were associated with higher susceptibility to misinformation in pooled analyses. The relationships among misinformation susceptibility and the individual-difference factors narcissism and conspiracy mentality were more context-dependent. Nevertheless, significant associations were found in three of four countries in these analyses. In sum, our findings highlight a set of predictors that may relatively robustly explain people's susceptibility to misinformation across a selection of Western nations.

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Competing Interests: The authors declare no competing interests.

Ethics Statement: The current study was approved by the Institutional Review Board of the department of the first and last authors (nr. 12660124).

Data Availability: The dataset and R code for this study are publicly available (see Gundersen, 2024S).

Supplementary Materials

The Supplementary Materials contain the following items (see Gundersen, 2024S):

- Research data
- R code
- Additional information

Index of Supplementary Materials

Gundersen, A. B. (2024S). *Supplementary materials for Predicting misinformation beliefs across four countries: The role of narcissism, conspiracy mentality, social trust, and perceptions of unsafe neighborhoods* [Research data, R code, and additional information]. OSF. https://osf.io/ug7jy

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