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Information Environments Surrounding General Social Trust in COVID-19 Context: A Model of Belief in Misinformation and In-Group Trust

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Although general social trust (i.e., trust in general others) plays an important role in the public's response to health measures, little is known about its antecedents in the information environment. This study investigated whether public beliefs in COVID-19 misinformation are influenced by their risk perception and, in turn, predict their level of general social trust. In addition, the moderation effect of public's in-group trust (e.g., trust toward close and similar others) on these relationships was tested. Survey data collected from South Korea indicate that people who perceive a higher risk of COVID-19 tend to believe misinformation more strongly only when they have a higher level of in-group trust. Further, people who believe misinformation about COVID-19 tend to distrust the general society when they perceive high in-group trust. This study contributes to the theorizing of the effects of the public's information environment and suggests practical implications for facilitating information exchange across diverse sources.

Keywords: misinformation, information environment, risk perception, in-group trust, general social trust, COVID-19, public health

General social trust—conceptualized as the trust people have in other members of society in general (Putnam, 2000)—is crucial in risk situations. It impacts effective public health responses by influencing people's willingness to engage in collective action and comply with policies for public welfare (Goldstein & Wiedemann, 2021; Putnam, 2001). However, conflicting observations exist about general social trust during times of external threats: Although some people express a decline in trust in general others (Kang & Skidmore, 2018), others feel an increased sense of community and trust to protect and support one another (Cassar, Healy, & von Kessler, 2017; Sibley et al., 2020). Given these differing observations, efforts have been made to identify factors that influence individuals' levels of general social trust. In the context of the COVID-19 pandemic (Thoresen, Blix, Wentzel-Larsen, & Birkeland, 2021), perceived health risks emerged as a significant predictor. Yet, findings about the relationship between risk perception and trust have been inconsistent (e.g., Diotaiuti et al., 2021; Han & Yan, 2019),

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with the underlying mechanism behind this relationship remaining unexplored. This study aims to address this gap, (a) offering insights into how individuals form trust-related responses to risks and (b) informing interventions or strategies aimed at fostering general social trust. Given the influential role of information environments in shaping trust, we attend to misinformation.

The rapid dissemination of excessive information about a problem, referred to as an infodemic, intensifies in risk situations such as disease outbreaks (Zarocostas, 2020). Infodemic was prominent during the COVID-19 pandemic (Eysenbach, 2020), often involving the spread of misinformation that caused public confusion, skepticism, and improper responses. The path from risk perception to misinformation to trust is partly evident. As highlighted by the World Health Organization (2020), misinformation can spread rapidly without people realizing it—especially in times of heightened uncertainty—leading to people's distrust in health authorities and consequently harming public health. As risk perception is subjective and varies among individuals, examining how it impacts the extent to which people recognize or share misinformation can inform the development of effective communication strategies. To address this goal, this study examines the role of belief in misinformation as a mediator. In other words, we test whether risk perception affects general social distrust through belief in misinformation.

In today's information environment where online social media are a prominent source, individuals can easily be exposed to unverified information, form their own perceptions about issues, and forward information without intermediaries (Apuke & Omar, 2021; Brashers, Goldsmith, & Hsieh, 2002; Brodie et al., 2001; Khoo, 2014). Moreover, misinformation amplifies individuals' exposure to negative content and contributes to online polarization (Stella, Ferrara, & De Domenico, 2018). Online polarization and the formation of echo chambers (Cinelli, De Francisci Morales, Galeazzi, Quattrociocchi, & Starnini, 2021; Hong & Kim, 2016) direct our attention to the role of in-group trust. Individuals' consumption of information is constrained by the information environments surrounding them (Scheufele & Krause, 2019). In groups consisting of like-minded people, individuals are likely to exchange information obtained from a limited set of sources with each other. Such adherence to one's own group could exacerbate the consequences of misinformation. Therefore, how strong in-group trust—often associated with group polarization and mistrust toward other groups—plays a role in individuals' beliefs in misinformation is an important question. This question can be effectively examined by examining the potential role of in-group trust as a contingency condition in the relationships between people's perception of risk, belief in misinformation, and trust toward general others.

To examine these relationships, we use data from an online survey that measures participants' perceptions of risk as well as misinformation about COVID-19, along with their perceptions of general social trust and in-group trust. In examining these questions, we contribute to the literature in two primary ways: first, by identifying the predictors of people's general social trust from the information environment, and second, by extending existing theorizing of both the predictors and consequences of belief in misinformation. This study also provides practical suggestions at the intersection of risk, misinformation, and group polarization.

Literature Review

Perception of Risk and General Social Trust

Risk perception is a subjective cognitive process in which people evaluate the severity and possible harms of hazardous situations. Risks are influenced by the larger societal context and can be characterized by complexity, uncertainty, and ambiguity (Renn, Klinke, & Van Asselt, 2011). Public perception of risk is value-laden and tends to rely on intuitive judgments (Kasperson et al., 1988). The extent to which people perceive risk as unfamiliar, catastrophic, and uncontrollable is a critical determinant of public response (e.g., Cori, Bianchi, Cadum, & Anthonj, 2020). Risk perception has consequences not only for public decisions to take precautionary actions but also for psychological reactions such as anxiety, fear, and trust toward institutions and the society (Cori et al., 2020).

General social trust refers to trust based on social relations in general, such as the belief that people can rely on each other and will generally care for others' interests (Putnam, 2000; Siegrist, Gutscher, & Earle, 2005). It is a key civic element of social capital and serves as the foundation of democracy and social inclusion (Delhey, Newton, & Welzel, 2011; Woolcock & Narayan, 2000). Trust is an important factor related to risk perception (Siegrist, 2021), and studies have largely examined trust as an explanatory variable predicting risk perception or related decision making. For instance, when the public possesses limited knowledge about hazards, their trust in authorities or stakeholders who oversee hazard management impacts their assessment of risk (Siegrist & Cvetkovich, 2000). A high level of social trust explained a higher likelihood of complying with public policy in the COVID-19 pandemic (Goldstein & Wiedemann, 2021). A recent cross-national study (Bollyky et al., 2022) found that general trust in other people, measured as whether people think that they can trust most people, was positively associated with COVID-19 vaccination rates and negatively associated with infection rates.

The reverse direction where risk perception is considered an antecedent of general social trust is less examined, and existing studies produced mixed findings. Diotaiuti and colleagues (2021), in their research in Italy during the COVID-19 pandemic, found that people who perceive a higher level of risk have higher trust in others' preventive behaviors as well as health and government authorities. On the other hand, Han and Yan (2019) found that a higher level of food-risk perception was associated with the public's lower level of trust in government. Similarly, perceived health threats from COVID-19 and levels of worry were associated with a low level of general social trust (Thoresen et al., 2021). These mixed empirical findings may be attributed to contextual differences. This study disentangles the underlying mechanism linking risk perception and general social trust, attempting to understand the reasons for varying levels of general social trust among individuals. The following sections discuss two key constructs that we argue to be important in this path: Belief in misinformation and in-group trust.

Misinformation During the COVID-19 Pandemic

Misinformation complicates effective communication between institutions and the public, and discerning misinformation from credible information is challenging in risk situations (Wang, Zhang, Fan, & Zhao, 2022). In risk situations when the public has a high level of demand for information to reduce

uncertainty, inaccurate health information is circulated at a higher speed (Jang, Mckeever, Mckeever, & Kim, 2019; Kim & Kim, 2020). Further, when people confront an unknown and unfamiliar risk such as COVID-19, the risk is perceived with more discomfort, fear, and anxiety (Cori et al., 2020). The dynamics of misinformation in public health crisis situations help explain the relationship between individuals' risk perceptions and their general social trust. First, a higher level of fear can lead to the spread of rumors, conspiracy theories, and misinformation (Lee, 2022; Wood, 2018) particularly if people have difficulty evaluating the accuracy or reliability of information (Pennycook, Cannon, & Rand, 2018). Kim and Kim (2017) showed that risk perception of the unexpected Fukushima accident was the most powerful factor in explaining increasing belief in rumors. In COVID-19 contexts, Kim and Kim (2020) found that a higher level of perceived vulnerability to COVID-19 had a positive correlation with belief in fake news. Second, the extent to which people believe misinformation can be associated with their level of trust in the society. Ognyanova, Lazer, Robertson, and Wilson (2020) found that consuming fake news was associated with lower trust in political institutions for liberals, but with higher trust for moderates and conservatives. In a study of misinformation about COVID-19 among Pakistani citizens, Ejaz, Ittefaq, Seo, and Naz (2021) found that a higher level of trust in social media content was associated with stronger belief in conspiracy theories, while trust in traditional media had no significant impact. Authors attribute this relationship to the proliferation of misinformation and conspiratorial content on social media (Cinelli et al., 2020), indicating that belief in conspiracy theories may impact public's trust in and support for government health policies. Altogether, these findings suggest the potential role of belief in misinformation as a mediator, where perception of risk influences general social distrust through belief in misinformation.

H1: Belief in misinformation will mediate the relationship between risk perception and general social distrust.

In-Group Trust and Sharing of Misinformation

There are two primary forms of trust in others: In-group trust and out-group trust (Glanville & Paxton, 2007). In-group trust refers to particular, thick, or specific trust formed in a narrow circle of close and similar people; out-group trust refers to general, thin, or diffuse trust that involves a wider circle of unfamiliar and heterogenous people (Delhey et al., 2011). People who share in-group trust are more likely to believe that they should conform to the group's collective norms on domestic or national issues (Crepaz, Jazayeri, & Polk, 2017). In this sense, in-group trust can be associated with groupthink, which is a way of thinking people engage in when involved in a cohesive group (Janis, 1971). When groups are cohesive, a strong desire for consensus diminishes the power of individual members to assess alternatives independently and critically (Ntayi, Byabashaija, Eyaa, Ngoma, & Muliira, 2010).

In-Group Trust as a Moderating Factor

Existing research examines the effects of in-group affiliation on communication behaviors (e.g., Jeong & Lee, 2018; Scheufele & Krause, 2019), suggesting the potential role of in-group trust as a contingency condition in the relationships between people's perception of risk, belief in misinformation, and trust toward general others. This study assesses two different moderating effects of in-group trust: first, on

the relationship between risk perception and belief in misinformation, and second, on the relationship between belief in misinformation and generalized social trust.

First, we hypothesize that variations in in-group trust may affect the extent to which risk perception influences belief in misinformation. Grosser, Lopez-Kidwell, and Labianca (2010) suggested that people in a strong friendship group are more likely to be engaged in the transmission of negative gossip than those linked by instrumental ties. Furthermore, when individuals have a strong sense of trust within a coherent group, they can easily share misinformation among group members (DiFonzo & Bordia, 2007), and the possibility of shared information being trusted without verification subsequently increases (Pennycook et al., 2018). In addition, perceptions of risk are intertwined with the mediating role of in-group trust. As uncertainty-identity theory (Hogg, 2007) suggests, individuals have a strong desire to reduce anxiety by identifying themselves with groups in uncertain situations. Therefore, in situations of high uncertainty, individuals' information processing may rely less on objective knowledge but more on the perspectives of those who share similar values (Siegrist & Cvetkovich, 2000). It can be predicted that these tendencies will be particularly pronounced when individuals have formed strong trust among members within their group.

Second, this study predicts that a higher level of in-group trust is associated with a stronger effect of individuals' belief in misinformation on their general social trust. According to social identity theory, the conceptualization of out-group is a critical component of in-group perception (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Individuals with strong in-group trust, when believing in misinformation, may develop a stronger sense of negativity toward information and individuals outside their group while prioritizing cohesion within their own group. Echo chambers promote polarized opinions that are circulated within the chambers, especially when members have homogeneous opinions on controversial topics such as vaccination (Baines, Ittefaq, & Abwao, 2021). In turn, social division and group polarization can result in a lower level of trust and cooperation among individuals (Salvi et al., 2021). If information is circulated particularly within groups with extreme ideology, information is likely to become politicized and distorted (Hopp, Ferrucci, & Vargo, 2020), reinforcing a heightened distrust toward individuals and institutions outside of one's own group.

Integrating these two predictions, the moderating effect of in-group trust on the full mediation model is hypothesized as well. Since the paths between risk perception and belief in misinformation as well as between belief in misinformation and general social trust are predicted to be stronger for individuals with higher levels of in-group trust, the indirect effect between risk perception and general social trust is hypothesized to be stronger when in-group trust is high. As higher risk perception is hypothesized to be positively associated with a lower level of general social trust, we employ the term general social *dis*trust in the conceptual model for the sake of simplicity (Figure 1).

H2: In-group trust will moderate the relationship between risk perception and belief in misinformation, such that the effect of risk perception on belief in misinformation will be stronger for those with higher in-group trust and weaker for those with lower in-group trust.

H3: *In-group trust will moderate the relationship between belief in misinformation and general social distrust, such that the effect of belief in misinformation on general social distrust will be stronger for those with higher in-group trust and weaker for those with lower in-group trust.*

H4: *The indirect effect of risk perception on general social distrust via belief in misinformation will be moderated by in-group trust, such that this indirect effect will be stronger for those with higher in-group trust and weaker for those with lower in-group trust.*

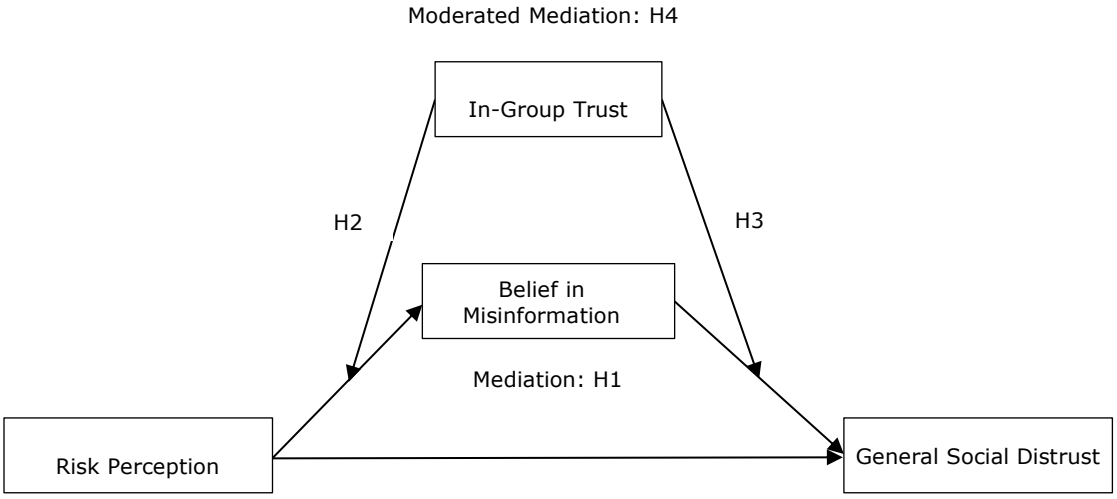

Figure 1. Conceptual model.

Method

Respondents and Procedures

The data for the current study were collected via an online survey in February 2021.[1] The sample of 600 respondents was selected via quota sampling and consisted of 120 residents from each of the five major metropolitan areas in South Korea. A description of the respondents is presented in Table 1. Since an initial outbreak of COVID-19 in early 2020, a massive volume of both accurate information and misinformation quickly circulated online in the country, causing confusion and fear among the public (Kim & Kim, 2020; Lee, 2020). The response for COVID-19 in South Korea was effective in terms of prompt epidemiological tracing and quarantine measures, owing to an overall high level of trust in institutions, coordination among the public, and strong digital infrastructure (Lee & Wong, 2021). Yet, an exceptionally

1 The survey was administered by a survey research agency that recruits and maintains a panel of potential survey respondents. The panel includes volunteers who consent to participate in research studies by telephone or face-to-face interviews. In exchange for participation, respondents received points worth approximately $3 that they could redeem for rewards.

high level of smartphone penetration and Internet usage accelerated the spread of misinformation (Lee & Wong, 2021; Tworek & Lee, 2021).

Table 1. Sociodemographic Characteristics of Respondents.

Variables	Category	*n*
Gender	Male	306 (51%)
	Female	294 (49%)
Age	20–29	120 (20%)
	30–39	120 (20%)
	40–49	120 (20%)
	50–59	120 (20%)
	60–69	120 (20%)
Education	Less than high school or high school graduate	123 (20.5%)
	College graduate or bachelor's degree	417 (69.5%)
	Graduate school	60 (10%)
Political orientation	Conservative	28 (4.7%)
	Moderate conservative	110 (18.3%)
	Moderate	298 (49.7%)
	Moderate liberal	131 (21.8%)
	Liberal	33 (5.5%)

Respondents answered questions asking their perceptions toward two types of misinformation. The two pieces of news containing misinformation in this study were shown in the format of full online news articles and contained information that distorts the purpose and intention of governmental preventive control of COVID-19. One (News A) suggests that wearing a mask can cause serious diseases, including cancer. The second one (News B) suggests a conspiracy theory about the COVID-19 vaccine, claiming that vaccines contain a microchip to track individuals.

Measures

All measures besides demographic characteristics were on a 7-point Likert scale ranging from 1 (Strongly disagree) to 7 (Strongly agree). *Risk perception* refers to the extent to which one thinks they and others are at risk for COVID-19. Eleven items (α = 0.92) from Morton and Duck's (2001) perceived risk scale were used, which was originally developed to measure perceptions of skin cancer risk. The items included statements such as "COVID-19 is an important problem to me"; "I feel risk from COVID-19"; "I am worried about myself being affected by COVID-19 sometime in the future"; and "Others are likely to be affected by COVID-19 sometime in the future."

Belief in misinformation refers to the extent to which individuals reported that they believe information in each of the new articles included in the questionnaire. We used Roberts's (2010) five items that are a subset of Meyer's (1988) 12 items (α = 0.82), including "This news is fair" and "This news is unbiased."

In-group trust refers to strong trust in cohesive groups such as family, neighbors, and others known personally (Delhey et al., 2011). The survey asked respondents to think about either offline or online collectives that they frequently participate in or interact with. A total of five items ($\alpha = .87$) adopted from Kenworthy and Jones (2009) were used to measure in-group trust, including "To me, all of the group members are the same when it comes to being trustworthy" and "If I find out that a person belongs to this group, I trust them automatically."

General social distrust refers to the degree to which respondents have negative perception about members of the society in general. We adopted Siegrist et al. (2005) six items ($\alpha = 0.71$), including "Most people are too busy looking out for themselves to be helpful" and "If given a chance, most people would try to take advantage of you."

Analysis

Since the hypotheses predicted an indirect effect (H1) as well as a mediation relation being contingent on the level of a moderator (H2, H3, and H4), we ran a mediation (Model 4) and a moderated mediation (Model 58) of the PROCESS macro developed by Hayes (2013). Parameter estimates from a mediation analysis were combined with parameter estimates from a moderation analysis to quantify the conditionality of the impact of risk perception on general social distrust. The macro uses ordinary least squares (OLS) analysis for calculating the mediation and moderated mediation effects and bootstrapping to calculate the confidence interval (CI). We used bias-corrected bootstrap CIs based on 5,000 bootstrap samples with a 95% level of confidence. When confidence intervals do not include zero, the effect is interpreted as significant.

Results

An independent sample *t*-test was performed between the group with high in-group trust (above the mean) and the group with low in-group trust (below the mean). Results revealed differences between the two groups in terms of risk perception ($t = -2.73$, $p < .01$), belief in News A ($t = -2.90$, $p < .01$), belief in News B ($t = -2.91$, $p < .01$), and general social distrust ($t = -2.65$, $p < .01$). The group with high in-group trust had a higher mean value for all variables compared with the low group (Table 2). Pearson's correlations (Table 3) show that general social distrust was positively correlated with all variables: Risk perception ($r = 0.26$, $p < .01$), in-group trust ($r = 0.28$, $p < .01$), belief in News A ($r = 0.27$, $p < .01$), and belief in News B ($r = 0.24$, $p < .01$).

Table 2. T-Test Analyses for Mean Differences Between Groups With High In-Group Trust and Low In-Group Trust.

	High In-Group Trust (n = 276)		Low In-Group Trust (n = 324)		
	M	*SD*	*M*	*SD*	*t*
Risk Perception	5.33	0.89	5.13	0.93	−2.73**
Belief in News A	3.21	1.31	2.92	1.21	−2.90**
Belief in News B	3.34	1.46	3.01	1.30	−2.91**
General Social Distrust	4.74	0.93	4.53	1.01	−2.65**

Table 3. Descriptive Statistics and Correlations Among the Variables (n = 226).

	Risk Perception	In-Group Trust	Belief in News A	Belief in News B	General Social Distrust
Risk Perception	–				
In-Group Trust	0.17**	–			
Belief in News A	0.04	0.15**	–		
Belief in News B	0.05	0.19**	0.66**	–	
General Social Distrust	0.26**	0.28**	0.27**	0.24**	–
M	5.24	4.50	3.08	3.19	4.65
SD	0.91	1.03	1.23	1.40	0.98

**$p < .01$.

Tests of Simple Mediation

To test the proposed model (Figure 1), we first examined the potential mediating role of belief in misinformation by testing a regression model and then calculating the indirect effect. Gender (i.e., male as a reference group), age (i.e., higher value for older age), education (i.e., higher value for higher education level), and political orientation (i.e., higher value for more liberal) were included in the model. First, the results (Table 4) show a positive significant effect of risk perception on belief in News A ($\beta = 0.10$, $p < .05$) and general social distrust ($\beta = 0.23$, $p < .001$). In addition, belief in misinformation was positively associated with general social distrust ($\beta = 0.24$, $p < .001$). As for News B, results show a significant positive effect of risk perception on belief in misinformation ($\beta = 0.08$, $p < .01$) and general social distrust ($\beta = 0.16$, $p < .001$), and a positive significant effect of belief in misinformation on general social distrust ($\beta = 0.11$, $p < .001$). The bootstrap CIs for the indirect effect (indirect effect $_{\text{News A}} = 0.02$, 95% CI ranges = 0.03 to 0.04; indirect effect $_{\text{News B}} = 0.02$, 95% CI ranges = 0.01 to 0.04) show a significant mediated effect, providing support for H1.

Table 4. Mediation Analysis Predicting Belief in Misinformation and General Social Distrust.

		DV: Belief in News A $R^2 = 0.06$ $F = 7.14^{**}$				DV: General Social Distrust $R^2 = 0.12$ $F = 13.84^{***}$			
		B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
News A	Gender	0.16	0.14	0.05	1.21	−0.04	0.06	−0.03	−0.65
	Age	−0.01	0.01	−0.02	−0.52	0.01	0.01	0.01	0.04
	Education	−0.36	0.13	0.12	-2.84^{*}	0.05	0.05	0.03	0.83
	Political orientation	−0.32	0.08	−0.17	-4.26^{***}	0.04	0.03	0.05	1.27
	Risk Perception	0.18	0.07	0.10	2.47^{*}	0.19	0.03	0.23	6.05^{***}
	Belief in News A					0.11	0.02	0.24	6.15^{***}
		DV: Belief in News B $R^2 = 0.05$ $F = 5.88^{***}$				DV: General Social Distrust $R^2 = 0.11$ $F = 12.58^{***}$			
		B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
News B	Gender	0.20	0.14	0.06	1.43	−0.04	0.06	−0.03	−0.67
	Age	0.01	0.01	−0.01	−0.09	0.01	0.01	−0.01	−0.07
	Education	−0.40	0.13	−0.12	-3.04^{**}	0.04	0.05	0.03	0.81
	Political orientation	−0.24	0.08	−0.12	-3.04^{**}	0.03	0.03	0.04	0.90
	Risk Perception	0.21	0.08	0.11	2.74^{**}	0.19	0.03	0.16	6.01^{***}
	Belief in News B					0.10	0.02	0.11	5.54^{***}

$^{**}p < .01$ $^{***}p < .001$.

Tests of Moderated Mediation

To examine whether the observed mediated effects differ based on the level of in-group trust, a moderated mediation analysis was conducted. The results (Table 5) show that there is a significant interaction between risk perception and the proposed moderator, in-group trust, on belief in News A and B (β = 0.11, p < .01; β = 0.12, p < .01). These results indicate a moderating role of in-group trust in the relationship between risk perception and belief in misinformation, providing support for H2. The results also show significant moderating effects of in-group trust in the relationship between belief in misinformation and general social distrust ($\beta_{\text{News A}}$ = 0.09, p < .01; $\beta_{\text{News B}}$ = 0.13, p < .001), providing support for H3.

Table 5. Moderated Mediation Analysis Predicting Belief in Misinformation and General Social Distrust.

		DV: Belief in News A R^2 = 0.07 F = 7.01***				DV: General Social Distrust R^2 = 0.19 F = 17.48***			
		B	*SE*	*β*	*t*	*B*	*SE*	*B*	*t*
News A	Gender	1.88	0.13	0.11	1.40	−0.01	0.06	−0.01	−0.09
	Age	−0.01	0.01	−0.01	−0.96	−0.01	0.01	−0.01	−1.05
	Education	−0.40	0.13	−0.24	−3.22**	0.04	0.05	0.04	0.72
	Political orientation	−0.33	0.08	−0.20	−4.40***	0.04	0.03	0.04	1.19
	Risk Perception	0.17	0.08	0.09	2.28*	0.15	0.03	0.14	4.92***
	In-Group Trust	0.13	0.07	0.08	1.88	0.17	0.03	0.17	6.04***
	Risk Perception x In-Group Trust	0.19	0.07	0.11	2.79**				
	Belief in News A					0.09	0.02	0.15	5.12***
	Belief in News A x In-Group Trust					0.05	0.02	0.09	3.44**
		DV: Belief in News B R^2 = .08 F = 7.01***				DV: General Social Distrust R^2 = .20 F = 17.87***			
		B	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
News B	Gender	0.24	0.14	0.14	1.74	−0.01	0.06	−0.01	−0.23
	Age	−0.01	0.01	−0.01	−0.80	−0.01	0.01	−0.01	−1.02
	Education	−0.45	0.13	−0.26	−3.50**	0.04	0.05	0.04	0.71
	Political orientation	−0.24	0.08	−0.14	−3.16**	0.02	0.03	0.02	0.66
	Risk Perception	0.18	0.08	0.10	2.35*	0.15	0.03	0.13	4.76***
	In-Group Trust	0.22	0.07	0.13	3.17**	0.17	0.03	0.18	6.19***
	Risk Perception x In-Group Trust	0.22	0.07	0.12	3.11**				
	Belief in News B					0.07	0.02	0.11	3.97***
	Belief in News B x In-Group Trust					0.08	0.02	0.13	4.93***

*p < .05, **p < .01 ***p < .001.

To facilitate the interpretation of moderated interaction, we plotted the relationships using one SD above and below the mean to show the high and low levels of in-group trust. Figures 2 and 3 show that risk perception has a positive effect on belief in misinformation, and that belief in misinformation has a positive effect on general social distrust only when in-group trust is high. Primarily, the results indicate that the impact of risk perception on belief in misinformation differs across the levels of in-group trust. Individuals with high in-group trust showed an increase in belief in misinformation as risk perception increased ($B_{\text{News A}} = 0.37$, $p < .01$; $B_{\text{News B}} = 0.41$, $p < .001$). However, the positive association was not found for individuals with low in-group trust. The results also showed that the impact of belief in misinformation on general social distrust differs across levels of in-group trust. Individuals with high in-group trust showed an increase in general social distrust as belief in misinformation increased ($B_{\text{News A}} = 0.14$, $p < .001$; $B_{\text{News B}} = 0.14$, $p < .001$), while this effect was not significant for people with low in-group trust.

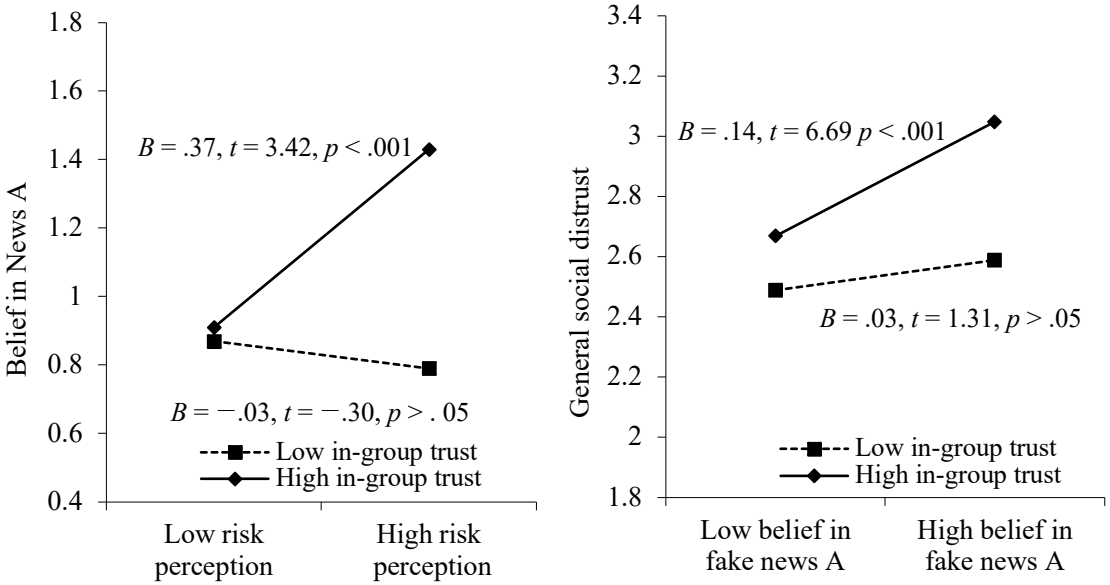

Figure 2. Interaction plots showing the interaction between in-group trust and risk perception and between in-group trust and belief in News A.

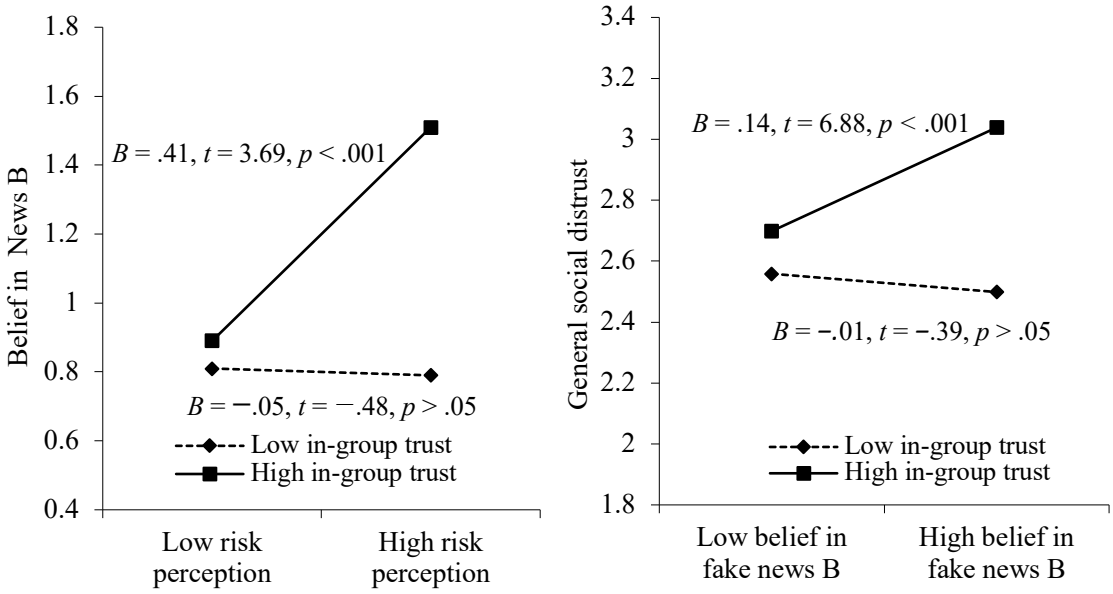

Figure 3. Interaction plots showing the interaction between in-group trust and risk perception and between in-group trust and belief in News B.

To further examine the full conditional indirect effects in H4, we tested the magnitude of the conditional indirect effect of risk perception on general social distrust through belief in misinformation, depending on the level of in-group trust. Table 6 shows CIs for bootstrap tests at three information cross-checking values: (1) one SD below the mean, (2) the mean, and (3) one SD above the mean. The bootstrap CIs for the indirect effect when in-group trust values are one SD above the mean (conditional indirect effect $_{\text{News A}}$ = 0.05, 95% CI ranges = 0.01 to .09; conditional indirect effect $_{\text{News B}}$ = 0.05, 95% CI ranges = 0.02 to 0.09, which includes zero) show that there is significant indirect effect. In other words, there is a significant mediated effect under the condition of one SD above the mean of in-group trust, supporting our conceptual model and H4. However, under conditions of below mean, there is no significant indirect effect of risk perception on general social distrust through belief in misinformation (conditional indirect effect $_{\text{News A}}$ = −0.01, 95% CI ranges = −0.01 to 0.01; conditional indirect effect $_{\text{News B}}$ = 0.01, 95% CI ranges = −0.01 to 0.01). These results show that risk perception is positively associated with belief in misinformation and, in turn, with higher general social distrust only under the condition of high in-group trust.

Table 6. Conditional Indirect Effects at Three Levels of In-Group Trust.

			95% CI	
	In-Group Trust	*β*	LLCI	ULCI
News A	M-1SD	−0.01	−0.01	0.01
	M	0.01	0.01	0.03
	M+1SD	0.05	0.01	0.09
News B	M-1SD	0.01	−0.01	0.01
	M	0.01	0.01	0.02
	M+1SD	0.05	0.02	0.09

Discussion

The findings from this study help us unpack the puzzle surrounding the observation that some members of society exhibit low levels of general social trust in risk situations, despite the situation calling for stronger coordination among individuals. Although recent literature has expanded our understanding of the determinants of general social trust at both individual and social levels (e.g., Lu & Kandilov, 2022; Thoresen et al., 2021), little attention has been given to the role of misinformation. In summary, this study shows an overall tendency for people to experience lower levels of general social trust when they perceive higher risk, and this relationship is mediated by individuals' belief in misinformation. Further, lower general social trust is more prevalent among those with high in-group trust. That is, for those who have high in-group trust, risk perception is more likely to coincide with belief in misinformation, and such belief is more likely to be associated with a lower level of general social trust.

This study contributes to the understanding of misinformation by examining both the antecedents and consequences of belief in misinformation in risk situations. The findings offer a theoretical explanation of the link between individuals' risk perception and general social distrust by explicating the role of believing in misinformation and trusting members of a group one is embedded in. In terms of the nature of theoretical pursuits classified by Slater and Gleason (2012), our study first elucidates underlying mechanisms explaining general social trust by examining the mediating variable, and second, elucidates contingent conditions by investigating both moderation and moderated mediation effects. We further elaborate on these two aspects of the theoretical contribution below.

First, the mediating role of individuals' belief in misinformation helps us understand the fundamental question of "how" in the relationship between risk perception and general social trust (Slater & Gleason, 2012). The positive association between risk perception and belief in misinformation can be supported in part by prior research. For example, Siegrist and Cvetovich (2000) show that people who face an unfamiliar risk situation are less likely to evaluate the accuracy or reliability of information and instead rely on a selected group of experts whom they consider to be sharing important values with themselves. Moreover, when people face uncertainty about ongoing events, they are more likely to believe misinformation to be true (Kimmel & Keefer, 1991).

Information that aligns with biased clusters of users has a higher likelihood of spreading through a network (Nguyen, 2020). O'Neil, Khan, Holland, and Cai (2022) show that a group of health specialists in Australia primarily retweeted and mentioned each other, contributing to the propagation of myths surrounding COVID-19 and the public's exposure to misinformation. This negative mechanism relates to the formation of echo chambers, a structure in which beliefs are amplified by interactions of people sharing similar views (Törnberg, 2018) and systematically distrusting external information sources (Jamieson & Cappella, 2008). Questioning the accuracy of information sources can make individuals become more skeptical of social norms, institutions, and the collective power of society. Such distrust also leads to polarization and social divisions (Kang & Skidmore, 2018), eroding people's trust in general others. In essence, the indirect effects tested in our study suggest that individuals' belief in misinformation serves as an intervening factor in the relationship between individuals' risk perception and general social trust.

Second, this study contributes to the theoretical understanding of the role of individuals' belief in misinformation by explaining circumstances in which the mediation path discussed above operates differently among groups of individuals (Slater & Gleason, 2012). The level of in-group trust generated a significant difference in the strength of the associations between risk perception and belief in misinformation as well as between belief in misinformation and general social distrust. Specifically, people who perceive a higher risk of COVID-19 tended to trust fake news more strongly only when they have a higher level of in-group trust. This finding lends support to previous literature, which shows that group membership influences individuals' identities and protects them in uncertainties (Hogg, 2007). People who strongly identify with their groups are more likely to believe in information when they feel uncertain rather than to engage in information validation. This heuristic process is similar to information cascade in a cohesive group, which refers to the process in which individuals accept others' decisions and follow their behaviors without relying on evidence (Çelen & Kariv, 2004). Findings about in-group trust in our study imply that information circulation within densely connected groups could potentially constitute a space for echo chambers to produce biased and polarized information (Memon & Carley, 2020; O'Neil et al., 2022).

Moreover, the result shows that people who believe misinformation are likely to distrust the general society when they have a higher level of in-group trust. Groups with common concerns and ideology tend to produce inaccurate perceptions through information sharing (Myers & Lamm, 1976), and group members can more easily conform to the consensus of the group without proper information validation. Jeong and Lee (2018) suggested that communicating with diverse information sources lowers the negative effects of rumor acceptance on polarized or biased views. The results of this study demonstrate that blind belief in misinformation and obfuscated judgment are associated with negative social attitudes of individuals in cohesive groups (Cigler & Joslyn, 2002). In sum, people with higher in-group trust may hold a lower level of general social trust because of belief in misinformation, becoming less confident about public health guidelines.

Practical Implications

Understanding how risk perception influences general social trust has significant practical implications for the alleviation of social conflicts and effective policy implementation in public health crises. As seen during the pandemic, the public's response to health measures is critical in risk situations that involve high uncertainty. Furthermore, the public's perceived trust in institutions is essential for crisis

communication and management (e.g., Cheng & Shen, 2022). We offer insights into a more general dimension of trust, showing that people's trust of other members of the society might be associated with the circulation of misinformation. Therefore, it is important for health practitioners, policy makers, and educators to foster an information environment in which the public can carefully assess and intervene against misinformation. Given the role of risk perception found in this study, such precautionary measures would be particularly important for population groups who perceive a high risk associated with the health crisis. Therefore, using data analytics to quickly detect the types of misinformation circulating on topics related to risk can assist with developing effective health communication strategies. For instance, if popular misinformation content amplifies the public's fear associated with vaccination, efforts should be made to tailor communication messages so that scientific evidence can particularly appeal to population groups who perceive higher health risks. Findings also suggest that excessive or exaggerated reporting of risks by media may have a negative impact on public assessments of misinformation.

The findings also indicate that assessing the information environment of the public, including the groups people mainly interact and communicate with, is important. In societies that have intense political rivalries such as South Korea, misinformation is often used as a tool for raising public dissent against institutions or policies (Tworek & Lee, 2021). Subsequently, collective distrust in public health measures can result in serious health threats. In addition to authoritative health entities communicating facts with the public, policy makers need to facilitate the use of reputable platforms that citizens can easily access to check facts (Tworek & Lee, 2021) and to report misinformation. Given that some people may not be motivated to fact-check the information they are viewing, online content or news messages that contain keywords associated with misinformation should include a warning. In addition, as implemented in some social media platforms, viewers of such information should be directed to reliable health information sources.

Given the role of in-group trust in amplifying the negative impact of misinformation, it is important to promote the diversity of information content shared in polarized groups. Monitoring the structure of online media content such as tweets or discussion forums and identifying key topics of misinformation circulated within each cluster of users can be a helpful first step. Using such analyses can better inform the decision about which information topics should be flagged and which facts should be promoted. Social media sources can employ tools to ask users to assess the accuracy of content before sharing it with others (Greenspan & Loftus, 2021). Further, since online group polarization often aligns with political polarization, public health authorities and experts from diverse backgrounds and orientations should be involved in communicating accurate information. In addition, public support such as media literacy education is required to enable broader participation in information fact-checking.

Limitations and Future Directions

Some limitations give rise to future research. Although people are exposed to misinformation from numerous media and personal sources, the current study did not differentiate sources of misinformation. Future research could examine information sources and their specific characteristics that differently drive belief in misinformation. In addition, the characteristics of online and offline groups are likely to be distinctive in their potential to spread misinformation and foster polarization. Distinguishing between online and offline groups people closely interact with and trust will provide more insight into the unique risk associated with online

communication in spreading misinformation. Another limitation is that this study assessed the communication environment in general and did not identify whether respondents have been exposed to specific types of misinformation from the in-group that they considered in responding to the survey. Unpacking the sources of misinformation and corresponding levels of belief in misinformation will help gain detailed insights on the antecedents of the public's perception of general social distrust. Last, the cyclical effect between misinformation and general social distrust is yet to be examined. If people lower their trust toward institutions and society, they could engage in opportunistic behaviors such as disseminating fake news to undermine the credibility of health institutions (Cori et al., 2020). Although the current study provided a theoretical explanation of the path between risk perception and general social trust, future studies could consider alternative pathways between risk perception, belief in misinformation, and general social distrust.

This study examined misinformation at the time of COVID-19, which is fundamentally different from other ongoing public health issues. As the public had no prior experience or knowledge of the topic matter, they tried to quickly make sense of this unprecedented disruption, and many have relied on misinformation. In this sense, the information environment surrounding COVID-19 is likely to diverge from that of other contexts, such as vaccination or climate change, where there are ongoing science communication efforts to dispel rumors and conspiracy theories. Future research is encouraged to examine whether the role of belief in misinformation and in-group trust found in this study holds in other public health contexts.

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