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Conspiracy Beliefs about Groups Benefitting from the COVID-19 Pandemic Moderate the Relationship Between Fear of COVID-19 and Subjective Assessment of the Efficacy of Preventive Measures

Iwona Nowakowska, Anna Zarazińska
Maria Grzegorzewska University, Institute of Psychology, Szczęśliwicka 40, 02-353 Warsaw, Poland

Drawing on the protective motivation theory and parallel response model, in this cross-sectional, questionnaire-based study (N = 212) carried out on a sample of the general public (age 18-65), we aimed to test the potential interaction effects of fear of COVID-19 and conspiracy beliefs about groups benefitting from the COVID-19 pandemic in predicting subjective assessment of the efficacy of three COVID-19 preventive measures. The results have shown that fear of COVID-19 was positively related to a positive assessment of the efficacy of frequent disinfection of hands and surfaces, but only in people who had COVID-19 conspiracy beliefs on an average or high level. However, on all levels of COVID-19 conspiracy beliefs, fear of COVID-19 related positively to a positive assessment of mask wearing and social distancing efficacy, however, to a different extent. We discuss the results in light of the protective motivation theory and the affiliation function of COVID-19 conspiracy beliefs and conforming to the prevention guidelines.

Key words: conspiracy beliefs, fear of COVID-19, mask wearing, parallel response model, protective motivation theory, social distancing, vaccinations

Introduction

Despite a history of local and global epidemics, the COVID-19 pandemic has been unprecedented in Europe, given the scale, characteristics of the disease, and broader context of times in which it occurred. Unlike other pandemics known in modern times, many governments in Europe have decided to introduce policies aimed at prevention – lock-downs, limits for human gatherings, and regulations regarding vaccinations (e.g., priority groups; Nguyen et al., 2021). The widespread access to Internet technologies enabled and encouraged individuals to rely

Correspondence concerning this article should be addressed to Iwona Nowakowska, Maria Grzegorzewska University, Institute of Psychology, Szczęśliwicka 40, 02-353 Warsaw, Poland.
E-mail: inowakowska@aps.edu.pl

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more heavily on technology as a substitute for interaction.

These circumstances quickly and broadly affected everyday life and caused significant uncertainty regarding many issues. First, the fear of getting infected or infecting someone else, and disrupted plans for the near and far future (Douglas, 2021). Fear of COVID-19 was confirmed to be linked to preventive measures against this disease (Reuken et al., 2020; Scrima et al., 2022). However, faced with information about the pandemic, many people may have asked questions such as: "Why did that happen?" or "What caused this global crisis?". The unprecedented lock-downs and, for many people, the shift in education, and ways of working and performing tasks online might have caused a feeling of loss of predictability, and as a result, control over life (Bhoyroo et al., 2021). Thus, such an uncertain landscape was a fertile ground for many COVID-19 conspiracy theories to grow and thrive (Douglas, 2021).

Conspiracy theories, in general, are an attempt to understand important, hard-to-explain events as malevolent acts of secret and forceful groups (Douglas et al., 2017; 2019). Oleksy and colleagues (2021) suggest that the general conspiracy theories about COVID-19 focus in their content on the benefits that undefined "groups" gain from the development of the pandemic. This type of conspiracy theories, contrary to more specific ones about COVID-19 (e.g., blaming specific groups, corporations, or persons), resembles the "conspiracy mentality" (Bruder et al., 2013; Oleksy et al., 2021). They are however general and ambivalent, thus, as we assume, can lead to either boycotting preventive measures (given that undefined groups have "planned" the hoax-alike pandemic for their benefit) or conforming to them (given that these groups might be malevolent, creating a dangerous virus for their gains).

However, how do COVID-19 conspiracy believers differ in terms of the link between fear of COVID-19 and their assessment of the efficacy of COVID-19 preventive measures? If we consider non-support of COVID-19 conspiracy beliefs and rational behavior in terms of compliance with preventive guidelines, does fear of COVID-19 level still play a role in assessing the efficacy of preventive measures in people who do not support COVID-19 conspiracy beliefs? To answer these research questions, the current study builds on the protective motivation theory. We aim to find the potential interaction effects of COVID-19 conspiracy beliefs and fear of COVID-19 in predicting the subjective assessment of a variety of preventive measures recommended by governments and medical staff from the very beginning of the pandemic: mask wearing, social distancing, and frequent disinfection of hands and surfaces. Below, we present a literature review with hypotheses and justification.

Literature Review

The COVID-19 pandemic is a public health risk, causing governments to find ways of mitigating the spread of the virus. The willingness of people to engage in the strategies suggested by experts and politicians may rely on how they perceive the threat of the disease. A relevant theoretical framework that may support understanding people's response to the COVID-19 crisis is the protective motivation theory (PMT; Rogers, 1975; see also Norman et al., 2005).

The PMT foundations were laid by early research by Hovland and colleagues (1953), which suggested that when communication is fear-inducing, the recipient will be willing to reduce his/her negative emotional state. If communication provides behavioral advice, an individual can choose to follow it to reduce fear. If that proves helpful, a person will con-

tinue to employ the directions given to them. However, if following behavioral advice does not result in fear reduction or does not contain any advice, an individual may choose coping responses which are not adaptive (e.g., avoidance or denial).

Rogers (1975; 1983), building on Hovland's (Hovland et al., 1953) findings and designing the PMT, suggested that a variety of sources of information can activate two appraisal processes: 1) threat and 2) coping appraisal (see also: Norman et al., 2005). Threat appraisal refers to the source of the threat. Rogers (1983) implies that greater fear of a threat results from a perceived vulnerability to a serious health threat (such as COVID-19). This positively influences protective motivation (the intention to follow the behavioral recommendation, which is considered a proximal determinant of behavior, as it arouses, directs, and sustains activity; Rogers, 1975). Coping appraisal concentrates on dealing with the threat and the factors that could influence the probability of adaptive response to it. Such a response could be, for example, following behavioral recommendations. The probability of an adaptive response to a threat is increased by the belief in the effectiveness of the advised behavior or one's own capabilities to follow the recommendations.

PMT assumptions resemble another relevant theory – the parallel response model (PRM) by Leventhal (1970; see also Norman et al., 2005). According to Leventhal (1970), fear appeal starts two independent control processes. The first one is fear control, which aims to reduce the emotional response. The second is danger control, a cognitive response that concentrates on ways to reduce the actual danger (and may reveal itself in following behavioral advice). Both PMT and PRM suggest that two paths are activated when deciding whether to follow the behavioral recommendations or not: emotional (such as fear of COVID-19 in the context of COVID-19), and cognitive, that precedes the decision to follow advice. During COVID-19, such important cognitions might be convictions (sometimes in the form of conspiracy theories) regarding the pandemic, its origins, and how it is managed by governments that provide behavioral advice (Douglas, 2021; Romer & Jamieson, 2020).

During COVID-19, we can observe individuals who deny the existence of the pandemic or believe in various news regarding the origins of the virus. For example, COVID-19 disbelief has been linked to maladaptive personality organization and defense mechanisms that could form a "protective shield" against threatening news (such as splitting, denial, and dissociation; Zajenkowska et al., 2021). Similarly, COVID-19 conspiracy beliefs may be a form of protection from uncertainties and negative emotions connected to the pandemic. People tend to exhibit conspiracy thinking when their essential needs are not satisfied (Douglas, 2021).

The PMT also discusses that a low perception of one's own vulnerability (thus, low fear of COVID-19 during the COVID-19 pandemic) can be linked to maladaptive forms of coping, which could be avoidance or wishful thinking (Rogers, 1983). Therefore, we hypothesize that:

H1: The relationship between fear of COVID-19 and COVID-19 conspiracy beliefs is negative.

The endorsement of conspiracy theories may, in general, have serious consequences for public health. People who believe in them support governmental policies less (Van Prooijen & Douglas, 2018) and show limited trust toward authorities and institutions (Jolley & Douglas, 2014). During the pandemic, the belief in COVID-19 conspiracy theories is related to lower obedience to safety measures (such as frequent hand washing and social distancing; Allington et al., 2023; Bierwiaczonek et

al., 2020; Imhoff & Lamberty, 2020; Swami & Barron, 2020) and lower acceptance of vaccinations (Bertin et al., 2020; Earnshaw et al., 2020; Romer & Jamieson, 2020; Ruiz & Bell, 2021). That is why we hypothesized that:

H2: The higher the COVID-19 conspiracy beliefs, the more negative the assessment of the efficacy of COVID-19 preventive measures.

Conspiracy theories generally prosper during crises and catastrophes (Van Prooijen & Douglas, 2017), and during COVID-19, those who accept them are a major challenge for public health communication specialists. People can differ significantly in terms of the extent to which they accept COVID-19 conspiracy theories. People may also have different experiences with avoiding infection, either by employing government- and authority-provided advice, or by pure luck. Generally, fear of COVID-19 is considered a positive correlate of preventive measures acceptance (Bendau et al., 2021; McElfish et al., 2021; Nazli et al., 2021; Pakpour & Griffiths, 2020). According to H1, the less someone believes in COVID-19 conspiracy theories, the more they fear COVID-19, given that they do not employ a "protective shield" of COVID-19 conspiracy theories to manage fears. We can assume that people who do not suspect the government or malevolent groups of steering the pandemic assess the behavioral advice similarly regardless of how they fear the virus. However, in the case of people who control danger by employing COVID-19 conspiracy theories, the necessary mechanism that could activate protection motivation should be the strength of fear of COVID-19 (as greater fear in the language of PMT). Thus, we hypothesize that:

H3: The positive association between fear of COVID-19 and the assessment of the efficacy of COVID-19 preventive measures is moderated by the COVID-19 conspiracy beliefs (the effect is stronger for participants with higher conspiracy beliefs).

To the best of our knowledge, our study is the first to reveal the interaction effects between emotional responses to COVID-19 (fear of COVID-19) and cognitions (COVID-19 conspiracy beliefs) in predicting a variety of subjective assessments of government-imposed regulations on COVID-19 mitigation, taking into account the general population. We considered three preventive measures, depicting the main governmental recommendations employed in Poland since the very beginning of the pandemic: mask wearing, social distancing, and frequent disinfection of hands and surfaces. Given that these measures are qualitatively different (e.g., frequent disinfection of hands and surfaces requires effort, is however is not always "visible" to others as is mask wearing or keeping social distance; mask wearing has been obligatory in public places at the time of planning and conducting the study in Poland, therefore, not conforming can prevent one from certain activities and/or induce social ostracism; etc.), we were interested whether and how the fear of COVID-19 and conspiracy beliefs shape each of them separately. Such an approach can enable us to draw more exact, ecologically valid conclusions; it has been applied in research previously in terms of some of the investigated preventive behaviors, e.g., mask wearing and avoiding social gatherings separately (Korn et al., 2021). We assume that the effects of these variables and their interaction might be different for various preventive measures, however, we refrain from specific hypotheses given the scarcity of data on the topic.

We also decided to control for demographic variables: age and gender. Age is of potential importance to our models, given that higher age is a risk factor for severe COVID-19, which typically leads older generations to display preventive behaviors more frequently (Korn et al., 2021), as confirmed in studies around the world (Luo et al., 2021; Raude et

al., 2020). Gender is also interesting, given the studies suggesting women's higher compliance to COVID-19 preventive behaviors in general (Otterbring & Festila, 2022), social distancing and handwashing/preventive hygiene (Bronfman et al., 2021; Okten et al., 2020), and mask wearing (Okten et al., 2020; Palmer & Peterson, 2020), which has even led to coining a term of "toxic mask-ulinity" (Palmer & Peterson, 2020). Thus, by controlling for these demographic variables and acknowledging their potential predictive power, we will be able to see whether our hypothesized effects are applicable.

We planned the data for the study to be collected in Poland during the fifth wave of the pandemic, in December 2021 – January 2022. It was a moment of less concern about COVID-19 on the one hand, and on the other, European Union's appeals not to ignore the threat, act coherently and in a coordinated way within the EU countries, enhance the vaccination actions and accelerate booster vaccinations. In Poland, it was a period right after a lengthier attempt to return to normality (no lock-down since the beginning of the summer holidays of 2021). The beginning of December brought an increase in the number of hospitalized patients in Poland, only to drop throughout January (Our World in Data, 2022). In response, during this time, given the anticipation of the highly contagious Omicron variant dominating, a mini lock-down was introduced for schools (schools were forced to introduce remote teaching for a week before the Christmas holidays and a week afterward). It needs to be noted, that Poland is an interesting country to study opinions about socially responsible behaviors (such as COVID-19 preventive measures), given the low trust towards public institutions reported consistently in the last years (Kołczyńska, 2015; Nowakowski, 2008), as well as during the pandemic (Rydlewski, 2021).

Method

Note on Data

Raw data for the project is publicly available from Open Science Framework (OSF) https://osf.io/fj24w/. The study has not been preregistered.

Power Analysis

We sought at least medium effect sizes ($f^2 \geq .15$) to interpret only non-negligible results. A power analysis conducted in G*Power (Faul, 2009) indicated that a sample of 138 people was required to detect an effect of .15 with an α error probability of .05, and a power of .95 in a regression analysis with five predictors.

Participants

Our study included a total of 212 participants aged 18-65 (M = 26.68; SD = 8.98). Table 1 presents the demographic data for the sample.

Procedure

We conducted the study online from December 2021 to mid-January 2022. Participants were recruited through social media, using a wide variety of city and university groups across Poland. The survey was addressed to all adults (18 years of age and over) and described as a study on views and opinions, including opinions regarding COVID-19. Before conduction, the study materials and protocol were approved by Maria Grzegorzewska University Research Ethics Committee. All participants provided informed consent for participation. The study was completely anonymous and the participants did not receive any remuneration.

Table 1 *Demographic characteristics of the sample*

Variable	Value	N	%
Gender	Female	168	79.2
	Male	38	17.9
	Other/Prefer not to declare	6	2.8
Place of residence	Village	42	19.8
	Town of fewer than 50,000 inhabitants	15	7.1
	Town of 50,000-100,000 inhabitants	15	7.1
	Town of 100,000-500,000 inhabitants	36	17.0
	Town with over 500,000 inhabitants	104	49.1
Last finished stage of education	Vocational school	3	1.4
	High school	99	46.7
	Bachelor's degree or equivalent	57	26.9
	Master's degree or equivalent	43	20.3
	PhD or higher scientific degree	9	4.2
	Other	1	.5
Personal experiences with COVID-19 since the very beginning of the pandemic	Had COVID-19 at least once	64	30.2
	Had not had COVID-19	92	43.3
	Unsure about whether they had COVID-19	56	26.4
	Had been hospitalized due to COVID-19	1	.5
	Presently having COVID-19	5	2.4
	Suspecting to have COVID-19 presently	3	1.4
	Witnessed loved one(s) having COVID-19	171	80.7
	Had loved one(s) hospitalized due to COVID-19	61	28.8
	Witnessed friends/casual acquaintances having COVID-19	194	91.5
	Had friends/casual acquaintances hospitalized due to COVID-19	77	36.3
	Had loved one(s) or friends/casual acquaintance(s) who died from COVID-19	60	28.3
History of COVID-19 vaccinations	Took one dose	6	2.8
	Took two doses	114	53.8
	Took three doses	43	20.3
	Took none	49	23.1
	Willing to take further doses	143	67.5
	Not willing to take further doses	69	32.5

Measures

Fear of COVID-19 was measured with The Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2022; Polish adaptation: Chodkiewicz & Gola, 2021). The scale in its original version is unifactorial and consists of 7 items, e.g., *I am afraid of losing my life because of Corona*. The respondents answer on a scale from 1 (strongly disagree) to 5 (strongly agree). The Polish adaptation data (including a CFA analysis) confirmed the original structure of the scale and acceptable fit indices, along with

high reliability (.84) and satisfactory discriminating power of items (Chodkiewicz & Gola, 2021). The scale is thus recommended for use for research purposes. The general score in the current study was obtained by computing the mean from all items. Cronbach's α for this study was .84.

COVID-19 conspiracy beliefs about groups benefitting from the pandemic were measured with 2 items by Oleksy and colleagues (2021), used for a similar purpose in the studies by the author of the scale. The respondents answered on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). We used a score, computed as a mean from the 2 items. In the paper introducing the items, the Pearson's *r* correlation between items ranged .71-.80 (4-wave study; Oleksy et al., 2021). In our study, the correlation was $r = .78$; $p < .001$.

Subjective assessment of preventive measures. For this study, we chose three preventive measures to protect against the COVID-19: wearing masks, social distancing, and frequent disinfection of hands and surfaces. We asked one question for each of these measures, formulated as: *How would you rate… as an effective COVID-19 prevention strategy?* Answer options were on a scale of 0 (completely ineffective) to 100 (completely effective).

Analytic Strategy

All analyses were performed using IBM SPSS 28.0.1.0 (IBM Corp., 2021) with Andrew F. Hayes PROCESS 4.0 macro (Hayes, 2018). First, Pearson's *r* correlations between continuous variables were computed. The focal analysis was performed using moderation analysis (Andrew F. Hayes Model 2) with bootstrapping for $N = 5000$. The conditioning values were -1 SD, mean, and +1 SD. Assumption check was assisted with Ahmed Daryanto HeteroskedascityV3 (Daryanto, 2020). Effect sizes f^2 were computed using Daniel Soper's Effect Size Calculator for Multiple Regression (Soper, n/d) and interpreted sensu Cohen (1988).

Results

Table 2 presents the results of correlation analysis regarding the continuous variables and basic descriptive statistics for these.

As hypothesized in H1, the fear of COVID-19 was negatively and significantly related to COVID-19 conspiracy beliefs about groups benefitting during the pandemic ($r = -.40$; $p < .001$). Furthermore, congruent with H2, COVID-19 conspiracy beliefs were negatively and significantly related to subjective assessments of the efficacy of all three investigated preventive measures: $r = -.59$; $p < .001$ for wearing masks, $r = -.53$; $p < .001$ for social distancing, $r = -.43$; $p < .001$ for frequent disinfection of hands and surfaces.

Next, to test H3, we performed the moderation analyses for three dependent variables: mask wearing (Model 1), social distancing (Model 2), and frequent disinfection of hands and surfaces (Model 3). For all models, the independent variables were: fear of COVID-19, COVID-19 conspiracy beliefs, their interaction effect, and gender and age for control purposes. All continuous variables were standardized prior to the moderation analysis. Table 3 presents results of these analyses. Prior to analysis, no observations were excluded. Heteroskedascity assessments indicated homoskedascity for all models (Breusch-Pagan test $p > .05$); residuals showed distribution close to normal (skewness and kurtosis between <-1.21 and 0.5> in all cases except for age) and no multicollinearity (VIF statistics shown in Table 3), as well as no autocorrelation of residuals (Durbin-Watson statistics shown in Table 3).

Table 2 *Descriptive statistics and Pearson's r correlations between continuous variables*

Variable	1	2	3	4	6	7	9
1. Age	-						
2. Gender (0 = female, 1 = male)	.00	-					
3. Fear of COVID-19	.24***	-.19**	-				
4. COVID-19 conspiracy beliefs: groups	-.19**	.08	-.40***	-			
5. Subjective assessment of the efficacy of wearing masks	.17*	-.20**	.50***	-.59***	-		
6. Subjective assessment of efficacy of social distancing	.16*	-.21**	.48***	-.53***	.84***	-	
7. Subjective assessment of the efficacy of frequent disinfection of hands and surfaces	.08	-.13	.32***	-.43***	.58***	.66***	-
M	26.68	-	2.19	4.58	51.48	55.35	58.63
SD	8.98	-	.79	2.02	33.10	31.34	30.71
Skewness	1.99	-	.50	-.36	-.34	-.35	-.58
Kurtosis	3.77	-	-.10	-1.15	-1.21	-1.00	-.83

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, *M* – mean, *SD* – standard deviation.

Table 3 *Results of moderation analysis predicting subjective assessments of COVID-19 preventive measures: mask wearing (Model 1), social distancing (Model 2), and frequent disinfection of hands and surfaces (Model 3)*

	Model 1				Model 2				Model 3				VIF
Predictors	***B* [95% CI]**	**SE**	***t***	***p***	***B* [95% CI]**	**SE**	***t***	***p***	***B* [95% CI]**	**SE**	***t***	***p***	
Fear of COVID-19	.31 [.20; .43]	.06	5.37	< .001	.30 [.18; .42]	.06	4.80	< .001	.18 [.05; .32]	.07	2.64	.009	1.29
COVID-19 conspiracy beliefs	-.47 [-.58; -.36]	.06	-8.34	< .001	-.40 [-.52; -.28]	.06	-6.72	< .001	-.36 [-.50; -.23]	.07	-5.42	< .001	1.21
Fear of COVID-19 x COVID-19 conspiracy beliefs	.16 [.07; .25]	.05	3.37	< .001	.14 [.04; .24]	.05	2.86	.005	.19 [.08; .30]	.06	3.40	< .001	1.02
Age	.01 [-.09; .11]	.05	.19	.852	.02 [-.09; .13]	.06	.38	.706	-.02 [-.15; .10]	.06	-.39	.694	1.08
Gender (0 = female, 1 = male)	-.11 [-.21; -.01]	.05	-2.11	.036	-.13 [-.24; -.02]	.06	-2.29	.023	-.08 [-.20; .05]	.06	-1.21	.227	1.04
R^2_{adj}		.469				.389				.242			
F(5; 200)		37.18				27.14				14.12			
p		< .001				< .001				< .001			
Durbin-Watson		2.15				2.26				1.93			

Note. *SE* – standard error, *CI* – confidence interval, *VIF* – variance inflation factor, R^2_{adj} – adjusted R^2, *p* – significance level.

Data from Table 3 show that in case of assessment of the efficacy of mask wearing the overall regression was statistically significant, $F(5; 200) = 37.18$; $p < .001$, adjusted $R^2 = .469$, $f^2 = .88$; large effect size. A negative and most prominent predictor was COVID-19 conspiracy beliefs: 95% CI [-.58; -.36]. The positive predictors were: fear of COVID-19; 95% CI [.20; .43], fear of COVID-19 and COVID-19 conspiracy beliefs interaction: 95% CI [.07; .25], and female gender: 95% CI [-.21; .-.01]. Age was not a significant predictor.

For the assessment of efficacy of social distancing the overall regression was statistically significant, $F(5; 200) = 27.14$; $p < .001$, adjusted $R^2 = .389$; $f^2 = .64$; large effect size. A negative and most prominent predictor was COVID-19 conspiracy beliefs: 95% CI [-.52; -.28]. The positive predictors were as follows: fear of COVID-19: 95% CI [.18; .42], fear of COVID-19 and COVID-19 conspiracy beliefs interaction: 95% CI [.04; .24], and female gender: 95% CI [-.24; -.02]. Age was not a significant predictor.

For the assessment of efficacy of frequent disinfection of hands and surfaces the overall regression was statistically significant, $F(5; 200) = 14.12$; $p < .001$, adjusted $R^2 = .242$; $f^2 = .31$; medium effect size. A negative and most prominent predictor was COVID-19 conspiracy beliefs: 95% CI [-.50; -.23]. The positive predictors were: fear of COVID-19: 95% CI [.05; .32], and fear of COVID-19 and COVID-19 conspiracy beliefs interaction: 95% CI [.08; .30]. Neither age nor gender were significant predictors.

Post hoc analyses indicated that there was a significant and positive linkage between fear of COVID-19 level and subjective assessment of the efficacy of mask wearing in preventing COVID-19: for all levels of COVID-19 conspiracy beliefs: low, $B = .16$, 95% CI [.02; .30], average, $B = .31$, 95% CI [.20; .43], and high, $B = .47$, 95% CI [.32; .63]. The strength of this linkage was thus different on various levels of COVID-19 conspiracy beliefs. Figure 1 shows a visualization of this effect.

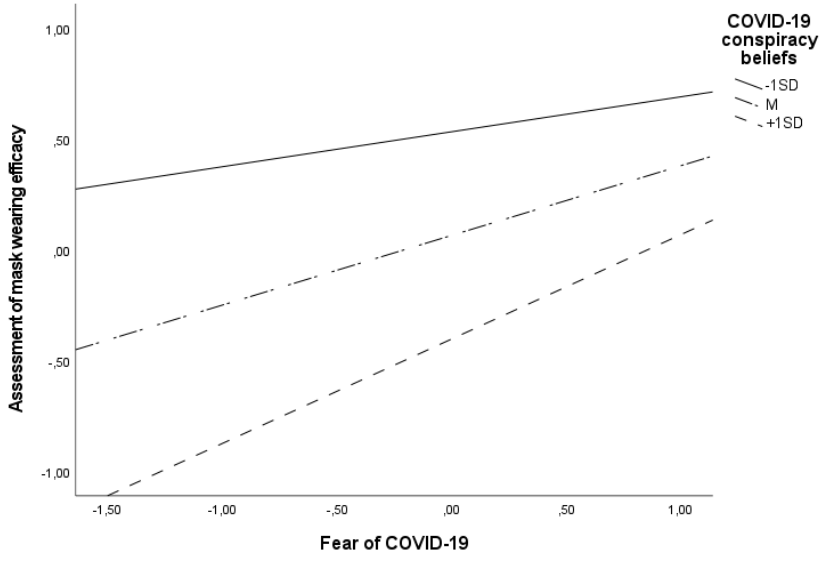

Figure 1 Subjective assessment of the efficacy of mask wearing dependent on the interaction of fear of COVID-19 and COVID-19 conspiracy beliefs.

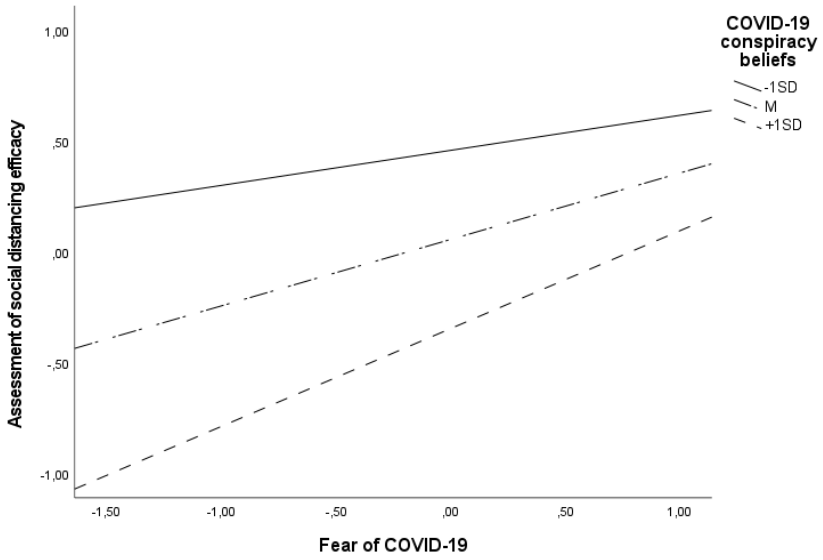

Figure 2 Subjective assessment of the efficacy of social distancing dependent on the interaction of fear of COVID-19 and COVID-19 conspiracy beliefs.

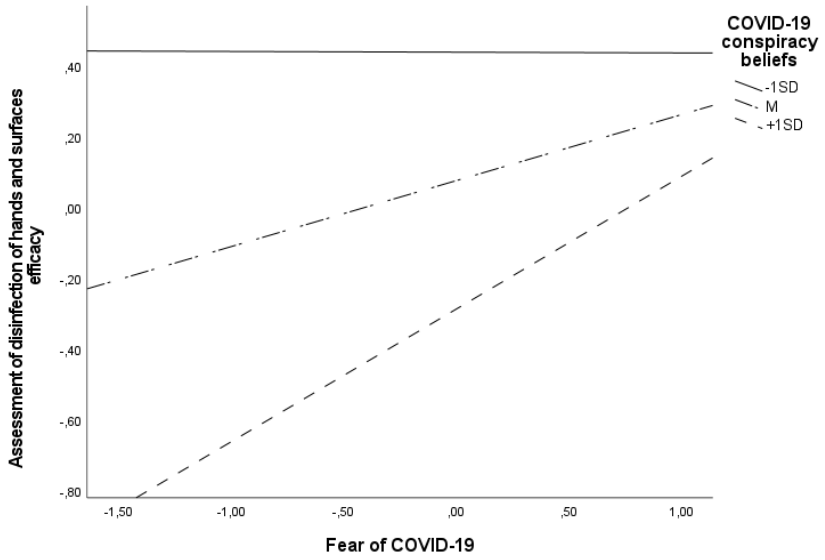

Figure 3 Subjective assessment of frequent disinfection of hands and surfaces dependent on the interaction of fear of COVID-19 and COVID-19 conspiracy beliefs.

There was a significant and positive linkage between fear of COVID-19 level and subjective assessment of the efficacy of social distancing for all levels of COVID-19 conspiracy beliefs: low, *B* = .16, 95% CI [.01; .31], average, *B* = .30, 95% CI [.18; .42], and high, *B* = .44, 95% CI [.28; .61]. The strength of this linkage was thus different on various levels of COVID-19 conspiracy beliefs. Figure 2 shows a visualization of this effect.

There was a significant and positive linkage between fear of COVID-19 level and subjective assessment of the efficacy of frequent disinfection of hands and surfaces only when COVID-19 conspiracy beliefs was average, *B* = .19, 95% CI [.05; .32] and high, *B* = .37, 95% CI [.19; .56]. This linkage was statistically insignificant for a low level of COVID-19 conspiracy beliefs, *B* = -.00, 95% CI [-.17; .16]. Figure 3 shows a visualization of this effect.

Discussion

The current study aimed to test the potential interaction effects of COVID-19 conspiracy beliefs and fear of COVID-19 in predicting the subjective assessment of the following preventive measures: mask wearing, social distancing, and frequent disinfection of hands and surfaces. We controlled for age and gender in all of our models.

As we expected (H1), fear of COVID-19 and COVID-19 conspiracy beliefs were negatively correlated. Conspiracy theories are defined as an attempt to understand and explain threatening events (Douglas et al., 2017; 2019). That is why they can be viewed as a way to cope with uncertainty (Van Prooijen & Douglas, 2017) – and in the case of the COVID-19 pandemic, be related to the lower appraisal of the threat (Romer & Jamieson, 2020).

When evaluating the subjective assessments of the efficacy of three COVID-19 preventive measures, the simple slopes effect showed that fear of COVID-19 was related positively, whereas the COVID-19 conspiracy beliefs was related negatively to endorsing all of these measures (the latter confirming H2). COVID-19 conspiracy beliefs were also the strongest predictor of the assessment of all of the measures we examined about. As argued in the PRM (Leventhal, 1970), fear appeal, such as the fear of COVID-19, may be related to fear and danger control strategies. Following behavioral advice regarding prevention can be a form of control. Similarly, in the PMT (Rogers, 1983), fear is related to the perception of one's vulnerability, which in turn activates the protective motivation. Our results thus confirm the theoretical assumptions and replicate findings that found fear of COVID-19 to be a positive correlate of adhering to the COVID-19 prevention strategies (e.g., Ahorsu et al., 2020; Bendau et al., 2021). Regarding COVID-19 conspiracy beliefs, our study is also congruent with the existing data, which have shown that people endorsing conspiracy theories show less trust in authorities (Jolley & Douglas, 2014), moreover, trust as an individual difference has also been shown to relate positively to belief in prevention-related socially responsible behaviors in people who have not personally experienced COVID-19 disease nor did they witness a person close to them getting infected (Jasielska et al., 2022). Therefore, the COVID-19 conspiracy beliefs are negatively related to preventive behaviors (Barua et al., 2020). What is novel in our study is that we revealed that these simple effects are similar across a variety of COVID-19 preventive measures within a single research plan.

However, most importantly, our study tested how fear of COVID-19 and COVID-19 conspiracy beliefs interact to predict the subjective assessment of the efficacy of various preventive measures. We have found that for frequent disinfection of hands and surfaces,

the higher the fear of COVID-19, the more positive the assessment of these measures, except for people low on COVID-19 conspiracy beliefs, who, regardless of their fear of COVID-19 level, endorsed these measures to a similar extent (and higher than average and high COVID-19 conspiracy theories believers). This suggests that COVID-19 might be a strong social situation (Mischel, 1977) in which people who do not use mental defenses such as conspiracy theories regardless of their feelings, believe in the efficacy of prevention measures. However, in those who tend to reduce their feeling of threat by endorsing unchecked news, the PMT (Rogers, 1983) and PRM (Leventhal, 1970) assumptions work, i.e., they assess the efficacy of preventive measures differently, depending on how they perceive their vulnerability. This may lead to a conclusion that only among conspiracy theories' endorsers can highlighting the COVID-19 stress prove to be effective and convincing in terms of the efficacy of frequent disinfection of hands and surfaces. In contrast, among non-endorsers of COVID-19 conspiracy theories, a ceiling effect can appear in the case of fear of COVID-19 and belief in this strategy's efficacy. A similar effect was observed in a study on the sample of Polish teachers by Nowakowska and colleagues (2022) on the link between fear of COVID-19 and belief in COVID-19 vaccination efficacy, which existed only when people believed in COVID-19 conspiracy theories on an average or high level.

According to the Terror Management Theory (TMT; Greenberg & Arndt, 2011; Pyszczynski et al., 2021), people in light of awareness of death risk (such as high fear of COVID-19) activate defenses to lower their feeling of vulnerability. Thus, they seek symbolic immortality and try to form close bonds with social groups (Putri et al., 2020). Such a form of searching for bonds could turn into an endorsement of conspiracy theories (Douglas, 2021), but in some cases it could also mean conforming to what others conform to – in case of the pandemic, the preventive measures. That affiliation mechanism may be underlying our results regarding the fear of COVID-19 – frequent disinfection link in people believing in COVID-19 conspiracy theories (on an average or high level).

A slightly different pattern was observed for assessments of wearing masks and social distancing. On all levels of COVID-19 conspiracy theories endorsement, we found a link between fear of COVID-19 and positive assessment of mask wearing and social distancing. For masks wearing, literature shows that the most common reasons for not wearing masks are: lack of confidence in the effectiveness of the masks, discomfort wearing a mask, difficulty making mask wearing a habit, and not being concerned about COVID-19 (Taylor & Asmundson, 2021) – the latter was confirmed in our study. Notably, social distancing, similarly to mask wearing, is immediately visible to strangers – it is not private or visible only to the closest surroundings of a person (as is for instance disinfection of hands and surfaces). During the official COVID-19 regulations period, if mask wearing or social distancing measures were not complied with, people around could react with ostracism or comments aimed to protect their own safety, reminding a person of the COVID-19 rules/regulations.

We suppose that people with high fear of COVID-19 need to take control. Research shows that fear and anxiety-inducing situations more easily evoke "illusions of control" (Andrade, 2020) and can motivate an individual to take actions to regain a sense of control (Jonas et al., 2014). Compared to other preventive measures, wearing masks and social distancing might be the most visible, easy, and affiliating way to increase the subjective sense of control in people regardless of what theories they endorse regarding the

pandemic. Perhaps wearing masks and staying distanced remind people that they have taken specific measures to protect themselves from COVID-19, as they literally feel that they are using some form of protection, clearly conforming to what others do, so their need of belonging, threatened during social distancing, might be at least partially satisfied. Interestingly, only in the case of these two preventive measures – mask wearing and social distancing – have we found women to be more inclined to assess these measures positively. This additionally suggests the supposed existence of a mechanism implying that higher gender (cultural upbringing)-related agreeableness and conscientiousness in women has been found to be responsible for women's compliance to COVID-19 preventive measures, at least to some extent (Otterbring & Festila, 2022). Based on the knowledge about the Big Five (Costa & McCrae, 1992), agreeable individuals may find it difficult to confront the person criticizing them for not complying with the rules and conscientious ones would be focused on fulfilling duties and regulations.

Moreover, in our study, age did not prove to be a significant predictor of either of the assessments of preventive measures. Age is found to be an important factor in predicting COVID-19 preventive measures acceptance when older generations are taken into account (Luo et al., 2021; Korn et al., 2021), given the high-risk of developing severe disease. The reason behind the lack of association in our study might be the relatively narrow age range that we were able to recruit, or indeed the negligible effect of age, when we take into account stronger predictors such as fear of COVID-19 or conspiracy beliefs.

Taken all the discussed data into account, we were able to accept H3 – the higher the fear of COVID-19, the higher the assessment of efficacy of preventive measures; the higher the conspiracy beliefs, the stronger the fear of COVID-19 effect on this assessment. However, it needs to be noted, that in the case of assessment of frequent disinfection of hands and surfaces, the effect of fear of COVID-19 on low conspiracy beliefs level was statistically insignificant.

Limitations and Future Research Directions

Although our research provided some new findings about connections between fear of COVID-19, COVID-19 conspiracy beliefs, and preventive measures, showing effect sizes of at least a medium size, it was not free of limitations. The sample consisted of mainly women, therefore, the results should be treated with caution in reference to men. Moreover, the study was conducted online, and it was only possible to get data from people who had access to the Internet and used social media. The sample was also derived from only one country, thus, the results are reliant on the cultural and political situation specific to Poland. In addition, we had only a small number of people over 35 years of age. Another limitation is that we did not examine the actual behavior of people and their use of preventive measures, such as wearing masks and disinfecting, but rather their beliefs about the effectiveness of preventive measures in protecting against the coronavirus. Finally, it would be worthwhile to measure other potential covariates, such as years of education, in order to test further hypotheses.

Moreover, our study was correlational and cross-sectional, making it impossible to form causality statements. We also need to note that we focused on the fear of COVID-19, assessing not simply the acknowledgment of the threat, but strong fear-related, self-reported emotional, cognitive, and behavioral reactions to the information on COVID-19. We also

focused on COVID-19 conspiracy theories and not the general conspiracy mentality. Future research could measure the COVID-19-related beliefs and general conspiracy beliefs and their links. It would be interesting to examine whether other forms of conspiracy beliefs are predictive of the ones related to COVID-19, or can the COVID-19 conspiracy beliefs arise also in people who do not have a general tendency for conspiracy thinking. To-date research suggests that conspiracy beliefs do co-occur, even when contradictory (Wood et al., 2012). Future research could explore this issue, taking into account the beliefs specific to the pandemic. Moreover, it would be worthwhile to examine how conspiracy beliefs (general vs. COVID-19-related) emerge, and whether they have similar predictors or antecedents. Studies on the evolution of fake news (laboratory-based, e.g., experimental studies, or social media content analysis) and their spread, as well as research on personality- and social environment-related (e.g., size and characteristics of the social circles, sociodemographic features) predictors of the tendency to accept and share fake news could provide such information.

Implications for Practice

Our study has highlighted a psychological mechanism that could be useful in practice, e.g., in planning pro-prevention campaigns and educational and public health-related strategies to encourage people to behave socially responsibly. The results may also help prepare training for health professionals, improve the knowledge of psychological factors modifying the attitudes toward COVID-19 prevention, make more effective the transmission of information about preventive measures and their importance, and highlight the need to follow recommendations to reduce the risk of disease.

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Authors' ORCID

Iwona Nowakowska
https://orcid.org/0000-0001-7701-5612
Anna Zarazińska
https://orcid.org/0000-0003-2709-9365

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