COVID-19 Related Stresses, Conspiracy Beliefs, Uncertainty, and Non-adherence to Safety Guidelines

Estrés relacionado con COVID-19, creencias de conspiración, incertidumbre e incumplimiento de las pautas de seguridad

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Abstract.
Introduction: Inconsistent use of protective preventive measures and nonadherence of the guidelines set by the World Health Organization regarding the coronavirus are associated with increased morbidity and mortality, as well as increased health care costs. **Objective:** The purpose of this study was to examine the role of COVID-19 related worries, conspiracy beliefs, and uncertainty in adherence to preventative measures in Iran. **Method:** In a large survey with data collected online from a volunteer sample of 599 individuals, assessments were made of the distress associated with the anticipated potential consequences associated with the COVID-19 pandemic and the lockdown, extent of agreement with conspiracy beliefs, level of situation-specific uncertainty, and self-reports of compliance with preventive measures. Data were analyzed to explore paths leading to nonadherence to safety guidelines proposed by the medical authorities. **Results:** A large majority of individuals report significant distress and worry associated with the COVID-19 pandemic. Results indicate that increasing levels of situation-specific uncertainty intolerance, as well as conspiracy beliefs regarding the coronavirus, are associated with non-compliance with the advised protocols. Specifically, the results show that worries related to the COVID-19 pandemic are linked to non-compliance with preventive measures through conspiracy beliefs and feelings of uncertainty associated with the COVID-19 situation even after gender, education, and perceived socioeconomic status were controlled. **Conclusions:** Findings imply that emotional exhaustion is likely to have set in and become counterproductive as people choose to violate safety guidelines. The authors discuss the theoretical and practical implications of these results.

Resumen.
Introducción: el uso inconsistente de medidas preventivas de protección y la falta de adherencia de las directrices de la Organización Mundial de la Salud con respecto al coronavirus está asociado con el aumento de la morbilidad y la mortalidad, así como el de los costos de atención de la salud. **Objetivo:** El propósito de este estudio fue examinar el papel de las preocupaciones relacionadas con COVID-19, creencias de conspiración e incertidumbre en adherencia a las medidas preventivas en Irán. **Método:** Se aplicó una encuesta virtualmente. La muestra fue de 599 personas voluntarias. Se evaluó la angustia asociada con las posibles consecuencias anticipadas de la pandemia de COVID-19 y el bloqueo, el grado de acuerdo con las creencias de conspiración, el nivel de incertidumbre específica de la situación y los autoinformes de cumplimiento de medidas preventivas. **Resultados:** La mayoría de las personas reportan angustia y preocupación significativas asociadas con la pandemia de COVID-19. Los resultados muestran que las preocupaciones provenientes de la pandemia de COVID-19 están relacionadas con el incumplimiento de las medidas preventivas, a través de creencias de conspiración y sentimientos de incertidumbre asociados a la situación de COVID-19, incluso después de tomar en cuenta el género, la educación y el nivel socioeconómico percibido. **Conclusiones:** Los hallazgos implican que es probable que elegir la violación de las reglas de seguridad se ha vuelto contraproducente y muy probablemente ha causado agotamiento emocional. Los autores discuten las implicaciones teóricas y prácticas de estos resultados.

Keywords.
COVID-19; Worry; Conspiracy Beliefs; Uncertainty; Emotional Exhaustion; Ntoncompliance.
Palabras Clave.
COVID-19; Preocupaciónci; Creencias de conspiración; Incertidumbre; Incumplimiento; Agotamiento emocional.

1. Introduction

An important factor for globally containing the spread of the potentially lethal COVID-19 for individuals is the consistent use of protective preventive measures and adhering to the guidelines set by the World Health Organization. Adherence to prescribed measures is associated with a reduction in both the percentage of individuals infected with the virus and mortality from the condition. Conversely, nonadherence is associated with higher rates of hospital admissions, increased morbidity and mortality, as well as increased health care costs. Nonadherence to the WHO guidelines regarding protection against the virus is a complex behavior likely influenced by many factors, some related to the individual such as gender and education (Brouard et al., 2020), occupation or financial concerns (Webster et al., 2020). Additional individual-related barriers to adherence may include mental health conditions associated with impaired cognition or a self-serving bias similar to the 'personal fable', where a belief in one's invulnerability is associated with risk-taking behaviors. For example, Zajenkowski et al. (2020) found personality traits such as impulsivity, amorality, egoism, and antisocial leanings associated with non-compliance with COVID-19-related public health measures. It appears that some of the individual-related factors could be termed unintentional factors (e.g., inadequate understanding of the rationale underlying the preventive measures, or forgetting to follow the guidelines) and others intentional factors (e.g., active decision to stop abiding by the guidelines based on inconvenience experienced, or beliefs and attitudes about the disease).

Many factors relate to the micro-, meso-, exo, macro- and even chronosystem elucidated in the ecological systems theory (Bronfenbrenner & Morris, 1998). Context or environment-related factors include the stressors uniquely associated with COVID-19. The mandated lockdown has introduced many challenges and prolonged disruptions caused by this pandemic are being experienced as distressing. Jobs have been lost, academic careers have been halted, family disputes have increased, interpersonal functioning has declined. While these stressors may be experienced as worries and may drive people to follow the preventive guidelines, the same stressors may be too challenging and threaten an individual's sanity contributing to nonadherence. As such, we predicted that adherence to protocols for the prevention of the spread of COVID-19 is directly related to the amount of COVID-19 associated stressors or worries an individual experiences.

Hypothesis 1: Compliance with measures for the prevention of the spread of COVID-19 is positively related to the amount of COVID-19 related worries.

1.1 The Mediating Role of Conspiracy Beliefs

An interesting factor associated with COVID-19 is the beliefs people hold about the coronavirus itself. These beliefs are often labeled as stemming from a conspiracy theory. A conspiracy theory (CT) is an unsubstantiated false belief that an event has been caused by a plot developed by a group of people, organizations or countries collaborating toward a specific secret goal (Swami et al., 2014) to deceive people or to keep them in control (Stieger et al., 2013). Examples are the belief that Acquired Immunodeciency Syndrome (AIDS) was a human-generated disease, or that pharmaceutical companies assist in the creation of diseases (Bogart et al., 2010).

Currently, there are several controversial beliefs related to COVID-19, attributing the origin of the virus to a government sponsored bioweapon development program, 5G cell towers spreading COVID-19, or pharmaceutical companies encouraging the spread of COVID-19 to make lucrative profits (Earnshaw et al., 2019). The term conspiracy theories is descriptive of these beliefs as they do refer to the existence of a malicious intent. Recent research has shown that conspiratorial beliefs about the COVID-19 are associated with decreased social distancing (Bierwiaczonek et al., 2020), pseudoscientific practices (Teovanović et al., 2021), violence (Jolley & Paterson, 2020), feelings of anxiety and lack of control, as well as a justification of and inclination toward non-compliance with regulations (Šrol et al., 2022). People who maintain conspiracy beliefs are also likely to be less supportive of public health policies to address pandemics (Earnshaw et al., 2019).

Researchers have investigated the reasons behind beliefs in conspiracy theories and some dispositional traits have been identified as correlates of conspiracy thinking: feelings of powerlessness, low interpersonal trust, anomie (Goertzel, 1994), uncertainty (van Prooijen & Jostmann, 2013), and a tendency to believe in paranormal or supernatural forces (Brotherton et al., 2013; Bruder et al., 2013). A belief in conspiracy theories may intensify the amount of COVID-19 related worries that the individual feels, while simultaneously making adherence to prevention related protocols challenging.

Hypothesis 2: The relationship between COVID-19 related worries and compliance with preventive measures is mediated by beliefs in conspiracy theories.

1.2 The Mediating Role of Situation Specific Uncertainty

Individuals tend to form conspiratorial beliefs when they experience anxiety or worry and perceive a lack of control over an uncertain situation or outcome (Bruder et al., 2013; Grzesiak-Feldman, 2013; van Prooijen & Acker, 2015). The dispositional inability to tolerate these aversive reactions is termed intolerance of uncertainty (Carleton, 2016). Intolerance of uncertainty may be trait-like or associated with specific situations that cause distress.

Mahoney and McEvoy (2012) introduced the concept of situation-specic intolerance of uncertainty, that is, intolerance of uncertainty that is associated with situations that particularly distress people with anxiety disorders (e.g., uncertainty about the cause of symptoms of anxiety or uncertainty about the meaning or consequences of intrusive thoughts). Existing research has focused on exploring trait or trans-situational intolerance of uncertainty, for example, general beliefs such as 'When I am uncertain I can't function very well' or 'Unforeseen events upset me greatly' (Carleton, 2016). Intolerance of uncertainty as a stable trait may not reflect uncertainty associated with specic situations such as the current pandemic that causes most people difculty. In fact, Mahoney and McEvoy (2012) found that trait intolerance of uncertainty to be less relevant to panic disorder and that situation-specic intolerance of uncertainty was predictive of symptoms of panic disorder and agoraphobia over and above trait intolerance of uncertainty. Such a situation is also likely to hold true about the current circumstances. The current COVID-19 pandemic is being experienced as a crisis by most people and we believe that the situation-specific distress experienced may be akin to a situation-specific uncertainty being experienced by the majority of the population, not only by those with pre-existing anxiety disorders.

The COVID-19 pandemic is a global threat to survival with unpredictable health, economic, social, and psychological consequences for the individual (Plohl & Musil, 2021), but individuals differ in their perceptions of the risk COVID-19 poses to themselves and to their loved ones. With the circulation of various conspiracy beliefs about the emergence of COVID-19, the uncertainty being experienced by individuals is more situation-specific than merely dispositional. These conspiracist ideas together with negative attitudes regarding the capability of authorities to deal with the COVID-19 crises can undermine accurate perception of the potential risks related to the virus and affect an individual's tolerance of the situation specific uncertainty. In other words, conspiracist ideation can, through altering an individual's cognitive and emotional approach to uncertainty, also alter the individual's perception of the preventive measures imposed by authorities. Erceg et al. (2020) investigated the association between trait anxiety, worry about the coronavirus crises and conspiracy beliefs with responsible behavior during the pandemic and found that weaker endorsement of COVID-19 related conspiracy beliefs was associated with a more responsible pandemic behavior, i.e., greater compliance with preventive guidelines. In another study by Plohl and Musil (2021), the extent of compliance with COVID-19 prevention guidelines was attributed to the degree of trust in science.

Hypothesis 3: Situation specific uncertainty mediates the relationship between COVID-19 related worries and compliance with preventive measures.

Hypothesis 4: Situation specific uncertainty is positively related to beliefs in conspiracy theories.

Hypothesis 5: Conspiracy beliefs and situation specific uncertainty serially mediate the relationship between COVID-19 related worries and compliance with preventive measures.

1.3 The Present Study

As described above, conspiracy beliefs and situation specific uncertainty are both implicated in the relationship between worries from COVID-19 and adherence to prevention protocols. Research has shown that these two factors are intercorrelated (van Prooijen & Douglas, 2018). The current study explored associations between COVID-19 associated worries, conspiracy beliefs, situation specific uncertainty, and compliance with public health recommendations. We wanted to determine what proportion of the individuals surveyed believes in the conspiracy beliefs about COVID-19. We also wanted to know how much conspiracy beliefs and feelings of uncertainty influence adherence to preventative measures. It was hypothesized that stress associated with COVID-19 and the lockdown is overwhelming, and its relationship with compliance with public health recommendations surrounding COVID-19 will be mediated by beliefs in COVID-19 conspiracies and situation-specific uncertainty.

Given the empirical evidence above, we theorized that COVID-19 related worries experienced by individuals is related to adherence to preventative measures through beliefs in conspiracy theories, first, and then, situation-specific uncertainty. Integrating the two models with mediation through conspiracy beliefs and with mediation through situation-specific uncertainty yields a three-path mediation model, depicted in Figure 1. We tested whether conspiracy beliefs and situation-specific uncertainty sequentially mediate the relationship between COVID-19 related worries and adherence to preventative measures.

2. Method

2.1 Participants and Procedure

A total of 599 participants (231 men, 368 women) participated in the study from September to October 2020 in the midst of the worldwide COVID-19 pandemic. The sample size obtained was more than sufficient to provide adequate statistical power (.80) for a multiple-regression analysis with up to 6 predictors and an anticipated small effect size. Participants completed a demographic information sheet that included questions on age, gender, marital status, education completed, perceived level of socio-economic status, and whether they or a family member had contracted the coronavirus. Demographic details of the sample are summarized in Table 1. The majority (82%) were well educated with college degrees, ranging from Associate or Bachelor degrees (41.57%) to

Table 1

Demographic Information of the Participants

Variable	Category	Frequency	Percentage
Sex	Female	368	61.44
	Male	231	38.56
Marital Status	Single	317	52.92
	Married	271	45.24
	Divorced/Widowed	11	1.84
Education	High School or Less	104	17.36
	Associate or Bachelor's Degree	249	41.57
	Master's or Doctorate Degree	246	41.07
Perceived Socioeconomic Status	Lower Class	308	51.42
	Lower Middle Class	173	28.88
	Upper Middle Class	69	11.52
	Upper Class	49	8.18
Contracted COVID-19	No	520	86.81
	Yes	79	13.19
Relative Contracted COVID-19	No	346	57.76
	Yes	253	42.24

Master's or doctorates (41.07%). A large percentage (51.42%) perceived their socioeconomic status to be very low, while 28.88%, 11.52% and 8.18% perceived their socioeconomic status to be lower middle class, middle class, and upper middle class, respectively. The majority (86.81%) had not contracted the virus. As can be seen in Table 4, participants ranged in age from 18 to 61 years with a mean age of 31.7 years ($SD = 9.2$).

The study proposal was approved by the IRB of the Ahvaz Jundishapur University of Medical Sciences (IR.AJUMS.REC. 1399.946), Iran, and the study was conducted entirely online. Healthy adults aged 18 or older were invited to participate in an online survey posted on a cloud-based platform used to create and distribute surveys as well as various social media platforms, including Reddit, Telegram, Whatsapp, Instagram, and LinkedIn. Internet-based consent was obtained from all participants before participation in the study. Inclusion criteria included being at least 18 years old and having the ability to read Persian. Exclusion criteria included age under 18 years and completion of less than 6 years of school. Participants provided responses to self-report measures of COVID-19 related worries and stress, conspiracy beliefs, intolerance of uncertainty, and adherence to public health recommendations surrounding COVID-19.

2.2 Measures

2.2.1 COVID-19 Worries and Stress Scale

The COVID-19 Worries Scale is a 21-item scale constructed for the purpose of this study. The scale consists of feared potential negative consequences associated with COVID-19 (e.g., fear of contracting the virus, inadequate handling of the virus by the medical professionals and other authorities, death of loved ones from the virus), associated with the lockdown (e.g., financial problems due to inability to meet medical and living ex-penses, inflation, unemployment and academic disruption, prolonged quarantine, difficulty with shopping), and interpersonal problems (e.g., stresses related to family conflicts, reduced social interactions, loneliness). Participants indicated how stress provoking each item was using a 5-point Likert scale with 0 = not at all stressful to 4 = extremely stressful. In this study, the scale was found to have very good internal consistency (Cronbach's $\alpha = .91$). An exploratory factor analysis revealed a unidimensional structure composed of all 21 items with factor loadings from .448 to .762. The Bartlett's Test of Sphericity was significant ($p < .001$) and the Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy was .941. Individuals endorsing a score of 4 to any one item were considered as "distressed".

2.2.2 COVID-19 Conspiracy Beliefs Scale (Pavela Banai et al., 2020)

The COVID-19 Conspiracy beliefs Scale used in the current study included eight items from a measure created by Pavela Banai et al. (2020). The items include the beliefs currently circulating among people such as "Spread of the coronavirus is related to the 5G technology", "Coronavirus is part of a biological warfare program", "Coronavirus was engineered to depopulate an overcrowded planet", "Bill Gates has something to do with the coronavirus", and "Cure for coronavirus infection already exists". Participants responded to the questions by indicating on a 5-point scale the extent to which they endorsed each statement, with 1=Strongly disagree to 5=Strongly agree and 3 = Undecided. Higher scores indicated strong conspiracy beliefs. The measure was translated into Persian and adopted for this study. The items were translated into Persian by the first and third authors for use in the current study. Then, the second author, a bilingual professional translator, with-

out reference to the original text, back-translated the items into English to verify linguistic equivalence. The scale was found to have good reliability (Cronbach's $\alpha = .75$) in this study. Exploratory factor analysis revealed that all 8 items loaded on to a single factor with factor loadings from .447 to .917. The Bartlett's Test of Sphericity was significant ($p < .001$) and the Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy was .899. Those endorsing any one belief as "Agree" or "Strongly Agree" were considered as believers of conspiracy theories, those endorsing any item with a rating of disagree or strongly disagree were considered non-believers, and the rest were considered as undecided.

2.2.3 Situation Specific Uncertainty Scale

A scale to measure feelings of uncertainty specific to the current COVID-19 crises was created by adapting the 12-item Intolerance of Uncertainty Scale (IUS-12; Carleton et al., 2006), which is a short version of the original 27-item Intolerance of Uncertainty Scale (Freeston et al., 1994) that measures responses to uncertainty, ambiguous situations, and the future. The 12 items are rated on a 5-point Likert scale ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). The Persian version (Khaje Mansoori et al., 2016) of the scale has been used widely and for the purpose of this study we added a phrase to each item to assess uncertainty related to the COVID-19 situation. Examples of the modified items are "Uncertainty caused by COVID-19 keeps me from living a full life", "In the current COVID-19 situation, I want to know what the future has in store for me" and "A small unforeseen event caused by COVID-19 can spoil everything even with the best of planning". In the present study, the internal consistency of this instrument was found to be adequate (Cronbach's $\alpha = .85$). In order to avoid confusion with the construct intolerance of uncertainty, which refers to a dispositional trait, in the present study we use the term feelings of *situation specific uncertainty* or *simply feelings of uncertainty* to refer to various degrees of tolerable to intolerable feelings of uncertainty related to the current COVID-19 situation. Individuals with total scores $\geq$ 1SD were considered to be experiencing high levels of situational anxiety.

2.2.4 Adherence to Public Health Guidelines (Preventative Measures)

This 8-item scale was constructed for this study. The items were developed based on the precautionary measures advised by the health ministry of Iran (www.behdasht.gov.ir). The scale assesses behaviors such as mask wearing, social distancing, frequently and thoroughly washing hands, avoiding travel, crowds and indoor gatherings, frequently disinfecting surfaces, wearing gloves, washing fruits and vegetables. The items are rated on a 5-point Likert scale ranging from 0 (not at all true of me) to 4 (completely true of me). The internal consistency of

this scale in this study was found to be high (Cronbach's $\alpha = .82$). Exploratory factor analysis revealed that all 8 items loaded on to a single factor, with factor loadings from .421 to .729. The Bartlett's Test of Sphericity was significant ($p < .001$) and the Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy was .919. Individuals with a total score < 1SD were considered as those with low adherence and those with total scores > 1SD were considered as those with high adherence.

2.3 Statistical Analyses

Descriptive statistics and Pearson correlation analysis were conducted using IBM SPSS Statistics 25. Model 6 of the PROCESS macro was conducted to examine the multiple mediating effect of conspiracy beliefs and situation specific uncertainty (Hayes, 2018). Furthermore, the bootstrapping method (5000 bootstrap samples) with 95% confidence intervals was conducted to test the significance of indirect effects (Hayes, 2018).

3. Results

Table 1 presents the demographic information of the 599 participants along with the percentage of individuals who contracted the virus or had a close relative that contracted it. Table 2 presents the percentage of respondents reporting distressing levels of worries associated with the COVID-19 crises. As can be seen, worries about financial problems, inflation and loss of employment are reported by a large majority of the individuals surveyed. Results also indicate that the majority report concerns related to having to use public transportation, making frequent trips for shopping due to lack of access to online shopping facilities, lack of access to the internet and technology required for online classes or working from home, and challenges associated with maintaining social distances. Surprisingly, a much smaller percentage reports worries about contracting the virus. Table 3 displays the percentage of individuals who believe, do not believe or are undecided about the various conspiracy theories regarding the COVID-19. As shown, a significant proportion of the individuals sampled express a belief in various conspiracy beliefs. A significant proportion of the individuals in this study believes that the Corona virus is man-made, likely related to advanced technology and to be used as part of biological warfare or to control the world's population, and that a cure for the disease already exists. Only a small percentage is inclined to believe that the COVID-19 is a hoax and no more dangerous than the flu. The vast majority tend to believe that the statistics provided by the WHO are false. A seemingly large percentage is undecided about whether the coronavirus was engineered to depopulate an overcrowded planet or whether Bill Gates has something to do with the coronavirus. Regarding adherence to preventive measures, 159 individuals (26.54%) reported low adherence while 156 individ-

Table 2

Proportion of Individuals Reporting Distressing Levels of Worries Related to COVID-19

Source of Worry	Frequency	Percentage
Contracting the Virus	169	28.2
Prolongation of Lockdown	182	30.4
Incapability of Medical Professionals	315	52.6
Death of a Close Relative due to COVID-19	399	66.7
Financial Problems	434	72.5
Medical Expenses	352	58.8
Loss of Employment	382	63.8
Reliance on public transportation	377	62.9
Disruption in Education	311	51.9
Obligatory In-Person Shopping	343	57.3
Inadequate Access to Required Technology	405	67.6
Family Conflicts	141	23.5
Social Distancing Impossible	328	54.7
Inflation	427	71.3

Table 3

Percentage of Individuals Expressing Various Levels of Agreement with the Conspiracy Beliefs (N = 599)

Belief	Believe	Do not Believe	Undecided	χ^2
Coronavirus is related to 5G technology	46%	16.8%	37.2%	81.3***
Coronavirus is part of a biological warfare program	42.7%	11.1%	46.2%	135***
Coronavirus is not more dangerous than the flu	25.6%	56.5%	17.9%	150***
Coronavirus was engineered to depopulate an overcrowded planet	19.3%	14.3%	66.4%	299***
Official infection and mortality rates provided by the WHO are lower than the truth	69.8%	8.1%	22.1%	377***
Bill Gates has something to do with the Coronavirus	11.0%	29.7%	59.3%	215***
COVID-19 is a hoax	13.3%	45.7%	41%	111***
Treatment for Coronavirus already exists	32.2%	21.3%	46.5%	57.9***

Note. ***$p < .001$

uals (26.04%) reported high adherence. Similarly, 313 individuals (52.25%) reported high levels of situational uncertainty. Table 4 displays the means, standard deviations, Pearson's correlations, and reliability estimates (Cronbach alphas) for all the study variables.

All analyses regarding hypothesis testing were conducted using macro PROCESS Model 6 (Hayes & Rockwood, 2017). PROCESS does not require the assumption of normality of the distribution. The generation of confidence intervals for significance testing is executed using the bootstrap procedure. In the structural model analysis, we estimated all the path coefficients, simultaneously controlling for participant's age, gender, education, and perceived socioeconomic status. Table 4 shows the results. In our analytical model, we tested for a three-path mediated effect (Hayes, 2018). The advantage of this approach is that we are able to isolate the indirect effect of both mediators: conspiracy beliefs and feelings of uncertainty. This approach also allows us to investigate the indirect effect passing through both these mediators serially (Hypothesis 5). Figure 1 illustrates these models.

In Table 5, we provide estimates of the indirect effects, along with the 95% bias corrected bootstrapped confidence intervals for our path estimates. Figure 1 also identifies the estimates from the structural path coefficients.

In sum, COVID-19 related worries were positively related to adherence to preventative measures. Conspiracy beliefs mediated the path between COVID-19 related worries and adherence to preventative protocol, as well as the path between COVID-19 related worries and feelings of uncertainty. Furthermore, feelings of situation specific uncertainty mediated the path from COVID-19 related worries to adherence to preventative protocols, that is, worries related to COVID-19 were associated with greater conspiracy beliefs and feelings of uncertainty, which were related to lower levels of adherence to preventative measures.

An examination of the direct and indirect effects of COVID-19 worries and stresses (see Table 5) reveals that while COVID-19 related worries and stress directly predict adherence to preventative measures positively ($b = .08$, $SE = .02$, $t = 4.14$, $p < .001$), a conspiracy mentality, i.e., an inclination to believe in conspiracy theories, along with situational uncertainty are having signif-
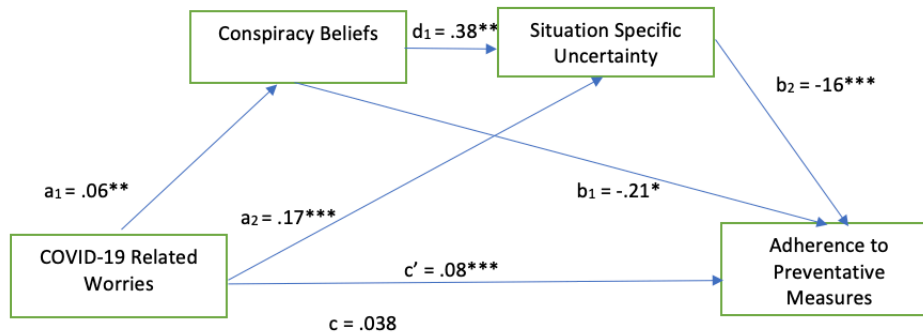
Table 4

Means, Standard Deviations, Correlations, and Reliability Estimates for Study Variables (N = 599)

Variable	Cronbach's α	M	SD	1	2	3	4
1. Age		31.7	9.2				
2. COVID-19 Related Worries	.91	48.76	15.24	$-.02$			
3. Conspiracy Beliefs	.75	18.24	3.85	$-.05$	.23***		
4. Situation Specific Uncertainty	.85	36.75	7.36	$-.10$	.40***	.29***	
5. Adherence to Protocol	.82	30.61	6.81	$-.08$	.09**	$-.12**$	$-.14**$

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

Figure 1

Three-Path Mediation Model

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 5

Path Coefficients and Indirect Effects for Serial Mediation Model

	Path Coefficients (SE)				
	To Adherence	To Conspiracy Beliefs	To Situational Uncertainty	Estimate ($BootSE$)	Bias Corrected Bootstrap 95% Confidence Interval
COVID-19 Related Worries	.08 (.02)	.07 (.01)	.17 (.02)		
Conspiracy Beliefs	$-.21$ (.08)		.38 (.08)		
Situational Uncertainty	$-.16$ (.04)				
Total				$-.043$ (.009)	$-.062, -.025$
CW→CON→ADH				$-.012$ (.005)	$-.022, -.003$
CW →SU→ADH				$-.027$ (.007)	$-.042, -.014$
CW→CON→SU→ADH				$-.003$ (.001)	$-.007, -.001$

Note. SE=Standard Error; CW=Covid-19 related worries; CON=Conspiracy beliefs; SU=Situation specific uncertainty; ADH=Adherence to safety protocols

icant negative effects indirectly on adherence to preventative measures (total indirect effect $= -.043$, $BootSE = .009$, $BootCI -.062, -.025$), reducing the total effect ($b = .038$, $SE = .018$, $t = 2.07$, $p < .05$).

4. Discussion

The COVID-19 crisis has once again begun to escalate and despite government mandated lockdowns and restrictions, many people tend to disregard the recom- mended safety guidelines. The primary objectives of this study were to investigate the relationship between worries, conspiracy beliefs, and uncertainty associated with the COVID-19 pandemic, and whether they played a role in the decreased compliance with preventive measures.

The findings obtained from this study have theoretical significance. First, our findings show that worries associated with potential consequences of the COVID-19 crisis are only marginally associated with compliance with safety guidelines, that is, concerns about the pos-

sible direct consequences of the pandemic such as financial losses, disruption to education, incapability of medical personnel and other authorities in controlling the pandemic do seem to urge individuals to adhere to safety guidelines. However, the large majority report challenges with managing the required logistics. It appears that barriers to compliance exist in the form of in-person shopping or visits out of home and use of public transportation being obligatory to meet needs of daily living. These challenges appear to make social distancing almost impossible despite individual motivations to do so and, therefore, increase the risk of noncompliance with safety guidelines. Our results are consistent with previous studies (Hills & Eraso, 2021) that have pointed to the importance of practical hurdles precluding individuals from adhering to health and safety regulations. Impediments to compliance with safety guidelines in our study included many factors that lie beyond an individual's influence.

Second, we evaluated the roles of conspiracy beliefs and feelings of uncertainty as mediators of the relationship between COVID-19 related worries and adherence to safety guidelines. Conspiracy beliefs on their own mediated the relationship between COVID-19 associated worries and adherence to precautionary measures. Although the effect size was very small, the relationship between the two factors was linear. These findings accord with a published work (e.g., Earnshaw et al., 2020), in which participants believing conspiracies reported less compliance with public health recommendations regarding COVID-19. Previously, the detrimental effect of conspiracist beliefs about HIV/AIDS on the attitudes toward preventative guidelines and treatment adherence (Bogart et al., 2010) and the role of conspiracy theories regarding the dangers of childhood vaccinations in lower vaccination rates have been reported (Jolley & Douglas, 2014). Regarding COVID-19, an inclination to believe in conspiracy theories were inversely associated with participants' intentions to be vaccinated against COVID-19 in the future (Bertin et al., 2020; Ullah et al., 2021).

One implication of the small effect size is that conspiracy beliefs do not alone account for the relationship between COVID-19 related worries and adherence to safety guidelines unless they lead to feelings of uncertainty. The positive association between conspiratorial beliefs regarding COVID-19 and feelings of uncertainty does confirm a potential bidirectional relationship consistent with previous reports (Alper et al., 2020; Maftei & Holman, 2020).

Regarding the role of feelings of uncertainty, our findings show that feelings of uncertainty mediated the relationship between COVID-19 related worries that individuals have and noncompliance of safety guidelines. This finding suggests that experiencing worries about potential consequences of COVID-19 in their daily lives can increase feelings of uncertainty and decrease levels

of tolerance, thereby reducing their ability to be compliant with preventive measures. The negative association between feelings of anxiety and compliance with public health guidelines regarding COVID-19 appears to contradict previous findings that people high in dispositional intolerance of uncertainty tend to overestimate the severity and likelihood of adverse events leading them to experience fear which, in turn, motivates them to comply with safety regulations such as social distancing (Harper et al., 2020). Furthermore, the positive association of feelings of uncertainty with conspiracy beliefs and the negative association of the two factors with compliance with preventive measures also implies that as beliefs in conspiracy theories get stronger, individuals who experience significant COVID-19 related worries also experience greater feelings of the situational uncertainty and might be motivated to violate safety guidelines and resort to noncompliance. These findings imply that in the context of a surge in COVID-19 related infections and deaths, the experience of COVID-19 related worries and exposure to conspiracy theories about the development of virus for malicious purposes results in individuals experiencing situational uncertainty, which, in this study, are at very high levels. While high levels of intolerance of uncertainty are expected to be linked to higher risk aversion and a behavioral inhibition response (Nelson et al., 2015), they have also been associated with risk taking in substance abuse and addiction (Radell et al., 2016), and similar to drug addicted individuals, individuals with higher intolerance of uncertainty were also found to choose small, low-probability rewards over larger but delayed high-probability rewards (Luhmann et al., 2011). In light of these previous reports, the present findings seem to confirm that individuals with high intolerance of situation specific uncertainty show a pre-existing cognitive bias that promotes impulsive decision-making.

Yet another possible explanation for the negative associations between both conspiracist ideation and feelings of uncertainty with compliance with preventive recommendations relates to perceptions and desires for predictability and controllability, rumination, and distress tolerance. Predictability and controllability go hand in hand and depend on the level, strength, and generality of self-efficacy, the perceived capacity to predict and control consequences (Bandura, 1989). In situations of uncertainty, self-efficacy and, therefore, predictability and control are compromised potentiating a variety of maladaptive emotional and behavioral responses (Carleton, 2016). Rumination is viewed as a specific cognitive by-product of feelings of uncertainty and is defined as repetitive thoughts that focus the individual's attention on his or her life events, emotional state, its causes, and its consequences (Nolen-Hoeksema, 1991). Rumination is an emotion regulation strategy (Huang et al., 2019) that, if maladaptive, exacerbates distress (Lyubomirsky

& Tkach, 2003). Two subtypes of rumination are considered: brooding a maladaptive coping strategy, and reflection, a less problematic coping strategy (Huang et al., 2019). In times of the current COVID-19 crises, in an attempt to understand the situation of the self and current problems, individuals with high levels of uncertainty are likely to reflectively ruminate about the negative aspects introduced into their life by the COVID-19 pandemic, as well as about one or more of the conspiracy beliefs. However, rumination may intensify the distress associated with uncertain situations. Distress tolerance, an individual's capacity to tolerate negative emotional experiences (Simons & Gaher, 2005), is a higher-order meta-cognitive construct associated with emotion regulation, and feelings of uncertainty is considered to be a lower-order construct that contributes to distress tolerance (Bardeen et al., 2013; Zvolensky et al., 2010). Feelings of uncertainty may directly and indirectly undermine distress tolerance (Laposa et al., 2015).

Our data suggest that conspiracist beliefs and feelings of uncertainty sequentially mediated the relationship between worries about COVID-19 and adherence to safety guidelines. This finding is significant because previous studies have shown that conspiracy beliefs and intolerance of uncertainty are related and have important implications for compliance with preventive measures, but no research has considered how both function together in this relationship.

We extend this research by showing that emotional exhaustion is associated with an increase in intolerance of uncertainty in the context of COVID-19 related worries compounded by conspiracy theories about the virus. Our primary interpretation of the finding that high levels of feelings of uncertainty were associated with lower levels of cooperation with public health recommendations in the present study is that elevated levels of feelings of uncertainty increase the psychological distress experienced by people and hampers their ability to abide by imposed constraints. The escalating uncertainty that people are experiencing along with the mandated restrictions may have resulted in emotional exhaustion.

1. Emotional exhaustion is one of the dimensions of burnout (Maslach & Jackson, 1981), which is conceptualized as feelings of fatigue, cynicism, and inefcacy or incompetence resulting from the emotional and physical demands made on the individual (Schaufeli et al., 2002). Emotional exhaustion occurs when individuals are pressured to perform tasks for which they lack the resources. They perceive the situation as overwhelming and overly distressing (Mulki et al., 2006). Just as emotional exhaustion has been associated with withdrawal and decreased job (e.g., Babakus et al., 1999) and academic performance (e.g., Bask & Salmela-Aro, 2013), In times of the present COVID-19 crisis, it is likely that many people are experiencing emotional exhaustion resulting from prolonged and intensive physical, emotional, and

cognitive strain (Demerouti et al., 2010), making them skeptical toward both health-promoting self-care behavior and the success of public health recommendations to contain the spread of COVID-19 and, therefore, less likely to partake in containment related behaviors.

One likely consequence of the rising stress and strain and corresponding increase in emotional exhaustion is that the latter may drive people to counterproductive behavior, which manifests as willful deviant or rule-breaking behavior that threatens the well-being of society. Our findings shed light on how the dynamic between COVID-19 pressures and compliance with preventive measures plays out through conspiracist ideation and feelings of uncertainty.

To summarize, in the context of the COVID-19 pandemic and the mandatory lockdown, people are reporting significant worry about the adverse sequelae they are likely to experience. The worry coupled with a belief in conspiratorial ideas about the emergence of the virus is associated with a profound sense of uncertainty. The uncertainty appears to be overwhelmingly intolerable, likely resulting in a feeling of emotional exhaustion. As observed by other researchers, albeit in academic and occupational settings, in the situation of the current crisis too, findings of this study imply that emotional exhaustion is likely to have set in and become counterproductive as people choose to violate safety guidelines. Future research is needed to confirm this new explanatory model.

5. Limitations

All findings are based on self-reports and correlations, so a limitation regarding causality must be noted. Also, the scales used for data collection in this study, although highly reliable, would require to be investigated for validity. Yet, it is undeniable that people do behave in accordance with their perceptions, and the findings from this study do imply the complex interplay among worries, beliefs, feelings of uncertainty, and their association with emotional exhaustion during a global crisis that places major challenges to daily living. Future research exploring the role of distress as mediating the relationship between feelings of uncertainty and deviance behavior will help confirm the role of emotional exhaustion. The sample included in this study was a large volunteer sample and caution should be exercised while generalizing to the larger population. Replication with a random sample is needed to confirm these preliminary findings. Finally, the present study used a cross-sectional design, so causality cannot be confirmed. Research using an experimental or longitudinal design is needed to explore the causal assumptions made in this study.

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