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# Psychological well-being and coping strategies of elderly people during the COVID-19 pandemic in Hungary

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## ABSTRACT

**Objective:** During COVID-19 lockdown the enforced social isolation and other pandemic-related changes highly increased the risk of mental health problems. We aimed to discover how elderly people coped with the psychological burdens of pandemic and the social isolation in Hungary.

**Methods:** This study included 589 (441 females) Hungarian individuals, aged 60–83 ( $M = 68.1$ ,  $SD = 4.46$ ). We collected online survey data to reach a wide population of elderly. Results of hierarchical linear modelling and structural equation modelling (SEM) analyses established how the current life-changing circumstances, the intolerance of uncertainty, loneliness and social support influence the mental health (e.g. depression, anxiety, well-being) of the elderly. The model was used to explore how adaptive and maladaptive emotion regulation strategies mediated the effects.

**Results:** Findings showed that perceived change in mood, social connectedness, and quality of life was negatively affected by catastrophizing and loneliness; whereas positive refocusing and contamination fear had a positive effect. According to the SEM analysis, intolerance of uncertainty and loneliness directly affected mental health. Further, maladaptive emotion regulation strategies mediated the connection between intolerance of uncertainty, contamination fear, loneliness and mental health. Whereas adaptive emotion regulation strategy mediated the connection between social support from friends, contamination fear, loneliness and mental health.

**Conclusion:** Overall, our research might help the understanding of how external and internal factors contributed to the well-being of elderly people during the COVID-19. The model can also be translated into professional interventions to develop coping strategies among elderly for the challenges of COVID-19 pandemic in their lives.

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## KEYWORDS

Aging; coronavirus; social isolation; mental health; structural equation modelling

## Introduction

The novel SARS-CoV-2 or coronavirus disease 2019 (COVID-19) has spread rapidly around the world over a short period of time starting in early 2020 with high infectious rate. Although most of the cases cause only mild symptoms, the chance of a severe disease and fatality rate increase with age. Based on a recent analysis, the fatality ratio is estimated as ten times higher in elderly people above the age of 60 than in adults younger than 60 (Livingston & Bucher, 2020). This might partly be because the vast majority of people who died had at least one pre-existing condition such as hypertension, diabetes or cardiovascular disease (Bavishi, Maddox, & Messerli, 2020; Guo et al., 2020). The fear due to higher chances of a severe case adds to the stress caused by the pandemic among elderly people. Moreover, recently published studies also suggested that COVID-19 has a particularly significant impact on psychological well-being, including suffering from social deprivation due to the isolation or quarantine, feeling of distress, anxiety (Garfin, Silver, & Holman, 2020), depression or suicide in more serious cases (Goyal, Chauhan, Chhikara, Gupta, & Singh, 2020).

Many countries have implemented lockdown (during first wave in March-May, 2020) to minimise the spread of

the virus, specifically instructing elderly people, who are at heightened risk, to self-isolate in order to protect themselves. In Hungary where the study was performed only mild restrictions were introduced during the first wave in March-May, 2020. Namely, time period of shopping for food and pharmaceuticals for elders was during the morning hours (9AM until noon) when only over 65 were allowed to shop. The 'Stay home' movement was encouraged, but not enforced.

During major infectious diseases social distancing and self-isolation, or voluntary quarantine can be an effective preventive intervention. However, the consequences of self-isolation such as separation from loved ones and friends, the loss of usual routine, participation in less social activities, and limited access to regular medical care can be distressing for individuals (Smith, Steinman, & Casey, 2020). Previous studies have shown that people who had been quarantined due to an infectious disease (e.g. SARS, H1N1) reported negative psychological effects like depression (Hawryluck et al., 2004; Mihashi et al., 2009), anxiety (DiGiovanni, Conley, Chiu, & Zaborski, 2004; Jeong et al., 2016), insomnia (Lee, Chan, Chau, Kwok, & Kleinman, 2005), and post-traumatic stress symptoms (Lee, Chi, Chung, & Chou, 2006; Reynolds et al., 2008) (for a review of

psychological effects of quarantine see Brooks et al., 2020). Indeed, even when there is no viral outbreak threatening people, social isolation has a pervading impact on neural, hormonal and genetic mechanisms intertwined with risk of mood disorder, sleeping disturbance, neurocognitive decline, worsening immune functions, or increased sensitivity to threat (Cacioppo & Hawkley, 2009). During the COVID-19 pandemic, loneliness through higher levels of intolerance of uncertainty could more likely result in mental health issues like hypochondriasis and obsessive-compulsive symptoms (Barnett, Moore, & Archuleta, 2019; Coelho, Suttiwan, Arato, & Zsido, 2020). Indeed, it has been suggested (Jensen & Heimberg, 2015) that intolerance of uncertainty has a substantial effect on contamination-focused obsessive-compulsive individuals. Such symptoms can have further implications under the present uncertain circumstances as the danger of contamination might keep individuals constantly on alert, the required safety behaviours might worsen the symptoms of the disorders, e.g. contamination fear (Olatunji, Etzel, Tomarken, Ciesielski, & Deacon, 2011). Moreover, the constant alertness and the increase of symptoms might result in additional mental problems, such as anxiety (Coelho et al., 2020; Hongbo, Hania & Waqas, 2020; Wheaton, Abramowitz, Berman, Fabricant, & Olatunji, 2012).

Among older individuals the risk for mental health concerns is disproportionately heightened during epidemics because they have smaller social networks and less access to social support. Previous studies have shown that the excessive avoidance of social contact contributes significantly to the development of mental health outcomes, such as depression and anxiety, for older individuals (Cornwell & Laumann, 2015; Santini et al., 2020). Social isolation, including subjective feelings of loneliness, could intensify reactions to any stress exposure like a potential risk of infectious disease (Steptoe, Owen, Kunz-Ebrecht, & Brydon, 2004). A study (Lau et al., 2008) examining the impact of the SARS outbreak in Hong-Kong has found that elderly people (65+ years) had lower levels of subjective well-being compared to younger adults (age 35–46 years). Further, the lower levels of subjective well-being were linked to other personal factors such as chronic illness, low education, and lack of social connectedness (Lau et al., 2008). Additionally, loneliness is not only a potential risk factor for depressive symptoms in the aging population (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006), but also a key factor that could mediate the relationship between mental health problems and the absence of social support (Chen & Feeley, 2014). Whereas social support could be a protective factor that promotes a better adjustment to stressors like the threat of a widespread viral illness. For example, higher levels of perceived social support from friends, family or healthcare professionals can alleviate the distress of older people by providing verbal encouragement, serving positive coping strategies and reassuring them that they can get through the difficulties (Mak, Law, Woo, Cheung, & Lee, 2009).

Due to the unpredictable nature and lack of reliable knowledge of COVID-19, the novel coronavirus pandemic might cause considerable distress (Coelho et al., 2020). Therefore, during the COVID-19 pandemic people might feel higher levels of uncertainty and little control over the

threat of infection. However, the reaction to an uncertain event depends on how the individual appraises and copes with the threat (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Rosen, Knauper, & Sammut, 2007). One can cope effectively with negative life events by using adaptive emotion regulation strategies (i.e. putting into perspective, positive refocusing, positive reappraisal, acceptance, refocus on planning). However, if the individual uses maladaptive emotion regulation strategies (i.e. self-blame, other-blame, rumination, catastrophizing), their coping won't support to overcome the burdens of the negative situation (Garnefski & Kraaij, 2007). Previous studies investigating the effects of appraisal processes regarding the past pandemic situation (i.e. H1N1, SARS) found that individuals who perceived themselves as possessing a deal of control over the virus were more likely to choose an effective coping strategy and felt reduced psychological distress and anxiety (Taha, Matheson, Cronin, & Anisman, 2014). In contrast, the perception of the pandemic as a high risk, uncontrollable situation might lead to less effective, avoidant behaviours including passivity and feelings of helplessness (Leppin & Aro, 2009). Furthermore, intolerance of uncertainty as a personality trait was also associated with appraisals in threatening situations. In the context of H1N1 pandemic, individuals with high intolerance of uncertainty were more likely to appraise the viral pandemic as potential threatening situation which predicted elevated levels of emotion-focused coping responses such as self-blaming, rumination, passive resignation, and greater reports of anxiety (Taha et al., 2014). Thus, based on the aforementioned results (Leppin & Aro, 2009; Taha et al., 2014) adaptive and maladaptive emotion-focused coping may serve as a mediating variable between the uncertainty, loneliness and fear caused by COVID-19 and older adults' mental health. Additionally, a recent study also confirmed the link between intolerance of uncertainty and mental well-being during the COVID-19 pandemic (Satici, Saricali, Satici, & Griffiths, 2020). According to these results, rumination and fear of COVID-19 had an important mediating role in the relationship between intolerance of uncertainty and mental well-being. People who cannot tolerate the uncertainty caused by this viral pandemic, tend to use rumination more frequently which, in turn, might increase the fear of COVID-19 and consequently worsen their mental well-being. Other studies that are not related to the pandemic situation also found positive relationship between mental health problems and maladaptive coping mechanisms such as catastrophizing and rumination (Görgen, Hiller, & Witthöft, 2014). While the adaptive strategies - planning, positive interpretation, and positive refocusing - were associated with better subjective well-being (Main, Zhou, Ma, Luecken, & Liu, 2011).

Based on the aforementioned findings, older adults are more vulnerable to COVID-19 viral illness, and they are more at risk of developing mental health symptoms. This is likely due to the fact that the stress levels associated with the potential risks of infection during a viral pandemic might also be increased with age (Chua et al., 2004). However, the psychological impacts of COVID-19 and the relevant factors influencing older adults' mental well-being and coping strategies are still understudied. Thus, our aim in the present study was to investigate the pathways

**Table 1.** Descriptive statistics for demographic variables.

Variable	Count	
N	589	
Age	68.1 (4.46)	
Sex		
	Male	25.1%
Education		
	No high school	4.1%
	High school	68.3%
	College or higher	27.7%
Marital status		
	Married	41.0%
	Partner	8.8%
	Separated	19.1%
	Single	12.1%
	Widow	18.8%
Living with		
	Wife/Husband/Partner	41.3%
	Family (Sister/Brother/ Children)	16.8%
	Alone	41.9%
Have chronic health conditions		54.8%
Perceived change in		
	Mood	−.78 (1.21)
	Social connectedness	−1.08 (1.30)
	Quality of life	−.82 (1.28)
Depression		2.17 (2.26)
Anxiety		6.99 (2.36)
Loneliness		16.1 (3.93)
WHO well-being		8.36 (3.47)

Notes. Data are mean (SD) or unweighted n (%). Well-being = WHO Well-Being Index, depression = Beck Depression Inventory (BDI-6) and anxiety = Spielberger Trait Anxiety Inventory (STAI).

through which social isolation (loneliness and lack of social support), intolerance of uncertainty, and fear of contamination affect older adults' mental well-being. Given the mediating pathways found in previous studies (Görge et al., 2014; Main et al., 2011; Satici et al., 2020; Taha et al., 2014), we hypothesised that adaptive and maladaptive coping mechanisms would mediate the association between these factors. We proposed that lack of social support, fear of contamination and high intolerance of uncertainty would predict symptoms of anxiety and depression through maladaptive coping strategies (e.g. rumination, catastrophizing, Garnefski & Kraaij, 2007). Whereas we hypothesised that the combination of protective factors (available social support and great tolerance of uncertainty) associated with adaptive coping strategies (e.g. positive refocusing, positive reappraisal, Garnefski & Kraaij, 2007) would contribute to higher levels of mental well-being.

## Methods

### Participants and procedure

A total of 589 respondents (441 females) volunteered to participate in our survey. Their mean age was 68.1 (SD = 4.46, age range: 60–83). See Table 1 for a more detailed description on demographic variables. The required sample size for this experiment was determined by computing estimated statistical power with a conservative approach (AGFI = .95,  $\beta > .95$ ,  $df = 19$ ) using the *semPower* package for R (Moshagen & Erdfelder, 2016; R Core Team, 2020). The analysis indicated a required total sample size of 434; thus, our study was adequately powered.<sup>1</sup> They were recruited via the Internet by posting invitations through the *Senior Academy Program* (Institute of Transdisciplinary Discoveries, Medical School, University of Pécs and Semmelweis

University, Budapest). The present survey was performed during COVID-19 pandemic in April-May 2020. The research was approved by the Hungarian United Ethical Review Committee for Research in Psychology (reference nr. 2020-51) and was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). Informed consent was obtained from all participants.

## Measures

### Demographic information

Demographic questions included age, gender, highest level of education, marital status, the people living in the same household (i.e. living alone, with spouse, or with family) and previous chronic conditions.

### Loneliness

We used the 8-item version of the UCLA Loneliness Scale (ULS-8) (Hays & Dimatteo, 1987) to measure loneliness. Participants rated the items on a 4-point Likert-type scale with values ranging from 'never' to 'always'. The ULS-8 has sound psychometric properties; in this study, the McDonald's  $\omega$  was .72.

### Intolerance of uncertainty

We used the 12-item version of the Intolerance of Uncertainty Scale (IUS-12) (Carleton, Norton, & Asmundson, 2007). The IUS-12 measures reactions to ambiguous situations, uncertainty and the future on a single factor. Participants rated each item on a 5-point Likert-type scale ranging from 'not at all characteristic of me' to 'entirely characteristic of me'. The IUS-12 has been widely used with good reliability and validity. In our study, the McDonald's  $\omega$  was .89.

### Contamination fear

We used the contamination fear subscale (CF) of the Padua Inventory (Burns, Keortge, Formea, & Sternberger, 1996), a 10-item one-factor scale assessing contamination obsessions and washing compulsions. Participants rated each item on a 5-point Likert-type scale ranging from 'not at all' to 'very much'. The measure has been shown to have high internal validity on numerous samples; in the present study, the McDonald's  $\omega$  was .87.

### Perceived change during COVID

We assessed participants' perceived change in their social connectedness, mood, and life quality on three, 7-point semantic differential scales. We asked them to indicate whether they felt any change in the given area due to the restrictions from −3 'Negative change' to 3 'Positive change'.

### Coping

We assessed catastrophizing, self-blame, other-blame, and rumination as maladaptive and positive refocusing, putting into perspective, positive reappraisal, acceptance, and planning as adaptive emotion regulation strategies. We used

**Table 2.** Regression analyses for the combined score of the perceived change in social connectedness, mood, and life quality during the COVID lockdown with IUS, CF, UCLA, CERQ subscales, MSPSS subscales, as the independent variables.

Predictor	B	SE	t	p	$\beta$	95% Confidence interval	
						Lower	Upper
IUS	-.02	.01	-1.40	.161	-.06	-.14	.02
UCLA	-.30	.04	-7.03	<.001	-.30	-.39	-.22
CF	.03	.01	2.04	.041	.08	.01	.16
MSPSS							
Significant other	.08	.05	1.61	.108	.10	-.02	.22
Family	-.03	.03	-.91	.363	-.05	-.16	.06
Friends	-.06	.02	-2.23	.026	-.11	-.21	-.01
CERQ							
Self-blame	.26	.14	1.80	.072	.07	-.01	.15
Acceptance	.09	.07	1.25	.211	.05	-.02	.13
Rumination	-.13	.10	-1.22	.220	-.05	-.14	.03
Positive refocusing	.26	.08	3.23	.001	.15	.05	.24
Planning	-.07	.08	-.86	.390	-.03	-.12	.04
Positive reappraisal	.21	.08	2.52	.012	.11	.02	.21
Perspective taking	.02	.09	.29	.767	.01	-.07	.10
Catastro-phizing	-.43	.12	-3.39	<.001	-.16	-.25	-.06
Other-blame	-.02	.07	-.38	.703	-.01	-.09	.06

Notes. The table shows the point estimates (B), standard errors (SE), standardised estimates ( $\beta$ ), 95% confidence intervals (95%CI) for the standardised estimates. IUS = Intolerance of Uncertainty Scale, loneliness = UCLA Loneliness Scale, CF = Contamination Fear subscale of Padua Inventory, MSPSS = Multidimensional Scale of Perceived Social Support, CERQ = Cognitive Emotion Regulation Questionnaire.

the 18-item short version of the Cognitive Emotion Regulation Questionnaire (CERQ-short) (Garnefski & Kraaij, 2006). Items are measured on a 5-point Likert-type scales ranging from 'almost never' to 'almost always'. The psychometric properties of the CERQ-short have been proven to be good, in our study McDonald's  $\omega$  values for catastrophizing and positive refocus were .81 and .74, respectively.

### Social support

The 12-item version of the Multidimensional Scale of Perceived Social Support (MSPSS) was used to measure perceived social support from friends, family and significant others (Zimet, Dahlem, Zimet, & Farley, 1988). Participants rate the items on a 7-point Likert-type scale, ranging from 'very strongly disagree' to 'very strongly agree'. The MSPSS has sound psychometric properties; in this study, the McDonald's  $\omega$  was .92 for friends, .94 for family and .91 for significant others.

### Well-being

We used the 5-item World Health Organization Well-Being Index (WHO-5) to measure the subjective well-being of the respondents (Topp, Østergaard, Søndergaard, & Bech, 2015). Items were scored on a 4-point Likert-type scale ranging from 'at no time' to 'all of the time'. The scale has adequate reliability and validity; in our study the McDonald's  $\omega$  was .79.

### Anxiety

We used the 5-item short version of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI-6) to measure anxiety symptom severity (Zsido, Teleki, Csokasi, Rozsa, & Bandi, 2020). Participants rated each item on a 4-point Likert-type scale ranging from 'Not at all' to 'Very much so'. The STAI-5 was shown to have adequate reliability and validity; in this study the McDonald's  $\omega$  was .86.

### Depression

To measure depressive mood, we have used the short, 6-item version of the Beck Depression Inventory (BDI-6)

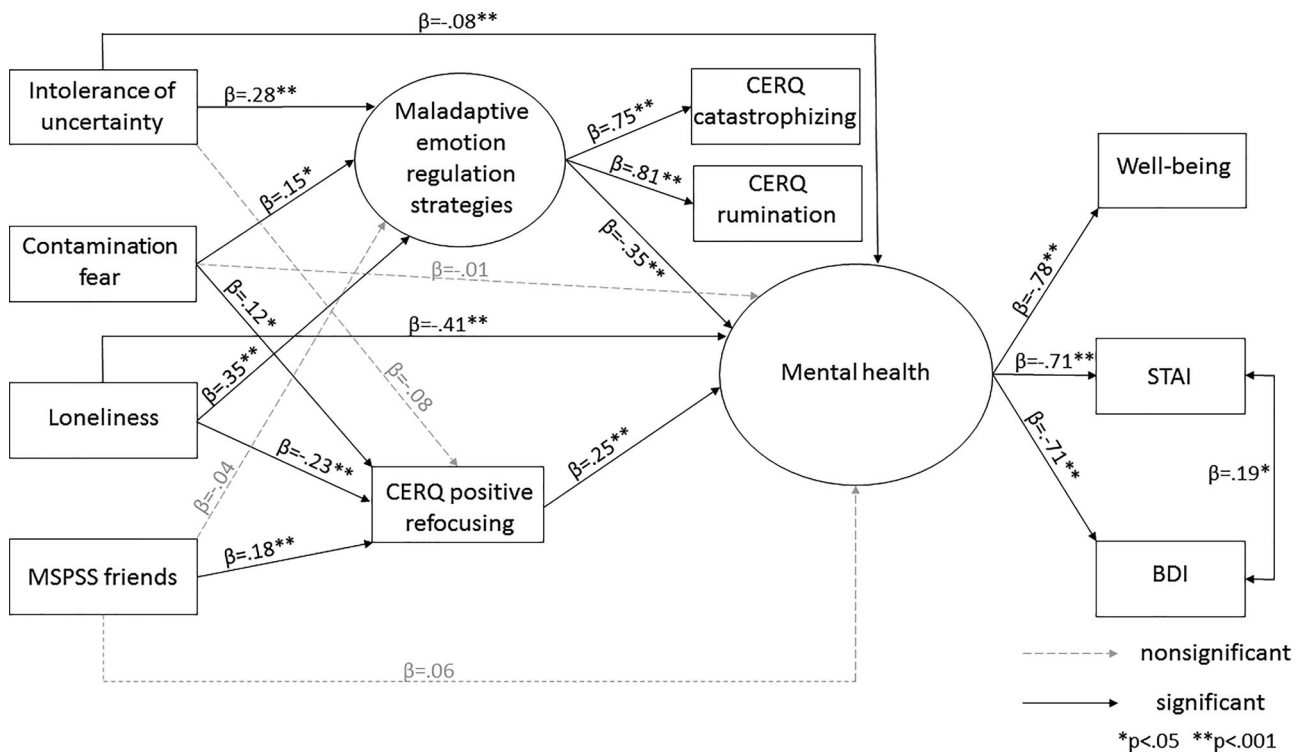
(Blom, Bech, Högberg, Larsson, & Serlachius, 2012). Items were presented on 4-point scales, similarly to the original 21-item version. The BDI-6 has adequate psychometric properties, in our study the McDonald's  $\omega$  was .72.

### Statistical analyses

To estimate the internal reliability of the scales, we calculated McDonald's  $\omega$  because, compared to Cronbach's  $\alpha$ , it allows a more robust measurement when the assumptions of the tau-equivalent model (i.e. the true standard deviation is constant in all elements) are not fulfilled (Dunn, Baguley, & Brunnsden, 2014).

First, we used linear regression modelling (enter method) to explore which of the measured factors determine participants' perceived negative change in social connectedness, mood, and life quality during the COVID lockdown. In the model, the combined score of the perceived change questions served as the dependent variable, while CERQ subscales, MSPSS subscales, IUS, UCLA, and CF were the independent variables. The Durbin-Watson test of autocorrelation was nonsignificant ( $DW = 1.95$ ,  $p = .51$ ) and VIF values were smaller than 3.

Then we performed a Structural Equation Modelling (SEM) using the JASP statistical software version 0.11.1 for Windows (JASP Team, 2019) utilising the lavaan (v. 0.6-1) package for R (Rosseel, 2012) to assess fit measures for our hypothetical model. The latent factor of mental health comprised of STAI, BDI, and WHO. The latent factor of maladaptive emotion regulation strategies comprised of CERQ catastrophizing and CERQ rumination. Other variables appeared as measured factors.<sup>2</sup> We used the diagonally weighted least squares (DWLS) estimator. For evaluating model fit the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA) and the standardised root mean square residual (SRMR) were used. The cutoffs for good model fit were CFI and TLI values of .95 or greater (Hu & Bentler, 1998), RMSEA and SRMR value of .08 or lower (Browne & Cudeck, 1992).



**Figure 1.** SEM of the relationship between the research variable. Note. Intolerance of uncertainty = Intolerance of Uncertainty Scale (Carleton, Norton, & Asmundson, 2007), contamination fear = Contamination Fear subscale of Padua Inventory (Burns, Keortge, Formea, & Sternberger, 1996), MSPSS friends = Multidimensional Scale of Perceived Social Support – Friends factor (Zimet, Dahlem, Zimet, & Farley, 1988), loneliness = UCLA Loneliness Scale (Hays & Dimatteo, 1987), CERQ = Cognitive Emotion Regulation Questionnaire (Garnefski & Kraaij, 2006), well-being = World Health Organization Well-Being Index (Topp, Østergaard, Søndergaard, & Bech, 2015), STAI = Spielberger State-Trait Anxiety Inventory (Zsido, Teleki, Csokasi, Rozsa, & Bandi, 2020), BDI = Beck Depression Inventory (Blom, Bech, Högberg, Larsson, & Serlachius, 2012). Dashed lines in grey represent coefficients that are statistically not significant.

## Results

Detailed descriptive statistics of the sample on all measures used are shown in Table 1. Overall, our respondents reported a rather negative change in their mood ( $M = -.78$ ,  $SD = 1.21$ ), connectedness ( $M = -1.08$ ,  $SD = 1.30$ ), and life quality ( $M = -.82$ ,  $SD = 1.28$ ).

Regarding perceived change, the linear regression model ( $F(15,570) = 14.9$ ,  $p < .001$ ,  $R_a^2 = .281$ ) showed that the risk factors that negatively predicted the scores were UCLA ( $\beta = -.30$ , 95%CI:  $-.39$  to  $-.22$ ,  $p < .001$ ), MSPSS friends ( $\beta = -.11$ , 95%CI:  $-.21$  to  $-.01$ ,  $p = .026$ ), and CERQ catastrophizing ( $\beta = -.16$ , 95%CI:  $-.25$  to  $-.06$ ,  $p < .001$ ). While the protective factors that positively predicted the score were CF ( $\beta = .08$ , 95%CI:  $.01$  to  $.16$ ,  $p = .041$ ), CERQ positive refocus ( $\beta = .15$ , 95%CI:  $.04$  to  $.24$ ,  $p = .001$ ), and CERQ positive reappraisal ( $\beta = .11$ , 95%CI:  $.02$  to  $.21$ ,  $p = .012$ ). See Table 2 for the exact values.

The SEM test yielded a good model fit ( $\chi^2(19) = 50.97$ ,  $p < .001$ , CFI = .96, TLI = .97, RMSEA = .05, 90%CI = .03 to .07], SRMR = .05). WHO ( $\beta = .775$ ,  $p < .001$ ), STAI ( $\beta = -.711$ ,  $p < .001$ ), and BDI ( $\beta = -.706$ ,  $p < .001$ ) loaded significantly on the latent variable of mental health. Similarly, CERQ catastrophizing ( $\beta = .745$ ,  $p < .001$ ), CERQ rumination ( $\beta = .812$ ,  $p < .001$ ) loaded significantly on the latent variable of maladaptive emotion regulation strategies. In line with our hypothesis maladaptive emotion regulation strategies ( $R^2 = .352$ ) were predicted by CF scores ( $\beta = .146$ ,  $p < .001$ ), UCLA scores ( $\beta = .346$ ,  $p < .001$ ), and IUS scores ( $\beta = .276$ ,  $p < .001$ ). Further, CERQ positive refocusing ( $R^2 = .140$ ) was predicted by MSPSS friends scores ( $\beta = .184$ ,  $p < .001$ ), CF scores ( $\beta = .123$ ,  $p = .003$ ), and UCLA scores ( $\beta = -.228$ ,  $p < .001$ ). In turn, mental health was

predicted by CERQ positive refocus scores ( $\beta = .250$ ,  $p < .001$ ) and maladaptive positive emotion regulation strategies ( $\beta = -.347$ ,  $p < .001$ ). Beside the indirect effect through the CERQ variables, UCLA scores ( $\beta = -.407$ ,  $p < .001$ ) and IUS scores ( $\beta = -.081$ ,  $p = .031$ ) also had a direct effect on mental health ( $R^2 = .601$ ). We also added a covariance between STAI and BDI ( $\beta = .186$ ,  $p = .014$ ) on account of being similar concepts (Figure 1).

## Discussion

The novel COVID-19 has emerged as the biggest pandemic of the 21st century. In order to slow down the spread and to prevent the elderly to contact the disease, most governments implemented social distancing, various restrictions in movement or total lockdown. This is a novel life situation that most people have not experienced before, and thus, results in great stress (Coelho et al., 2020). The possibility of turning to others for comfort is also limited, as the elderly is less prone to use information and communications technology devices to maintain social connections. Deficiency in social relationships increases perceived isolation, something that is already high in elderly and often cited as having serious mental health effects. Thus, in the present study, we aimed to discover how elderly people coped with the changed life situation during the COVID-19 pandemic and how these factors affect their mental well-being. Our results showed that the recent pandemic crisis brings concerns about the possible damage of the even mild social isolation as we found perceived social support from friends and loneliness as important factors influencing mental well-being and coping strategies (see also Smith et al., 2020). Further, our findings add to the existing

results (e.g. Gubler, Makowski, Troche, & Schlegel, 2020) by highlighting the importance of recognising the mediating role of the coping strategies, i.e. adaptive and maladaptive emotion regulation, between social factors, intolerance of uncertainty, contamination fear and mental well-being among elderly people in the context of health-related stressful situations.

Our participants reported a significant negative change in their mood, quality of life, and social connectedness during the first peak of the COVID-19 when restrictions were in place. This finding is consistent with previous studies (Bults et al., 2011; Main et al., 2011) highlighting that anxiety and other emotional symptoms increase during epidemics (e.g. H1N1, SARS) (see also Coelho et al., 2020 for a review). Based on the linear regression model, people who were more prone to catastrophize an event and reported higher levels of loneliness were more likely to subjectively perceive the changes as negative. In contrast, those who were more likely to use positive refocusing as a coping mechanism and reported higher levels of contamination fear experienced a less negative change. According to the transactional model of stress and coping (Folkman et al., 1986) the appraisal of threat determines the reaction of the individual. To gain a better understanding of the psychological consequences of the COVID-19 outbreak, we also examined the effects of these underlying social and psychological factors on mental well-being.

In addition to the existing results about COVID-19's association with social factors (e.g. loneliness), intolerance of uncertainty and mental well-being, the SEM model showed that social support from friends, intolerance of uncertainty, contamination fear, and loneliness all had an effect on mental well-being through either an adaptive or maladaptive emotion regulation strategy. Two variables, intolerance of uncertainty and loneliness, also had a direct effect on mental well-being. We found that intolerance of uncertainty predicted how people appraised the risks of COVID-19. Individuals with higher levels of uncertainty intolerance were more likely to interpret the current situation as more stressful. Further, they presumably felt as having little control over the pandemic which made it more likely to catastrophize the pandemic contributing to the development of anxiety-related symptoms. Similarly, the feeling of loneliness also worsened mental well-being directly, and also through catastrophizing of the event. These findings are in line with previous studies linking intolerance of uncertainty to worse mental health (Satici et al., 2020) and showing the mediating role of emotion-focused coping strategies between these factors (Taha et al., 2014) during viral pandemics. Regarding the other variables, perceived social support from friends predicted a more adaptive coping process, namely, positive refocusing, resulting in less incidence of depression and anxiety. This is consonant with previous findings (Main et al., 2011; Mak et al., 2009) demonstrating that higher levels of perceived social support from friends, family or healthcare professionals can reduce stress in older people and that adaptive strategies promoted subjective well-being. Furthermore, the effect of contamination fear on wellbeing was mediated by both adaptive and maladaptive coping strategies. That is, people more prone to fear of contamination either stressed more due to the catastrophizing of the event or

followed even more rigorous personal hygiene rules, resulting in a feeling of control over the situation and security. This is in line with an integrative review arguing that emotion regulation can augment or diminish fear depending on the emotion regulation strategy employed (Cisler, Olatunji, Feldner, & Forsyth, 2010).

There are some limitations within the current study that provide useful directions for future research. First, we employed an online survey method with a cross-sectional design. Therefore, we could not examine the causal links between viral pandemic and the psychological consequences as we did not have information about the participants' circumstances before the onset of the pandemic. Further, although we did not expect gender differences, the fact that the majority of the respondents (~75%) were females might have biased the results. Finally, although our models were able to predict a relatively large proportion of the variance, there are other variables that we did not measure but certainly can affect mental health during a pandemic.

Despite these limitations, the current study accomplishes an important incremental goal associated with mental health of elderly people during the COVID-19 pandemic. As the elderly are in danger of a more severe viral infection and in general a lack of social support characterises their lives, our results are crucial to understand how external and internal factors contribute to the mental well-being of elderly people during the COVID-19 pandemic. Further, the model can also be translated into professionals' interventions to develop and enhance coping strategies among the elderly for the novel challenges of the COVID-19 crisis in their social lives. Finally, a note has to be taken to draw readers' attention that cultural differences likely have a significant effect on the coping strategies.

## Notes

1. In fact, the post hoc computed achieved power was 0.995070 in this study.
2. To reduce the number of variables in the SEM model, and thus, make it more reliable, we used linear regression modelling (enter method) to explore which of the measured factors of each questionnaire (CERQ and MSPSS) predict mental health of participants during the COVID lockdown. [Supplementary material 1](#) shows the procedure of selecting the variables and exact statistical results. Based on the results we only used the scales CERQ positive refocusing, CERQ catastrophizing, CERQ rumination, and MSPSS friends from their respective questionnaires in the SEM analysis.

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## Disclosure statement

All authors declare that they have no conflicts of interest.

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## Current author contribution statement

Conceptualization: BL, NA, AS, ANZ, TB; Methodology: BL, NA, OI, DS, TB Formal analysis and investigation: ANZ; Writing - original draft preparation: BL, NA, OI, ANZ; Writing - review and editing: BL, NA, ANZ; Funding acquisition: BL, NA, ANZ; Supervision: BL, ANZ

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