RESEARCH IN PROGRESS

The Psychological Consequences of COVID-19 Outbreak Among the German Population

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Abstract The world is currently facing an unprecedented pandemic crisis. The highly contagious coronavirus, or COVID-19, first occurred in Wuhan (China) in December 2019. The outbreak of the virus quickly spread all over the world, reaching Europe in January 2020. The first case in Germany was reported to be diagnosed on January 27. This study focuses on assessing the mental health consequences of the German public during COVID-19 outbreak. Psychological discomfort, generalized anxiety disorder, sleep disturbances, depressive symptoms and threat perception are especially investigated with respect to demographics, security importance and negative affectivity. The psychological vulnerabilities that go along with the pandemic are evaluated in detail. The cross-sectional online survey conducted in Germany reveals a prevalence of depressive symptoms, psychological discomfort, threat perception, generalized anxiety disorder and sleep disturbances associated with the pandemic crisis. The results also indicate a relationship between mental health issues and negative affectivity as well as the perception of threat. This paper gives an outlook on long-term consequences and what could be the strategies to mitigate the negative mental health outcomes of the crisis.

Keywords COVID-19 · Mental health issues · Generalized anxiety disorder · Sleep disturbances · Threat · Psychological discomfort

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Introduction

The world is currently facing an unprecedented pandemic crisis. The highly contagious coronavirus, or COVID-19 (SARS-CoV-2), first occurred in Wuhan, China, in December 2019. The outbreak of the virus quickly spread all over the world, officially reaching Europe in January 2020. The first case in Germany was reported on January 27. The world has not experienced a pandemic crisis to such an extent since the Spanish influenza in 1918 (Mineo, 2020). The pandemic crisis is not only a threat for the individual's health, but also, as the course of the pandemic shows, each and every private and public, economic and non-economic sector are affected to a certain extent by the crisis. This disease brings a whole set of social, emotional, psychological and economic sufferings with it that was and is not fully predictable. The vehemence of the disease and how it hits the societies was simply underestimated, especially in Europe. The situation in Germany at the end of January, with the diagnosis of the first case, which was quickly followed by further cases, was, at first, not perceived as very threatening. Normal life went on, carnival season was celebrated as usual and even on March 4, the Robert Koch Institute (RKI), in their first status report (Robert Koch Institut, 2020a), considered the situation and the overall risk to the health of the German population as low to moderate with 262 confirmed cases. On March 9, the RKI considered the situation overall still moderate, and higher in particularly affected areas (Robert Koch Institut, 2020b). In their report from March 17, it is reported that the overall risk to the health was high with, by then, 7 156 confirmed cases of COVID-19 in Germany. Because of the rapid spread of the disease, Germany enacted several laws and decrees covering different areas to try to get the situation under control. It was followed by the end of March by

closures of public facilities, shops, etc. Because of this, many companies requested their employees to work from home; others requested their employees to go on short-term work due to a decrease in workload, along with economic difficulties. Based on other European Countries, such as Italy, Spain or France, which had imposed temporary closures of non-necessity shops, restaurants, bars, public facilities and even strict lockdowns, Germany also imposed such closures which grind to a halt of public life. Nevertheless, unlike some countries, Germany did not impose strict lockdowns. People were still allowed to leave their homes during March, April and May 2020.

This situation was, and still is, very new to most people, with all the changes, limitations, threats and sorrows that go along with it. It depicts how vulnerable established systems can be. The corona situation in Germany, like in most countries of the world, leads to a high uncertainty of the population resulting in anxiety-related behaviors, such as stockpiling of hand sanitizer, medical masks, as well as convenience goods, such as pasta, tinned food, flour, yeast and toilet paper. A study conducted by Chen et al. underlined that humans experience the loss of control in situations of anxiety and stress, such as the current pandemic, which results in such buying behavior to try to regain control over the situation (Chen et al., 2016). Furthermore, based on studies conducted by Huang and Zhao (2020), in China, there is a strong likelihood, that the pandemic had a serious impact on the mental health of the public.

The German Institute of Communication and Society (IKG) hypothesized that corona would affect the human mind in a negative way. It is a collective stress test for the whole society as well as for individuals (Kirchner, 2020). Both social isolation and physical distancing affect the psychological health in a negative way. The social isolation triggers unconscious fears and depressions. "In a pandemic, although uncertainty raises stress and anxiety levels in healthy individuals, it also aggravates the symptoms in those with preexisting mental disorders" (Azim et al., 2020, p. 1). Galea et al. write in their recently published article on mental health consequences of COVID-19 and social distancing, that it leads to depression, anxiety states, substance abuse, loneliness and domestic violence (Galea et al., 2020). They state that after quarantine and a lockdown, there will be people that will not only suffer from economic damages but also from potential lasting psychological damage. Looking back at previous pandemics responsible for important human deaths (Fan et al., 2018), infectious diseases represent severe ecological threats to humans. Previous research underlines that pandemic or epidemic can affect mental health in a negative way. Prior studies on psychological consequences of quarantine found that the fear regarding one's own health and the health of family members, a missing routine, less social and physical

contacts, boredom and shortage of supplies, as well as medical care tend to affect the mental health negatively (Brooks et al., 2020). Another systematic literature review and meta-analysis undertaken by Stuijfzand et al. (2020) included studies from 2000 to 2014 about the effect of another pandemic/epidemic showing that mental health is at risk in this kind of context. Studies ranging from the investigation of Ebola (Lehmann et al., 2016; Li et al., 2015; Vyas et al., 2016), SARS (Brooks et al., 2018; Chan & Huak, 2004; Chan et al., 2005; Maunder, 2009), A/H1N1 (Goulia et al., 2010), MERS (Lee et al., 2018; Son et al., 2019) all underline that mental health is negatively affected by the outbreak of such diseases, especially for clinical staff, but also for the general populations.

These studies show that anxiety, social isolation, psychological distress, perceived stress and concerns about infection of relatives can have tremendous effects on the psychological health of an individual. According to the meta-analysis undertaken by Brooks et al. (2020) on previous epidemics/pandemics, the burden of a quarantine gets stronger as it lasts longer. In reviewing 24 papers focusing on psychological impact of quarantine from 2004 to 2019, the authors found that "most reviewed studies reported negative psychological effects including post-traumatic stress symptoms, confusion and anger. Stressors included longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss and stigma. Some researchers have suggested long-lasting effects." (Brooks et al., 2020, p. 912). Actual research from China underlines that anxiety states, insomnia and depression increased since the beginning of the corona outbreak in December 2019 (Huang & Zhao, 2020). Besides that, financial losses, loss of jobs, dependency on others are stressors that are ubiquitous during and after a lockdown. A recent study focusing on the psychological situation of the German population underlines, that young people experience the corona situation as much more stressing than older people. According to the authors, the younger generation experiences more boredom, loneliness, depressiveness, nervousness and fear (Betsch et al., 2020).

The research gaps concerning COVID-19 are obvious: it is a disease with an unprecedented extent in a globalized world during the twenty-first century, thus, researchers from all over the world and different scientific fields are trying to understand this disease and its effects with all its facets and impacts. This paper delivers important insights on psychological impact of this crisis with an empirical investigation conducted in Germany during the first lockdown. The main purpose of this paper is to examine COVID-19's effect on psychological health and to reinforce findings of other recently published studies on the psychological vulnerabilities and uncertainties associated

with the COVID-19 crisis. The study presented here identifies and analyzes psychological consequences of the corona crisis, especially examining psychological outcomes, as well as personal and social effects. By assessing the crisis from a psychological perspective, in the field of applied psychology, it will help to delineate an actual picture of the human psychology in the twenty-first century during an extreme and unfamiliar situation and will help to better understand how a pandemic crisis can affect the population.

Mental Health Symptoms Caused by COVID-19

Evidence for the impact of COVID-19 on mental health is still limited. Nevertheless, different scientific and empirical examinations, such as those undertaken by Brooks et al. (2020), Huang and Zhao (2020), Husky et al. (2020), Gualano et al. (2020), Li et al. (2020), Luo et al. (2020), Ng et al. (2020), Nicomedes and Avila (2020), Ozamiz-Etxebarria et al. (2020), Pratap et al. (2020), Salari et al. (2020), Stanton et al. (2020), have been conducted in different cultures and regions in order to better understand the mental health issues caused by COVID-19 on different societies. The following section depicts specific mental health issues on which this paper focuses.

Threat Perception

The actual Corona pandemic is not the first one that claims lives all over the world. Looking back at previous pandemics responsible for important human deaths (Fan et al., 2018), infectious diseases represent severe ecological threats to humans. In the case of the coronavirus, the whole situation is abstract and invisible; therefore, humans are likely to feel, implicitly or explicitly, threatened. Terror management theory (Greenberg et al., 1997; Harmon-Jones et al., 1997) deals with mortality salience and typical human reactions. The virus is a salient trigger that makes people aware of their own mortality. Thus, COVID-19 is highly associated with fear, threat, destiny, and other severe problems.

But, like other animals, humans have the ability to cope with such situations (Klackl et al., 2014; LeDoux, 2012; Mobbs et al., 2015). As such, negative emotions, i.e., fear, can play a crucial role in perceiving a threat as ominous (van Bavel et al., 2020). However, fear can also be emotionally contagious, leading to be swept up into a collective panic. Emotional contagion is characterized as the "(…) tendency to automatically mimic and synchronize expressions, vocalizations, postures, and movements with those of another person's and, consequently, to converge emotionally" (Hatfield et al., 1994, pp. 153–154). Thus, it is a socially viral phenomenon spread also through media

coverage during the crisis that could trigger fear. The ubiquity of fear can result in weakening of rational thinking and rational decision-making and the alarming thing about fear is that "it infects people's feelings and actions, causing them to behave in ways that often run against their own interests, not to mention their larger obligations to public health and social life" (Ciaschi, 2020).

Hypothesis 1   *The pandemic crisis triggers fear.*

Psychological Discomfort

Leon Festinger described cognitive dissonance as an unpleasant emotional state while holding incompatible cognitions that induce psychological discomfort. Psychological discomfort is a subjective experience that usually arises when the expected state does not comply with the reality whereas people try to reduce this state. It is often associated with psychological pain (Festinger, 1957). The Covid-19 crisis can create a state of cognitive dissonance for most people while they experience high levels of psychological discomfort and stress. "Even for households free from the virus, the pandemic is likely to function as a major stressor (…) such effects may be exacerbated by self-isolation policies that can increase social isolation and relationships difficulties" (van Bavel et al., 2020, p. 466). Psychological discomfort occurs when people struggle to adapt to new situations (such as the pandemic crisis) due to a maladaptive response to this stressful situation.

Hypothesis 2   *The pandemic crisis leads to psychological discomfort.*

Generalized Anxiety Disorder (GAD)

One of the most common mental disorder is the generalized anxiety disorder (Spitzer et al., 2006), which is characterized by a feeling of unease, feeling restless and being racked by worries. Furthermore, a lack of concentration, heart palpitations or bad sleep are symptoms that characterize GAD. They can be caused by different events, in a wide range of situations and issues, rather than one specific event, and can elicit psychological and physiological symptoms. Researches showed that anxiety symptoms have been prevalent in previous diseases and associated quarantines (Brooks et al., 2020; Huang & Zhao, 2020).

Hypothesis 3   *The pandemic crisis causes a prevalence of generalized anxiety disorder.*

Depressive Symptoms

Depressive symptoms are characterized by feeling down and without energy. Although depressive symptoms vary

from individual to individual, there are some characteristic signs.

Emotions such as desperateness, sadness, anger, irritability, but also the loss of interest in normal activities, loss of appetite and weight are such symptoms. Especially the common appearance of symptoms could characterize a person as depressed (Berkman et al. 1986). The current pandemic could be an origin to elicit such symptoms as people were and are forced to totally change their daily routines due to corona. Not only the ubiquity of the disease due to media coverage but also the threat to be economically affected by the outcomes such as loss of jobs are reasons why also mentally stable people could show such symptoms. Mak et al. (2009) found in their investigation of SARS-survivors as well as Lee et al. (2018) and Huang and Zhao (2020) that depressive symptoms are most prevalent during and after a pandemic crisis.

Hypothesis 4 *The corona crisis leads to depressive symptoms.*

Sleep Disturbance

If humans experience a state of psychological tension and are troubled with it, this often goes along with sleep disturbances. So how well or bad a person sleeps is usually affected by current things in life, as humans process experiences especially during sleep and recovery phases. Sleep disturbances, especially insomnia, often go along with other mental health issues, such as depression (Ford & Kamerow, 1989). The occurrence of the corona pandemic is very threatening for many people, which is intensified through the omnipresent media coverage about the topic that could lead to sleep disturbances.

Hypothesis 5 *The corona crisis affects the sleep quality in a negative way.*

Negative Affect

Affect refer to one's propensity to experience rather positive or negative emotions and one's pervasive view of themselves and the world in general (Watson & Clark, 1984). Affectivity is important in relation to how people experience their life and it can influence their attitudes, opinions, and thoughts. Positive affectivity refers to positive emotions, such as pride, joy, happiness, and enthusiasm besides others (Watson et al., 1988). Negative affectivity in contrast refers to negative emotions, such as sadness, fear, distress, and lethargy (Watson & Clark, 1984). Additionally, research emphasizes that there is a strong relationship between affectivity and personality traits. Negative affectivity strongly correlates with neuroticism (Işık & Üzbe, 2015; Zanon et al., 2013).

Therefore, individuals high on general negative affectivity are especially vulnerable to pandemic-related mental health issues.

Hypothesis 6 *Individuals high on negative affectivity are more likely to report pandemic-related stress symptoms.*

Security Importance

Values play a fundamental role in human life as they denote what is important and desirable for an individual. As values, or value systems, affect how humans behave, they are guiding principles to navigate through a complex world (Schwartz, 1992). Schwartz has identified 10 distinct value types[1] which he organizes on two dimensions in his circumplex model of values: the first dimension describes the degree of self-enhancement, and the second, the degree of change (or preservation of status quo) (Burroughs & Rindfleisch, 2002; Schwartz, 1994). In unfamiliar and difficult situations, such as the current pandemic crisis, especially values toward safety and stability of individual and group relationships become conscious. Individuals who have a high security need are likely to keep the status quo as it is and they are conservative toward change (Burroughs & Rindfleisch, 2002). The invisible danger of the disease itself, as well as all the structural changes and policies to contain the negative outcomes of the pandemic make individuals with a high security need feel insecure. The high degree of uncertainty that comes along with a crisis, affects all areas of everyday life. Individuals with a strong security need experience stress, instability, and they feel like losing control over their ordinary routines.

Hypothesis 7 *People with a high security need are more likely to report pandemic-related stress symptoms compared to people with a low security importance.*

Sociodemographic Characteristics

According to the review undertaken by Brooks et al. (2020), there is evidence that certain sociodemographic characteristics are predictors of psychological impacts of a crisis. For example, Huang and Zhao (2020) showed with their investigation of the corona crisis in China, that especially young people are psychologically affected in a negative way. Power et al. also underline, in their study on youth mental health at the time of COVID-19, that "the psychosocial effects of COVID-19 disproportionately affect young people" (2020, p. 1). Young adults especially suffer from social distancing, quarantine, and the general

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[1] Schwartz' general value types are: power, achievement, hedonism, stimulation, self-direction, universalism, tradition, conformity, benevolence and security.

limitation of their social contacts, as social bonds, are extremely important for them.

Hypothesis 8 *Young people are more likely to report pandemic-related stress symptoms.*

An article by Lara Owen, on BBC News, highlights the challenges Asian women are facing during the crisis. What is mentioned there partly holds true also for women on other continents and countries such as Germany. Intensive childcare due to school closures, domestic violence, job loss or cutoff jobs are some examples that German women also were and are still facing. Owen writes that "mothers shoulder a disproportionate burden at home" (Owen, 2020). This is unfortunately true for many countries in the world. Gender equality at work and women's economic participation are still lacking, also in Germany (World Economic Forum, 2019). These are reasons explaining why women can be hit harder by the crisis than men, thus leading to more potential mental health risks. In Germany, as well as in other countries, people with children were and are experiencing specific difficulties as schools and child-care closed down for a certain period of time. Parents, especially single parents, who had to take care of their kids, to hold down their jobs and often had no support as, unlike in other countries such as France, the government and different health institutions warned to ask grandparents to take care of the kids, but did not offer enough support to parents. If at all, emergency childcare was only offered to people who worked in a so-called system-relevant job.

Hypothesis 9a *Women tend to experience and report negative responses more often than men.*

Hypothesis 9b *People with children, especially women, are more likely to report pandemic-related stress symptoms.*

Methods

Procedure

The general German population was the target group of this research. The identification of potential subjects was the first step then. To capture insights from the target audience Qualtrics was chosen as the proper research platform with a worldwide panel of 100 million + . Thus, German participants were recruited from the Qualtrics sample pool. During the research process, informed consent was obtained from all individual participants. The invited participants were voluntary, received financial compensation for completing the questionnaire and were guaranteed confidentiality. Only 18 years and older participants were eligible to complete the self-administered questionnaire.

Quotas where applied on gender (50% male and 50% women) as well as on age (50% under 41) in order to obtain an evenly balanced distribution across age groups. All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Furthermore, all procedures performed in the study involving human participants were in accordance with the ESOMAR guidelines for online research.

Sample

The data were collected through an online survey at the beginning of the month of June 2020, while the country was still locked down, under mandatory confinement for 2 months, April and May. The total sample size was 503, but 183 questionnaires had to be deleted due to incomplete answers; the final sample size is of 320 completed questionnaires. Among the remaining 320 questionnaires, 156 (48.8%) of them were completed by females and 164 (51.2%) by males. 42 (13.1%) of the respondents were between the ages of 18 to 24 years, 122 (38.1%) belonged to the age group ranging from 25 to 40 years, and 140 participants (43.8%) belonged to the age group from 41 to 66 years. 16 participants (5%) indicated being 67 or older. Regarding the household size and family structure, 149 (46.6%) said that they have children or grandchildren, whereas 171 (53.4%) selected the answer "no children or grandchildren." The household size ranged from one person (111, 34.7%), two persons (103, 32.2%), three (66, 20.6%) and four, or more (40, 12.5%). Concerning the education, employment status and the monthly household net income, the sample shows the following distributions: 13 participants (4.1%) indicated having no high school degree. 154 (48.2%) indicated holding a Certificate of Secondary Education, 81 (25.3%) have completed their A-Levels, (10.3%) had a bachelor degree, 30 (9.4%) had a Master degree, and 9 participants (2.8%) had a doctoral degree. The employment structure of the sample was as follows: 164 (51.2%) worked full-time, 60 (21.9%) participants indicated working part-time, and 86 (26.9%) reported being a student, trainee or non-working (including retirement or on maternity leave).

The distribution concerning the monthly household net income was as follows: 66 (20.6%) indicated earning less than 1.300 €, 70 (21.9%) indicated having between 1.300 € and 2.000 €. 80 participants (25%) reported having between 2.001 € and 3.000 €, 41 (12.8%) belonged to the income group of 3.001 € to 4.000 €, 35 (10.9%) belonged to the income group of 4.001 € to 5.000 €, and 28 (8.8%)

reported earning a monthly household net income above 5001 €.

Measures

The participants received a short description of the study before starting the questionnaire. To assess whether the participants showed a positive or negative affectivity in general, the German version of the PANAS scale was used (Breyer & Bluemke, 2016). Participants were presented with a 5-point-Likert-type scale showing different characteristics which they had to rate with 1 (not at all) to 5 (extremely).

The importance individuals attribute on safety and stability in their lives was assessed with the Security Importance Scale initially developed by Schwartz (1992) and used by Burroughs and Rindfleisch (2002). We shortened the original 7-item scale to 4 items to make it more context specific. The participants indicated the importance of each of the presented values on a 5-point Likert scale ranging from not important (1) to extremely important (5).

The prevalence of threat caused by COVID-19 was assessed with the 4-item Fearfulness Scale proposed by Duhachek (2005). The items were displayed on a 5-point-Likert-type scale ranging from 1 (does not apply at all) to 5 (does apply at all).

Generalized anxiety disorder (GAD) with regard to COVID-19 was measured with the German version of the generalized anxiety disorder-7 (GAD-7) (Löwe et al., 2002, 2007; Spitzer et al., 2006). This validated scale is widely used in the German culture. It is a 4-point-Likert-type scale ranging from 0 (never) to 3 (almost every day) with seven items evaluating the frequency of anxiety symptoms over the past 8 weeks (April and May 2020).

To assess depressive symptoms and moods connected to COVID-19 over the past 8 weeks (April and May 2020) the German version of the Center for Epidemiologic Studies Depression Scale (CES-D) was used (Radloff, 1977). The original version was validated and used in different scientific areas to assess the occurrence of these symptoms. The participants had to indicate on a 4-point-Likert-type scale whether the symptoms are prevalent (1 never or rarely; 4 usually or always).

To examine the sleep disturbances associated with COVID-19, the German version of the Pittsburg Sleep Quality Index (PSQI) scale was used. PSQI is a widely used scale developed by Buysse et al. (1989) to evaluate the participants' sleep disorder. In this case, the participants had to indicate their sleep quality over the past 8 weeks (April and May 2020). The participants were asked to report sleep disturbing incidents, their sleep quality, their usual sleep time, duration of sleep, use of medication to induce sleep as well as latency to fall asleep

and tiredness during the day (Backhaus et al., 2002; Buysse et al., 1989).

Psychological discomfort associated with the corona crisis was measured by the 3-item cognitive dissonance scale (Elliot & Devine, 1994; Spangenberg et al., 2003). Participants assessed if they experienced a state of psychological tension during the corona crisis on a 5-point-Likert-type scale that ranged from 1 (does not apply at all) to 5 (does apply at all).

To assess the relationship between sociodemographic characteristics and mental health issues, the participants were asked to indicate their gender, age group, whether they have children/grandchildren, household size, education, occupational status, and monthly household net income.

Data Analysis

Common Method Bias, Reliability and Factor Structure

Statistical analyses were conducted with IBM SPSS Statistics 25. The first step to assess the data's structure was to test for common method bias/variance (CMV). Therefore, Harman's single factor test was performed for all items (Tehseen et al., 2017). The generated PCA output revealed 16 distinct factors accounting 67.8% of the total variance in the dataset. The first unrotated factor captured 26.3% of the data's variance. Thus, the underlying assumptions for CMV—one single factor extracted and first factor accounting for most of the variance—did not meet. The results of Harman's single factor test revealed, that CMV is not an issue in this study.

This was followed by an exploratory factor analysis (EFA) (maximum likelihood estimation method) to determine the factor structure of the latent variables (scales) such as psychological discomfort, security importance, fear, negative affect, GAD-7, CES-D, and sleep quality. This was necessary in order to determine whether the factor structure is consistent with theory. Table 1 displays the Kaiser–Meyer–Olkin Measure of Sampling Adequacy (KMO) and the Bartlett's Test for sampling adequacy's results.

Only factors with eigenvalues ≥ 1 were considered (Guttman, 1954; Kaiser, 1960). An examination of Kaiser's criteria, the Scree Plot, and the factor loadings (suggested cutoff > 0.5) yielded empirical justification to merge the respective items to the scales.

In order to determine if the sample is adequate and has been selected according to the rigorously scientific procedure sample reliability information is needed. Thus, a reliability analysis was performed in order to determine the

Table 1 KMO and Bartlett's Test

		Depression symptoms	GAD	Sleep disturbance	Fear	Negative affect	Psychological discomfort	Security importance
Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.965	0.939	0.879	0.837	0.929	0.680	0.826
Bartlett's Test of Sphericity	Approx. Chi-Square	5051.229	1547.303	1964.459	766.242	1802.409	456.849	700.437
	df	190	21	136	6	45	3	6
	Sig	0.000	0.000	0.000	0.000	0.000	0.000	0.000

internal consistency of the items composing the individual scales. "Internal consistency reliability, the primary method of estimating reliability for multi-item scales, provides information about the associations among different items in the scale. Internal consistency is typically indexed by Cronbach's coefficient alpha (…)" (Frost et al., 2007, S95). Alpha coefficients of all scales[2] were higher than 0.75 indicating a good internal consistency (Nunnaly & Bernstein, 1994). Scales' descriptive statistics are reported in Table 2.

Higher mean scores of the constructs presented above reflect a prevalence of those symptoms. Thus, the higher the score is, the more often they occur and the more severe they are. Based on the means, the data showed moderate levels of anxiety, fear, psychological discomfort, and security importance across the sample. The sample represents a low-to-moderate prevalence of depressive symptoms and low levels of sleep disturbances. Table 3 shows the scale values, their categorization according to the severeness of the symptoms as well the distributions among the sample.

Analyses of Variance

Effects of Sociodemographic Characteristics on Mental Health Issues

In the next step, the different analyses of variance were run in order to test for significant differences on mental health issues (psychological discomfort, GAD, fear, depressive symptoms and sleep disturbances) concerning different sociodemographic criteria (categorical predictor variables).

A two-way between subjects' ANOVA was conducted to compare the effect of age group and gender on threat perception due to COVID-19. The results revealed no significant effect among the conditions at the $p < 0.05$

level [$F (3, 312) = 0.009$, $p = 0.999$]. Similar results were obtained for the effect of gender and age on psychological discomfort related to the corona crisis [$F (3, 312) = 0.586$, $p = 0.624$]. There was no significant interaction between the effect of age and gender on generalized anxiety disorder [$F (3, 312) = 0.020$, $p = 0.996$], although simple main effects analysis showed a significant effect of age. Post hoc comparisons using the Gabriel test (condition: homogeneity of variances, different sub-group sizes) indicated the mean score for GAD of the age group under 25 ($M = 1.42$, SD = 0.74) was significantly different in connection to the age group 41–66 ($M = 0.78$, SD = 0.81). There was also a significant difference concerning GAD between the age groups 25–40 ($M = 1.13$, SD = 0.77) and 41–66 ($M = 0.78$, SD = 0.81). No significant difference between participants 67 and older ($M = 0.98$, SD = 0.91) was revealed in comparison with one of the other groups.

There was no significant interaction between the effect of age and gender on the prevalence of depressive symptoms [$F (3, 312) = 0.802$, $p = 0.493$]. However, simple main effect analysis revealed an effect of age. Post hoc comparisons using the Gabriel test indicated the mean score for depressive symptoms of the age group under 25 years ($M = 2.3$, SD = 0.67) was significantly different compared to the age group 41–66 years ($M = 1.60$, SD = 0.69) and the age group of 67 and older years ($M = 1.71$, SD = 0.78). There was also a significant difference concerning the mean of age group 25–40 years ($M = 1.98$, SD = 0.73) compared to the age group 41–66 years.

Sleep disturbances associated with COVID-19 were not observed from the data, as there was no significant interaction between the effect of age and gender [$F (3, 312) = 0.897$, $p = 0.443$]. Nevertheless, simple main effect analysis showed a significant difference for gender ($p = 0.005$), indicating that women experienced stronger sleep disturbances ($M = 1.06$, SD = 0.55) than men ($M = 0.85$, SD = 0.52). Table 4 summarizes the results and show which results are significant and where the assumption of no significant differences (H0) can be rejected.

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[2] Cronbach's alpha: negative affect (.887), security importance (.886), psychological discomfort (.842), fear (threat perception) (.898), GAD (.930), depressive symptoms (.962), sleep disturbance (.751).

Table 2 Mean, standard deviation, and interpretation of symptom prevalence for sample

Scale	Mean	Standard deviation	Interpretation/occurrence
Fear	3.12	1.15	Moderate
Psychological discomfort	3.42	1.12	Moderate
GAD	1.01	0.82	Moderate
Depressive symptoms	1.84	0.75	Low to moderate
Sleep disturbance	0.95	0.54	Low
Negative affect	2.32	0.98	Moderate
Security importance	3.86	1.07	Strong

Table 3 Interpretation of symptom prevalence based on mean values

Depression symptoms		GAD		Psychological discomfort		Sleep disturbances		Fear (threat perception)	
Values	Percentage (%)	Values	Percentage (%)	Values	Percentage (%)	Values	Percentage (%)	Values	Percentage (%)
1–1.49 low/not existent	44.4	0–0.49 low/not existent	35.6	1–1.49 not existent	7.5	0–0.49 low/not existent	21.3	1–1.49 not existent	10.9
1.5–2.49 low–moderate	30.3	0.5–1.49 low–moderate	34.7	1.50–2.49 low	12.5	0.50–1.49 low–moderate	58. 1	1.50–2.49 low	13.8
2.5–3.49 moderate–strong	22.8	1.50–2.49 moderate–strong	25.6	2.50–3.49 moderate	30.3	1.50–2.49 moderate–strong	20	2.50–3.49 moderate	33.1
3.50–4 severe	2.5	2.50–3 severe	4.1	3.50–4.49 strong	30.6	2.50–3 severe	0.6	3.50–4.49 strong	25.6
				4.5–5 severe	19.1			4.50–5 severe	16.6

Table 4 Test of differences between age and gender

Effects of age and gender	Age			Gender		
	p value	Decision	Interpretation	p value	Decision	Interpretation
Generalized anxiety disorder	0.000*	Reject H0	Significant	0.101	Accept H0	Not significant
Depressive symptoms	0.000*	Reject H0	Significant	0.073	Accept H0	Not significant
Sleep disturbance	0.118	Accept H0	Not significant	0.005*	Reject H0	Significant
Psychological discomfort	0.588	Accept H0	Not significant	0.527	Accept H0	Not significant
Fear	0.427	Accept H0	Not significant	0.249	Accept H0	Not significant

*Statistically significant difference $p < .05$

Although the tests revealed no significant differences between women and men in terms of generalized anxiety disorder, there is a significant difference between men having children and no children regarding generalized anxiety disorder [$F (1, 162) = 5.108$, $p = 0.025$]. Men who have no children/grandchildren tend to experience higher levels of GAD ($M = 1.05$, SD = 0.80) than men with children/grandchildren ($M = 0.76$, SD = 0.79).

The one-way ANOVAs regarding depressive symptoms and sleep disturbances revealed no significant effects of

Table 5 Effects of children, split men and women

Children/grandchildren	p value	Women Decision	Interpretation	p value	Men Decision	Interpretation
Generalized anxiety disorder	0.051	Accept H0	Not significant	0.025*	Reject H0	Significant
Depressive symptoms	0.890	Accept H0	Not significant	0.066	Accept H0	Not significant
Sleep disturbance	0.109	Accept H0	Not significant	0.236	Accept H0	Not significant
Psychological discomfort	0.000*	Reject H0	Significant	0.873	Accept H0	Not significant
Fear	0.002*	Reject H0	Significant	0.538	Accept H0	Not significant

*Statistically significant difference $p < .05$

children or grandchildren. Regarding the experience of psychological discomfort, there is a significant difference [$F (1, 154) = 13.356$, $p = 0.000$] between women having children/grandchildren ($M = 3.84$, SD = 1.06) and those who indicated to be childless ($M = 3.18$, SD = 1.19). The same applies for the experience of fear [$F (1, 154) = 9.770$, $p = 0.002$]. Women with kids ($M = 3.53$, SD = 1.12) also experience a higher threat due to COVID-19 than women who are childless ($M = 2.93$, SD = 1.24). Table 5 summarizes the results and shows where the children have an effect on men and women in terms of mental health. The assumption of no significant differences (H0) can be rejected in 3 cases.

Further analyses were performed in order to investigate the effects of household size, household net income, education and occupation on the prevalence of fear, psychological discomfort, anxiety, depressive symptoms and sleep disturbances. Significant differences were only observed for men that work full-time (more than 35 h per week) compared to men who work part-time (less than 15 h per week) in terms of anxiety ($p = 0.007$) and in terms of depressive symptoms ($p = 0.011$). Regarding the effects of the other sociodemographic characteristics on mental issues, no significant differences were observed.

Influence of Negative Affect on Mental Health Issues

The one-way ANOVA for negative affect and its effect on psychological discomfort yielded to significant results [$F (4, 315) = 6.301$, $p = 0.000$] showing that a higher level of negative affect tends to go along with a higher level of psychological discomfort. Multiple comparisons revealed significant differences between people who do not show any negative affect ($M = 3.00$, SD 1.30) compared to people who experience a little negative affect ($M = 3.49$, SD = 1.07), moderate negative affect ($M = 3.49$, SD = 0.96) and severe negative affect ($M = 4.87$, SD = 0.35).

Furthermore, the conditions of severe negative affect compared to a little, moderate, and strong negative affect ($M = 3.48$, SD = 1.06) revealed significantly different mean values.

Likewise, the ANOVA for GAD and negative affectivity showed significant effects [$F (4, 315) = 37.296$, $p = 0.000$]. The Gabriel post hoc test showed that the mean difference is significant at the 0.05 level among almost all conditions, indicating that the stronger the negative affectivity, the higher the level of anxiety. There was no significant difference between people indicating that they have a severe negative affectivity versus people who indicated having a strong or a moderate negative affectivity.

The same holds true for depressive symptoms. The ANOVA disclosed significant effects for the measures of depressive symptoms concerned with negative affectivity [$F (4, 315) = 39.647$, $p = 0.000$]. Although there was no significant difference between people indicating having a strong negative affectivity versus people who indicated having a moderate or a severe negative affectivity regarding depressive symptoms, all other conditions were significant at the 0.05 level indicating that the higher the level of negative affectivity, the higher the level of depressive symptoms.

In order to test the effect of negative affectivity on sleep disturbances, an ANOVA was also performed. The results disclosed significant effects for the measures [$F (4, 315) = 11.290$, $p = 0.000$]. Gabriel post hoc test for multiple comparisons revealed significant differences in sleep disturbances among several conditions of negative affectivity, indicating that a stronger distinction of negative affectivity shows a stronger prevalence of sleep disturbances. The results showed a significant difference at the $p = 0.05$ level between the no negative affectivity condition ($M = 0.70$, SD = 0.50), the moderate negative affectivity condition ($M = 1.04$, SD = 0.49), the strong negative affectivity condition ($M = 1.32$, SD = 0.46), as well as to the severe negative affectivity condition ($M = 1.58$, SD =

0.79). Further significant differences were found between a light negative affectivity ($M = 0.91$, SD = 0.52), a strong negative affectivity and a severe negative affectivity, as well as between moderate negative affectivity and severe negative affectivity.

The influence of negative affectivity on threat perception was also examined by performing an ANOVA. The results showed a significant effect [F (4, 315) = 12.141, $p = 0.000$]. Multiple comparisons underlined significant differences on threat perception between people who indicated having no negative affectivity ($M = 2.60$, SD = 1.28) compared to people who experience moderate negative affectivity ($M = 3.40$, SD = 0.92), strong negative affectivity ($M = 3.53$, SD = 1.07) and severe negative affectivity ($M = 4.87$, SD = 0.35). Furthermore, there are significant differences between people with moderate negative affectivity compared to people with severe negative affectivity and between people with strong and severe negative affectivity. Table 6 summarizes the results.

Influence of Security Importance on Mental Health Issues

The importance of safety in one's personal life also seems to play a role in the experience of mental health issues. The samples' mean ($M = 3.86$, SD = 1.07) indicates a strong importance of security for the participants whereas 15% indicate a moderate security need, 33.4% indicate a strong security need, and 40% indicate a severe security need.

Further analyses showed significant differences for the varying levels of security importance and psychological discomfort [F (4, 315) = 17.520, $p = 0.000$]. Multiple comparisons showed that people placing no importance on safety ($M = 1.93$, SD = 1.52) show significant mean value differences compared to people with moderate security importance ($M = 3.12$, SD = 0.74), strong ($M = 3.39$, SD = 1.03) and severe security importance ($M = 3.85$, SD = 1.05). There are also differences between severe security importance and low security importance ($M = 2.76$, SD = 0.75), moderate and strong security importance. To summarize, people with higher levels of security importance also express higher levels of psychological discomfort.

The one-way ANOVA for security importance and threat perception reveals significant differences [F (4, 315) = 9.511, $p = 0.000$]. Mean values for threat perception are higher in relation to the level of safety; the stronger importance people place on safety, the stronger their threat perception will be. Multiple comparisons showed significant differences between people who indicated placing no importance on safety ($M = 1.81$, SD = 1.42), versus people with moderate security importance ($M = 3.04$, SD = 0.87), people with strong security importance ($M = 3.04$, SD = 1.13) and people with severe security importance ($M = 3.45$, SD = 1.15). There are also significant differences between people with low security importance ($M = 1.81$, SD = 1.42) and people with severe security importance as well as between people with strong and severe security importance.

To test the effect of security importance on GAD an ANOVA was also performed. The results revealed significant differences [F (4, 315) = 2.549, $p = 0.034$]. Multiple comparisons for all conditions show a significant difference between the condition related to moderate security importance ($M = 1.29$, SD = 0.62) and strong security importance ($M = 0.88$, SD = 0.80).

It looks similar for depressive symptoms and security importance [F (4, 315) = 3.498, $p = 0.008$]. Multiple comparison showed significant differences between people with a moderate security need ($M = 2.19$, SD = 0.60), strong (MD = 1.75, SD = 0.73) and a severe security need (MD = 1.77, SD = 0.78). For sleep disturbances, the ANOVA revealed no significant difference among the different conditions of security importance [F (4, 315) = 0.843, $p = 0.499$]. Table 7 depicts a summary of the results.

Discussion

The major objective of this study is to investigate the influence of a pandemic, here the case of the COVID-19 pandemic, on the mental health of the German population.

Table 6 Influence of negative affect

Negative affect	p value	Decision	Interpretation
Generalized anxiety disorder	0.000*	Reject H0	Significant
Depressive symptoms	0.000*	Reject H0	Significant
Sleep disturbance	0.000*	Reject H0	Significant
Psychological discomfort	0.000*	Reject H0	Significant
Fear (threat perception)	0.000*	Reject H0	Significant

*Statistically significant difference $p < .05$

Table 7 Effect of security importance on mental health

Security importance	p value	Decision	Interpretation
Generalized anxiety disorder	0.000*	Reject H0	Significant
Depressive symptoms	0.000*	Reject H0	Significant
Sleep disturbance	0.499	Accept H0	Not significant
Psychological discomfort	0.000*	Reject H0	Significant
Fear (threat perception)	0.000*	Reject H0	Significant

*Statistically significant difference $p < .05$

With the fast spread of the pandemic in early 2020, most European countries were and are affected massively, which is somewhat new. As no previous epidemic or pandemic in the last decades hit European countries that hard, especially Germany, the influence of such a pandemic on the mental health of the German public remains unclear. The overarching research question and the major gap, which our study is attempting to fill, can be summarized as "how does the presence of the highly infectious COVID-19 pandemic in Germany affects the mental health of the German public?". Thus, the aim of this study was to focus especially on pandemic-related mental health issues, such as GAD, depressive symptoms, sleep disorder, psychological discomfort and how specific traits or predispositions, such as negative affectivity, values like security importance or sociodemographic characteristics reinforce mental disorder. While still largely undocumented, answering the research question above contributes to the existing literature on pandemic-related mental health consequences that so far is limited to other diseases or other regional areas. The identification of mental health issues will help to facilitate the understanding of pandemic outcomes, and how to deal with mental health consequences on a societal level. It will further help to develop services and preventive activities at the national level.

To study this specific research question, a cross-sectional research design was chosen, targeting the general German population. The survey was conducted in early June when mandatory confinements were still active across Germany. To test the hypotheses, analyses of variance (ANOVA's) were the appropriate statistical method to apply. The present study identified certain psychological and mental health issues associated with the crisis and reinforces previous findings. The results of the analysis show a prevalence of symptoms such as psychological discomfort, anxiety, depression, sleep disturbances, and fear across the sample. Moderate levels of these symptoms are mostly distributed across the sample, although symptoms with strong and severe levels are reported. 30.3% of the participants reported to suffer from moderate levels of psychological discomfort, whereas 30.6% indicated strong,

and even 19.1% reported severe psychological discomfort associated with the crisis. Conspicuous are also the moderate (33.1%), strong (25.6%) and severe (16.6%) levels reported for threat perception across the sample. General anxiety disorder is as well prevalent in the sample: 34.7% of the participants reported low-to-moderate levels, 25.6% moderate to strong levels, and 4.1% reported severe anxiety symptoms suffering from GAD almost every day. It looks similar for depression symptoms with 30.3% of the participants indicated low-to-moderate levels, but 22.8% reported moderate to strong levels, and even 2.5% suffered from severe depressive symptoms almost all the time in the past 8 weeks. Low-to-moderate sleep disturbances during the considered period were reported by 58.1%, whereas 20% reported moderate to strong, and 0.6% reported severe sleep disturbances. The increased frequency of the reported symptoms found in the current sample could be interpreted as COVID-19 related, thus hypotheses 1–5 are confirmed. A study published in the *Journal of Health Monitoring* in 2019 by Hapke et al. (2019) before the pandemic crisis shows that participants from Germany had a higher prevalence for depressive symptoms (9.2%), compared to participants from other European countries (6.6%), and ranks on the second position after Luxembourg (10%). Young adults are especially affected with depressive symptoms compared to elderly people according to study undertaken by Hapke et al. (2019). According to DGPPN (German society for psychiatry, psychotherapy, psychosomatic medicine and neurology), 18 Million people suffer from mental illnesses per year (DGPPN, 2020), whereas the most mental health issues reported are anxiety disorder, depressive symptoms, as well as alcohol- and drug-related disorder. Although Germany is a country with a relatively high rate of mental illnesses before the outbreak of the virus compared to other European countries, it is expected that the number of Germans suffering from new mental health issues is much higher in 2020. The findings mentioned above underline this assumption and they are consistent with research findings from other countries. Thus, other studies conducted in Europe and related to mental health issues associated with COVID-19 also report higher

levels of mental health issues. Husky et al. (2020) investigated stress and anxiety among university students in France during COVID-19 mandatory confinement also showing increased levels of anxiety and stress. Another study, conducted by Shevlin et al. (2020) in the UK, shows moderate to high levels of anxiety (GAD) associated with COVID-19, as well as gastrointestinal and fatigue symptoms. Similar results were obtained by a study conducted in Italy by Gualano et al. (2020). Italy was the first country in Europe that entered a nationwide lockdown with very high cases and deaths associated with COVID-19. This study shows a general prevalence of anxiety (23.2%) and depression symptoms (24.7%) as well as sleep disturbances (42.2%). Yet another study for Italy undertaken by Mazza et al. (2020) shows "an increased percentage of people with high and very high levels of distress" (Mazza et al., 2020, p. 12). Other studies come to similar results such as those obtained by Ozamiz-Etxebarria et al. (2020) in northern Spain, as well as González-Sanguino et al. (2020) for the entire country: Spain.

Further studies related to COVID-19 and mental health issues undertaken in other regional contexts and/or with different objectives underline as well, that mental health is at risk. Hence, as one of the first studies published, Huang and Zhao (2020) identified higher levels of GAD, depressive symptoms and sleep quality across the general Chinese public. Furthermore, the meta-analyses conducted by Ng et al. (2020) on the effects of COVID-19 on the mental constitution of healthcare workers in Asia show increased symptom prevalence, especially anxiety and depressive symptoms. The study of Li et al. (2020) "aimed to investigate the COVID-19-related factors that were associated with sleep disturbance and suicidal thoughts among members of the public during the COVID-19 pandemic in Taiwan" (Li et al., 2020, p. 1). Their results underline that a higher prevalence of sleep disturbances and suicidal thoughts are associated with the virus outbreak compared to results from a previous population-based survey undertaken before the outbreak. A study conducted by Pratap et al. (2020) in the USA focused on the online search behavior regarding mental health symptoms search during March. They found that it dramatically rose after stay-at-home orders and underline that the awareness of potential mental health issues related to a pandemic increased.

Finally, the study conducted by Stanton et al. (2020) focused on the prevalence of depression, anxiety, and stress on physical activity, sleep, alcohol intake and cigarette smoking. Their results show negative changes in lifestyle associated with higher depression, stress, and anxiety symptoms.

The present study investigated further factors that might influence the vulnerability to certain mental health issues such as sociodemographic characteristics like age, gender, children, household net income and occupation. The results underline that younger people (under 25) seem to be more affected with the occurrence of mental health issues, such as depressive symptoms and GAD, than elderly people. The results show that the prevalence decreases with age. This goes in line with the results of the European Health Interview Survey, conducted before the pandemic crisis (Hapke et al., 2019). Furthermore, the vulnerability of young people has also been shown by other research on the effect of COVID-19 (e.g., González-Sanguino et al., 2020; Huang & Zhao, 2020; Ozamiz-Etxebarria et al., 2020; Power et al., 2020) and also for other diseases such as Ebola (e.g., Vyas et al., 2016). This observation could be explained by the fact, that a certain part of the participants in the age group under 25 (15.7%) are students and students usually report higher levels of mental health issues, especially stress (Bert et al., 2020; Chen et al., 2013; Ozamiz-Etxebarria et al., 2020; Sharp & Theiler, 2018), when isolated. Cao et al. (2020) also underlined that the changes in academia due to COVID-19 and the potential delays in obtaining the degree correlate with anxiety. Other risk factors for young adults are the short-term or limited employment (Bert et al., 2020); and, lastly, a large amount of information due to extensive use of social media which could promote stress (Cheng et al., 2014). Consequently, as the results show a specific vulnerability of young people to all mental health issues, hypothesis 8 is confirmed.

Unlike the results of other studies related to COVID-19 and anxiety, depression and sleep disturbances (Brooks et al., 2020; González-Sanguino et al., 2020; Gualano et al., 2020; Huang & Zhao, 2020; Mazza et al., 2020), the hypotheses (H9a,b), stating that gender plays an important role in experiencing mental health issues, and that women are more prone to anxiety and depression, cannot be confirmed. This is contrary to the results of the European Health Interview Survey, underlining that women are more prone to depressive symptoms (10.8%) than men (7.6%) (Hapke et al., 2019). The results of the present study further suggest that sex does not play a role in threat perception and psychological discomfort. Nevertheless, the data showed a significant difference between men and women regarding sleep disturbances indicating that women tend to experience more sleep disturbances than men do. This was as well underlined by the results of Gualano et al. (2020). Gender seems not to play a major role in the occurrence of mental health issues according to the results of the present study. Thus, hypothesis 9a is not confirmed. However, when comparing the effect of having children versus not having children on mental health issues, reported by men and women, we found different results. Psychological discomfort and fear seem to be more prevalent for women with children and GAD seems to be more prevalent for men with children. Although there are significant

differences, no universal trend shows a specific vulnerability of women with kids to mental health issues. Thus, hypothesis 9b (*People with kids, especially women, are more likely to report pandemic-related stress symptoms*) is not confirmed. To summarize, even if sex does not play a major role in prevalence of these symptoms according to the results of the prevalent study, we suggest challenging this result with further investigations as previous examinations presented opposite results.

Another focus of this study was to investigate personal predispositions, such as the tendency to negative affectivity and values such as security importance, in relation to pandemic-related mental health issues. The investigation of negative affectivity and its effect on mental health revealed interesting insights. In fact, the results suggest that individuals with negative affectivity have a stronger tendency to report pandemic-related symptoms. Based on previous results not related to COVID-19, and confirmed by our data collected during the pandemic, a higher negative affectivity positively correlates with depressive symptoms (Lonigan et al., 1994; Santor & Zuroff, 1994; Watson & Clark, 1984) and anxiety (Lonigan et al., 1994; Watson & Clark, 1984). The same holds true for psychological distress, whereas a higher self-reported level of psychological discomfort goes in line with higher levels of negative affectivity. According to Brennan and Barnett (1998), negative affectivity can account for a great deal of self-reported psychological distress, as we have found as well. Our results underline that negative affectivity is related positively to fear, thus a higher tendency state of negative affect goes in line with higher levels of threat. Similar results were obtained by Pérez-Fuentes et al. (2020). They investigated negative affect as a mediator for COVID-19 related threat perception among the Spanish population. Their results indicated a higher prevalence for threat perception the stronger participants' negative affectivity is prevailing. In summary, our results reveal that hypothesis 6 (*Individuals high on negative affectivity are more likely to report pandemic-related stress symptoms such as anxiety, depressive symptoms, sleep disturbances, psychological discomfort and threat*) is confirmed.

The results obtained on security importance are conspicuous as well. Safety seems to play an important role to the German society as the sample data reveals ($M = 3.86$, 40% indicate a severe security need). This is not surprising as the "German" perception of security in relation to epidemic/pandemic was not distressed before the outbreak of COVID-19 as for previous epidemics such as SARS, MERS, and Ebola the German population was barely or not affected at all. The German population could feel relatively safe as previous pandemics affected only other countries to a great deal, and the last pandemic that hit Germany to such an extent was the Spanish influenza in the early twentieth century with an estimated number of 300.000 deaths. The data revealed furthermore significant effects of peoples' safety need on mental health symptom prevalence such as psychological discomfort, GAD, depressive symptoms and threat perception (but not sleep disturbances). Hence, there is a trend to report a stronger occurrence of mental health issues when people perceive safety as very important and hypothesis 7 can be confirmed. The results are thus not very surprising, as individuals who ascribe security a high value in their lives feel distressed during times of high uncertainty. The results can be furthermore explained by the fact that Germany was perceived as relatively safe country and the overall perception of the society is to be invulnerable. The subliminal presumption of the German population, before the outbreak of the pandemic was, that this would only hit other countries but not Germany as the country has an advanced health care system that would protect the population against a nationwide outbreak. The course of the pandemic in Germany convulses values such as security need and leads to high prevalence of uncertainty.

Implications and Future Directions

The present study identified certain psychological and mental health issues associated with the crisis and reinforces previous findings. During the time of the data collection, the figures about infections at the beginning of June 2020 were relatively lower than those for other European countries with comparable population sizes. As of June 1st, Germany reported a total of 181.815 infections, 8.511 deaths associated with COVID-19 and 333 new cases since the previous day. The figures were much higher in the UK (255.519 confirmed cases, 37.445 deaths, 1125 daily increase), Spain (253.651 confirmed cases, 29.392 deaths, 317 daily increase), Italy (233.019 confirmed cases, 33.415 deaths, 335 daily increase) and France (148.524 cases, 28.746 deaths, 88 daily increase) (World Health Organization, 2020).

The present sample shows low-to-moderate mental health issues associated with the pandemic crisis. This could be explained by the perception of the society that Germany is coping better with the crisis in a European comparison. Furthermore, it could be attributed partially to the advanced health care system, as this might also have a psychological influence, since German people feel relatively secure. Another possible reason of why this study shows low-to-moderate results of mental health issues is that there was no strict lockdown (people were still allowed to go out) imposed to the general public. During the extremely uncertain months of March, April, and May, people were still allowed to leave their houses and have social contact, although it was recommended to limit it as

much as possible, keeping a physical distance between people. Another reason why the general population in Germany might not have suffered severely from mental health issues is that a functioning labor structure and solidarity gave people a feeling of security. Germany offers a strong employment protection, has very active labor organizations, and a well-functioning social system. Financial support was offered to self-employed people right from the beginning of the crisis. A "hire and fire" mentality, such as in the USA, is not common in Germany, and workplaces are protected by labor laws. Although many companies sent their employees on short-term work, the continuance of the workplace is then guaranteed by law. Besides the fear toward the infection itself, the associated economical burdens that go along with the pandemic crisis might be one of the key stressors affecting mental health in a negative way. Compared to other countries, the advanced German social system and jurisdiction are means to mitigate economical threats in society as a whole. Nevertheless, it is important that the public discourse in Germany, as well in other countries, does not only focus on physical and economic consequences of the disease, but also stress upon the psychological consequences. This is important as mental health issues also produce consequential costs for the society. As mental illnesses increase as an outcome of corona, digital support services for people concerned should be expanded. Another aspect is the role of employers and organizations. Employers can support their employees who are affected, as in recent years the number of working people affected with mental diseases steadily increased (DGPPN, 2020). For this reason, investigating the role of employers during a pandemic could be a fruitful area of research. Furthermore, it would be interesting to investigate how certain occupational groups, such as health care workers, nursing and teaching staff, politicians, among others, or people who are on short-term work, or even those who lost their jobs due to the crisis, are affected mentally. Besides, the investigation of different social classes and how they are affected psychologically due to corona would be an interesting field of research. It can be supposed that a family of 5 living in a flat with limited space is more vulnerable to mental symptoms than a childless couple with double income and a house a suburban area.

The ongoing research and findings on psychological consequences of COVID-19 underline that mental health is at risk. "Stable mental health is one of the keys to fighting this ongoing pandemic and to restoring a post-pandemic society" (Azim et al., 2020). In order to maintain, or to achieve, a stable mental health across a society, social or community resilience is a key requisite. This helps individuals and societies to cope with challenging situations without negative long-term impacts. The prevailing crisis shows that this is important not only at an individual level, but also on a societal level (Cheng et al., 2014). The psychological resilience is an important factor to cope with such a situation; it is not innate but rather develops during a crisis or is the result of a crisis. "The social and personal resources (e.g., seeing family and getting sufficient sleep) available to individuals can be important resilience-related factors for mitigating mental health difficulties under particularly stressful circumstances" (Holmes et al., 2020, p. 549). Optimistic people tend to show a stronger resilience than people with a rather negative affectivity tendency do. The results of our study underline that a society should work on this capacity. The research on social resilience associated with a pandemic could thus be an interesting direction for future research.

An important study concerns the role played by the media in the context of the crisis and its potential influences on individual mental health. Since the outbreak started, news about the virus dominate the headlines of media channels all over the world. The media coverage is extremely important to disseminate information to global citizens in times where the course of the pandemic is unpredictable (Wen et al., 2020). However, the role of the media is more important than ever before. Misleading coverage, badly investigated facts, and fake news engender a danger and make the society feel even more insecure. Especially social media, such as Facebook, Twitter, WhatsApp, and Instagram, are widely used across the German public and are often used as a source of information, especially for younger people. The findings of Gao et al. (2020) underline that mental health issues are positively related to social media exposure. Thus, "communication strategies must strike a balance between breaking through optimism bias without inducing excessive feelings of anxiety and dread." (van Bavel et al., 2020, p. 461). Therefore, the effect of media consumption on mental health during a crisis can be another area of research. The rise of fake news and conspiracy theories in the context of COVID-19 is a promising phenomenon of social research. The media channels and social media platforms should pay more attention to their coverage and to the threat of fake news. As this study shows, as well as what previous findings underline, young people are more vulnerable to negative mental health consequences of the pandemic. As they use social media a lot, they are likely to be misinformed by fake news. This leads to uncertainty and their mental stability could be affected in a negative way. Societies should pay special attention to that and addressing young people's needs should be a primary focus (Holmes et al., 2020; Power et al., 2020).

However, there are many other strategies to mitigate the negative effects of social/physical distancing, isolation and associated loneliness on mental health that are

characterizing the crisis. The rise of video chat usage, pop-up of "neighborhood support initiatives," online courses and gatherings on different interests, balcony parties and much more, showed that human beings can be quite creative in tough times in order to satisfy their social needs and to show acts of solidarity. By not acting in utility maximizing, but rather in a cooperative way, helps to cope with such a crisis and to foster the mental public welfare. In the long term, giving and showing solidarity pays off rather than acting egoistically. Thus, it would be interesting to know more about how such positive initiatives influence and affect the perceptions and wellbeing during a pandemic crisis and how the exposure to the crisis changes over time.

To summarize, there are certain factors that can affect the mental health of a human being: individual factors such as predispositions, traits, emotions, illness, family, friends, and external factors such as the governmental activities to ban the pandemic, media coverage, social system, etc. In order to enhance the understanding of mental health issues associated with the experience of a crisis, research on what role the prementioned factors play is inevitable. Cross-cultural comparisons on how different societies deal with the pandemic and how it affects mental health of individuals in other countries can be a fruitful area for future research. The knowledge about the effects of confinement strategies may be used to reduce negative impacts on the mental health especially of vulnerable populations.

Limitations of the Study

Unfortunately, this cross-sectional study is not fully representative of the overall German population, in terms of economic statutes. Thus, the findings may not represent the whole population, but they clearly represent a strong tendency. Although general data on the mental health constitution of the German population are available, the present empirical investigation is not based on time series data; therefore, a comparison of the obtained results with data from before the crisis is not thoroughly possible.

Conclusion

The pandemic crisis is a collective stress test for societies all over the world. The present study, conducted in Germany in June 2020, identified certain psychological and mental health issues associated with the crisis and reinforces previous findings and findings from other countries on the effect of COVID-19 on mental health. To summarize, our study shows a prevalence of GAD, fear, depressive symptoms, sleep disturbances and psychological discomfort associated with COVID-19 during April, May and early June 2020. The increased frequency found in the

current sample could be interpreted as COVID-19 associated although further studies should confirm this association. As the pandemic and its spread are not yet under control, neither globally nor in Germany, it is likely that mental health issues persist and they clearly need to be taken into account.

To conclude, insights from psychology are inevitable to better understand feelings and behavior of people during such a pandemic crisis. In order to preserve vulnerable groups from mental health issues and help those who are already concerned, psychological tools and interventions need to be developed especially at the national level, in order to maintain a mentally healthy and resilient society. The current worldwide COVID-19 pandemic offers the opportunity to advance our understanding on how to deal with global pandemics and how to provide psychological and mental health care. Research on how the persistence of COVID-19 affects mental health and what are implications to the German population represents an important piece to fight the pandemic besides the search for an effective vaccine. It is still a race against time to prevent the societies for further physical, psychological and economic damages. With the end of the year 2020, the infection numbers and COVID-19-related deaths are dramatically increasing in Germany (Status December 17th: 1.406.161 infections, 24.125, 26.923 daily increase) (World Health Organization, 2020). As the situation seems out of control, more than ever before, the Conference of Ministers decided on December 13 a second, strict lockdown until January 10, 2021. This implies further closures of all non-necessity shops, schools, childcare, limited contacts, and much more. The severeness of the crisis and its threat becomes more obvious than ever before to the German public and consequentially affects the most important season of the year for not only individuals and families but also for the economy: Christmas. Thus, there is a likelihood that mental health issues will persist and increase among the German population.

Consent for Publication All procedures performed in studies involving human participants were in accordance with the ESOMAR guideline for online research.

Ethics Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References

Azim, D., Kumar, S., Nasim, S., Arif, T. B., & Nanjiani, D. (2020). COVID-19 as a psychological contagion: A new Pandora's box to close? *Infection Control and Hospital Epidemiology*. https://doi.org/10.1017/ice.2020.127

Backhaus, J., Junghanns, K., Broocks, A., Riemann, D., & Hohagen, F. (2002). Test–retest reliability and validity of the Pittsburgh sleep quality index in primary insomnia. *Journal of Psychosomatic Research, 53*, 737–740. https://doi.org/10.1016/S0022-3999(02)00330-6

Berkman, L. F., Berkman, C. S., Kasl, S., Freeman, D. H., Leo, L., Ostfeld, A. M., et al. (1986). Depressive symptoms in relation to physical health and functioning in the elderly. *American Journal of Epidemiology, 124*, 372–388. https://doi.org/10.1093/oxfordjournals.aje.a114408

Bert, F., Lo Moro, G., Corradi, A., Acampora, A., Agodi, A., Brunelli, L., et al. (2020). Prevalence of depressive symptoms among Italian medical students: The multicentre cross-sectional "PRIMES" study. *PLoS ONE, 15*, e0231845. https://doi.org/10.1371/journal.pone.0231845

Betsch, C., Korn, L., Felgendreff, L., Eitze, S., Schmid, P., Sprengholz, P., et al. (2020). *COVID-19 Snapshot Monitoring (COSMO)*. https://projekte.uni-erfurt.de/cosmo2020/cosmo-analysis.html#5_psychologische_lage.

Brennan, R. T., & Barnett, R. C. (1998). Negative affectivity: How serious a threat to self-report studies of psychological distress. *Women's Health: Research on Gender, Behavior, and Policy, 4*(4), 369–384.

Breyer, B., & Bluemke, M. (2016). *Deutsche Version der Positive and Negative Affect Schedule PANAS (GESIS Panel)*. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-65680-6.

Brooks, S. K., Dunn, R., Amlôt, R., Rubin, G. J., & Greenberg, N. (2018). A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during and infectious disease outbreak. *Journal of Occupational and Environmental Medicine, 60*, 248–257. https://doi.org/10.1097/JOM.0000000000001235

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., et al. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet, 395*, 912–920. https://doi.org/10.1016/S0140-6736(20)30460-8

Burroughs, J. E., & Rindfleisch, A. (2002). Materialism and well-being: A conflicting values perspective. *Journal of Consumer Research, 29*, 348–370. https://doi.org/10.1086/344429

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research, 28*, 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., et al. (2020). The psychological impact of the COVID-19 epidemic on college

students in China. *Psychiatry Research, 287*, 112934. https://doi.org/10.1016/j.psychres.2020.112934

Chan, A. O. M., & Huak, C. Y. (2004). Psychological impact of the 2003 severe acute respiratory syndrome outbreak on health care workers in a medium size regional general hospital in Singapore. *Occupational Medicine, 54*, 190–196. https://doi.org/10.1093/occmed/kqh027

Chan, S. S. C., Leung, G. M., Tiwari, A. F. Y., Salili, F., Leung, S. S. K., Wong, D. C. N., et al. (2005). The impact of work-related risk on nurses during the SARS outbreak in Hong Kong. *Family & Community Health, 28*, 274–287. https://doi.org/10.1097/00003727-200507000-00008

Chen, C. Y., Lee, L., & Yap, A. J. (2016). Control deprivation motives acquisition of utilitarian products. *Journal of Consumer Research*. https://doi.org/10.1093/jcr/ucw068

Chen, L., Wang, L., Qiu, X. H., Yang, X. X., Qiao, Z. X., Yang, Y. J., et al. (2013). Depression among chinese university students: Prevalence and socio-demographic correlates. *PLoS ONE, 8*, e58379. https://doi.org/10.1371/journal.pone.0058379

Cheng, C., Jun, H., & Liang, B. (2014). Psychological health diathesis assessment system: A nationwide survey of resilient trait scale for Chinese adults. *Studies of Psychology and Behavior, 12*, 735–742.

Ciaschi, P. (2020). 'Nothing spreads like fear': COVID-19 and the dangers of emotional contagion: Fear and panic can make people act in ways that run against their own interests and obligations to society. https://www.cbc.ca/news/opinion/opinion-covid-19-Coronavirus-society-behaviour-1.5501573. Accessed from 2 Aug 2020.

DGPPN. (2020). *Basisdaten Psychische Erkrankungen*. https://www.dgppn.de/_Resources/Persistent/a2e357dac62be19b5050a1d89ffd8603cfdb8ef9/20201008_Factsheet.pdf.

Duhachek, A. (2005). Coping: A multidimensional, hierarchical framework of responses to stressful consumption episodes. *Journal of Consumer Research, 32*, 41–53. https://doi.org/10.1086/426612

Elliot, A. J., & Devine, P. G. (1994). On the motivational nature of cognitive dissonance: Dissonance as psychological discomfort. *Journal of Personality and Social Psychology, 67*(3), 382.

Fan, V. Y., Jamison, D. T., & Summers, L. H. (2018). Pandemic risk: How large are the expected losses? *Bulletin of the World Health Organization, 96*, 129–134. https://doi.org/10.2471/BLT.17.199588

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.

Ford, D. E., & Kamerow, D. B. (1989). Epidemiologic study of sleep disturbances and psychiatric disorders. *JAMA, 262*, 1479. https://doi.org/10.1001/jama.1989.03430110069030

Frost, M. H., Reeve, B. B., Liepa, A. M., Stauffer, J. W., & Hays, R. D. (2007). What is sufficient evidence for the reliability and validity of patient-reported outcome measures? *Value in Health: THe Journal of the International Society for Pharmacoeconomics and Outcomes Research, 10*(Suppl 2), S94–S105. https://doi.org/10.1111/j.1524-4733.2007.00272.x

Galea, S., Merchant, R. M., & Lurie, N. (2020). The mental health consequences of COVID-19 and physical distancing: The need for prevention and early intervention. *JAMA Internal Medicine*. https://doi.org/10.1001/jamainternmed.2020.1562

Gao, J., Zheng, P., Jia, Y., Chen, H., Mao, Y., Chen, S., et al. (2020). Mental health problems and social media exposure during COVID-19 outbreak. *PLoS ONE, 15*, e0231924. https://doi.org/10.1371/journal.pone.0231924

González-Sanguino, C., Ausín, B., Castellanos, M. Á., Saiz, J., López-Gómez, A., Ugidos, C., et al. (2020). Mental health consequences during the initial stage of the 2020 Coronavirus

pandemic (COVID-19) in Spain. *Brain, Behavior, and Immunity, 87*, 172–176. https://doi.org/10.1016/j.bbi.2020.05.040

Goulia, P., Mantas, C., Dimitroula, D., Mantis, D., & Hyphantis, T. (2010). General hospital staff worries, perceived sufficiency of information and associated psychological distress during the A/H1N1 influenza pandemic. *BMC Infectious Diseases, 10*, 322. https://doi.org/10.1186/1471-2334-10-322

Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews Empirical assessments and conceptual refinements. In M. P. Zanna (Ed.), *Advances in experimental social psychology (Vol. 29, pp. 61–139, Advances in Experimental Social Psychology).* Academic.

Gualano, M. R., Lo Moro, G., Voglino, G., Bert, F., & Siliquini, R. (2020). Effects of Covid-19 lockdown on mental health and sleep disturbances in Italy. *International Journal of Environmental Research and Public Health.* https://doi.org/10.3390/ijerph17134779

Guttman, L. (1954). Some necessary conditions for common-factor analysis. *Psychometrika, 19*, 149–161. https://doi.org/10.1007/BF02289162

Hapke, U., Cohrdes, C., & Nübel, J. (2019). Depressive Symptomatik im europäischen Vergleich – Ergebnisse des European Health Interview Survey (EHIS) 2. *Journal of Health Monitoring.* https://doi.org/10.25646/6221

Harmon-Jones, E., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., & McGregor, H. (1997). Terror management theory and self-esteem: Evidence that increased self-esteem reduced mortality salience effects. *Journal of Personality and Social Psychology, 72*(1), 24.

Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1994). Emotional contagion. *Studies in emotion and social interaction* (1st ed.). Cambridge Univ Press.

Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., et al. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry, 7*, 547–560. https://doi.org/10.1016/S2215-0366(20)30168-1

Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 epidemic in China: A web-based cross-sectional survey. *Psychiatry Research.* https://doi.org/10.21203/rs.3.rs-17172/v1

Husky, M. M., Kovess-Masfety, V., & Swendsen, J. D. (2020). Stress and anxiety among university students in France during Covid-19 mandatory confinement. *Comprehensive Psychiatry, 102*, 152191. https://doi.org/10.1016/j.comppsych.2020.152191

Işık, Ş, & Üzbe, N. (2015). Personality traits and positive/negative affects: An analysis of meaning in life among adults. *Educational Sciences: Theory & Practice.* https://doi.org/10.12738/estp.2015.3.2436

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*, 141–151. https://doi.org/10.1177/001316446002000116

Kirchner, M. (2020). Die psychologischen Folgen der Coronakrise. Institut für Kommunikation und Gesellschaft (IKG). https://www.institut-kommunikation-gesellschaft.de/die-psychologischen-folgen-der-coronakrise/. Accessed from 9 Jul 2020.

Klackl, J., Jonas, E., & Kronbichler, M. (2014). Existential neuroscience: Self-esteem moderates neuronal responses to mortality-related stimuli. *Social Cognitive and Affective Neuroscience, 9*, 1754–1761. https://doi.org/10.1093/scan/nst167

LeDoux, J. (2012). Rethinking the emotional brain. *Neuron, 73*(4), 653–676.

Lee, S. M., Kang, W. S., Cho, A.-R., Kim, T., & Park, J. K. (2018). Psychological impact of the 2015 MERS outbreak on hospital workers and quarantine hemodialysis patients. *Comprehensive Psychiatry, 87*, 123–127. https://doi.org/10.1016/j.comppsych.2018.10.003

Lehmann, M., Bruenahl, C. A., Addo, M. M., Becker, S., Schmiedel, S., Lohse, A. W., et al. (2016). Acute Ebola virus disease patient treatment and health-related quality of life in health care professionals: A controlled study. *Journal of Psychosomatic Research.* https://doi.org/10.1016/j.jpsychores.2015.09.002

Li, D.-J., Ko, N.-Y., Chen, Y.-L., Wang, P.-W., Chang, Y.-P., Yen, C.-F., et al. (2020). COVID-19-related factors associated with sleep disturbance and suicidal thoughts among the Taiwanese public: A facebook survey. *International Journal of Environmental Research and Public Health.* https://doi.org/10.3390/ijerph17124479

Li, L., Wan, C., Ding, R., Liu, Y., Chen, J., Wu, Z., et al. (2015). Mental distress among Liberian medical staff working at the China Ebola Treatment Unit: A cross sectional study. *Health and Quality of Life Outcomes, 13*, 156. https://doi.org/10.1186/s12955-015-0341-2

Lonigan, C. J., Carey, M. P., & Finch, A. J. (1994). Anxiety and depression in children and adolescents: Negative affectivity and the utility of self-reports. *Journal of Consulting and Clinical Psychology, 62*, 1000–1008. https://doi.org/10.1037/0022-006X.62.5.1000

Löwe, B., Müller, S., Brähler, E., Kroenke, K., Albani, C., & Decker, O. (2007). Validierung und Normierung eines kurzen Selbstratinginstrumentes zur Generalisierten Angst (GAD-7) in einer repräsentativen Stichprobe der deutschen Allgemeinbevölkerung. *PPmP - Psychotherapie Psychosomatik Medizinische Psychologie.* https://doi.org/10.1055/s-2007-970669

Löwe, B., Spitzer, R. L., Zipfel, S., & Herzog, W. (2002). *Gesundheitsfragebogen für Patienten (PHQ-D). Komplettversion und Kurzform. Testmappe mit Manual, Fragebögen, Schablonen.* Karlsruhe.

Luo, M., Guo, L., Yu, M., Jiang, W., & Wang, H. (2020). The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public: A systematic review and meta-analysis. *Psychiatry Research, 291*, 113190. https://doi.org/10.1016/j.psychres.2020.113190

Mak, I. W. C., Chu, C. M., Pan, P. C., Yiu, M. G. C., & Chan, V. L. (2009). Long-term psychiatric morbidities among SARS survivors. *General Hospital Psychiatry, 31*, 318–326. https://doi.org/10.1016/j.genhosppsych.2009.03.001

Maunder, R. G. (2009). Was SARS a mental health catastrophe? *General Hospital Psychiatry.* https://doi.org/10.1016/j.genhosppsych.2009.04.004

Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracuti, S., Napoli, C., et al. (2020). A nationwide survey of psychological distress among Italian people during the COVID-19 pandemic: Immediate psychological responses and associated factors. *International Journal of Environmental Research and Public Health.* https://doi.org/10.3390/ijerph17093165

Mineo, L. (2020). The lesson is to never forget. https://news.harvard.edu/gazette/story/2020/05/harvard-expert-compares-1918-flu-covid-19/. Accessed from 3 Aug 2020.

Mobbs, D., Hagan, C. C., Dalgleish, T., Silston, B., & Prévost, C. (2015). The ecology of human fear: Survival optimization and the nervous system. *Frontiers in Neuroscience, 9*, 55.

Ng, Q. X., de Deyn, M. L. Z. Q., Lim, D. Y., Chan, H. W., & Yeo, W. S. (2020). The wounded healer: A narrative review of the mental health effects of the COVID-19 pandemic on healthcare workers. *Asian Journal of Psychiatry, 54*, 102258. https://doi.org/10.1016/j.ajp.2020.102258

Nicomedes, C. J. C., & Avila, R. M. A. (2020). An analysis on the panic during COVID-19 pandemic through an online form. *Journal of Affective Disorders, 276*, 14–22. https://doi.org/10.1016/j.jad.2020.06.046

Nunnaly, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (Vol. 3). McGraw-Hill.

Owen, L. (2020). Coronavirus: Five ways virus upheaval is hitting women in Asia. https://www.bbc.com/news/world-asia-51705199. Accessed from 23 Jul 2020.

Ozamiz-Etxebarria, N., Idoiaga Mondragon, N., Dosil Santamaría, M., & Picaza Gorrotxategi, M. (2020). Psychological symptoms during the two stages of lockdown in response to the COVID-19 outbreak: An investigation in a sample of citizens in northern Spain. *Frontiers in Psychology, 11*, 1491. https://doi.org/10.3389/fpsyg.2020.01491

Pérez-Fuentes, M. D. C., Molero Jurado, M. D. M., Martos Martínez, Á., & Gázquez Linares, J. J. (2020). Threat of COVID-19 and emotional state during quarantine: Positive and negative affect as mediators in a cross-sectional study of the Spanish population. *PLoS ONE, 15*, e0235305. https://doi.org/10.1371/journal.pone.0235305

Power, E., Hughes, S., Cotter, D., & Cannon, M. (2020). Youth mental health in the time of COVID-19. *Irish Journal of Psychological Medicine*. https://doi.org/10.1017/ipm.2020.84

Pratap, A., Bremer, V., Jacobson, N. C., Lekkas, D., Price, G., Heinz, M. V., et al. (2020). Flattening the mental health curve: COVID-19 stay-at-home orders are associated with alterations in mental health search behavior in the United States. *JMIR Mental Health*. https://doi.org/10.2196/19347

Radloff, L. S. (1977). The CES-D Scale. *Applied Psychological Measurement, 1*, 385–401. https://doi.org/10.1177/014662167700100306

Robert Koch Institut. (2020a). *Coronavirus Disease 2019 (COVID-19): 04.03.2020 - Daily Situation Report of the Robert Koch Institute* .

Robert Koch Institut. (2020b). *Coronavirus Disease 2019 (COVID-19): 09.03.2020 - Daily Situation Report of the Robert Koch Institute* .

Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., et al. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: A systematic review and meta-analysis. *Globalization and Health, 16*, 57. https://doi.org/10.1186/s12992-020-00589-w

Santor, D. A., & Zuroff, D. C. (1994). Depressive symptoms: Effects of negative affectivity and failing to accept the past. *Journal of Personality Assessment, 63*, 294–312. https://doi.org/10.1207/s15327752jpa6302_9

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Advances in experimental social psychology.* (Vol. 25). Academic Press.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues, 50*, 19–45. https://doi.org/10.1111/j.1540-4560.1994.tb01196.x

Sharp, J., & Theiler, S. (2018). A review of psychological distress among university students: Pervasiveness, implications and potential points of intervention. *International Journal for the Advancement of Counselling, 40*, 193–212. https://doi.org/10.1007/s10447-018-9321-7

Shevlin, M., Nolan, E., Owczarek, M., McBride, O., Murphy, J., Gibson Miller, J., et al. (2020). COVID-19-related anxiety predicts somatic symptoms in the UK population. *British Journal of Health Psychology, 25*, 875–882. https://doi.org/10.1111/bjhp.12430

Son, H., Lee, W. J., Kim, H. S., Lee, K. S., & You, M. (2019). Hospital workers' psychological resilience after the 2015 Middle East respiratory syndrome outbreak. *Social Behavior and Personality: An International Journal, 47*, 1–13. https://doi.org/10.2224/sbp.7228

Spangenberg, E. R., Sprott, D. E., Grohmann, B., & Smith, R. J. (2003). Mass-communicated prediction requests: Practical application and a cognitive dissonance explanation for self-prophecy. *Journal of Marketing, 67*, 47–62. https://doi.org/10.1509/jmkg.67.3.47.18659

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine, 166*, 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Stanton, R., To, Q. G., Khalesi, S., Williams, S. L., Alley, S. J., Thwaite, T. L., et al. (2020). Depression, anxiety and stress during COVID-19: Associations with changes in physical activity, sleep, tobacco and alcohol use in Australian adults. *International Journal of Environmental Research and Public Health*. https://doi.org/10.3390/ijerph17114065

Stuijfzand, S., Deforges, C., Sandoz, V., Sajin, C.-T., Jaques, C., Elmers, J., et al. (2020). Psychological impact of an epidemic/pandemic on the mental health of healthcare professionals: A rapid review. *BMC Public Health, 20*, 1230. https://doi.org/10.1186/s12889-020-09322-z

Tehseen, S., Ramayah, T., & Sajilan, S. (2017). Testing and controlling for common method variance: A review of available methods. *Journal of Management Sciences, 4*, 142–168. https://doi.org/10.20547/jms.2014.1704202

van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., et al. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour, 4*, 460–471. https://doi.org/10.1038/s41562-020-0884-z

Vyas, K. J., Delaney, E. M., Webb-Murphy, J. A., & Johnston, S. L. (2016). Psychological impact of deploying in support of the US response to Ebola: A systematic review and meta-analysis of past outbreaks. *Military Medicine*. https://doi.org/10.7205/MILMED-D-15-00473

Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin, 96*, 465–490. https://doi.org/10.1037/0033-2909.96.3.465

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Wen, J., Aston, J., Liu, X., & Ying, T. (2020). Effects of misleading media coverage on public health crisis: A case of the 2019 novel coronavirus outbreak in China. *Anatolia, 31*, 331–336. https://doi.org/10.1080/13032917.2020.1730621

World Economic Forum. (2019). Global Gender Gap: Report 2020. World Economic Forum. http://www3.weforum.org/docs/WEF_GGGR_2020.pdf.

World Health Organization. (2020). WHO Coronavirus Disease (COVID-19) Dashboard. World Health Organisation. https://covid19.who.int/.

Zanon, C., Bastianello, M. R., Pacico, J. C., & Hutz, C. S. (2013). Relationships between positive and negative affect and the five factors of personality in a Brazilian sample. *Paidéia (ribeirão Preto), 23*, 285–292. https://doi.org/10.1590/1982-43272356201302