

American Psychologist

Coping and Tolerance of Uncertainty: Predictors and Mediators of Mental Health During the COVID-19 Pandemic

Hannah Rettie and Jo Daniels

Online First Publication, August 3, 2020. <http://dx.doi.org/10.1037/amp0000710>

CITATION

Rettie, H., & Daniels, J. (2020, August 3). Coping and Tolerance of Uncertainty: Predictors and Mediators of Mental Health During the COVID-19 Pandemic. *American Psychologist*. Advance online publication. <http://dx.doi.org/10.1037/amp0000710>

Coping and Tolerance of Uncertainty: Predictors and Mediators of Mental Health During the COVID-19 Pandemic

Hannah Rettie
University of Bath

Jo Daniels
University of Bath and North Bristol NHS Trust, Southmead
Hospital, Bristol, United Kingdom

The current pandemic wave of COVID-19 has resulted in significant uncertainty for the general public. Mental health and examining factors that may influence distress have been outlined as key research priorities to inform interventions. This research sought to examine whether intolerance of uncertainty and coping responses influence the degree of distress experienced by the U.K. general public during the COVID-19 pandemic. Using a cross-sectional online questionnaire design, participants were recruited ($N = 842$) using snowball sampling over a 10-day period in the early “lockdown” phase of the pandemic. Around a quarter of participants demonstrated significantly elevated anxiety and depression, with 14.8% reaching clinical cutoff for health anxiety. A one-way multivariate analysis of variance indicated those in “vulnerable” groups were significantly more anxious ($p < .001$), and also more anxious in relation to their health ($p < .001$). Mediation modeling demonstrated maladaptive coping responses partially mediated the predictive relationship between intolerance of uncertainty and psychological distress. Mental health difficulties have become significantly raised during the first wave of the COVID-19 pandemic in the United Kingdom, particularly for the vulnerable. Findings support emerging research suggesting the general public is struggling with uncertainty, more so than normal. Vulnerable groups are more anxious about their health, but not more intolerant of uncertainty than the nonvulnerable. Finally, this study indicated two modifiable factors that could act as treatment targets when adapting interventions for mental health during the COVID-19 global health crisis.

Public Significance Statement



This study reflects increased mental health difficulties within the United Kingdom during the current wave of the COVID-19 pandemic. Individuals’ ability to tolerate uncertainty was predictive of mental health difficulties, and this was mediated by their coping responses. Future treatments could focus on supporting the general public to develop effective coping strategies and tolerate the uncertainty of the current climate, equipping them for potential future pandemic waves.

Keywords: COVID-19, intolerance of uncertainty, coping responses, mental health, physical health

Supplemental materials: <http://dx.doi.org/10.1037/amp0000710.supp>

COVID-19 is an infectious disease that was first detected in Wuhan, China, in December 2019. Since then, the novel COVID-19 strain of coronavirus has spread worldwide, and was declared a “public health emergency of international

concern” in January 2020 (World Health Organization, 2020a). The virus is contracted through an infected person coughing or sneezing, and will cause mild to moderate symptoms in most individuals infected. Symptoms include a

 Hannah Rettie, Department of Psychology, University of Bath;
 Jo Daniels, Department of Psychology, University of Bath, and North Bristol NHS Trust, Southmead Hospital, Bristol, United Kingdom.

Hannah Rettie served as lead for conceptualization, data curation, formal analysis, investigation, methodology, project administration, and writing—original draft. Jo Daniels served as lead for supervision and served in a

supporting role for conceptualization and methodology. Hannah Rettie and Jo Daniels contributed equally to writing—review and editing. No conflicts of interest have been identified.

Correspondence concerning this article should be addressed to Jo Daniels, Department of Psychology, University of Bath, 10 West, Claverton Down, Bath BA2 7AY, United Kingdom. E-mail: j.daniels@bath.ac.uk

fever, tiredness and a persistent dry cough (National Health Service, 2020b). However for some individuals, particularly those in vulnerable groups, symptoms can be more severe, and may result in hospitalization and/or death (World Health Organization, 2020a). There is currently no cure or vaccine for COVID-19.

At the time of recruitment (April 17, 2020), there were 2.12 million cases globally of COVID-19, and 147,364 deaths recorded (World Health Organization, 2020b). The number of confirmed cases within the United Kingdom stood at 103,093 (Department of Health and Social Care, 2020), and during recruitment the United Kingdom was in early “lockdown.” This required individuals to stay at home, except for very limited purposes (e.g., essential key work, food shop, exercise; Cabinet Office, 2020).

The socioeconomic impact of COVID-19 is uncertain, however it is likely to be profound and long lasting. While it is not completely clear what effects the pandemic and lockdown will have on the mental health of the general population (Xiang et al., 2020), previous research exploring the psychological impact of previous pandemics (e.g., severe acute respiratory syndrome; SARS) found that 35% of individuals recovering from SARS reported moderate to severe levels of depression and/or anxiety (Cheng, Wong, Tsang, & Wong, 2004), and during the H1N1 pandemic 30% of children and 25% of quarantined adults reported symptoms of posttraumatic stress disorder (Sprang & Silman, 2013). A recently published rapid review summarizes these concerns, stating that quarantine can have a negative, potentially long-lasting impact on psychological health, and that this can be amplified by stressors both within and after quarantine (e.g., duration of quarantine, lack of information, financial loss; Brooks et al., 2020).

Emerging reports suggest that due to the scale of the current pandemic, the impact is likely to be considerably larger, surpassing the effect of previous infectious disease outbreaks such as the SARS (Wilder-Smith, Chiew, & Lee, 2020). This gives some indication that for those who are unduly challenged by the uncertain time frame of restricted movement, reduced social contact for extended periods, and illness of self or close others, the psychological effects are likely to be very pronounced. This is supported by an initial survey of the U.K. population, which indicated that many individuals had widespread concerns about the impact the pandemic will have on their psychological health, more so than physical health concerns (Holmes et al., 2020).

Numerous articles have been written emphasizing the importance of considering the psychological impact of pandemics on the general population (e.g., Sim & Chua, 2004), and expert panels have stated that monitoring of mental health difficulties and examining psychological factors that may influence levels of distress are key research priorities during this time (Holmes et al., 2020). Recent data from China reflects 25% of the general population experienced

some level of psychological distress during the first wave of COVID-19 (Qiu et al., 2020). This level of distress seems to remain stable throughout different phases of the pandemic, with Wang et al. (2020) noting no significant difference between rates of stress, anxiety and depression during the initial phase of COVID-19 in comparison to the peak in China 4 weeks later. Therefore any increased psychological distress within the U.K. population could be long-standing, and is likely to have much wider socioeconomic impacts than anticipated (e.g., increased demand on mental health services). In addition, there has been limited research published exploring directly modifiable factors that influence distress, and it is therefore imperative to determine what factors exist that can be targeted in the treatment of any arising mental health difficulties.

The COVID-19 pandemic has resulted in a high degree of uncertainty worldwide; international responses have varied, rates of infection have been heterogeneous, but all agree that this pandemic is unprecedented. It is likely that some individuals will find this uncertainty difficult to tolerate. “Intolerance of uncertainty” (IU) is a psychological concept most notably examined as a key maintaining factor within generalized anxiety disorder. However, with more recent research suggesting IU is a concept found across many emotional disorders (e.g., Carleton et al., 2012; Carleton et al., 2014; Fergus & Bardeen, 2013; Holaway, Heimberg, & Coles, 2006), transdiagnostic models of IU have been established (Einstein, 2014; Freeston, Tiplady, Mawn, Bottesi, & Thwaites, 2020).

IU refers to an individual’s negative emotions, cognitions and behaviors (e.g., coping behaviors) when experiencing uncertainty (Birrell, Meares, Wilkinson, & Freeston, 2011); this could include day-to-day things such as wondering if the bus will arrive on time, to awaiting the outcome of an interview, the uncertain nature of an early stage relationship or presently, the not knowing when the threat of COVID-19 will remit.

Models of IU suggest that an individual’s ability to tolerate uncertainty will likely influence the way they respond and cope with a situation (Einstein, 2014). Coping strategies are an individual’s efforts to manage their distress, although they are not always effective at doing so. Particular coping strategies (e.g., acceptance, seeking support) are associated with greater psychological health than other, more maladaptive strategies (e.g., self-blame, denial; Hagan et al., 2017; Meyer, 2001).

While both concepts appear to bear saliency in the current climate of COVID-19, IU, coping responses and their relationship to psychological distress have not yet been explored during the current pandemic. Understanding what strategies individuals use to cope with the uncertainty of COVID-19 will provide a picture of how the U.K. population is coping with the current situation, and may inform future treatments.

Research exploring IU and coping within the H1N1 pandemic in Canada found that greater IU predicted higher levels of H1N1-specific anxiety in participants (Taha, Matheson, Cronin, & Anisman, 2014) but this relationship was mediated by the coping strategies used, with individuals with high IU being more likely to use emotion-focused coping (e.g., self-blame and rumination). Due to the proposed transdiagnostic nature of IU, further research is needed to explore whether IU and coping responses play a role in a range of mental health difficulties during a pandemic. In addition, there was no enforced lockdown in Canada for the general population during the H1N1 pandemic so generalizability is limited, and it is unclear what the psychological impact of the current, more restrictive containment measures for COVID-19 will be.

The proliferation of COVID-19 may also present a special case for individuals with underlying health conditions. In the United Kingdom, the government outlined groups that are likely to be more vulnerable to experiencing the severe symptoms of COVID-19; this included individuals with chronic respiratory diseases, those on immunosuppressive medication and those above the age of 70 (National Health Service, 2020a). Of all the COVID-19 deaths that occurred in England and Wales during March and April 2020, 90.4% of individuals had a preexisting health condition (Office for National Statistics, 2020). Previous research into IU in health conditions is sparse, however it could be argued that for these individuals, the increased uncertainty and more pronounced health threat will be particularly difficult to manage.

Thus, this study seeks to address knowledge gaps that may positively benefit understanding of mental health difficulties during the COVID-19 pandemic. Understanding the contribution of these key factors may clarify why some individuals are more likely to experience unmanageable distress, further serving to inform development of pandemic-related psychological treatments and resources for the present COVID-19 wave and future pandemics.

Aims and Objectives

This study seeks to investigate whether mental health difficulties during COVID-19 (specifically depression, anxiety and health anxiety) can be predicted by IU, and determine whether coping responses mediate this relationship. Individuals categorized in “vulnerable groups” will be compared to the rest of the sample, to determine whether the increased threat these groups experience has an impact on their ability to tolerate uncertainty, their coping, and their psychological health. Finally, general population means from previous studies will be compared with the current data, to establish whether there is an increase in mental health difficulties during this time and the precise nature of these difficulties.

Method

Ethical Approval

Ethical approval for the project was obtained from the University of Bath ethics committee (PREC Reference Number 20-094).

Design and Procedure

A prospective cross-sectional online questionnaire design was used to examine relevant study factors. A battery of standardized self-report questionnaires was distributed widely through social media channels over a brief sampling period. Individuals meeting inclusion criteria (i.e., adults living in the United Kingdom) participated by independently clicking through the study link. After reading the information sheet and providing consent, individuals completed a number of questionnaires. Debriefing information was provided following study completion.

Participants

Adults (age 18+) who lived in the United Kingdom were invited to participate in the online study. Snowball sampling was used to maximize recruitment during the lockdown period, through both social media (Facebook and Twitter) and e-mail distribution lists. The recruitment window was open from April 17, 2020, and April 26, 2020. Recruitment ceased quickly as the recruitment target was surpassed, and this provided a useful “snapshot” of the status quo of mental health during lockdown.

Of the 974 who participated in the survey, 842 of these were completed fully (86%). The incomplete surveys ($n = 132$) were excluded from any further analysis as chi-square analyses determined there was no significant differences between the demographics of these individuals, and those who fully completed the study ($p < .001$). This indicates that listwise deletion is appropriate (Cheema, 2014; Jakobsen, Gluud, Wetterslev, & Winkel, 2017). In addition to self-report measures (see following section), participants were asked to complete a demographics questionnaire, and the information collected for these 842 participants is found in Table 1. The distribution of participants across U.K. regions was fairly evenly spread, but somewhat concentrated at the site of study (Southwest England), Wales, and Northwest England. This table can be found in the online supplemental materials.

The mean age of participants was 38.06 ($SD = 14.69$) and 10.9% of individuals currently lived alone. Of the 71.3% of people who were still working, 37.7% had face-to-face contact with the general public.

Sixty-three (8%) individuals thought that they had already had COVID-19, and four of these had received a formal diagnosis. Twenty percent ($n = 165$) of individuals reported

Table 1
Demographics Information for Total Sample

Demographic	<i>n</i>	%
Gender		
Male	163	19.4
Female	673	79.9
Other/prefer not to say	6	0.7
Ethnicity		
White	799	95.1
Mixed/multiple ethnic groups	13	1.5
Asian/Asian British	20	2.4
Black/African/Caribbean/Black British	5	0.6
Other ethnic group	3	0.4
Employment		
Working (full time)	489	58.3
Working (part time)	109	13.0
Not working (furloughed)	77	9.2
Not working (looking for work)	14	1.7
Not working (disabled)	68	1.1
Not working (retired)	9	8.1
Not working (other)	29	3.5
Student	44	5.2

a close friend or family had been diagnosed with COVID-19.

Twenty-two percent ($n = 182$) of individuals self-reported a preexisting mental health condition, which accurately reflects national statistics (i.e., one in four; McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2009). This included a range of mental health difficulties, but was primarily anxiety (25.7%), depression (25.1%) or mixed anxiety and depression (28.1%). Overall, 22.7% of individuals reported being in a “vulnerable” group. The distribution of the vulnerable groups is outlined in Table 2.

Measures

IU was measured using the Intolerance of Uncertainty Scale (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994). This standardized 27-item scale uses a Likert scale of 1–5, and has excellent internal consistency ($\alpha = .94$) and good test–retest reliability ($r = .74$; Buhr & Dugas, 2002). In the current sample, internal consistency was excellent ($\alpha = .95$).

The eight-item Patient Health Questionnaire (PHQ-8) and seven-item General Anxiety Disorder (GAD-7) measured depression and anxiety. PHQ-8 is a variation of the original PHQ-9 with Item 9 (“thoughts that you would be better off dead or of hurting yourself in some way”) removed (Kroenke, Spitzer, & Williams, 2001). The PHQ-8 is used widely in research where due to self-report it is not always possible to respond immediately to an affirmative, positive response to Item 9 (Kroenke & Spitzer, 2002). The PHQ-8 has similar operating characteristics to the PHQ-9 (Kroenke & Spitzer, 2002; Wu et al., 2019), which has good internal reliability ($\alpha = .89$) and test–retest reliability ($r = .84$). In the current sample, internal consistency was good ($\alpha = .88$).

Similarly, the GAD-7 measure has shown excellent internal ($\alpha = .92$) and test–retest reliability ($r = .83$) in a clinical sample (Spitzer, Kroenke, Williams, & Löwe, 2006). In the current sample, internal consistency was excellent ($\alpha = .90$). Clinical cutoff scores are 10 and above for both the GAD-7 (Löwe et al., 2008), and PHQ-8 (Wu et al., 2019).

The Short Health Anxiety Inventory is a standardized 14-item measure used to assess levels of health anxiety, and uses a clinical cutoff score of 18 or above (Salkovskis, Rimes, Warwick, & Clark, 2002). This measure is based on the cognitive–behavioral model of health anxiety, and has shown good internal consistency ($\alpha = .86$) and good convergent and divergent validity in a nonclinical sample (Abramowitz, Deacon, & Valentiner, 2007). In the current sample, internal consistency was excellent ($\alpha = .91$).

To assess the coping strategies that individuals use during COVID-19, the brief coping orientation to problems experienced (COPE) was administered (Carver, 1997). This 28-item measure assesses 14 different coping responses during a particular situation, scored on a Likert scale of 1–4. All 14 coping dimensions have been shown to have good or excellent internal consistency ($\Omega = 0.71 - 0.98$; Monzani et al., 2015). The scale has been used in other disaster affected populations (Carver, 1997), and patients with health crises (Eisenberg, Shen, Schwarz, & Mallon, 2012). Previous literature has grouped the 14 subscales into “adaptive” strategies (planning, seeking emotional support, positive reframing, active coping, acceptance, seeking informational support, humor, religion), and “maladaptive” strategies (denial, self-blame, substance use, venting, behavioral disengagement, self-distraction) for analysis (e.g., Mahmoud, Staten, Hall, & Lennie, 2012), and these subscales will be adopted in the current research. In the current sample, internal consistency for the adaptive subscale was good ($\alpha = .83$), and acceptable for the maladaptive subscale ($\alpha = .72$).

Table 2
Percentage of Vulnerable Participants in Each Group Category

Category	<i>n</i>	% of Vulnerable group
Aged 70 or older	23	12.0
Chronic respiratory diseases	83	43.5
Chronic heart disease	7	3.7
Chronic kidney disease	1	0.5
Chronic liver disease	2	1.0
Chronic neurological conditions	5	2.6
Diabetes	22	11.5
Problems with spleen	2	1.0
Weakened immune system	20	10.5
Seriously overweight (body mass index ≥ 40)	18	9.4
Pregnant	19	9.9
Other	18	9.4

Note. Total $N = 191$. Percentages add up to over 100% due to some participants reporting multiple conditions.

Planned Analysis

Data analysis was completed using SPSS Version 25. Pearson's correlations examined associations between the main study variables. Due to multiple comparisons a more stringent significance value ($p < .001$) was used. One-sample t tests were used to compare scores on the GAD-7, PHQ-8, and Short Health Anxiety Inventory to previously collected general population data. Preliminary analysis of the distribution of the data indicated all variables had a positive skew, reflecting most scores clustering toward the nonclinical end of the scale. As one-sample t tests are considered robust to skewed distributions (Wilcox, 2012), a nonparametric equivalent was not used.

Difference in IU, generalized anxiety, depression, and health anxiety scores between vulnerable groups and the general population were assessed using a one-way multivariate analysis of variance. Levene's test highlighted that the assumption of homogeneity of variances had been violated ($p < .05$), so all four dependent variables were transformed using a square root transformation. The normal $Q-Q$ plots indicated that following transformation the variables were approximately normally distributed. Pearson's correlations identified no multicollinearity between dependent variables ($r < .90$; see Table 4), and scatterplots highlighted that there was a linear relationship between the dependent variables in both vulnerable and nonvulnerable groups. Mahalanobis distance identified multivariate outliers, but these were not removed as removing these outliers did not change the profile of results. There was homogeneity of variances and covariances, as shown by the nonsignificant result on Box's test ($p = .847$).

Finally, multiple parallel mediation modeling using the PROCESS macro for SPSS (Hayes, 2017) explored whether IU predicted mental health variables (i.e., anxiety, depression and health anxiety scores), and whether adaptive and maladaptive coping responses mediated this relationship. Based on information from previous literature (e.g., Kessler et al., 2007; McLean, Asnaani, Litz, & Hofmann, 2011; Scott et al., 2007) and following preliminary analysis of study demographic data, gender, age, previous mental health condition and vulnerable group status were all inputted as covariates to isolate the effects of IU and coping responses. Indirect effects were tested using nonparametric bootstrapping with 5,000 samples. When 95% confidence intervals (CIs) did not include zero, the indirect effect was considered significant (Hayes, 2017).

For all three mediation models, assumptions were met. Residuals were approximately normally distributed, and independence of residuals was indicated by the Durbin-Watson statistic (Anxiety = 1.97, Depression = 1.91, Health Anxiety = 2.01). Homoscedasticity was shown by visually inspecting studentized residuals versus unstandardized predicted values plot.

Results

Comparison to General Population Data

Mean anxiety scores ($M = 6.42$, $SD = 5.09$) were significantly higher than scores taken from normative data ($M = 2.97$; Löwe et al., 2008), $t(841) = 3.45$, $p < .001$. Löwe et al.'s study indicated that approximately 5% of their sample had GAD-7 scores of 10 or above, similar to the prevalence of GAD found in the 2014 Adult Psychiatric Morbidity Survey (5.9%; McManus, Bebbington, Jenkins, & Brugha, 2016). In the current Study 24.3% of individuals were above this clinical cutoff, 95% CI [21.5, 27.3].

Mean depression scores ($M = 6.76$, $SD = 5.36$) were significantly higher than the mean PHQ-8 score from a recent meta-analysis ($M = 5.30$, $SD = 5.20$; Wu et al., 2019), $t(841) = 7.91$, $p < .001$. Kroenke et al. (2009) reported that 8.6% of individuals in their sample scored above the clinical cutoff of 10 or above, in comparison to 25.8% of individuals in the current sample, 95% CI [22.9, 28.8].

The mean health anxiety score in the current sample was 11.21 ($SD = 6.71$), which is significantly higher than the mean score from a nonclinical sample in previous research ($M = 9.19$; Alberts, Sharpe, Kehler, & Hadjistavropoulos, 2011), $t(841) = 8.74$, $p < .001$. This significant difference remained even when excluding those of physical health status who are known to have higher health anxiety scores (Tyrrer et al., 2011; $M = 10.53$, $t(650) = 5.34$, $p < .001$). Previous studies have indicated that individuals meeting criteria for a health anxiety diagnosis within the general population is around 4–6% (Bleichhardt & Hiller, 2007; Sunderland, Newby, & Andrews, 2013), whereas in the current sample, 14.8% of individuals scored above the clinical cutoff of 18 and above (Tang, Wright, & Salkovskis, 2007), 95% CI [12.6, 17.4].

Comparing Vulnerable and Nonvulnerable Groups

Table 3 summarizes the mean questionnaire scores for vulnerable and nonvulnerable groups. A one-way multivariate analysis of variance showed that there was an overall significant difference between vulnerable and nonvulnerable groups on the dependent variables, $F(4, 837) = 8.97$, $p < .001$, Wilks' $\lambda = .96$, $\eta_p^2 = .04$. Follow-up univariate analyses of variance using a Bonferroni-adjusted p value of .013 found that there were statistically significant differences in anxiety, $F(1, 840) = 12.05$, $p = .001$; $\eta_p^2 = .01$, and health anxiety, $F(1, 840) = 31.63$, $p < .001$; $\eta_p^2 = .04$, between the two groups, but not for depression, $F(1, 840) = 4.82$, $p = .028$; $\eta_p^2 = .01$ or IU, $F(1, 840) = 2.25$, $p = .134$; $\eta_p^2 = .00$. Using Cohen's (1988) criteria for partial η^2 , the effect size for health anxiety and generalized anxiety dif-

Table 3
Summary Statistics for Total Sample

Questionnaire	Vulnerable group		Nonvulnerable group		Total (N = 842)	
	M (SD)	Range	M (SD)	Range	M (SD)	Range
GAD-7	7.57 (5.53)	21	6.09 (4.91)	21	6.42 (5.09)	21
PHQ-8	7.52 (5.67)	23	6.54 (5.25)	24	6.76 (5.36)	24
SHAI	13.55 (7.27)	39	10.53 (6.38)	41	11.21 (6.71)	41
IU	61.92 (19.84)	92	59.57 (20.34)	93	60.11 (20.24)	93
Coping						
Adaptive	36.43 (8.06)	43	36.73 (7.76)	42	36.66 (7.82)	43
Maladaptive	21.82 (5.12)	25	21.08 (4.73)	28	21.25 (4.83)	28

Note. GAD-7 = seven-item General Anxiety Disorder; PHQ-8 = eight-item Patient Health Questionnaire; SHAI = Short Health Anxiety Inventory; IU = Intolerance of Uncertainty Scale.

ferences were small. Individuals in vulnerable groups scored higher on health anxiety and generalized anxiety measures than individuals in nonvulnerable groups. In the vulnerable group, 30.9% of individuals group displayed clinical levels of generalized anxiety, and 24.1% displayed clinical levels of health anxiety (in comparison to 22.4% and 12.1% found in the rest of the sample).

Coping Responses and Intolerance of Uncertainty

The most commonly used coping strategies were acceptance (adaptive; $M = 6.33$, $SD = 1.50$), self-distraction (maladaptive; $M = 5.81$, $SD = 1.52$) and active coping (i.e., taking actions to improve the situation; adaptive; $M = 5.02$, $SD = 1.67$). The least commonly used coping strategies were denial (maladaptive; $M = 2.57$, $SD = 1.13$), behavioral disengagement (i.e., giving up; maladaptive; $M = 2.86$, $SD = 1.27$), and religion (adaptive; $M = 2.88$, $SD = 1.55$).

Looking at the coping subscales, correlational analyses (see Table 4) identified that there was a significant, positive relationship between the use of adaptive and maladaptive coping responses ($p < .001$). Correlational analyses also highlighted that all mental health variables were significantly, positively correlated with one another ($p < .001$), and there was a significant, positive correlation between IU and mental health scores, IU and maladaptive coping, and maladaptive coping and mental health outcomes ($p < .001$). Adaptive coping was not significantly correlated at the more

stringent significance value with any of the main study variables (IU $p = .083$; generalized anxiety $p = .021$; depression $p = .876$; health anxiety $p = .065$).

Three mediation models were run to determine whether IU predicted mental health difficulties, and to establish if maladaptive and adaptive coping mediated this relationship, over and above control variables (age, gender, previous mental health diagnosis and vulnerable group status).

Generalized anxiety. Results from the parallel mediation analysis are summarized in Figure 1. People with higher IU were significantly more likely to use maladaptive coping strategies, $a_2 = .012$, $t(836) = 16.06$, $p < .001$, and increased use of maladaptive coping strategies was subsequently related to greater levels of generalized anxiety, $b_2 = .389$, $t(834) = 11.57$, $p < .001$. Holding all control variables and adaptive coping constant, the indirect path of IU on anxiety via maladaptive coping was statistically significant ($a_2b_2 = .046$, 95% CI [0.037, 0.056]). Conversely, the indirect effect through adaptive coping was not statistically significant ($a_1b_1 = -.001$, 95% CI [-0.002, 0.001]). The direct effect of IU on generalized anxiety when keeping all potential mediators and covariates constant was significant ($c' = .077$, $p < .001$). Overall, findings show that the

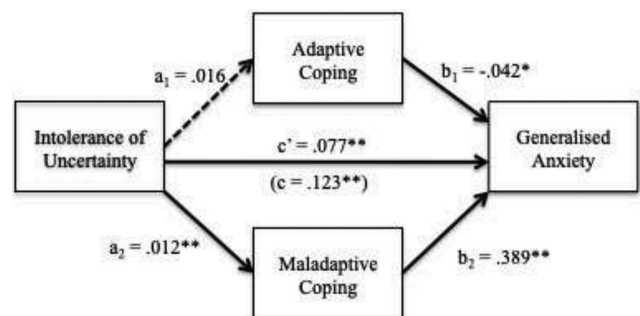


Figure 1. Model showing the mediating effect of coping between intolerance of uncertainty (IU) and generalized anxiety. Dotted arrow shows nonsignificant relationship. a = effect of IU on the mediators; b = effect of the mediators on anxiety; c' = direct effect of IU on generalized anxiety; c = total effect of IU on anxiety. * $p < .05$. ** $p < .001$.

Table 4
Pearson's Correlations Between Main Study Variables

Variable	1	2	3	4	5	6
1. Generalized anxiety	—	.75**	.54**	.58**	.08*	.58**
2. Depression		—	.44**	.55**	-.01	.57**
3. Health anxiety			—	.48**	.06	.38**
4. Intolerance of uncertainty				—	.06	.55**
5. Adaptive coping					—	.29**
6. Maladaptive coping						—

* $p < .05$. ** $p < .001$.

relationship between IU and generalized anxiety was partially mediated by the maladaptive, but not adaptive coping subscale of the brief COPE. Demographic variables were statistically controlled for in the analysis, and higher GAD-7 scores were found in females, those younger in age, individuals with previous mental health difficulties, and individuals categorized in the vulnerable group.

Depression. Results from the parallel mediation analysis for depression are summarized in Figure 2. As shown in the previous analysis, people with higher IU were significantly more likely to use maladaptive coping strategies ($a_2 = .012, p < .001$), and increased use of maladaptive coping strategies was subsequently related to greater levels of depression, $b_2 = .442, t(834) = 12.41, p < .001$. Holding all control variables and adaptive coping constant, the indirect path of IU on depression via maladaptive coping was statistically significant ($a_2b_2 = .053, 95\% \text{ CI } [0.042, 0.064]$). Conversely, the indirect effect through adaptive coping was not statistically significant ($a_1b_1 = -.002, 95\% \text{ CI } [-0.005, 0.002]$). The direct effect of IU on depression when keeping all potential mediators and covariates constant was significant ($c' = .070, p < .001$). Overall, findings show that the relationship between IU and depression was partially mediated by the maladaptive, but not adaptive coping subscale of the brief COPE. A similar picture was found for the control variables in the depression analysis, with higher PHQ-8 scores were found in females, those younger in age and individuals with previous mental health difficulties.

Health anxiety. Finally, results from the parallel mediation analysis for health anxiety are summarized in Figure 3. Once again, people with higher IU were significantly more likely to use maladaptive coping strategies ($a_2 = .012, p < .001$), and increased use of maladaptive coping strategies was subsequently related to greater levels of health anxiety, $b_2 = .183, t(834) = 3.59, p < .001$. Holding all control variables and adaptive coping constant, the indirect path of

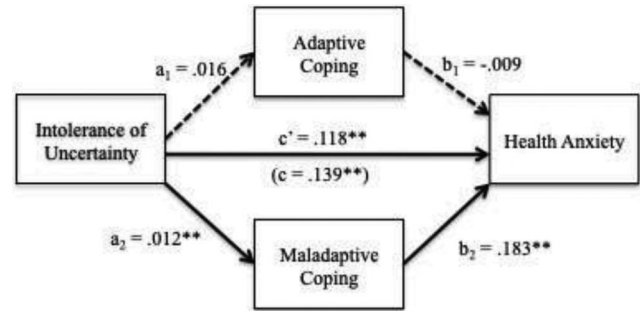


Figure 3. Model showing the mediating effect of coping between intolerance of uncertainty (IU) and health anxiety. Dotted arrow shows non-significant relationship. a = effect of IU on the mediators; b = effect of the mediators on health anxiety; c' = direct effect of IU on generalized health anxiety; c = total effect of IU on health anxiety. * $p < .05$. ** $p < .001$.

IU on health anxiety via maladaptive coping was statistically significant ($a_2b_2 = .022, 95\% \text{ CI } [0.009, 0.035]$). Conversely, the indirect effect through adaptive coping was not statistically significant ($a_1b_1 = 0.00, 95\% \text{ CI } [-0.002, 0.001]$). The direct effect of IU on health anxiety when keeping all potential mediators and covariates constant was significant ($c' = .118, p < .001$). Overall, findings show that the relationship between IU and health anxiety was partially mediated by the maladaptive, but not adaptive coping subscale of the brief COPE. Demographic variables statistically controlled for in the analysis showed that higher Short Health Anxiety Inventory scores were found in females, individuals with previous mental health difficulties, and individuals categorized in the vulnerable group.

Post hoc analysis of adaptive coping responses. A nonsignificant relationship was found in all three mediation models between IU and adaptive coping (see Figures 1–3). Post hoc correlational analysis breaking adaptive coping down into its eight original subscales (i.e., planning, seeking emotional support, positive reframing, active coping, acceptance, seeking informational support, humor, religion) provided further insight into this nonsignificant result. The adaptive strategies that are associated with help-seeking and preparation (i.e., emotional support, instrumental support and planning) were significantly positively correlated with IU ($p < .001$), suggesting those who were high in IU were more likely to use these help seeking strategies. Conversely, other adaptive strategies such as acceptance had a significant, negative correlation with IU ($p < .001$; see the online supplemental materials for full post hoc correlation table), indicating high IU individuals were less likely use these.

Discussion

The current study aimed to investigate the relative impact of IU and coping responses on anxiety, depression and health anxiety during the COVID-19 pandemic. We further

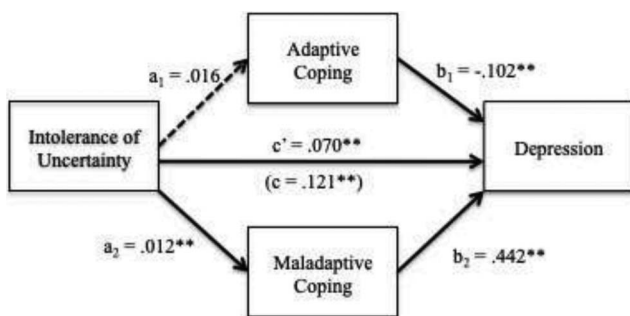


Figure 2. Model showing the mediating effect of coping between intolerance of uncertainty (IU) and depression. Dotted arrow shows nonsignificant relationship. a = effect of IU on the mediators; b = effect of the mediators on depression; c' = direct effect of IU on generalized depression; c = total effect of IU on depression. * $p < .05$. ** $p < .001$.

sought to assess whether current rates of psychological distress were higher than previous populations norms, particularly for those individuals categorized by the government as “vulnerable.”

Overall, findings demonstrated that generalized anxiety, depression and health anxiety rates were elevated within the current sample, with 37.5% of individuals above clinical cutoff for at least one of the three measured conditions, and 19.8% of individuals meeting two or more thresholds. This is higher than rates seen in previous pandemic research (e.g., Cheng et al., 2004; Sprang & Silman, 2013; Wang et al., 2020), and provides a clear indication that COVID-19 is having a profoundly negative impact on the general population’s mental health. Incidence of anxiety and depression in this sample is significantly higher than previous population norms (17%; McManus et al., 2016), despite disclosed previous mental health difficulties reflecting population norms. In addition, analysis of control variables indicated that particular groups of individuals could be at increased risk of developing mental health difficulties during this time, specifically females, those younger in age (for generalized anxiety and depression only), and individuals with preexisting mental health difficulties.

Those who identified with the U.K. government defined “vulnerable group” were significantly more likely to reach threshold for health anxiety or generalized anxiety than those who did not. This is consistent with previous research reporting high prevalence of health anxiety in medical and hospital samples (Alberts et al., 2011; Daniels, Salkovskis, & Parker, 2020), with highest reported rates of a similar 24.7% (Tyrer et al., 2011), where the normal range is 4–6% (Bleichhardt & Hiller, 2007; Sunderland et al., 2013). It is likely that during a time of increased threat such as an infectious disease pandemic, individuals with physical health conditions are likely to be vigilant, checking for symptoms and signs of COVID-19, avoiding contamination, and taking other strategic and automatic behaviors which inadvertently perpetuate or precipitate health anxiety (Salkovskis, Warwick, & Deale, 2003). Thus elevated rates of health anxiety are unsurprising, particularly given the higher rates of mortality in those with underlying conditions (Office for National Statistics, 2020).

Indeed, health anxiety may be seen as adaptive in this context, with anxiety previously being associated with higher compliance in safety precautions during pandemics (Rubin, Amlôt, Page, & Wessely, 2009). Many of these individuals will continue to “shield” for longer during current and future pandemic waves (Public Health England, 2020), therefore it is essential that their mental health needs are addressed in an accessible, evidence-based way (e.g., cognitive–behavioral therapy; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012).

Predictors and Mediators of Psychological Distress

In a recent article published in *The Lancet*, Holmes, et al. (2020) outlined that psychological support for COVID-19 should be “mechanistically informed.” Current findings indicated that IU predicted the three mental health difficulties studied within this article, and maladaptive coping responses partially mediated this relationship. This extends on Taha et al.’s (2014) research that found emotion-focused coping mediated the relationship between IU and H1N1-specific anxiety, as current findings highlight the transdiagnostic importance of these variables (Einstein, 2014). This finding is of clinical importance, as IU and maladaptive coping responses are modifiable factors that could be targeted when adapting psychological interventions for COVID-19.

Individuals in vulnerable groups were not significantly different in their ability to tolerate uncertainty than the rest of the general population, which may be attributed to an adapted tolerance of uncertainty when living with a long-term health condition (Kurita, Garon, Stanton, & Meyerowitz, 2013). Freeston et al.’s (2020) model of uncertainty distress suggests that alongside IU, “perceived threat” (i.e., degree to which one feels under threat) independently contributes to psychological distress. Thus it could be that for physically vulnerable individuals, it is the perceived (and arguably realistic) increase in threat, rather than their overall ability to tolerate uncertainty, that contributes to their increased levels of psychological distress. This should be examined further.

Current and future treatments may benefit from targeting modifiable predictors of psychological distress such as IU and maladaptive coping to help ameliorate distress in the context of these abnormal times, where uncertainty and threat in our lives has increased. Current evidence-based models of cognitive–behavioral therapy for generalized anxiety (National Institute for Health and Care Excellence, 2011), depression (National Institute for Health and Care Excellence, 2009), and health anxiety (Salkovskis et al., 2003) may benefit from adaptation to incorporate IU and patterns of coping as discussed herewith. For example, from both our results and proposed models of uncertainty distress (Freeston et al., 2020) it could be theorized that individuals who are struggling with their mental health may find uncertainty difficult to manage, and may be more likely to be using maladaptive coping strategies such as self-distraction as a result. Maladaptive strategies such as these can perpetuate distress by preventing disconfirmation of the feared outcome (Salkovskis et al., 2003). Thus, public health strategies should focus on providing resources to encourage and equip the public in the use of adaptive coping strategies such as acceptance, and appropriate levels of support seek-

ing (Daniels, 2020), to increase tolerance of uncertainty during this time.

However, it is worth noting that adaptive strategies were not a significant mediator. As reflected in the post hoc analysis, this is perhaps due to an underuse of some adaptive strategies (e.g., acceptance) and increased use of particular “help-seeking” strategies (e.g., seeking emotional and instrumental support) in individuals who find it difficult to tolerate uncertainty. The potential overuse of “help-seeking” type strategies may be reflective of safety-seeking behaviors commonly seen in health anxiety and GAD such as reassurance seeking, however the degree of safety-seeking and whether this constitutes “excessive,” for example, is purely speculative. In these cases, commonly considered adaptive strategies have the potential to become maladaptive (i.e., maintain the difficulties; Salkovskis et al., 2003), therefore this should be kept in mind when considering how to appropriately promote their use.

Regarding the potential benefit of increasing tolerance of uncertainty in the general public, previous transdiagnostic treatments of IU have already been established (e.g., Robichaud & Dugas, 2006) and form part of recommended U.K. guidelines (National Institute for Health and Care Excellence, 2011). Concepts from these treatments could be adapted to provide psychological support and guidance in a more structured and targeted way to those who are struggling the most with uncertainty. It is likely that while face-to-face contact is limited, online resources will be particularly useful and have been found to be as efficacious as traditional interventions (Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlöf, 2018). Development of online resources now will help prepare for future infection waves and pandemics.

Limitations

At 20%, males were underrepresented within the current study. Previous research suggests overrepresentation of females is common in mental health online surveys (Batterham, 2014), and that females have greater levels of mental health difficulties than males (19% compared to 12%; McManus et al., 2016). However, the rates of existing mental health difficulties were found to be typical of the general population, and rates of current mental health difficulties found within this study were still significantly above those rates found in females alone.

The scope of this project was restricted to the public, and future research could seek to determine whether other groups that may be less able to tolerate uncertainty and more vulnerable to psychological distress. For example, Kang et al. (2020) suggested that rates of distress may be even higher in “key worker” populations. However this data is currently emerging (Roberts et al., 2020). In addition, the current study considered whether people in vulnerable

groups were more likely to experience psychological distress, but did not ask whether individuals had close friends or family that were vulnerable when families are expected to “shield” together. It raises the question of indirect impact.

Finally, this study is cross-sectional in nature and therefore the mediation analyses offer an impression of directionality that could be explored further in future experimental research. Longitudinal research replicating current findings would firmly establish the psychological impact of COVID-19 and how IU and distress will change over the course of the current and future waves of the pandemic.

Conclusions

This study is the first to examine health anxiety and coping responses in the general population during COVID-19, adding to the emerging literature on psychological distress and IU during unprecedentedly uncertain times. Overall, this study reflects increased mental health difficulties during the first wave of the COVID-19 pandemic in the United Kingdom, highlighting the importance of targeting modifiable variables to enable the public to manage their psychological health during this time, equipping them for potential future pandemic waves.

References

- Abramowitz, J. S., Deacon, B. J., & Valentiner, D. P. (2007). The Short Health Anxiety Inventory: Psychometric properties and construct validity in a non-clinical sample. *Cognitive Therapy and Research, 31*, 871–883. <http://dx.doi.org/10.1007/s10608-006-9058-1>
- Alberts, N. M., Sharpe, D., Kehler, M. D., & Hadjistavropoulos, H. D. (2011). Health anxiety: Comparison of the latent structure in medical and non-medical samples. *Journal of Anxiety Disorders, 25*, 612–614. <http://dx.doi.org/10.1016/j.janxdis.2011.01.011>
- Batterham, P. J. (2014). Recruitment of mental health survey participants using Internet advertising: Content, characteristics and cost effectiveness. *International Journal of Methods in Psychiatric Research, 23*, 184–191. <http://dx.doi.org/10.1002/mpr.1421>
- Birrell, J., Meares, K., Wilkinson, A., & Freeston, M. (2011). Toward a definition of intolerance of uncertainty: A review of factor analytical studies of the Intolerance of Uncertainty Scale. *Clinical Psychology Review, 31*, 1198–1208. <http://dx.doi.org/10.1016/j.cpr.2011.07.009>
- Bleichhardt, G., & Hiller, W. (2007). Hypochondriasis and health anxiety in the German population. *British Journal of Health Psychology, 12*, 511–523. <http://dx.doi.org/10.1348/135910706X146034>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet, 395*, 912–920. [http://dx.doi.org/10.1016/S0140-6736\(20\)30460-8](http://dx.doi.org/10.1016/S0140-6736(20)30460-8)
- Buhr, K., & Dugas, M. J. (2002). The Intolerance of Uncertainty Scale: Psychometric properties of the English version. *Behaviour Research and Therapy, 40*, 931–945. [http://dx.doi.org/10.1016/S0005-7967\(01\)00092-4](http://dx.doi.org/10.1016/S0005-7967(01)00092-4)
- Cabinet Office. (2020, March 29). *Guidance: Staying at home and away from others (social distancing)*. Retrieved from <https://www.gov.uk/government/publications/full-guidance-on-staying-at-home-and-away-from-others/full-guidance-on-staying-at-home-and-away-from-others>
- Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., & Hedman-Lagerlöf, E. (2018). Internet-based vs. face-to-face cognitive behavior therapy for

- psychiatric and somatic disorders: An updated systematic review and meta-analysis. *Cognitive Behaviour Therapy*, 47, 1–18. <http://dx.doi.org/10.1080/16506073.2017.1401115>
- Carleton, R. N., Duranceau, S., Freeston, M. H., Boelen, P. A., McCabe, R. E., & Antony, M. M. (2014). “But it might be a heart attack”: Intolerance of uncertainty and panic disorder symptoms. *Journal of Anxiety Disorders*, 28, 463–470. <http://dx.doi.org/10.1016/j.janxdis.2014.04.006>
- Carleton, R. N., Mulvogue, M. K., Thibodeau, M. A., McCabe, R. E., Antony, M. M., & Asmundson, G. J. (2012). Increasingly certain about uncertainty: Intolerance of uncertainty across anxiety and depression. *Journal of Anxiety Disorders*, 26, 468–479. <http://dx.doi.org/10.1016/j.janxdis.2012.01.011>
- Carver, C. S. (1997). You want to measure coping but your protocol’s too long: Consider the brief COPE. *International Journal of Behavioral Medicine*, 4, 92–100. http://dx.doi.org/10.1207/s15327558ijbm0401_6
- Cheema, J. R. (2014). Some general guidelines for choosing missing data handling methods in educational research. *Journal of Modern Applied Statistical Methods*, 13, 53–75. <http://dx.doi.org/10.22237/jmasm/1414814520>
- Cheng, S. K., Wong, C. W., Tsang, J., & Wong, K. C. (2004). Psychological distress and negative appraisals in survivors of severe acute respiratory syndrome (SARS). *Psychological Medicine*, 34, 1187–1195. <http://dx.doi.org/10.1017/S0033291704002272>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Mahwah, NJ: Erlbaum.
- Daniels, J. (2020). Coronavirus: How to stop the anxiety spiralling out of control. *The Conversation*. Retrieved from <https://theconversation.com/coronavirus-how-to-stop-the-anxiety-spiralling-out-of-control-133166>
- Daniels, J., Salkovskis, P., & Parker, H. (2020). Prevalence and treatment of chronic fatigue syndrome/ME and co-morbid severe health anxiety. *International Journal of Clinical and Health Psychology*, 20, 10–19. <http://dx.doi.org/10.1016/j.ijchp.2019.11.003>
- Department of Health and Social Care. (2020). *Guidance: Number of coronavirus (COVID-19) cases and risk in the U.K.* Retrieved from <https://www.gov.uk/guidance/coronavirus-covid-19-information-for-the-public>
- Einstein, D. A. (2014). Extension of the transdiagnostic model to focus on intolerance of uncertainty: A review of the literature and implications for treatment. *Clinical Psychology: Science and Practice*, 21, 280–300. <http://dx.doi.org/10.1111/cpsp.12077>
- Eisenberg, S. A., Shen, B. J., Schwarz, E. R., & Mallon, S. (2012). Avoidant coping moderates the association between anxiety and patient-rated physical functioning in heart failure patients. *Journal of Behavioral Medicine*, 35, 253–261. <http://dx.doi.org/10.1007/s10865-011-9358-0>
- Fergus, T. A., & Bardeen, J. R. (2013). Anxiety sensitivity and intolerance of uncertainty: Evidence of incremental specificity in relation to health anxiety. *Personality and Individual Differences*, 55, 640–644. <http://dx.doi.org/10.1016/j.paid.2013.05.016>
- Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences*, 17, 791–802. [http://dx.doi.org/10.1016/0191-8869\(94\)90048-5](http://dx.doi.org/10.1016/0191-8869(94)90048-5)
- Freeston, M., Tiplady, A., Mawn, L., Bottesi, G., & Thwaites, S. (2020). Towards a model of uncertainty distress in the context of Coronavirus (COVID-19). *PsyArXiv*. <http://dx.doi.org/10.31234/osf.io/v8q6m>
- Hagan, T. L., Fishbein, J. N., Nipp, R. D., Jacobs, J. M., Traeger, L., Irwin, K. E., . . . Temel, J. S. (2017). Coping in patients with incurable lung and gastrointestinal cancers: A validation study of the Brief COPE. *Journal of Pain and Symptom Management*, 53, 131–138. <http://dx.doi.org/10.1016/j.jpainsymman.2016.06.005>
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.
- Hofmann, S. G., Asnaani, A., Vonk, I. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognitive Therapy and Research*, 36, 427–440. <http://dx.doi.org/10.1007/s10608-012-9476-1>
- Holaway, R. M., Heimberg, R. G., & Coles, M. E. (2006). A comparison of intolerance of uncertainty in analogue obsessive-compulsive disorder and generalized anxiety disorder. *Journal of Anxiety Disorders*, 20, 158–174. <http://dx.doi.org/10.1016/j.janxdis.2005.01.002>
- Holmes, E. A., O’Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., . . . Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, 7, 547–560. [http://dx.doi.org/10.1016/S2215-0366\(20\)30168-1](http://dx.doi.org/10.1016/S2215-0366(20)30168-1)
- Jakobsen, J. C., Gluud, C., Wetterslev, J., & Winkel, P. (2017). When and how should multiple imputation be used for handling missing data in randomised clinical trials: A practical guide with flowcharts. *BMC Medical Research Methodology*, 17, 162. <http://dx.doi.org/10.1186/s12874-017-0442-1>
- Kang, L., Li, Y., Hu, S., Chen, M., Yang, C., Yang, B. X., . . . Liu, Z. (2020). The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *The Lancet Psychiatry*, 7, e14. [http://dx.doi.org/10.1016/S2215-0366\(20\)30047-X](http://dx.doi.org/10.1016/S2215-0366(20)30047-X)
- Kessler, R. C., Angermeyer, M., Anthony, J. C., De Graaf, R., Demyttenaere, K., Gasquet, I., . . . the WHO Mental Health Survey Consortium. (2007). Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization’s World Mental Health Survey Initiative. *World Psychiatry*, 6, 168–176.
- Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals*, 32, 509–515. <http://dx.doi.org/10.3928/0048-5713-20020901-06>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16, 606–613. <http://dx.doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Kroenke, K., Strine, T. W., Spitzer, R. L., Williams, J. B., Berry, J. T., & Mokdad, A. H. (2009). The PHQ-8 as a measure of current depression in the general population. *Journal of Affective Disorders*, 114, 163–173. <http://dx.doi.org/10.1016/j.jad.2008.06.026>
- Kurita, K., Garon, E. B., Stanton, A. L., & Meyerowitz, B. E. (2013). Uncertainty and psychological adjustment in patients with lung cancer. *Psycho-Oncology*, 22, 1396–1401. <http://dx.doi.org/10.1002/pon.3155>
- Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care*, 46, 266–274. <http://dx.doi.org/10.1097/MLR.0b013e318160d093>
- Mahmoud, J. S. R., Staten, R., Hall, L. A., & Lennie, T. A. (2012). The relationship among young adult college students’ depression, anxiety, stress, demographics, life satisfaction, and coping styles. *Issues in Mental Health Nursing*, 33, 149–156. <http://dx.doi.org/10.3109/01612840.2011.632708>
- McLean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research*, 45, 1027–1035. <http://dx.doi.org/10.1016/j.jpsychires.2011.03.006>
- McManus, S., Bebbington, P., Jenkins, R., & Brugha, T. (2016). *Mental health and wellbeing in England: Adult psychiatry morbidity survey 2014*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/556596/apms-2014-full-rpt.pdf
- McManus, S., Meltzer, H., Brugha, T., Bebbington, P. E., & Jenkins, R. (2009). *Adult psychiatric morbidity in England: Results of a household survey*. Retrieved from <https://digital.nhs.uk/data-and-information/publications/statistical/adult-psychiatric-morbidity-survey/adult-psychiatric-morbidity-in-england-2007-results-of-a-household-survey>

- Meyer, B. (2001). Coping with severe mental illness: Relations of the Brief COPE with symptoms, functioning, and well-being. *Journal of Psychopathology and Behavioral Assessment*, 23, 265–277. <http://dx.doi.org/10.1023/A:1012731520781>
- Monzani, D., Steca, P., Greco, A., D'Addario, M., Cappelletti, E., & Pancani, L. (2015). The situational version of the Brief COPE: Dimensionality and relationships with goal-related variables. *Europe's Journal of Psychology*, 11, 295–310. <http://dx.doi.org/10.5964/ejop.v11i2.935>
- National Health Service. (2020a). *Advice for people at higher risk: Coronavirus (COVID-19)*. Retrieved from <https://www.nhs.uk/conditions/coronavirus-covid-19/advice-for-people-at-high-risk/>
- National Health Service. (2020b). *Check if you have coronavirus symptoms*. Retrieved from <https://www.nhs.uk/conditions/coronavirus-covid-19/check-if-you-have-coronavirus-symptoms/>
- National Institute for Health and Care Excellence. (2009). *Depression in adults: Recognition and management* (Clinical Guideline No. 90). Retrieved from <https://www.nice.org.uk/guidance/cg90>
- National Institute for Health and Care Excellence. (2011). *Generalised anxiety disorder and panic disorder in adults: Management* (Clinical Guideline No. 113). Retrieved from <https://www.nice.org.uk/guidance/cg113>
- Office for National Statistics. (2020). *Deaths involving COVID-19, England and Wales: Deaths occurring in April 2020*. Retrieved from <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsinvolvingcovid19englandandwales/latest#covid-19-and-the-overall-mortality-rate-for-april>
- Public Health England. (2020). *Guidance on shielding and protecting people who are clinically extremely vulnerable from COVID-19*. Retrieved from <https://www.gov.uk/government/publications/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19>
- Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. *General Psychiatry*, 33, e100213. <http://dx.doi.org/10.1136/gpsych-2020-100213>
- Roberts, T., Daniels, J., Hulme, W., Horner, D., Lyttle, M., Samuel, K., . . . Carlton, E. (2020). *The COVID-19 emergency response assessment study (phase 1 findings)*. Manuscript submitted for publication.
- Robichaud, M., & Dugas, M. J. (2006). A cognitive-behavioral treatment targeting intolerance of uncertainty. In G. C. L. Davey & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment* (pp. 289–304). Chichester, UK: Wiley. <http://dx.doi.org/10.1002/9780470713143.ch17>
- Rubin, G. J., Amlôt, R., Page, L., & Wessely, S. (2009). Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: Cross sectional telephone survey. *British Medical Journal*, 339, b2651. <http://dx.doi.org/10.1136/bmj.b2651>
- Salkovskis, P. M., Rimes, K. A., Warwick, H. M. C., & Clark, D. M. (2002). The Health Anxiety Inventory: Development and validation of scales for the measurement of health anxiety and hypochondriasis. *Psychological Medicine*, 32, 843–853. <http://dx.doi.org/10.1017/S0033291702005822>
- Salkovskis, P. M., Warwick, H. M., & Deale, A. C. (2003). Cognitive-behavioral treatment for severe and persistent health anxiety (hypochondriasis). *Brief Treatment and Crisis Intervention*, 3, 353–367. <http://dx.doi.org/10.1093/brief-treatment/mhg026>
- Scott, K. M., Bruffaerts, R., Tsang, A., Ormel, J., Alonso, J., Angermeyer, M. C., . . . Von Korff, M. (2007). Depression-anxiety relationships with chronic physical conditions: Results from the World Mental Health Surveys. *Journal of Affective Disorders*, 103, 113–120. <http://dx.doi.org/10.1016/j.jad.2007.01.015>
- Sim, K., & Chua, H. C. (2004). The psychological impact of SARS: A matter of heart and mind. *Canadian Medical Association Journal*, 170, 811–812. <http://dx.doi.org/10.1503/cmaj.1032003>
- Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, 166, 1092–1097. <http://dx.doi.org/10.1001/archinte.166.10.1092>
- Sprang, G., & Silman, M. (2013). Posttraumatic stress disorder in parents and youth after health-related disasters. *Disaster Medicine and Public Health Preparedness*, 7, 105–110. <http://dx.doi.org/10.1017/dmp.2013.22>
- Sunderland, M., Newby, J. M., & Andrews, G. (2013). Health anxiety in Australia: Prevalence, comorbidity, disability and service use. *The British Journal of Psychiatry*, 202, 56–61. <http://dx.doi.org/10.1192/bjp.bp.111.103960>
- Taha, S., Matheson, K., Cronin, T., & Anisman, H. (2014). Intolerance of uncertainty, appraisals, coping, and anxiety: The case of the 2009 H1N1 pandemic. *British Journal of Health Psychology*, 19, 592–605. <http://dx.doi.org/10.1111/bjhp.12058>
- Tang, N. K., Wright, K. J., & Salkovskis, P. M. (2007). Prevalence and correlates of clinical insomnia co-occurring with chronic back pain. *Journal of Sleep Research*, 16, 85–95. <http://dx.doi.org/10.1111/j.1365-2869.2007.00571.x>
- Tyrer, P., Cooper, S., Crawford, M., Dupont, S., Green, J., Murphy, D., . . . Tyrer, H. (2011). Prevalence of health anxiety problems in medical clinics. *Journal of Psychosomatic Research*, 71, 392–394. <http://dx.doi.org/10.1016/j.jpsychores.2011.07.004>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., McIntyre, R. S., . . . Ho, C. (2020). A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain, Behavior, and Immunity*, 87, 40–48. <http://dx.doi.org/10.1016/j.bbi.2020.04.028>
- Wilcox, R. (2012). *Introduction to robust estimation and hypothesis testing* (3rd ed.). Oxford, UK: Elsevier.
- Wilder-Smith, A., Chiew, C. J., & Lee, V. J. (2020). Can we contain the COVID-19 outbreak with the same measures as for SARS? *The Lancet Infectious Diseases*, 20, e102–e107. [http://dx.doi.org/10.1016/S1473-3099\(20\)30129-8](http://dx.doi.org/10.1016/S1473-3099(20)30129-8)
- World Health Organization. (2020a). *Coronavirus*. Retrieved from https://www.who.int/health-topics/coronavirus#tab=tab_3
- World Health Organization. (2020b). *Coronavirus disease (COVID-19): Situation Report 133*. Retrieved from https://www.who.int/docs/default-source/coronavirus/situation-reports/20200601-covid-19-sitrep-133.pdf?sfvrsn=9a56f2ac_4
- Wu, Y., Levis, B., Riehm, K. E., Saadat, N., Levis, A. W., Azar, M., . . . Thombs, B. D. (2019). Equivalency of the diagnostic accuracy of the PHQ-8 and PHQ-9: A systematic review and individual participant data meta-analysis. *Psychological Medicine*, 50, 1368–1380.
- Xiang, Y. T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The Lancet Psychiatry*, 7, 228–229. [http://dx.doi.org/10.1016/S2215-0366\(20\)30046-8](http://dx.doi.org/10.1016/S2215-0366(20)30046-8)

Received June 4, 2020

Revision received June 23, 2020

Accepted June 26, 2020 ■