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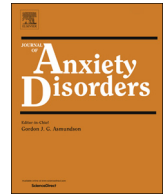
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Do pre-existing anxiety-related and mood disorders differentially impact COVID-19 stress responses and coping?

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ABSTRACT

Background: People with pre-existing mental health conditions may be more susceptible to stressors associated with COVID-19 relative to the general population; however, no studies have assessed whether susceptibility differs between classes of mental health disorders. We assessed COVID-19-related stress, self-isolation stressors, and coping in those with a primary anxiety-related disorder diagnosis, a primary mood disorder diagnosis, and no mental health disorder.

Methods: Adults from a population-representative sample from the United States and Canada who reported current (past year) anxiety-related ($n = 700$) or mood ($n = 368$) disorders were compared to a random sample of respondents who did not report a current mental health diagnosis ($n = 500$) on COVID-19-related stress, self-isolation stress, and coping.

Results: The anxiety-related disorders group exhibited higher COVID Stress Scales total scores and higher scores on its fears about danger and contamination, socioeconomic consequences, xenophobia, and traumatic stress symptoms scales than the other groups. The mood disorders group had higher scores on the traumatic stress symptoms and socioeconomic consequences scales than those with no current mental disorder. Those with current anxiety-related or mood disorders were more likely to voluntarily self-isolate and were more likely to report greater self-isolation stressors and distress than those without a mental health disorder. Yet, there were no major differences in perceived effectiveness of coping strategies across groups.

Conclusion: People with anxiety-related or mood disorders were more negatively affected by COVID-19 compared to those with no mental health disorder; however, adding to psychological burden, those with anxiety-related disorders reported greater fears about danger and contamination, socioeconomic consequences, xenophobia, and traumatic stress symptoms than the other groups. These findings suggest the need for tailoring COVID-19-related mental health interventions to meet the specific needs of people with pre-existing mental health conditions.

1. Introduction

There is evidence of widespread emotional distress in response to the COVID-19 pandemic. Data from China, for example, suggests that 25 % of the general population have experienced moderate to severe levels of anxiety- or stress-related symptoms in response to COVID-19 (Qiu et al., 2020; Wang et al., 2020). Likewise, there is evidence of considerable distress specific to COVID-19; indeed, several investigators have reported elevated levels of fear of infection (Ahorsu et al., 2020; Lee, 2020; Mertens, Gerristen, Salemink, & Engelhard, 2020; Park et al., 2020) as well as elevated prevalence of posttraumatic stress disorder

(Tan et al., 2020). Recent research based on data collected in the early stages of the COVID-19 pandemic from a large American and Canadian population-representative sample suggests that pandemic-related distress may comprise a network on five interconnected symptom categories—danger and contamination fears, socioeconomic concerns, xenophobia, traumatic stress symptoms, and compulsive checking and reassurance seeking—corresponding to a COVID Stress Syndrome (Taylor et al., 2020a, Taylor et al., 2020b).

There have been several recent commentaries suggesting that people with pre-existing mental health conditions may be more susceptible to stressors associated with COVID-19 relative to the general

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population, particularly given disruptions to routines and mental health care and associated increases in potential for relapse or exacerbation of symptoms (Chatterjee, Malathesh, & Mukherjee, 2020; Druss, 2020; Yao, Chen, & Xu, 2020). However, to the best of our knowledge, only one study has systematically addressed and reported on this issue. Taylor et al. (2020a) reported that the COVID Stress Syndrome is associated with premorbid psychopathology; that is, people with a pre-existing (past year) mental health disorder scored significantly higher on the COVID Stress Scales (CSS) total score (Taylor et al., 2020b) than those without. This finding generally supports prior suggestions that individuals with pre-existing mental health conditions are more negatively impacted by COVID-19-related stress than those without pre-existing mental health conditions. It remains to be determined whether specific classes of mental health disorders are differentially impacted by COVID-related stress.

To further delineate the impacts of pandemic-related stress on those with pre-existing mental health conditions, we assessed differences between those with a primary current (i.e., past year) anxiety-related disorder (e.g., generalized anxiety disorder, posttraumatic stress disorder, social anxiety disorder, panic disorder, or obsessive-compulsive disorder; see Asmundson, 2019), a primary current mood disorder (e.g., major depressive disorder, bipolar disorder), and no current mental health disorder on total and scale scores on the CSS. Given concerns that self-isolation may be inherently more challenging for those with pre-existing mental health disorders (Chatterjee et al., 2020), we also assessed whether these groups differed in the proportion that engaged in voluntary self-isolation and if there were related differences in social-isolation stressors and coping behaviors. We predicted that those with a primary current anxiety-related disorder would be more negatively impacted by COVID-19 than those with a primary current mood disorder or no current diagnosis.

2. Method

2.1. Sample and data collection procedures

Data were collected from Canada and the United States using an online self-report survey delivered in English by Qualtrics, a commercial survey sampling and administration company, between March 21 and April 1, 2020. The sampling methods are described in greater detail elsewhere (Taylor et al., 2020a, Taylor et al., 2020b). All respondents provided informed consent prior to participation. The full sample comprised 6854 adults aged 18–94 years ($M = 49.8$ years, $SD = 16.2$). Respondents indicated whether they had a pre-existing current (i.e., past year) mental-health diagnosis and, if so, specified their primary diagnosis. Self-reported diagnoses of mental disorders have been shown to be an adequate indicator of mental health status (Mawani & Gilmour, 2010; Sanchez-Villegas et al., 2008). Of the 1227 respondents (17.9 %) who reported a current mental health diagnosis, 368 reported a current primary mood disorder (i.e., 229 with major depressive disorder, 90 with bipolar disorder, 43 with persistent depressive disorder, 4 with cyclothymic disorder, and 2 with other) and 700 reported a current primary anxiety-related disorder (i.e., 360 with generalized anxiety disorder, 103 with posttraumatic stress disorder, 94 with social anxiety disorder, 54 with panic disorder, 39 with obsessive-compulsive disorder, 33 with anxiety due to another medical condition, 6 with separation anxiety, 5 with agoraphobia, 2 with a specific phobia, 1 with hoarding disorder, 1 with adjustment disorder, and 2 with other). An additional 159 respondents indicated a primary diagnosis other than mood or anxiety-related disorders, and were excluded from analyses. A random sample of 500 respondents who did not report a current mental health diagnosis was selected for purposes of comparison.

2.2. Measures

Respondents completed a general demographics questionnaire

wherein they indicated their country of residence, age, sex, ethnicity, employment status, education level, and household income. They also completed the following measures.

2.2.1. Patient Health Questionnaire-4 (PHQ-4 Kroenke, Spitzer, Williams, & Löwe, 2009)

The PHQ-4, a measure of current anxiety and depression, comprises four items assessing how often in the past week respondents have been bothered by problems related to anxiety and depression. Items are scored on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day). Current anxiety and depression are each measured using two items, with higher scores indicating greater levels of anxiety or depression. The PHQ-4 has been validated for use in both clinical and non-clinical samples (Kroenke et al., 2009; Löwe et al., 2010). For the current study, Cronbach's alpha for the PHQ-4 was excellent ($\alpha = .91$)

2.2.2. COVID Stress Scales (CSS; Taylor et al., 2020a)

The CSS are recently developed measures of COVID-19-related stress, comprising 36-items distributed over five scales: (1) danger and contamination fears (DAN), (2) fears about socioeconomic consequences (SEC), (3) xenophobia (XEN), (4) compulsive checking and reassurance seeking (CHE), and (5) traumatic stress symptoms (TSS). Each scale consists of six items, with the exception of DAN, which consists of 12 items. Items within DAN, SEC, and XEN are scored on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely), where respondents are asked to indicate the extent to which they have experienced various COVID-19-related worries in the past week. Items within CHE and TSS are scored on a 5-point Likert scale ranging from 0 (never) to 4 (almost always). For these scales, respondents are asked to indicate how often they have engaged in compulsive checking or reassurance seeking behaviours, and how frequently they experience problems related to traumatic stress in the past week. Higher scores on the CSS are indicative of greater levels of COVID-19-related stress. The CSS have demonstrated robust psychometric properties and good-to-excellent internal consistencies (Taylor et al., 2020a). For the current study, Cronbach's alphas ranged from good to excellent ($\alpha = .83$ to $\alpha = .94$) for the individual scales and was excellent ($\alpha = .96$) for the total scale score.

2.2.3. Self-isolation distress and coping

Respondents who identified that they were currently in voluntary self-isolation completed measures of: (1) stressors associated with self-isolation, (2) self-isolation distress, and (3) coping strategies that might be used during self-isolation. Stressors associated with self-isolation were assessed using 16 items asking respondents to indicate whether they encountered various problems, such as financial difficulties and taking care of children during self-isolation, and were rated on a yes/no scale. The number of stressors endorsed were summed to derive a total score on this scale. Self-isolation distress was assessed using seven items concerning the experience of aversive emotions or stress reactions during self-isolation (e.g., irritability, anxiety). Respondents indicated the extent to which statements represented their feelings during self-isolation, and were rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). Total scores on self-isolation distress were calculated by summing scores on these seven items. Internal consistency of the scale was good, $\alpha = .89$. Coping strategies were assessed using 28 items asking respondents to indicate whether they used various coping strategies (e.g., setting a routine for oneself, spending time reading) and the extent to which they found the strategy helpful during self-isolation. Coping strategies were rated on a 5-point Likert scale ranging from 0 (did not use this coping resource), and 1 (tried the coping resource but found it was not helpful) to 4 (tried it and found it extremely helpful). The scale points were labelled to permit assessment of whether or not a given coping strategy was used and, if used, its perceived helpfulness. Additional details regarding these measures are available in Taylor et al. (2020a).

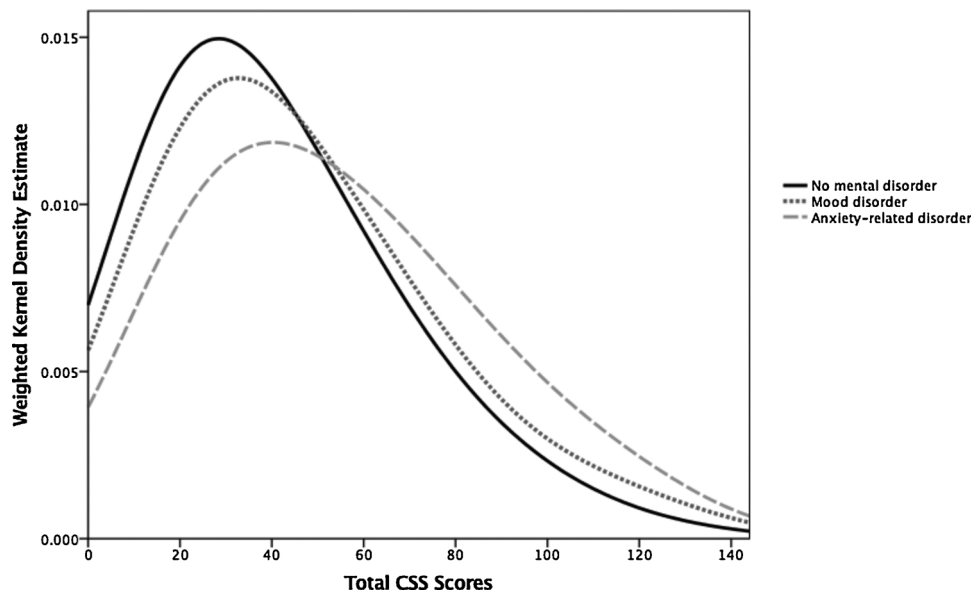


Fig. 1. Kernel density estimation of total unadjusted CSS scores across diagnostic groups. Density is weighted to reflect the proportion of cases within each group along total unadjusted CSS scores. CSS = COVID Stress Scales.

2.2.4. Statistical procedures

Statistical procedures used in the current study are similar to those reported by Carleton et al. (2012). Differences between groups on demographic variables as well as on the PHQ-4 were assessed using analysis of variance (ANOVA) for continuous measures and χ^2 analyses for discrete measures in order to characterize the sample. Analysis of covariance (ANCOVA) was conducted to compare CSS total and scale score means. ANCOVA was also conducted to compare self-isolation distress and coping between groups. Previous studies have indicated that COVID-19-related stress tends to be higher in those who are female, younger, unemployed, less educated, and non-White (Statistics Canada, 2020; Taylor et al., 2020b). Accordingly, covariates in the present study included age, sex, minority status, unemployment, and college education. Categorical covariates (i.e., sex, minority status, unemployment, and college education) were converted to dichotomous variables and dummy coded. Bootstrapping was performed to ensure the robust nature of statistically significant results (Byrne, 2001; Davison & Hinkley, 2006; Nevitt & Hancock, 2001). Given the number of analyses reported in this article, the alpha level was set at .01 instead of .05. This adjustment corrects for inflated Type I error without unduly inflating Type II error with a more stringent correction, such as a Bonferroni correction.

Empirical distributions of CSS total scores between groups were studied using Kernel density estimation curves, a data smoothing algorithm wherein population inferences are made based on distribution characteristics of an empirical sample (Salgado-Ugarte & Pérez-Hernández, 2003). Compiled univariate Kernel density estimation curves tend to be reliable and informative for large datasets and allow for parsimonious examination of distributions of one variable across several groups in a single plot (Wilke, 2019). A Gaussian function was used, with a bandwidth of one, to compile the curves. Visual inspection of plots indicate how distribution features (e.g., variance, skew, kurtosis) and modality (e.g., relative normality, bimodality) differ across diagnostic groups (Salgado-Ugarte, Shimizu, & Taniuchi, 1994).

3. Results

3.1. Sample characteristics

Details regarding demographic characteristics, PHQ-4 scores, and the number of respondents in self-isolation at the time of the survey for

the total sample and by group are available in Supplement Table 1. The total sample ($N = 1,568$) was primarily female (56.4 %) and White (66.7 %), with a mean age of 45.4 years ($SD = 15.3$), and just over half were from Canada (52.4 %). Most respondents had completed full or partial college education (61.6 %), and most were employed full- or part-time (50.1 %).

The anxiety-related, mood, and no mental disorder groups differed significantly in terms of age ($F(2,838.83) = 63.42, p < .001, \eta^2 = .08$), sex ($X^2(2) = 68.78, p < .001, V = .21$), income levels ($X^2(8) = 81.60, p < .001, V = .16$), ethnicity, ($X^2(8) = 21.86, p = .005, V = .08$), levels of education ($X^2(8) = 41.34, p < .001, V = .12$), and employment status ($X^2(6) = 119.55, p < .001, V = .20$; see Supplement Table 1). The groups did not differ significantly in terms of country of residence ($X^2(2) = 4.24, p = .120, V = .05$). The proportion of respondents in self-isolation at the time of the survey differed significantly between the anxiety-related disorder (60.7 %) and mood disorder (58.4 %) groups in comparison to the no mental disorder group (45.6 %), $X^2(2) = 29.21, p < .001, V = .14$.

As indicated by PHQ-4 subscale scores, levels of current anxiety ($F(2,868.41) = 110.92, p < .001, \eta^2 = .12$) and depression ($F(2,852.27) = 168.10, p < .001, \eta^2 = .15$) differed between groups. Respondents with anxiety-related and mood disorders reported significantly higher levels of current anxiety and depression than those with no diagnosis ($ps < .001$; see Supplement Table 1). The anxiety-related disorder group reported significantly higher levels of current anxiety ($p < .001$) and similar levels of current depression compared to the mood disorder group ($p > .01$).

3.2. Distribution estimates

Kernel density distribution estimates on CSS total scores for the anxiety-related, mood, and no current mental disorder groups are illustrated in Fig. 1. Distribution estimates across these three groups followed a similar pattern, with unadjusted total CSS scores falling towards the lower end of the distribution and appearing to be positively skewed; however, it also appears that a greater proportion of those in the anxiety-related disorder group have higher CSS total scores.

3.3. Between groups analyses

Adjusted means and standard errors for the CSS and self-isolation

Table 1
Descriptive statistics by group on the COVID Stress Scales, self-isolation distress, and self-isolation stressors.

| Variable | No mental disorder (n = 500) Adjusted Mean (SE) | Mood disorder (n = 368) | Anxiety-related disorder (n = 700) |
|---------------------------------------|---|----------------------------|---------------------------------------|
| Total CSS | 41.7 (1.4) | 45.1 (1.6) | 52.4 (1.2) |
| Danger and contamination fears | 18.3 (0.6) | 19.5 (0.6) | 21.8 (0.5) |
| Socioeconomic consequences | 7.0 (0.3) | 8.1 (0.3) | 9.4 (0.3) |
| Xenophobia ^a | 5.8 (0.3) | 5.9 (0.3) | 7.0 (0.3) |
| Traumatic stress | 3.9 (0.3) | 5.2 (0.3) | 6.7 (0.2) |
| Compulsive checking | 6.8 (0.3) | 6.4 (0.3) | 7.6 (0.2) |
| Self-isolation distress ^b | 8.1 (0.5) | 10.6 (0.5) | 12.1 (0.3) |
| Self-isolation stressors ^b | 1.6 (0.2) | 2.9 (0.2) | 3.0 (0.1) |

Note. CSS = COVID Stress Scales. Adjusted means and standard deviations account for age, ethnicity, sex, education, and employment.

^a Age was not included as a covariate for xenophobia because age did not correlate with xenophobia ($r = -.009, p = .719$).

^b $n = 871$ in current self-isolation.

distress and stressors are presented in Table 1. There were significant group differences across all outcome variables (see Supplement Table 2). Given the differences in sample size between groups, the assumption of homogeneity of variance was especially important in order to avoid inflation of Type I error (Tabachnik & Fidell, 2013). To determine the severity of heterogeneity of variance, F_{Max} (i.e., the ratio between the variance of the largest and the smallest sample size) was calculated in accordance with Tabachnik and Fidell (2013). As F_{Max}

Table 2
Coping strategies across groups.

| Coping strategy | No mental disorder (n = 228) % | Mood disorder (n = 215) % | Anxiety-related disorder (n = 425) % | χ^2 (df = 2) | p | V | Pairwise comparisons (1 = no disorder, 2 = mood, 3 = anxiety) |
|---|--------------------------------------|---------------------------------|--|----------------------|--------|-----|--|
| Set a schedule or routine for myself | 37.3 | 42.9 | 50.1 | 10.83 | .004 | .11 | 1 = 2, 1 ≠ 3, 2 = 3 |
| Spent time connecting with people via the internet | 73.2 | 79.1 | 84.8 | 10.31 | .006 | .11 | 1 = 2, 1 ≠ 3, 2 = 3 |
| Asked friends or family to deliver food or other things to my door | 28.6 | 23.3 | 33.7 | 6.48 | .039 | .09 | ns |
| Spent time reading or writing | 79.9 | 77.7 | 70.4 | 6.70 | .035 | .09 | ns |
| Spent time on hobbies | 75.0 | 79.6 | 79.5 | 1.23 | .542 | .04 | ns |
| Watched TV or movies | 97.9 | 95.3 | 98.9 | 3.16 | .076 | .06 | ns |
| Played video games or computer games | 50.4 | 56.8 | 66.4 | 17.27 | < .001 | .14 | 1 = 2, 1 ≠ 3, 2 ≠ 3 |
| Spent time cooking | 80.8 | 70.8 | 79.8 | 8.13 | .017 | .10 | ns |
| Tried new recipes | 57.6 | 39.6 | 53.6 | 16.25 | < .001 | .14 | 1 ≠ 2, 1 = 3, 2 ≠ 3 |
| Searched the Internet for news on COVID-19 | 68.4 | 61.9 | 71.8 | 6.46 | .040 | .09 | ns |
| Searched the Internet for new ways of keeping myself occupied | 36.0 | 35.3 | 45.9 | 7.78 | .020 | .10 | ns |
| Spent time talking with or texting friends on my phone | 79.9 | 85.7 | 85.2 | 4.48 | .107 | .07 | ns |
| Kept busy cleaning or tidying up | 81.7 | 80.0 | 87.8 | 6.62 | .036 | .09 | ns |
| Kept busy by working at my job from home | 37.3 | 31.2 | 39.8 | 3.69 | .158 | .07 | ns |
| Kept busy by trying to keep my children entertained | 21 | 17 | 30 | 14.68 | .001 | .13 | 1 = 2, 1 = 3, 2 ≠ 3 |
| Exercised | 56.1 | 43.3 | 52.8 | 7.66 | .022 | .09 | ns |
| Yoga | 25.0 | 23.8 | 27.7 | 1.14 | .566 | .04 | ns |
| Meditation | 21.1 | 28.9 | 32.0 | 8.81 | .012 | .10 | ns |
| Practiced relaxation exercises | 27.2 | 30.8 | 34.7 | 3.17 | .076 | .06 | ns |
| Reminded myself that it would soon be over | 61.4 | 63.3 | 69.5 | 3.81 | .149 | .07 | ns |
| Reminded myself that self-isolation is important for helping my community | 82.3 | 82.6 | 89.7 | 7.87 | .020 | .10 | ns |
| Ate more than I normally would | 43.4 | 50.8 | 59.5 | 14.27 | .001 | .13 | 1 = 2, 1 ≠ 3, 2 = 3 |
| Consumed more alcohol or recreational drugs than I normally would | 26.9 | 26 | 32.5 | 3.56 | .167 | .06 | ns |
| Slept more than I normally would | 60.9 | 62.3 | 68.2 | 5.01 | .082 | .08 | ns |
| Searched for porn on the internet | 18.1 | 26.6 | 28.0 | 7.93 | .019 | .10 | ns |
| Shopped online | 50.6 | 56.6 | 62.1 | 9.85 | .007 | .11 | 1 = 2, 1 ≠ 3, 2 = 3 |
| Monitored my symptoms | 33.9 | 37.2 | 42.4 | 5.83 | .054 | .08 | ns |
| Met with a doctor or counsellor via the internet | 12.9 | 17.2 | 17.4 | 3.72 | .155 | .07 | ns |

Note. Alpha = .01.

values were less than 2 across all dependent variables and the larger variance was associated with the larger sample size, homogeneity of variance was deemed to be not severely violated in the current study. Nonetheless, use of the more stringent alpha of .01 (see above) for this study corrects for and minimizes any impact of lack of homogeneity of variance (Tabachnik & Fidell, 2013).

3.3.1. COVID Stress Scales

The anxiety-related disorder group reported significantly higher overall COVID-19-related stress, as indicated by the CSS total score, than those in the mood disorder ($M_{diff} = 7.32, 99\% \text{ CI} = [2.13, 12.24], p = .002$) and no mental disorder ($M_{diff} = 10.68, 99\% \text{ CI} = [5.95, 15.54], p = .001$) groups. There were no significant differences between the mood disorder and no mental disorder groups on the CSS total ($p = .098$). A similar pattern of differences was found for the DAN and XEN scores. The anxiety-related disorder group reported significantly higher DAN and XEN scores than the mood disorder (DAN $M_{diff} = 2.22, 99\% \text{ CI} = [0.13, 4.39], p = .009$; XEN $M_{diff} = 1.19, 99\% \text{ CI} = [0.14, 2.25], p = .004$) and no mental disorder (DAN $M_{diff} = 3.46, 99\% \text{ CI} = [1.45, 5.65], p = .001$; XEN $M_{diff} = 1.22, 99\% \text{ CI} = [0.29, 2.26], p = .001$) groups. There were no significant differences between the mood disorder and no mental disorder groups on DAN or XEN ($ps > .01$).

The anxiety-related disorder group also reported higher SEC and TSS than those in the mood disorder (SEC $M_{diff} = 1.29, 99\% \text{ CI} = [0.10, 2.33], p = .003$; TSS $M_{diff} = 1.43, 99\% \text{ CI} = [0.44, 2.64], p = .002$) and no mental disorder (SEC $M_{diff} = 2.44, 99\% \text{ CI} = [1.39, 3.43], p = .001$; TSS $M_{diff} = 2.72, 95\% \text{ CI} = [1.83, 3.76], p = .001$) groups; however, unlike other CSS domains, those in the mood disorder

group reported significantly greater SEC and TSS than those in the no mental disorder group (SEC $M_{diff} = 1.14$, 99 % CI = [0.10, 2.21], $p = .007$; TSS $M_{diff} = 1.29$, 99 % CI = [0.32, 2.33], $p = .002$). On CHE, the anxiety-related group differed from the mood disorder group ($M_{diff} = 1.21$, 99 % CI = [0.21, 2.14], $p = .001$), but not from the no mental disorder group ($p = .029$). The differences between the mood disorder group and the no mental disorder group did not achieve significance ($p = .278$).

3.3.2. Self-isolation distress and coping

Among respondents currently in self-isolation, those with either an anxiety-related or mood disorder reported experiencing significantly greater self-isolation stressors ($M_{diff} = 1.35$, 99 % CI = [0.77, 1.92], $p = .001$, $M_{diff} = 1.22$, 99 % CI = [0.59, 1.86], $p = .001$, respectively) and distress ($M_{diff} = 3.96$, 99 % CI = [2.51, 5.47], $p = .001$, $M_{diff} = 2.50$, 99 % CI = [0.92, 4.04], $p = .001$, respectively) than those with no mental disorder. Despite the lack of difference in reported self-isolation stressors between the anxiety-related and mood disorder groups ($p = .592$), the anxiety-related disorders group reported greater distress during self-isolation than the mood disorder group ($M_{diff} = 1.46$, 99 % CI = [0.08, 2.91], $p = .009$).

Frequencies for use of various coping strategies are provided in Table 2. Adjusted means and standard errors for helpfulness of used coping strategies are presented in Supplemental Table 3. There were several between groups differences regarding use of coping strategies during self-isolation, primarily wherein those with an anxiety-related disorder were significantly more likely than those without a mental health disorder to engage in particular strategies (e.g., set a schedule or routine, spend time connecting with people via the Internet, eat more than normal, shop online; see Table 2); however, there were no significant differences between groups on the perceived helpfulness of the utilized coping strategies ($ps > .01$; see Supplement Table 3), with the exception of “met with a doctor or counsellor via the internet (e.g., phone, Skype, FaceTime)”, $F(1,121) = 7.28$, $p = .001$, partial $\eta^2 = .11$. The anxiety-related disorder group reported that meeting with a doctor or counsellor was more helpful than did those with no mental disorder ($M_{diff} = 0.86$, 99 % CI = [0.24, 1.45], $p = .003$); but, there were no differences between the anxiety-related and mood disorder groups or between the mood disorder and no mental disorder group on this variable ($ps > .01$).

4. Discussion

The aim of this investigation was to examine how individuals with different classes of pre-existing mental health problems react to, and cope with, COVID-19. It was hypothesized that individuals who self-identify with pre-existing anxiety-related disorders would fare poorer compared to individuals with self-reported mood disorders and those who do not report any mental health disorder. To our knowledge, this is the only investigation to evaluate the effects of COVID-19 on individuals with different classes of mental health problems.

There was general support for the hypothesis that COVID-19 would have greater adverse consequences for individuals with anxiety-related disorders compared to those with mood disorders or no reported mental health problems. There were, however, some specific patterns. Across all five scales of the CSS, as well as the CSS total score, individuals with primary anxiety-related disorders scored consistently higher than individuals with mood disorders. Those with primary anxiety-related disorders also tended to score higher on all indices of the CSS than those with no mental disorder, with the exception of the compulsive checking and reassurance seeking. Further, the mood disorders group had higher scores on the traumatic stress symptoms and socioeconomic consequences scales than those with no current mental disorder. While these findings warrant additional investigation, they do suggest that individuals with primary anxiety-related disorders may be particularly at risk for COVID Stress Syndrome (Taylor et al., 2020a, Taylor et al.,

2020b), at least in comparison to those with mood disorders and no mental health diagnosis.

Individuals with anxiety-related disorders were more likely to self-isolate and to make more active efforts at coping with self-isolation distress, despite no evidence of appreciable benefit of their coping methods. Considering that each of the scale scores of the CSS were significantly higher for those with anxiety-related disorders than for the other groups, it could be that COVID Stress Syndrome is most evident in self-isolated individuals with anxiety-related disorders. With the extensive media reporting on the pandemic, fear activation is likely to remain high in anxiety sufferers. During the COVID-19 pandemic, a common recommendation for coping with the associated stress has been to limit one’s exposure to news reports (Gruber et al., in press); but, even if individuals with self-reported anxiety problems adopt this coping strategy, they nonetheless may be more sensitive to information, thereby sparking anxious reactions. This may be further complicated by the loss of social capital that comes with self-isolation. Social capital is a broad construct that encompasses social support, community integration and cohesion, and endorsement of social norms (Lin, Cook, & Burt, 2017). Research on psychological consequences of self-isolation during the early stages of the COVID-19 pandemic suggests the loss of social capital increases anxiety and stress (Xiao, Zhang, Kong, Li, & Yang, 2020). Additional research is warranted to determine the extent to which exposure to pandemic-related news reports and loss of social capital uniquely impact those with anxiety-related disorders and which coping strategies might specifically address the danger and contamination fears facet given its centrality in the COVID Stress Syndrome.

There are several limitations to this study. First, mental health diagnoses were based on self-report rather than clinical evaluation. While this necessitates future research incorporating diagnostic assessment, we are confident in the veracity of our findings given evidence that self-reported mental health is an adequate indicator of mental health status (Mawani & Gilmour, 2010; Sanchez-Villegas et al., 2008) and that mean PHQ-4 scores for our groups with anxiety-related and mood disorders were in the range expected for individuals in the general population with possible mood and anxiety disorders (Löwe et al., 2010). Second, respondents were not queried on potential comorbid conditions. Given that comorbidity rates between the anxiety-related and mood disorders are relatively high (i.e., 20–40 %; Huppert, 2008), some individuals who identified primarily anxiety-related disorders could have also suffered from mood disorders, or vice versa. This might have attenuated the between-group differences found in this study. Nonetheless, the study provides important initial findings on the nature and scope of impact that the COVID-19 pandemic has had on individuals with anxiety-related and mood disorders, and potential directions for intervention.

The research is the first to address the impacts of COVID-19 on pre-existing mental health disorders. This moves the research from primarily speculation informed by theory to data-based findings. The results suggest the need for tailoring COVID-19-related mental health interventions to meet the specific needs of people with pre-existing mental health conditions and, more specifically, addressing the domains assessed in the CSS as well as targeted coping strategies for those with pre-existing anxiety-related disorders.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.janxdis.2020.102271>.

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