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Vulnerability to COVID-19–Related Disability: The Impact of Posttraumatic Stress Symptoms on Psychosocial Impairment During the Pandemic

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As a result of the COVID–19 pandemic, many individuals have experienced disruptions in social, occupational, and daily life activities. Individuals with mental health difficulties, particularly those with elevated posttraumatic stress symptoms (PTSS), may be especially vulnerable to increased impairment as a result of COVID–19. Additionally, demographic factors, such as age, gender, and race/ethnicity, may impact individual difficulties related to the pandemic. The current study examined the concurrent and prospective associations between posttraumatic stress disorder (PTSD) symptoms, broader anxiety and depression symptoms, and COVID–19–related disability. Participants recruited through Amazon's Mechanical Turk ($N = 136$) completed questionnaire batteries approximately 1 month apart during the COVID–19 pandemic (i.e., Wave 1 and Wave 2). The results indicated that PTSD, anxiety, and depressive symptoms were all associated with increased COVID–19–related disability across assessment points, rs = .44–.68. PTSD symptoms, specifically negative alterations in cognition and mood, significantly predicted COVID–19–related disability after accounting for anxiety and depressive symptoms as well as demographic factors, βs = .31–.38. Overall, these findings suggest that individuals experiencing elevated PTSS are particularly vulnerable to increased functional impairment as a result of COVID–19 and suggest a need for additional outreach and clinical care among individuals with elevated PTSD symptoms during the pandemic.

The novel coronavirus that emerged in late 2019 (COVID–19) has affected millions of individuals across the globe, leading to hundreds of thousands of deaths in the United States alone. In addition to physical health implications, the COVID–19 pandemic has disrupted individual, family, educational, and occupational systems (Gruber et al., 2020). Widespread quarantine and social distancing procedures, implemented to mitigate the spread of COVID–19, have resulted in job loss, social isolation, uncertainty about the future, and various other disruptions to everyday routines (Gruber et al., 2020; Tang et al., 2020). In combination with the threat of illness, these disruptions have led to increases in psychiatric symptoms, overall distress, unhealthy coping behaviors, and psychosocial impairment (Hsing et al., 2020; Nelson et al., 2020; Pfefferbaum & North, 2020; Rosen et al., 2020). Research from past pandemics, such as the 2003 SARS and 2014 Ebola pandemics, has shown that these increases in distress and disability remain even after protective measures have ceased (Hawryluck et al., 2004; Mihashi et al., 2009). Thus, it is critical to examine COVID–19–related functional impairment and associated vulnerabilities.

Importantly, recent findings indicate disproportionate impacts of the COVID–19 pandemic on vulnerable populations in the United States (Kantamneni, 2020; Laurencin & McClinton, 2020; Martin et al., 2020; Tai et al., 2020). Within the United States, COVID–19–related restrictions and economic impacts, along with rates of infection and mortality, have varied geographically, across time, and across age groups (Bialek et al., 2020). Further, individuals with preexisting mental health difficulties may be particularly vulnerable to increased impairment as a result of the COVID–19 pandemic, as disruptions to routine, increased daily stressors, and reduced social interaction are known to exacerbate psychiatric symptoms (Gruber et al., 2020). In fact, recent studies have illustrated the impact of the COVID–19 pandemic on mental health difficulties, including anxiety, depression, and posttraumatic stress disorder (PTSD) symptoms (e.g., Fitzpatrick et al., 2020; Lebel et al., 2020; Liu et al., 2020; Tang et al., 2020; Twenge & Joiner, 2020). These individuals may have a particularly difficult time adapting to life changes brought on by the pandemic. This hypothesis has been corroborated by research highlighting the associations between anxiety,

mood-related, and trauma-related psychopathology and significant impairment in social, occupational, and daily life functioning (e.g., Barth et al., 2005; Friedrich, 2017; Grant et al., 2005; Ross et al., 2018).

Although these commonly co-occurring mental health difficulties have been shown to predict increased disability broadly, individuals with elevated PTSD symptoms may be especially susceptible to impairment in the context of the COVID–19 pandemic. According to the criteria outlined in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; American Psychiatric Association, 2013), PTSD is a psychiatric disorder characterized by chronic stress symptoms, including intrusions, avoidance, negative alterations in cognitions and mood (NACM), and hyperarousal resulting from a traumatic experience. Extant research suggests that trauma exposure and PTSD symptoms may decrease an individual's psychosocial resources and coping capacity (Hobfoll, 2002) and increase stress sensitivity (Lanius et al., 2017; Resnick et al., 1995). Further, research has suggested that prior traumatic experiences and elevated PTSD symptoms may contribute to heightened safety concerns, increased distress, and higher levels of impairment in response to subsequent stressful events (Sutker et al., 2002). In a recent cross-sectional study, Park et al. (2020) found that participants with clinically elevated levels of PTSD symptoms reported more changes to daily routine and engagement in ineffective (e.g., substance use, eating or shopping for comfort, experiential avoidance) coping strategies during the pandemic. Thus, in the context of the widespread disruption to daily life, PTSD symptoms may confer significant vulnerability for sustained COVID–19–related impairment.

Therefore, the current study examined the concurrent and prospective associations between outbreak size, demographic factors, psychiatric symptoms, and COVID–19–related disability. We utilized a validated assessment instrument developed by Schmidt and colleagues (2020) to better understand the impact of COVID–19 on mental health, including COVID–19–related disability. This measure is meant to specifically capture the extent to which difficulties in household activities, day-to-day work, community activities, emotional health, concentration, getting along with new people, and maintaining friendships have been influenced by the COVID–19 pandemic. We hypothesized that individuals with elevated anxiety, depressive, and PTSD symptoms would report higher levels of COVID–19–related impairment at baseline (Wave 1) and 1-month follow-up (Wave 2). Further, we hypothesized that PTSD symptoms would predict significantly elevated and sustained COVID–19–related impairment across timepoints after accounting for demographic factors as well as broader anxiety and depressive symptoms. Finally, we conducted exploratory analyses to examine the unique impact of individual PTSD symptom clusters (i.e., intrusions, avoidance, NACM, and hyperarousal) on COVID–19–related impairment.

Method

Participants

Participants ($N = 249$; $M_{age} = 38.30$ years, $SD = 11.80$) were adults living in the United States who were recruited through an online crowdsourcing platform (see Procedure for further details). The total sample represented participants across 37 U.S. states and over 150 counties in both rural and urban areas. The county population density ranged from 5.30 to 49,545.45 individuals per square mile ($M = 3,106.27$, $SD = 9,209.51$). County COVID–19 infection rates ranged from 0 to 1,794.99 per 100,000 people ($M = 207.63$, $SD = 320.61$). Given that the current study examined prospective predictors of COVID–19–related disability, only individuals with valid Wave 1 and Wave 2 data were included in the analyses. Of the 249 participants who completed questionnaires at Wave 1, 170 participants completed the subsequent questionnaire battery 1 month later (Wave 2). Of the participants who completed both questionnaire batteries ($n = 170$), 34 were excluded for missing more than one of seven validation items designed to prevent the inclusion of unreliable data and automatic or "bot" responses.

The final sample ($N = 136$; $M_{age} = 40.04$ years, $SD = 12.02$) represented participants across 34 states and over 100 counties in both urban and rural areas. The county population density ranged from 5.30 to 49,545.45 individuals per square mile ($M = 2,633.13$, $SD = 8,201.31$). County COVID–19 infection rates ranged from 0 to 1,794.99 per 100,000 persons ($M = 194.12$, $SD = 293.43$). Demographic factors did not differ substantially from those reported in the total sample (see Table 1). In the final sample, 50.0% of participants identified as male, 49.3% as female, and 0.7% as nonbinary. Most participants identified as White ($n = 106$, 77.9%), and a small proportion identified as Hispanic ($n = 15$, 11.0%). Most participants endorsed having completed at least some college (88.3%), and 64% of participants reported a yearly family income of $75,000 (USD) or less. Approximately half of the sample (50.7%) was married, and 47.1% of participants had at least one child. At Wave 1, 23.4% of participants endorsed clinically elevated PTSD symptoms according to threshold cutoffs based on the Posttraumatic Stress Disorder Checklist for *DSM-5* (PCL-5; i.e., a score of 33 or higher; Blevins et al., 2015).

Procedure

Participants were recruited using Amazon's Mechanical Turk (MTurk), an online crowdsourcing platform designed to provide access to a diverse pool of research participants, and surveys were administered through Qualtrics Survey Software at two time points (i.e., Wave 1 and Wave 2). Wave 1 data collection began on April 13th, 2020, and the Wave 2 survey was sent to the same participants on May 14th, 2020. Four traditional "attention check" items were included to prevent the inclusion of unreliable data (e.g., "select slightly true for me"). Additionally, due to emerging evidence that traditional

Table 1

Sample Characteristics

Variable	Total sample (N = 249)		Final sample (n = 136)	
	M	*SD*	*M*	*SD*
Age (years)	38.30	11.80	40.04	12.02
	n	*%*	*n*	*%*
Gender/sex at birth				
Male	128	51.4	68	50.0
Female	120	48.2	67	49.3
Nonbinary	1	0.4	1	0.7
Race				
White or Caucasian	190	76.3	106	77.9
Black or African American	33	13.3	15	11.0
Asian	18	7.2	12	8.8
American Indian/Alaskan Native	4	1.6	1	0.7
Native Hawaiian/ Pacific Islander	2	0.8	0	0.0
Other	2	0.8	2	1.5
Ethnicity				
Hispanic or Latino	26	10.4	15	11.0
Non-Hispanic or Latino	223	89.6	121	89.0
Marital status				
Single/never married	69	27.7	40	29.4
Cohabitating	17	6.8	12	8.8
Married	138	55.4	69	50.7
Divorced	19	7.6	11	8.1
Widowed	4	1.6	3	2.2
Other	1	0.4	1	0.7
Number of children				
0	116	46.6	72	52.9
1	68	27.4	36	26.5
2	49	19.7	18	13.2
3	10	4.0	6	4.4
≥ 4	6	2.4	4	2.9
Educational attainment				
High school diploma or equivalent (GED)	16	6.4	10	7.4
Business/trade/technical school	10	4.0	6	4.4
Some college/2-year degree	50	20.1	31	22.8
College degree	123	49.4	62	45.6
Graduate degree	50	20.1	27	19.9
Estimated annual family income				
< $10,000	7	2.8	4	2.9
$10,000–$24,999	17	6.8	11	8.1
$25,000–$39,999	38	15.3	22	16.2
$40,000–$74,999	93	37.3	50	36.8
$75,000–$99,999	55	22.1	28	20.6
$100,000–$149,999	31	12.4	16	11.8
$\geq$ $150,000	8	3.2	5	3.7

attention check items can be circumvented using automatic responding (e.g., Peer et al., 2014), three attention check items that used both adversarial questioning (i.e., referring to alternative answers in the questions) and deliberate typographical errors were included in the study. Participants who failed any attention check items were excluded. For both surveys, modal completion occurred on the same day. All participants had to be 18 years of age or older, live in the United States, and have an MTurk approval rating of at least 95% for a minimum of 100 surveys (e.g., Peer et al., 2014). Before survey completion, all participants provided electronic informed consent. Participants received $4.00 per time point as compensation for completing Wave 1 and Wave 2 surveys via their Amazon account as per Mechanical Turk guidelines. Study procedures were approved by the Institutional Review Board of Florida State University, and the study was conducted in accordance with the 1964 Helsinki declaration and its subsequent amendments.

Measures

Demographic Characteristics

Participants provided demographic information, including age, gender identity, race, ethnicity, educational attainment, marital status, family income, number of children, and zip code. Demographic information was used to characterize the sample, and zip code was used to characterize the relative size of the COVID–19 outbreak in the participants' respective geographical areas. In addition, select demographic variables (i.e., age, gender, racial/ethnic minority status) and outbreak size were examined in regression analyses.

COVID–19 Outbreak Size

Participants' zip codes were used to identify their county of residence. Using data from USA Facts (2020), we recorded the number of new active cases in the survey participants' counties for the day that each participant completed the survey and summed them to get the total number of cases per county. Then, we used county population numbers to calculate these values per 100,000 people. Due to day-to-day fluctuations in outbreak values, we calculated a 7-day rolling average for the total number of cases per 100,000 to better reflect COVID–19 infection rates relative to a 1-day window (Badr et al., 2020; Leeb et al., 2020).

COVID–19 Impact

The COVID–19 Impact Battery (CIB; Schmidt et al., 2020) is a 57-item, self-report measure that contains three subscales: Behaviors, Worry, and Disability. The current study utilized the CIB Disability Scale (see Supplementary Materials). The CIB Disability scale contains seven items adapted from the World Health Organization Disability Assessment 12- item scale (WHODAS-12; Üstün et al., 2010) and was used to assess difficulties in daily life functioning due to the COVID–19 outbreak. Participants were instructed to rate difficulties that occurred "due to the COVID–19 outbreak" rather than those

that arose "due to health conditions." Respondents scored items using a 5-point scale ranging from 0 (*none*) to 4 (*extreme or cannot do*). Items were used to specifically assess the impact of COVID–19 on household activities, day-to-day work, community activities, emotional health, concentration, getting along with new people, and maintaining friendships. The initial development and validation of the CIB disability scale evidenced strong reliability and validity, with Cronbach's alpha values for internal consistency ranging from .82 to .87; longitudinal measurement invariance showed a good fit; and the scale score related as expected to factors, such as negative affect (Schmidt et al., 2020). In the current study, the CIB Disability subscale demonstrated good internal consistency at both Wave 1, Cronbach's $\alpha = .84$, and Wave 2, Cronbach's $\alpha = .83$.

Lifetime Trauma Exposure

The Life Events Checklist for *DSM-5* (LEC-5; Weathers, Blake, et al., 2013) was used to assess the number and type of lifetime traumatic events participants had experienced, as defined by *DSM-5* PTSD Criterion A. Participants indicated whether they directly experienced, witnessed, or learned about 17 different types of traumatic events encompassing interpersonal trauma, such as physical and sexual assault; natural disasters; accidents; and combat experiences. Participants were also asked to indicate their most distressing (i.e., "index") traumatic event. In the current sample, participants reported having experienced an average of 9.32 (*SD* = 6.25) types of traumatic events across their lifetime.

PTSD Symptoms

The Posttraumatic Stress Disorder Checklist for *DSM-5* (PCL-5; Weathers, Litz, et al., 2013) is a 20-item, self-report measure used to assess PTSD symptoms. The PCL-5 includes four subscales that correspond to the *DSM-5* PTSD symptom clusters (i.e., intrusions, avoidance, NACM, and hyperarousal). Participants were asked to rate their past-month PTSD symptoms in relation to the index event identified on the LEC-5, scoring their responses on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The PCL-5 has a score range of 0 to 80, with higher scores indicating more severe symptoms; a score of 33 or higher has been identified to indicate probable PTSD (Blevins et al., 2015). The PCL-5 has demonstrated high levels of internal consistency (Cronbach's $\alpha = .94$) and reliability (*r* = .82; Blevins et al., 2015). In the present sample, the PCL-5 demonstrated excellent internal consistency at both Wave 1, Cronbach's $\alpha = .97$, and Wave 2, Cronbach's $\alpha = .97$.

Anxiety

The Generalized Anxiety Disorder–7 (GAD-7; Spitzer et al., 2006) is a seven-item self-report measure used to assess anxiety symptoms during the past 2 weeks. Participants were asked to rate their anxiety symptoms, using a 4-point scale ranging from 0 (*not at all*) to 3 (*nearly every day*). The GAD-7 has a score range of 0 of 21, with higher scores indicating more severe symptoms of GAD. Spitzer et al. (2006) recommend using

Table 2

Descriptive Data and Zero-Order Correlations Across Wave 1 (W1) and Wave 2 (W2)

	Variable	1	2	3	4	5	6	7	8
1.	W1 PCL-5	-	.62**	.59**	.56**	.82**	.52**	.61**	.68**
2.	W1 GAD-7		-	.67**	.54**	.62**	.81**	.65**	.53**
3.	W1 DASS-Dep			-	.49**	.69**	.62**	.75**	.51**
4.	W1 CIB-Dis				-	.51**	.44**	.44**	.68**
5.	W2 PCL-5					-	.61**	.73**	.63**
6.	W2 GAD-7						-	.72**	.52**
7.	W2 DASS-Dep							-	.55*
8.	W2 CIB-Dis								-
	M	19.79	7.27	6.15	9.16	17.79	6.47	5.86	8.60
	SD	19.36	5.57	5.59	6.22	18.37	5.61	5.65	5.71

Note. PCL-5 = Posttraumatic Stress Checklist for *DSM-5*; GAD-7 = Generalized Anxiety Disorder–7; DASS = Depression Anxiety Stress Scales–21; DASS-Dep = DASS Depression subscale; CIB-Dis = COVID–19 Impact Battery Disability subscale.
$*p < .05.$ $**p < .01.$

a cutoff score of 10 to indicate a moderate level of anxiety. The GAD-7 has demonstrated excellent internal consistency (Cronbach's α = .92) and test–retest reliability (r = .83; Spitzer et al., 2006). In the present sample, the GAD-7 demonstrated good internal consistency at both Wave 1, Cronbach's α = .92, and Wave 2, Cronbach's α = .93.

Depressive Symptoms

The Depression Anxiety Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995) is a 21-item self-report measure used to assess depression, anxiety, and stress; in the present study, only the seven-item Depression subscale was used. Participants were asked to rate their past-week experiences, scoring responses on a 4-point scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). Scores on the Depression subscale can range from 0 to 21, with higher scores reflecting more frequent and severe negative emotions. The DASS-21 has shown excellent internal consistency (Cronbach's α = .94) and validity (Antony et al., 1998; Henry & Crawford, 2005). In the present sample, the DASS-21 Depression subscale demonstrated good internal consistency at both Wave 1, Cronbach's α = .92, and Wave 2, Cronbach's α = .94.

Data Analysis

At both Wave 1 and Wave 2, we examined the associations between the PCL-5, GAD-7, DASS-21 depression, and CIB Disability subscale using bivariate (i.e., Pearson's r) correlations. Then, hierarchical linear regression was conducted to examine whether PTSD symptoms at Wave 1 prospectively predicted COVID–19–related disability at Wave 2 after controlling for COVID–19–related disability at Wave 1, demographic factors (i.e., age, gender, and racial/ethnic minority status), infection rates, generalized anxiety symptoms, and depressive symptoms. At Step 1, Wave 1 COVID–19–related disability was regressed on Wave 2 COVID–19–related disability. At Step 2,

demographic factors and Wave 1 and Wave 2 infection rates were entered. At Step 3, generalized anxiety and depressive symptoms were entered. Finally, at Step 4, PTSD symptoms were entered. To follow-up on our main findings, we conducted an additional hierarchical regression examining PTSD symptom subscales (i.e., Intrusions, Avoidance, NACM, and Hyperarousal) to determine which PTSD symptom clusters accounted for unique variance in COVID–19–related disability after controlling for overlapping anxiety and depressive symptoms. Steps were consistent with the initial regression model except that PTSD symptom subscales were entered separately in Step 4. All analyses were conducted using SPSS (Version 26).

Results

Descriptive Data

Table 2 presents descriptive statistics and zero-order correlations among the main study variables, including PCL-5, GAD-7, DASS-21 Depression, and CIB Disability scores at Wave 1 and Wave 2. Symptom measures were highly correlated and similarly associated with COVID–19–related impairment at Wave 1 and Wave 2. Of note, PTSD symptoms at both assessment points were most strongly correlated with Wave 2 COVID–19–related disability. See Figure 1 for a graphical depiction of COVID–19–related disability across PTSD symptom levels.

Hierarchical Regression Analyses

Hierarchical linear regression was conducted to determine whether PTSD symptoms at Wave 1 prospectively predicted COVID–19–related disability at Wave 2 after controlling for COVID–19–related disability at Wave 1, demographic factors (i.e., age, gender, and racial/ethnic minority status), infection rates, generalized anxiety symptoms, and depressive symptoms (see Table 3). At Step 1, COVID–19–related disability at Wave

Table 3

Prospective Prediction of Wave 2 (W2) COVID–19–Related Disability

Step	Predictor	t	df	β	p
1		—	—	—	—
	W1 CIB-Dis	10.74	126	.69	< .001
	$R^2 = .48$, $F(1, 126) = 115.24$, $p < .001$				
2		—		—	—
	W1 CIB-Dis	9.88	121	.68	< .001
	Age	−0.65	121	−.05	.520
	Gender	−0.20	121	−.01	.846
	Race/ethnicity	−0.18	121	−.01	.861
	W1 infection rate	−0.54	121	−.11	.590
	W2 infection rate	−0.61	121	−.04	.713
	$\Delta R^2 = .01$, $\Delta F = .017$, $p = .975$				
3		—		—	—
	W1 CIB-Dis	6.69	119	.52	< .001
	Age	−0.72	119	−.05	.473
	Gender	−0.28	119	−.02	.784
	Race/ethnicity	−0.11	119	−.01	.914
	W1 infection rate	−0.96	119	−.19	.337
	W2 infection rate	0.72	119	.14	.475
	W1 GAD-7	1.37	119	.12	.175
	W1 DASS-Dep	2.34	119	.20	.021
	$\Delta R^2 = .06$, $\Delta F = 7.85$, $p = .001$				
4		—		—	—
	W1 CIB-Dis	5.79	118	.43	< .001
	Age	−0.01	118	−.01	.997
	Gender	−0.24	118	−.01	.813
	Race/ethnicity	−0.33	118	−.02	.743
	W1 infection rate	−0.43	118	−.08	.670
	W2 infection rate	0.40	118	.07	.689
	W1 GAD-7	0.12	118	.01	.906
	W1 DASS-Dep	1.13	118	.09	.261
	W1 PCL-5	4.59	118	.38	< .001
	$\Delta R^2 = .07$, $\Delta F = 21.02$, $p < .001$				
	Full Model: $R^2 = .61$, $F(9, 118) = 20.59$, $p < .001$.				

Note. W1 = Wave 1; PCL-5 = Posttraumatic Stress Checklist for *DSM-5*; GAD-7 = Generalized Anxiety Disorder–7; DASS = Depression Anxiety Stress Scales–21; DASS-Dep = DASS Depression subscale; CIB-Dis = COVID–19 Impact Battery Disability subscale.

1 predicted COVID–19–related disability at Wave 2, $t(126) =$ 10.74, $\beta = .69$, $p < .001$. At Step 2, demographic factors and infection rates did not predict COVID–19–related disability at Wave 2. At Step 3, depressive symptom severity significantly predicted disability outcomes, $t(119) = 2.34$, $\beta = .20$, $p = .021$, but generalized anxiety symptom severity did not, $t(119) = 1.37$, $\beta = .12$, $p = .175$. Finally, at Step 4, PTSD symptoms significantly predicted COVID–19–related disability, $t(118) = 4.59$, $\beta = .38$, $p < .001$. Symptoms of PTSD accounted for an additional 6.9% of the variance in Wave 2 COVID–19 disability ratings. Altogether, the final model accounted for 61.1% of the variance in Wave 2 COVID–19–related disability.

When PTSD symptoms were broken down by cluster, only NACM uniquely predicted COVID–19–related disability,

$t(115) = 2.16$, $\beta = .31$, $p = .033$. The effects of intrusions, $t(115) = 0.65$, $\beta = .08$, $p = .515$; avoidance, $t(115) = -1.19$, $\beta = -.12$, $p = .236$; and hyperarousal, $t(115) = 1.00$, $\beta = .13$, $p = .321$, were insignificant in this model. An examination of individual subscales in Step 4 accounted for an additional 8.1% of the variance in Wave 2 COVID–19 disability ratings. Altogether, this model accounted for 62.3% of the variance in Wave 2 COVID–19 related disability.
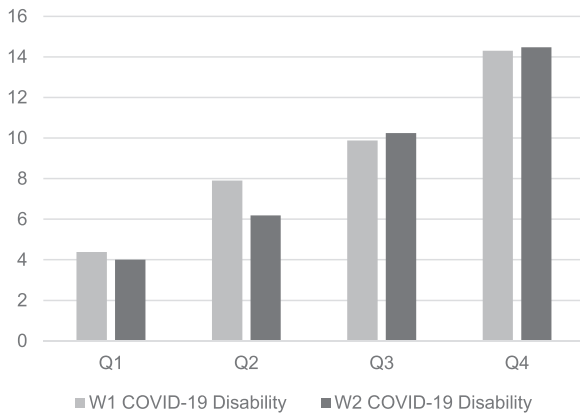
Discussion

The present study examined the concurrent and prospective associations between COVID–19 outbreak size, demographic

factors, psychiatric symptoms (i.e., anxiety, depression, and PTSD), and COVID–19–related functional impairment. Descriptive data indicated that symptom measures and COVID–19–related disability decreased slightly from Wave 1 to Wave 2, potentially reflecting natural recovery over time or an adjustment to COVID–19–related threat and regulations. The results demonstrated that individuals with elevated anxiety, depressive, and PTSD symptoms experienced a higher level of COVID–19–related disability across time points. This is consistent with current research demonstrating the impact of the COVID–19 pandemic on mental health difficulties (e.g., Fitzpatrick et al., 2020; Lebel et al., 2020; Liu et al., 2020; Tang et al., 2020; Twenge & Joiner, 2020) as well as with findings from prior studies illustrating the association between psychiatric symptoms and functional impairment (e.g., Barth et al., 2005; Friedrich, 2017; Grant et al., 2005; Ross et al., 2018).

In addition, when these overlapping symptoms were examined together, only PTSD symptoms uniquely predicted changes in COVID–19–related disability. Although COVID–19–related disability decreased slightly over time among individuals with relatively lower PCL-5 scores (i.e., scores of 16 or below), disability among those with higher PCL-5 scores (i.e., scores of 17–80) remained elevated. This suggests that individuals with elevated PTSD symptoms may be particularly vulnerable to sustained functional impairment as a result of the ongoing COVID–19 pandemic. These findings are consistent with previous work on the impact of prior traumatic experiences and elevated PTSD symptoms on responses to subsequent stressful events (Sutker et al., 2002). This increased vulnerability may be due, in part, to increased reactivity to stressors and decreased coping capacity (Hobfoll, 2002; Lanius et al., 2017), which may lead to increased changes in daily routine and engagement in ineffective coping strategies, as observed by Park and colleagues (2020).

Further, the findings from exploratory analyses suggest that NACM, specific to PTSD, uniquely predict COVID–19 disability. The NACM symptom cluster includes strong negative beliefs about the self, other people, and the world, as well as strong negative feelings, including fear, horror, anger, guilt, and shame. Daily challenges inherent in the COVID–19 pandemic may be interpreted as confirming these negative beliefs and feelings as opposed to representing a unique, temporary experience. Additionally, NACM symptoms encompass loss of interest in activities and disconnection from other people. As a result of these symptoms and an increased normalization of safety behaviors, such as self-isolation, individuals may withdraw and experience decreased motivation to engage in daily activities. Although decreased expectations for social engagement may initially provide comfort for individuals with elevated PTSD symptoms, avoidance of social situations may contribute to the perpetuation of symptoms and continually increasing social impairment. Relatedly, the results of a recent network analysis suggest that, of the PTSD symptom clusters, the NACM cluster is most highly associated with impairments in close relationships (Ross et al., 2018). This is especially relevant in the context of the COVID–19 pandemic, with many individuals spending more time at home in the presence of close others or connecting via virtual platforms while those who live alone or avoid engaging with others may be increasingly isolated.

Therefore, expanding outreach and access to interventions, including those specifically designed to target PTSD symptoms in clinical and subclinical populations, may be particularly important amidst the ongoing COVID–19 pandemic. The utilization and promotion of telehealth options have already played a vital role in reducing the mental health burden of the COVID–19 pandemic (Zhou et al., 2020), and prior research has demonstrated the efficacy of trauma-focused treatments, such as cognitive processing therapy (CPT) and prolonged exposure (PE), conducted via telehealth (Turgoose et al., 2018). Although research on interventions among subclinical populations is sparse, evidence suggests that exposure-based treatments may be at least equally effective for individuals with subclinical levels of PTSD symptoms (Korte et al., 2016). Thus, the dissemination of exposure-based telehealth treatments should be considered for individuals with both clinical and subclinical levels of PTSD symptoms.

Preliminary research has also shown that CPT telehealth groups, which could provide opportunities for increased social connection, may as effective as their in-person counterparts (Morland et al., 2011). Unfortunately, no studies to date have examined the differential impact of entirely remote home-based telehealth groups for PTSD. Thus, further research is needed. Alternatively, skill-based interventions for PTSD may be indicated to mitigate the impact of changes in daily routine, replace ineffective coping strategies, and improve social support and communication. For example, Skills Training in Affective and Interpersonal Regulation (STAIR), which is available in both

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individual and group formats and has been adapted for use with telehealth, directly addresses difficulties in emotion management and interpersonal relationships (Azevedo et al., 2016; Ortigo et al., 2020).

Despite the strengths of the current study, including its longitudinal design and use of an empirically validated COVID–19–related disability scale (i.e., the CIB disability scale; Schmidt et al., 2020), the present findings must be considered in the context of several limitations. Although the use of online crowdsourcing mechanisms, including Amazon's MTurk platform, is well-accepted, and attention check items were utilized to prevent the inclusion of automated responses, the findings from this sample should be interpreted with caution, as they may not be representative of the entire U.S. population. Thus, additional research examining COVID–19–related functional outcomes within more diverse and clinically relevant samples is indicated. Additionally, the current study utilized two time points during the COVID–19 pandemic. Specifically, our results apply to experiences early in the pandemic, when individuals were first subjected to the COVID–19 threat and associated restrictions. Therefore, these results cannot speak to how PTSD impacts longer-term adjustment to the cumulative stress of the pandemic or adjustment in its wake. Thus, future research would benefit from an examination of symptoms and functioning across later timepoints within the COVID–19 pandemic as well as its aftermath. Finally, we did not control for medical conditions or the use of immune-compromising medications, nor the presence of vulnerable individuals in the home. Future studies should consider the impact of underlying conditions and situational factors that contribute to increased COVID–19–related disability.

Overall, the findings from the current study suggest that individuals with elevated psychiatric and PTSD symptoms, in particular, are vulnerable to increased disability as a result of the COVID–19 pandemic. This association held after controlling for demographic factors and local outbreak size (within the United States). The results of the exploratory analyses indicate that the NACM symptom cluster uniquely predicted increased disability. These findings suggest that expanding outreach and access to care for trauma-exposed individuals with elevated PTSD symptoms is vital. The utilization of individual and group telehealth treatments might help to meet this goal. Future research should examine the relative efficacy of these interventions within individuals experiencing disruptions to daily life as a result of the COVID–19 pandemic and other crises.

Open practices statement

The study reported in this article was not formally preregistered. The complete COVID–19 Impact Battery is included in the Supplementary Materials associated with this article. The data have not been made available on a permanent third-party archive; requests for the data should be sent via email to the lead author at morabito@psy.fsu.edu.

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