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RESEARCH ARTICLE

The relationship between health worry, work distress, and affective symptoms during the COVID-19 pandemic: The mediating role of hopelessness and helplessness

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Abstract

Objectives: The COVID-19 pandemic presented both serious health threats and economic hardships, which were reflected in increased rates of mood and anxiety symptoms. We examined two separate distress domains, health worries and work distress, as predictors of mood and anxiety symptoms. Additionally, we considered whether these two domains might be uniquely associated with the development of dysfunctional beliefs, as a proposed mechanism to account for increased symptoms during the pandemic. Two separate models were considered to examine if associations remained stable through the first year of the pandemic.

Methods: Participants (N = 2152) were a representative sample of Florida adults. They completed online surveys at three waves: Wave 1 (April–May 2020), Wave 2 (May–June 2020), and Wave 3 (December–February 2021). Participants completed measures of COVID-19 health worry and work distress, anxiety, and depression. They also reported their level of hopelessness and helplessness (indices of dysfunctional beliefs).

Results: In an early pandemic model (Wave 1-Wave 2), health worry directly and indirectly predicted anxiety and depression via dysfunctional beliefs. In contrast, work distress only *indirectly* predicted both outcomes. In a longer-term model (Wave 2-Wave 3), health worry had direct and indirect effects on downstream anxiety but not depression. Pandemic work distress had no effect on depression or dysfunctional beliefs; however, it was associated with less anxiety.

Conclusions: Although health worry and work distress predicted later symptoms of anxiety and depression, they appeared to operate through different pathways. These find-

ings provide guidance for the development of more effective interventions to reduce the impact of pandemics.

KEYWORDS
affective symptoms, COVID-19 pandemic, health worry, helplessness, hopelessness, work distress

Practitioner Points

- Two facets of COVID-19 distress, health worry and work distress, predicted affective symptoms through different pathways over the course of the COVID-19 pandemic
- Dysfunctional beliefs (hopelessness and helplessness) mediated the link between these facets of COVID-19 distress and later symptoms
- Treatments for pandemic-related mental health symptoms should also focus on reducing feelings of hopelessness and helplessness
- Continuing to identify potential targets for the treatment of affective symptoms related to community-wide stressors, such as the COVID-19 pandemic, is of the utmost importance

INTRODUCTION

The coronavirus 2019 (COVID-19) pandemic is a global public health crisis that has impacted both physical and mental health (e.g., Khan et al., 2020; Torales et al., 2020). Reports indicate that COVID-19 pandemic has led to higher rates of both anxiety and depression (e.g., Salari et al., 2020; Xiong et al., 2020), emphasizing the need to better understand the specific factors contributing to this rise in affective symptoms. COVID-19 distress, defined as stress associated with the onset of the COVID-19 pandemic (e.g., Taylor et al., 2020b), is one factor thought to contribute to increased symptoms of depression and anxiety during this time. While previous studies have typically measured COVID-19 distress as a unidimensional construct (e.g., Ahorsu et al., 2020; Mertens et al., 2020), recent findings suggest it may consist of distress related to several distinct domains, including health worry and socioeconomic concern (Mertens et al., 2021; Taylor et al., 2020a, 2020b). The COVID-19 pandemic has been characterized by both serious health threats (e.g., del Rio et al., 2020) and the tremendous economic hardships that accompanied national lockdowns (e.g., Onyeaka et al., 2021). See Figure S1 for a timeline of major health and economic events related to the COVID-19 pandemic. Worries about either of these two domains may further compound one another, as emerging research indicates that increased *health worries* related to becoming sick or spreading the virus were exacerbated by *distress related to occupational and financial challenges* experienced as a result of the pandemic (Solomou & Constantinidou, 2020; Tull et al., 2020). To our knowledge, no study has examined whether worries about these distinct domains of COVID-19, defined as health worry and work distress, may differentially predict the development of affective symptoms.

While research has linked general COVID-19 distress to increased mental health problems during the pandemic (Gallagher et al., 2020; Mosheva et al., 2020), the mechanisms underlying this relationship remain understudied. One potential mediator of this relationship is a person's level of dysfunctional cognitive beliefs, operationalized in this study as feelings of hopelessness and helplessness. Studies have shown a significant increase in dysfunctional beliefs during the pandemic (e.g., El-Zoghby et al., 2020; Hacimusalar et al., 2020), and COVID-19 distress has been linked with increased feelings of hopelessness (Lee et al., 2020; Shanahan et al., 2020). Additionally, feelings of hopelessness and helplessness are thought to play a key role in the development of both anxiety and depression (e.g., Brozina & Abela, 2006; Ciarrochi, 2004; Haaga et al., 1991) and may be particularly important during the pandemic due to the

threat to people's long-term health and financial security. However, we do not know whether different domains of distress may be uniquely associated with the development of dysfunctional beliefs, and no research has explored dysfunctional beliefs as a proposed mechanism of the rise in affective symptoms during the pandemic.

Within the context of a protracted pandemic, such as the case of COVID-19, it is important to understand how the relationships between domain-specific worry and affective symptoms might change or shift as the pandemic continues to impact daily life. The initial phase of the COVID-19 pandemic in spring of 2020 was characterized by significant fear and uncertainty around the health impacts of the virus (e.g., Rodríguez-Rey et al., 2020), as countries began to grapple with appropriate public health responses. Over time, more information about COVID-19 emerged and the public became more aware of effective virus prevention methods, thus reducing much of the acute stress and uncertainty related to the pandemic. As time went on, many began to adjust to life during COVID-19 and rates of both anxiety and depression actually decreased (e.g., Belz et al., 2021; Fancourt et al., 2021). This difference in reported rates of affective symptoms and stress reactivity from early to later in the pandemic highlights the need to understand the factors contributing to anxiety and depression at different phases. While health worries related to the pandemic appear to have decreased over time (Ongaro et al., 2021), the economic impacts of the pandemic actually became more entrenched as time went on (Center on Budget and Policy Priorities, 2022). To determine the impact of domain-specific worry on mental health over time, it will therefore be important to consider these relationships within the context of early/initial responses to the pandemic versus later responses to the pandemic as it became more protracted. While COVID-19 distress has been cross-sectionally linked with increased anxiety and depression (e.g., Gallagher et al., 2020), few studies have used a longitudinal design to examine these relationships throughout the pandemic (e.g., Megalakaki et al., 2021), and no study has considered the unique influence of different distress domains on mental health.

The current study explored the relationships between two domains of COVID-19 distress, defined as health worry and work distress, dysfunctional beliefs, and symptoms of anxiety and depression in a large, representative community sample of US adults. Participants were assessed across three waves between April 2020 and February 2021. This design allowed us to examine associations across time and further provided an opportunity to compare the pattern of relationships between variables of interest in a one-month model, at the start of the pandemic, to those observed in a ten-month model, almost a year after the pandemic started.

Our first aim was to determine whether two distinct factors of COVID-19 distress, health worry and work distress, at the start of the pandemic (Wave 1; April–May 2020) would be differentially associated with affective symptoms assessed approximately one month later (Wave 2; May–June 2020). The model also tested dysfunctional beliefs (hopelessness and helplessness) as one proposed mechanism underlying this relationship by specifying partial mediation via dysfunctional beliefs. We hypothesized that health worry and work distress would have both direct and indirect effects on affective symptoms. Our second aim was to examine a similar ten-month model focusing on Wave 2 and Wave 3 (December–February 2021) of data collection. These analyses allowed us to determine whether the pattern of relationships between these constructs remained stable throughout the pandemic.

METHOD

Participants

Participants were a representative sample of 3088 adults from the state of Florida. The final sample used for analysis ($N = 2152$) included 1145 adults drawn from South Florida, the southernmost region of Florida which includes Broward, Miami-Dade, and Monroe counties. The remainder of participants were drawn from across the rest of the state, which included more rural areas and ideologically distinct regions (see

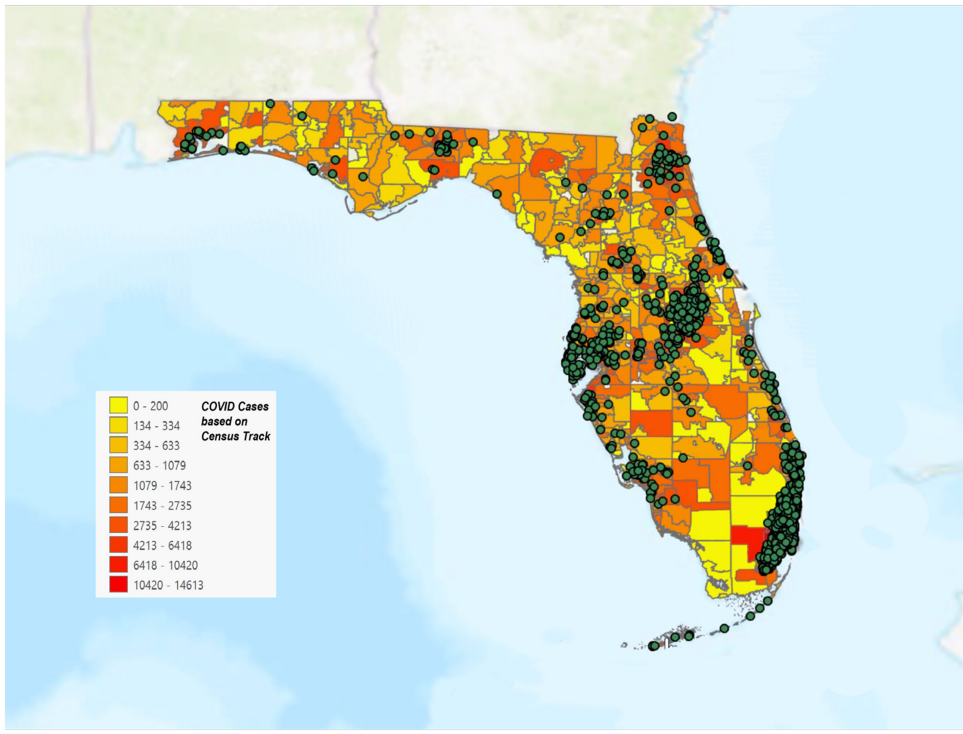

FIGURE 1 Participants enrolled in the study are shown based on location across Florida (green dots). Participants were recruited across urban and rural areas, including ideologically distinct regions within the state. Also depicted is an overlaid heat map of community-level COVID cases based on census track and aggregated between March 2020 and March 2021, which demonstrates varying levels of COVID-19 risk (source: Florida Department of Health: https://open-fdoh.hub.arcgis.com/datasets/FDOH::florida-cases-zips-covid19/about; data accessed 7/22/2020–8/11/2020).

Figure 1). As Figure 1 depicts, we enrolled a diverse group of participants from across the state of Florida, including individuals living in more urban versus rural areas. Our sample is therefore representative of the population of Florida and captures a wide swathe of individual- and community-level differences across political ideology, pandemic response, and COVID-19 risk levels. We chose to restrict our sample to one state given the high degree of variability in public health pandemic responses across the nation. Specifically, we recruited from Florida as it allowed us to include persons living in rural areas marked by lower COVID-19 risk and those living in urban areas with extremely high COVID-19 risk. See Table 1 for the demographic characteristics of the sample. At Wave 1, participant ages ranged from 18–94 (M = 47.09, SD = 18.02). Over half of the participants identified as female (64%) and White (66.8%), and 39.7% identified as Hispanic or Latino. See the Supplemental Materials for a detailed demographic breakdown of the sample across each wave.

Procedures

Participants were recruited online via Qualtrics XM Research Panels (Qualtrics, Provo, UT) and local listservs in late April 2020. Data collected via these online panels have been found to have similar psychometric properties compared to conventionally sourced data (Behrend et al., 2011; Walter et al., 2019), and samples are generally representative of the US population (Arditte et al., 2016; Buhrmester et al., 2011; Shapiro et al., 2013). In addition to the Qualtrics XM sample, we also advertised on listservs and WhatsApp groups to oversample persons working in local hospitals in the greater Miami-metro area. Participants were oversampled from the South Florida community to capture adults living in a high-risk area at the onset of the pandemic. Recruiting participants from both South Florida and the rest of the state allowed

TABLE 1 Demographic characteristics of the study sample

	Overall sample (*N* = 2152)
Age (*M*, *SD*)	47.09 (18.02)
Female (*n*, %)	1377 (64%)
Race (*n*, %)	
White	1438 (66.8%)
Black	400 (18.6%)
Asian	118 (5.5%)
American Indian	16 (0.7%)
Pacific Islander	7 (0.3%)
Multiracial	115 (5.3%)
Ethnicity (Hispanic/Latino; *n*, %)	855 (39.7%)
McArthur SES (*M*, *SD*)	6.18 (1.92)
Education (*n*, %)	
Less than GED/High school diploma	44 (2.0%)
GED/High school diploma	280 (13.0%)
Some college	425 (19.7%)
Associate's or Bachelor's degree	903 (41.9%)
Master's degree	368 (17.1%)
Doctorate or Professional degree	122 (5.7%)
Other	9 (0.4%)
Employed (*n*, %)	1110 (52.1%)

Note: Some variables do not add up to 100% due to missing data.

us to consider these relationships within both rural and urban communities that are politically divided and demographically diverse.

For participants recruited via the Qualtrics XM research panels, quota sampling was used to achieve a sample with approximately the same proportion of individuals residing in the more urban areas of South Florida as the rest of the state. We further used quotas to select a sample that reflected the age and racial/ethnic breakdown of South Florida. Specifically, we set the following quotas for the sample: 50–60% female, 25–30% over the age of 65, 35–40% Hispanic or Latino/a, 15–20% African American or Black, and an approximate equal per cent across different income brackets.

Participants provided informed consent before responding to an online survey (Wave 1, April–May 2020). If participants consented to be contacted for follow-up surveys, they received an invitation to complete a second survey approximately one month later (Wave 2, May–June 2020), and an invitation to a third follow-up survey approximately eight to ten months later (Wave 3, December 2020–February 2021). Participants recruited through Qualtrics Research Panels received a range of incentives (monetary compensation, gift cards, etc.) as arranged between Qualtrics XM and the various panels. Participants recruited through the local listservs received a $20 gift card from an online retailer of their choice. The Institutional Review Board approved all procedures.

Measures

Demographics

Participants reported their basic demographic information (gender, age, race, ethnicity), their highest level of education completed, and whether they were currently employed. They also completed the MacArthur Scale of Subjective Social Status (Adler et al., 2000) to measure their perceived socioeconomic status (SES).

COVID-19 distress

The level of COVID-19 worry and distress was assessed using seven items developed by the investigators. Each question covered a domain of COVID-19 distress since the start of the pandemic (e.g., *"Since the pandemic started, how worried have you felt about being infected?"*). Five items assessed COVID-19 health worry, including infection worry, washing frequency, general worry, COVID-19 rumination, and worry about infecting others. Two items assessed COVID-19 work distress, including work interference and financial stress. Participants respond using a 1–4 Likert scale (1 = *Not at all* to 4 = *Extremely*). Scores for each item range from 1–4, with higher scores indicating higher levels of that respective domain of COVID-19 distress. Participants completed this measure of COVID-19 distress at all three waves; however, the current study focused on these items at Wave 1 and Wave 2. Factor analyses confirmed a two-factor structure of COVID-19 distress as expected (see Supplemental Materials).

Patient health questionnaire-2 (PHQ-2)

The PHQ-2 is a 2-item self-report measure assessing the frequency of depressed mood and anhedonia over the past 2 weeks (Kroenke et al., 2003). Participants are asked to rate how bothered they have been by these symptoms *("Little interest or pleasure in doing things"* and *"Feeling down, depressed, or hopeless"*) over the past 2 weeks, using a 0–3 Likert scale (0 = *Not at all* to 3 = *Nearly every day*). Possible scores across the two items range from 0–6, with higher scores indicating higher levels of current depression symptoms. Participants completed the PHQ-2 at all three waves; however, the current study only used the PHQ-2 at Wave 2 and Wave 3. The PHQ-2 was internally consistent in the current sample (Wave 1: α = .85; Wave 2: α = .83; Wave 3: α = .87).

Generalized anxiety disorder 2-item (GAD-2)

The GAD-2 is a 2-item self-report measure assessing anxiety symptoms over the past 2 weeks (Kroenke et al., 2007). Participants are asked to rate how bothered they have been by these symptoms (*"Feeling nervous, anxious, or on edge"* and *"Not being able to stop or control worrying"*) over the past 2 weeks, using a 0–3 Likert scale (0 = *Not at all* to 3 = *Nearly every day*). Total scores can range from 0–6, with higher scores indicating higher levels of current anxious symptoms. Participants completed the GAD-2 at all three waves; however, the current study only used the GAD-2 at Wave 2 and Wave 3. The GAD-2 was internally consistent in the current sample (Wave 1: α = .88; Wave 2: α = .91; Wave 3: α = .91).

Hopelessness and helplessness

Hopelessness and helplessness were assessed in the current study using two items. Participants rated their current feelings of hopelessness ("*How hopeless do you feel?*") and helplessness (*"How helpless do you feel?"*) on a slider scale from 0 (*Not at all*) to 100 (*Extremely*). Higher scores indicate higher levels of current hopelessness or helplessness. Participants completed these ratings of hopelessness and helplessness at both Wave 2 and Wave 3.

Data analytic processes

Preliminary analyses

For each wave of data collection, responses were screened and participants excluded for failure to complete the survey, failure to agree to an honest-response item, failure to complete the survey in a suffi-

ciently long timespan (i.e., at least 60% of the estimated completion time), and failing at least one of two attention checks. At Wave 1 data collection, 936 participants were excluded for a final sample of 2152 participants. At Wave 2, 1200 participants were lost to follow-up and an additional 121 were excluded for failing to meet the data validity criteria, for a final sample of 831 participants. At Wave 3, 455 participants were lost to follow-up and an additional 32 were excluded for failing the data validity criteria, for a final sample of 344 participants who completed all three data collection waves. Importantly, while our attrition rate for this study is high, it is similar to that of other longitudinal community studies conducted during the pandemic (e.g., Probst et al., 2020; Ramiz et al., 2021).

Due to the substantial attrition across time, we further investigated whether there were significant demographic differences in participants who completed different waves of data collection: (1) participants completing only Wave 1 ($n = 1199$); (2) participants completing only Wave 1 and Wave 2 ($n = 610$); (3) participants completing Wave 1, Wave 2, and Wave 3 ($n = 344$). See Supplemental Materials for more information regarding the demographic differences of the sample by wave completed. We also assessed whether there were baseline differences in important study variables between the three sub-samples (see Supplemental Materials for more details).

Prior to conducting the primary analyses, data were examined for potential outliers and violations of assumptions of normality. All variables had relatively normal distributions (i.e., skewness <3 and kurtosis <8). Casewise diagnostics revealed outliers on several variables; however, none were influential (all Cook's *D* values less than 1) so they were all retained in subsequent analyses. Mplus statistical software (Muthén & Muthén, 2017) was used for all analyses. As the chi-squared test of significance is not informative with such a large sample size (e.g., Babyak & Green, 2010), we relied on the root mean squared error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean squared residual (SRMR) as the fit indices for each structural model tested.

Missing data

Missing data resulting from attrition ranged from 0–63%, depending on the variable and the model. Thirty-nine per cent of the sample ($n = 831$) completed measures at both Wave 1 and Wave 2, and 16% of the sample ($n = 344$) completed measures at all three waves. Analyses revealed that attrition at Wave 2 and Wave 3 was conditional on the COVID-distress items, as participants who completed the Wave 2 and Wave 3 surveys reported significantly lower levels of COVID-19 distress at Wave 1 and Wave 2, respectively ($p < .05$). As the COVID-19 distress items were included as predictors in the model, their inclusion reduced the impact of the missing data (Graham, 2009). We used full information maximum likelihood (FIML) to estimate model parameters for both the one-month and ten-month models.

Sensitivity analyses

Due to the high attrition rate and the demographic differences in individuals who completed different waves of data collection (see Supplemental Materials), we ran all analyses twice: once using the full sample ($n = 2152$) and again using only the participants who completed all three waves of data collection ($n = 344$). These sensitivity analyses allowed us to examine whether the pattern of relationships was impacted due to attrition across study waves.

Measurement model

Before testing our structural models, we tested a measurement model of the seven COVID-related distress items to determine whether they formed two latent factors of health worry and work distress. We then added a factor of dysfunctional beliefs formed by two indicators, the hopelessness rating and the helplessness rating. These three latent factors were then incorporated into the structural model.

Structural models

Each structural model tested whether COVID-19 health worry and work distress predicted both anxiety and depression at the next wave. In addition, we also tested whether dysfunctional beliefs, measured with two indicators, mediated the relationship between health worry, work distress, and both anxiety and depression. The one-month model included COVID-19 health worry and work distress at Wave 1, dysfunctional beliefs at Wave 2, and symptoms of depression and anxiety at Wave 2. The ten-month model included COVID-19 health worry and work distress at Wave 2, dysfunctional beliefs at Wave 3, and symptoms of depression and anxiety at Wave 3.

RESULTS

Overview of Sample

The means and standard deviations of the study variables across time are reported in Table 2. Participants reported a generally high level of COVID-19 distress at Wave 1, particularly on washing frequency, infection worry, and general worry. Participants generally reported significantly lower levels of the COVID-19 distress items over time (all p's $< .05$; see Table 2 for specific comparisons). Table 3 includes the correlations between all study variables at all three waves.

At Wave 1, 476 participants (22.1%) met the cut-off for clinical levels of depression (PHQ-2 score ≥ 3; Kroenke et al., 2003) and 550 participants (25.6%) met the cut-off for clinical levels of anxiety (GAD-2 score ≥ 3; Hughes et al., 2018). These rates are approximately three times higher than the percentage of US adults meeting the same clinical cut-offs for depression and anxiety pre-pandemic in 2019 (Terlizzi & Schiller, 2021), and are in line with rates reported during the pandemic for populations similar to the current sample (Czeisler et al., 2020). At Wave 2, the per cent meeting clinical cut-offs dropped to 13.8% ($n = 114$) for depression and 15.8% ($n = 131$) for anxiety. At Wave 3, 38 participants (11.0%) reported clinically significant levels of depression, and 50 participants (14.5%) reported clinically significant levels of anxiety. Compared to Wave 1, participants reported significantly lower levels of depression at Wave 3 ($p < .05$) and significantly lower levels of anxiety at both Wave 2 and Wave 3 (all p's $< .05$).

Measurement model

Factor analysis confirmed a two-factor structure (health worry and work distress) of COVID-19 distress at Wave 1 (RMSEA = .05; CFI = .99; SRMR = .02). We then added the additional latent variable of dysfunctional beliefs, defined by the two ratings of hopelessness and helplessness, to this two-factor model. This combined measurement model also fit the data well (RMSEA = .05; CFI = .98; SRMR = .03). All standardized factor loadings were greater than 0.4 and were significantly associated with the corresponding factor ($p < .001$). The dysfunctional beliefs factor was significantly correlated with the COVID health worry factor ($r = .41$) and the COVID work distress factor ($r = .49$).

Aim 1: One-month structural model (Wave 1-Wave 2)

The structural model fit the data (RMSEA = .04; CFI = .98; SRMR = .04). See Figure 2 for the path diagram of the Wave 1-Wave 2 structural model tested, including standardized coefficients and significant paths. Unstandardized path coefficients, standard errors, confidence intervals, and z values are presented in Table 4. At Wave 2, depression and anxiety were correlated ($r = .54$, $p < .001$), controlling for predictors in the model.

TABLE 2 Descriptive statistics of study variables by wave

	Wave 1 n = 2152	Wave 2 n = 831	Wave 3 n = 344	Statistical comparison[a]	Post Hoc differences between waves
COVID-19 Distress	*M* (SD)	*M* (SD)	*M* (SD)		
Infection Worry	2.62 (.93)	2.47 (.91)	2.45 (.88)	$F(1,317) = 15.08^{**}$	1 > 2; 1 > 3
Washing Frequency	3.28 (.67)	3.22 (.63)	3.10 (.61)	$F(1,317) = 19.60^{**}$	1 > 3; 2 > 3
General Worry	2.60 (.89)	2.35 (.86)	2.34 (.85)	$F(1,317) = 28.37^{**}$	1 > 2; 1 > 3
Rumination	2.44 (.97)	2.20 (.93)	2.14 (.91)	$F(1,317) = 29.32^{**}$	1 > 2; 1 > 3
Worry About Others	2.27 (1.03)	1.98 (.98)	2.05 (.93)	$F(1,317) = 14.32^{**}$	1 > 2
Work Interference	2.25 (1.06)	1.86 (.92)	1.87 (.94)	$F(1,317) = 5.49^{*}$	1 > 2
Financial Stress	2.29 (1.03)	1.98 (.97)	1.69 (.90)	$F(1,317) = 66.91^{**}$	1 > 2 > 3
Psychological Symptoms	*M* (SD)	*M* (SD)	*M* (SD)		
PHQ-2	1.51 (1.72)	1.06 (1.47)	0.90 (1.41)	$F(1,317) = 7.61^{*}$	1 > 3
GAD-2	1.66 (1.82)	1.17 (1.58)	1.16 (1.58)	$F(1,317) = 6.54^{*}$	1 > 2; 1 > 3
Dysfunctional Beliefs	*M* (SD)	*M* (SD)	*M* (SD)		
Hopelessness	--	21.52 (26.27)	19.36 (25.70)	$t(317) = -.36$	--
Helplessness	--	22.27 (27.03)	19.90 (25.13)	$t(317) = .30$	--

Note: All values are means and standard deviations. Abbreviations: GAD-2, Generalized Anxiety Disorder 2-Item; PHQ-2, Patient Health Questionnaire.

[a]Statistical comparison only includes participants with data at all waves.

$^{*}p < .05$; $^{**}p < .01$.

Wave 1 health worry directly predicted both Wave 2 anxiety ($\beta = .24$, 95% CI [.13, .34]) and depression ($\beta = .11$, 95% CI [.01, .21]). In contrast, Wave 1 work distress had no significant direct effects on either Wave 2 anxiety ($\beta = -.01$, 95% CI [−.13, .11]) or depression ($\beta = .03$, 95% CI [−.09, .15]). Both Wave 1 health worry ($\beta = .22$, 95% CI [.09, .35]) and work distress ($\beta = .31$, 95% CI [.17, .45]) significantly predicted Wave 2 dysfunctional beliefs. The indirect effect of health worry mediated by Wave 2 dysfunctional beliefs was significant for both Wave 2 anxiety ($\beta = .12$, 95% CI [.05, .19]) and depression ($\beta = .13$, 95% CI [.05, .21]). Similarly, the indirect effect of work distress mediated by Wave 2 dysfunctional beliefs was significant for both Wave 2 anxiety ($\beta = .16$, 95% CI [.09, .24]) and depression ($\beta = .18$, 95% CI [.10, .27]). Increased dysfunctional beliefs fully mediated the relationship between Wave 1 work distress and both depression and anxiety at Wave 2.

The one-month model controlling for both age and gender resulted in a similar pattern of results.

Sensitivity analysis

The restricted one-month model resulted in a similar pattern of results as the model using the full sample. The only difference was that Wave 1 health worry was not a significant predictor of Wave 3 depression in the restricted model; however, the standardized path coefficient for this relationship was remarkably similar in both models (Full Model: $\beta = .11$; Restricted Model: $\beta = .13$). See Supplemental Materials for further details.

Aim 3: Ten-month structural model (Wave 2-Wave 3)

The structural model fit the data (RMSEA = .04; CFI = .98; SRMR = .03). See Figure 3 for the path diagram of the structural model tested, including standardized coefficients and significant paths. Unstand-

TABLE 3 Zero-order correlations between study variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Wave 1	1. COVID-19 Health Worry	--															
	2. COVID-19 Work Distress	.57**	--														
	3. PHQ-2	.35**	.42**	--													
	4. GAD-2	.49**	.45**	.73**	--												
Wave 2	5. COVID-19 Health Worry	.75**	.49**	.35**	.46**	--											
	6. COVID-19 Work Distress	.48**	.66**	.37**	.40**	.58**	--										
	7. PHQ-2	.33**	.32**	.64**	.53**	.37**	.37**	--									
	8. GAD-2	.40**	.33**	.58**	.66**	.46**	.43**	.73**	--								
	9. Hopelessness	.33**	.33**	.50**	.47**	.43**	.40**	.58**	.55**	--							
	10. Helplessness	.33**	.35**	.51**	.49**	.41**	.40**	.59**	.58**	.81**	--						
Wave 3	11. COVID-19 Health Worry	.70**	.43**	.37**	.45**	.74**	.49**	.34**	.42**	.36**	.36**	--					
	12. COVID-19 Work Distress	.48**	.61**	.35**	.43**	.55**	.60**	.26**	.35**	.40**	.41**	.58**	--				
	13. PHQ-2	.30**	.23**	.50**	.46**	.33**	.29**	.57**	.54**	.37**	.40**	.36**	.28**	--			
	14. GAD-2	.43**	.25**	.55**	.62**	.46**	.27**	.51**	.58**	.42**	.45**	.43**	.34**	.70**	--		
	15. Hopelessness	.36**	.25**	.40**	.47**	.40**	.33**	.36**	.41**	.50**	.46**	.38**	.38**	.53**	.53**	--	
	16. Helplessness	.38**	.24**	.42**	.44**	.37**	.35**	.44**	.51**	.48**	.57**	.36**	.37**	.54**	.54**	.73**	--

Abbreviations: GAD-2, Generalized Anxiety Disorder 2-Item; PHQ-2, Patient Health Questionnaire-2.

*$p < .05$. **$p < .01$.

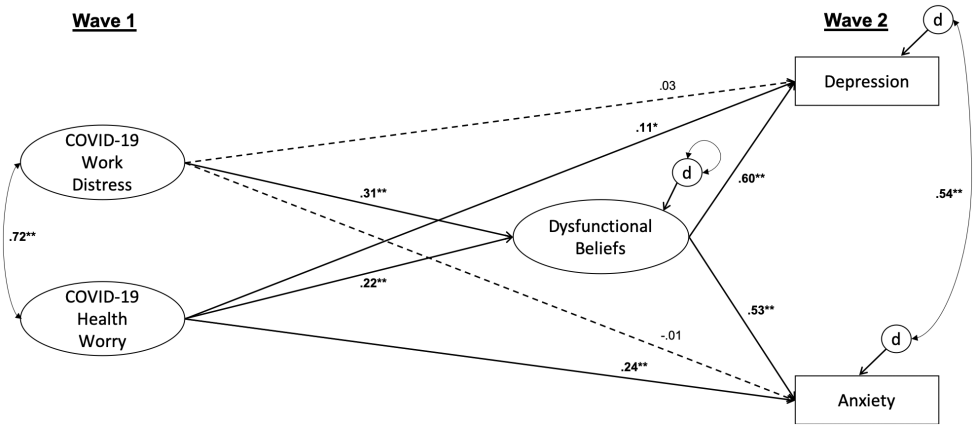

FIGURE 2 One-Month Structural Model (Wave 1-Wave 2). Structural model of COVID-19 health worry and work distress at Wave 1 predicting dysfunctional beliefs, depression, and anxiety at Wave 2 using the full sample. Solid lines represent significant paths, while dashed lines represent non-significant paths. All paths are shown with standardized coefficients. * $p < .05$. ** $p < .01$.

TABLE 4 Unstandardized path coefficients, standard errors (SE), 95% confidence intervals (CI), and z values for direct and indirect effects for the one-month structural model (Wave 1-Wave 2)

	Coefficient	SE	95% CI	z
Direct paths				
Wave 1 COVID-19 work distress to Wave 2 depression	.05	.11	[−.16, .26]	.50
Wave 1 COVID-19 work distress to Wave 2 anxiety	−.02	.12	[−.25, .21]	−.18
Wave 1 COVID-19 work distress to Wave 2 dysfunctional beliefs	8.66	2.08	[4.57, 12.74]	4.32**
Wave 1 COVID-19 health worry to Wave 2 depression	0.22	.11	[.01, .43]	2.07*
Wave 1 COVID-19 health worry to Wave 2 anxiety	0.51	0.12	[.28, .73]	4.47**
Wave 1 COVID-19 health worry to Wave 2 dysfunctional beliefs	7.02	2.11	[2.88, 11.15]	3.37**
Wave 2 dysfunctional beliefs to Wave 2 depression	0.037	0.002	[.03, .04]	19.96**
Wave 2 dysfunctional beliefs to Wave 2 anxiety	0.036	0.002	[.03, .04]	17.26**
Indirect paths				
Wave 1 COVID-19 work distress to Wave 2 depression via Wave 2 dysfunctional beliefs	0.32	0.08	[.17, .48]	4.18**
Wave 1 COVID-19 work distress to Wave 2 anxiety via Wave 2 dysfunctional beliefs	0.31	0.08	[.10, .40]	4.10**
Wave 1 COVID-19 health worry to Wave 2 depression via Wave 2 dysfunctional beliefs	0.26	0.08	[.11, .42]	3.33**
Wave 1 COVID-19 health worry to Wave 2 anxiety via Wave 2 dysfunctional beliefs	0.25	0.08	[.16, .47]	3.35**

*$p < .05$; **$p < .01$.

ardized path coefficients, standard errors, confidence intervals, and z values are presented in Table 5. At Wave 3, depression and anxiety were correlated ($r = .52$, $p < .001$), controlling for model predictors.

Wave 2 health worry significantly predicted Wave 3 anxiety ($\beta = .45$, 95% CI [.26, .63]) but not depression ($\beta = .06$, 95% CI [−.14, .26]). Similarly, work distress had a significant negative direct effect on anxiety ($\beta = -.26$, 95% CI [−.46, −.05]), but not depression ($\beta = .03$, 95% CI [−.19, .24]). While Wave 2 health worry significantly predicted Wave 3 dysfunctional beliefs ($\beta = .36$, 95% CI [.14, .59]), Wave 2 work

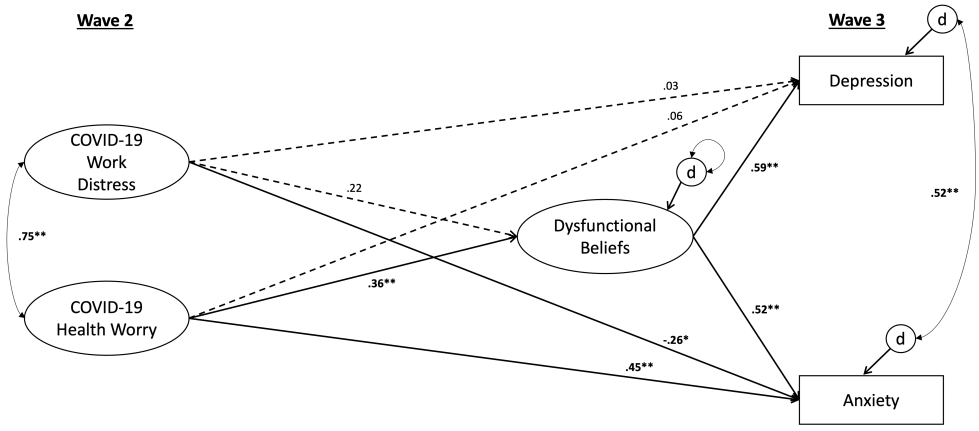

FIGURE 3 Ten-Month Structural Model (Wave 2-Wave 3). Structural model of COVID-19 health worry and work distress at Wave 2 predicting dysfunctional beliefs, depression, and anxiety at Wave 3 using the full sample. Solid lines represent significant paths, while dashed lines represent non-significant paths. All paths are shown with standardized coefficients. *$p < .05$. **$p < .01$.

distress did not ($\beta = .22$, 95% CI [−.02, .46]). The total indirect effect of Wave 2 health worry mediated by Wave 3 dysfunctional beliefs was significant for both Wave 3 depression ($\beta = .22$, 95% CI [.08, .35]) and Wave 3 anxiety ($\beta = .19$, 95% CI [.08, .30]). Increased dysfunctional beliefs appeared to fully mediate the relationship between Wave 2 health worry and Wave 3 depression. In contrast, dysfunctional beliefs did not mediate the relationship between Wave 2 work distress and either depression ($\beta = .13$, 95% CI [−.02, .27]) or anxiety ($\beta = .11$, 95% CI [−.02, .25]) at Wave 3.

As with the one-month model, the ten-month model controlling for both age and gender produced similar results.

Sensitivity analysis

As there were significant differences in the demographic makeup of the Wave 3 sample (see Supplemental Materials), we also re-ran this model with a restricted sample that included only the participants who completed all three waves ($n = 344$). The pattern of results also remained the same using this restricted sample: health worry and work distress independently predicted later anxiety, but not depression, and for health worry, this effect was partially mediated by Wave 3 dysfunctional beliefs. There were no differences in the pattern of our findings between the models using the full and restricted samples, demonstrating the consistency of our results despite study attrition. See Supplemental Materials for the full results for the restricted sample.

Exploratory follow-up analysis

We ran an exploratory follow-up analysis to explore the negative relationship between Wave 2 work distress and Wave 3 anxiety. We hypothesized that individuals with high levels of work distress may have been more motivated to seek out additional work opportunities over the summer of 2020, thus leading to lowered anxiety at Wave 3. At both Wave 2 and Wave 3, participants also reported their current level of difficulty paying their bills (0 = No difficulties; 3 = Extreme difficulties). We ran a linear regression model to see whether work distress at Wave 2 predicted change in difficulty paying bills from Wave 2 to Wave 3. Higher levels of work distress at Wave 2 predicted improvement in difficulty paying bills from Wave 2 to Wave 3 at a trend level ($\beta = .10$, $p = .09$).

TABLE 5 Unstandardized path coefficients, standard errors (SE), 95% confidence intervals (CI), and z values for direct and indirect effects for the ten-month structural model (Wave 2-Wave 3)

	Coefficient	SE	95% CI	z
Direct paths				
Wave 2 COVID-19 work distress to Wave 3 depression	.05	.20	[−.36, .46]	.24
Wave 2 COVID-19 work distress to Wave 3 anxiety	−.55	.23	[−1.00, −.11]	−2.47*
Wave 2 COVID-19 work distress to Wave 3 dysfunctional beliefs	6.45	3.70	[−.81, 13.70]	1.76
Wave 2 COVID-19 health worry to Wave 3 depression	.12	.20	[−.27, .51]	.61
Wave 2 COVID-19 health worry to Wave 3 anxiety	.98	.21	[.56, 1.40]	4.74**
Wave 2 COVID-19 health worry to Wave 3 dysfunctional beliefs	10.96	3.52	[4.06, 17.87]	3.22**
Wave 3 dysfunctional beliefs to Wave 3 depression	.038	.004	[.03, .046]	10.81**
Wave 3 dysfunctional beliefs to Wave 3 anxiety	.038	.005	[.029, .047]	9.28**
Indirect paths				
Wave 2 COVID-19 work distress to Wave 3 depression via Wave 3 dysfunctional beliefs	.25	.14	[−.04, .53]	1.65
Wave 2 COVID-19 work distress to Wave 3 anxiety via Wave 3 dysfunctional beliefs	.24	.15	[−.05, .53]	1.59
Wave 2 COVID-19 health worry to Wave 3 depression via Wave 3 dysfunctional beliefs	.42	.14	[.14, .69]	3.06**
Wave 2 COVID-19 health worry to Wave 3 anxiety via Wave 3 dysfunctional beliefs	.41	.13	[.16, .66]	3.30**

*$p < .05$; **$p < .01$.

DISCUSSION

The current study investigated whether two aspects of COVID-19 distress, health worry and work distress, would differentially predict later symptoms of anxiety and depression throughout the pandemic. Additionally, we examined the mediating roles of dysfunctional beliefs, defined as feelings of hopelessness and helplessness, in the relationship between COVID-19 distress and affective symptoms. Both COVID-19 health worry and work distress predicted later symptoms of anxiety and depression as hypothesized; however, the two aspects appeared to operate through different pathways at different times during the pandemic. Earlier in the pandemic, health worry both *directly* and *indirectly* influenced anxiety and depression symptoms, while work distress was only *indirectly* associated with affective symptoms via dysfunctional beliefs. These relationships shifted as the pandemic continued, as health worry at Wave 2 became the only significant predictor of Wave 3 dysfunctional beliefs. Together, these results suggest that different mechanisms contribute to the association between health worry, work distress, and affective symptoms over the course of the COVID-19 pandemic.

Health worry and work distress differed in their roles influencing dysfunctional beliefs and later symptoms of anxiety and depression over the three waves captured in this study. Health worry predicted dysfunctional beliefs both in the early and later phases of the pandemic, consistent with recent literature on the relationship between fear of COVID-19 and feelings of hopelessness and helplessness (e.g., Saricali et al., 2020). Interestingly, work distress predicted dysfunctional beliefs in the one-month but not the ten-month model, suggesting that the effect of this factor may have changed over time as the context of the pandemic in the United States also changed. Work distress may have been more closely linked to feelings of hopelessness and helplessness in the early stages of the pandemic, as the economic downturn and increased job loss began during that time (e.g., Polyakova et al., 2020). This is consistent with previous literature linking economic and work stress with both hopelessness (e.g., Truchot & Andela, 2018; Violanti et al., 2016) and helplessness (e.g., Baum et al., 1986; Brown et al., 2016). In turn, this effect may

have been attenuated by subsequent stimulus payments that would have been received by Wave 3 (e.g., Cooney & Shaefer, 2021). Further research is needed to understand how COVID-19 distress and dysfunctional beliefs may change during different phases of a pandemic.

These findings also highlight the important role of COVID-19 health worry over the course of the pandemic and suggest that health worry may be particularly important throughout the pandemic. Recent research has found a strong link between COVID-19 health worries and negative mental health symptoms during the pandemic (Fitzpatrick et al., 2020; Liu et al., 2020). Our findings suggest that increased feelings of hopelessness and helplessness may be one mechanism underlying this relationship over the course of the pandemic, highlighting a potential target for long-term intervention. To our knowledge, this study is the first to highlight the role of dysfunctional beliefs as an important mechanism underlying the relationship between different facets of COVID-19 distress and affective symptoms at different times during the pandemic. Further research is needed to continue to explore these relationships in the context of the COVID-19 pandemic and other large-scale community stressors. Additionally, future research should consider other cognitive mechanisms that may contribute to the relationship between COVID-19 distress and affective symptoms during the pandemic, such as intolerance of uncertainty (e.g., Freeston et al., 2020; Reizer et al., 2021).

Surprisingly, Wave 2 work distress was a negative predictor of Wave 3 anxiety, suggesting that individuals with high levels of work and financial concerns in May 2020 actually reported *lower* levels of anxiety in the winter of 2020–2021. While the direction of this relationship is unexpected, these findings may be elucidated when considering the broader context of the changes in the pandemic and the US economy between May and the winter of 2020–2021. Individuals with high levels of work and financial concerns in May 2020 may have been more motivated to seek out additional work and may have been more likely to get a job when the economy started to improve over the summer of 2020 (US Census Bureau, 2020). This is in line with previous findings on the predictive role of high levels of perceived financial need on the intensity of a job search (Van Hooft & Crossley, 2008). Our exploratory follow-up analysis supports this theory, as individuals with higher levels of work distress at Wave 2 reported less difficulty paying their bills from Wave 2 to Wave 3 at trend level. Additional research is needed to further explore the possibility of higher levels of work distress motivating positive changes in one's work or financial situation. Another possible explanation is that the two rounds of economic impact payments during this time may have helped alleviate the financial burden for lower-income persons, thus reducing their later anxiety (e.g., Cooney & Shaefer, 2021). As there are many potential explanations for this surprising negative relationship between work distress at Wave 2 and anxiety at Wave 3, further research is needed to better understand what factors may have contributed to this effect.

LIMITATIONS

There are several limitations of the current study. First, dysfunctional beliefs were assessed at the same time as affective symptoms in each model, so we cannot conclusively state the directionality of the results. While we did collect data at three waves, we decided to run two separate models due to the discrepancy in length between the different waves (one month between Wave 1 and Wave 2 and eight to ten months between Wave 2 and Wave 3). Our hypothesized directional effects were based on existing literature, but further research with more times of observation is needed to satisfy the temporality needed for mediation. Additionally, hopelessness and helplessness were assessed using only one item each, introducing potential issues of content validity, sensitivity, and reliability for these constructs (McIver & Carmines, 1981). Future research should replicate these results using validated measures of dysfunctional beliefs to determine whether these results remain consistent.

Another limitation is the sample attrition across the three waves of data collection. As only 16% of the sample (n = 344) completed the surveys at all three waves, it is possible that this smaller sample is not representative of our original sample. While it is important to consider this limitation as it could possibly limit the generalizability of our findings, we found that our results did not change after re-running our

structural model with the sample that completed all three time points. In fact, the pattern of our results remained remarkably consistent when using the full versus the restricted sample. Thus, we believe that this limitation does not negate the conclusions of this study. Finally, this study sampled a large community population. While this sample was deliberately selected and was representative of the Florida population, findings from this study may not be generalizable to the larger population. Additionally, we are unable to extend our findings to a clinical population. Future research should examine these relationships within a clinical sample to assess the risk factors for clinically significant levels of anxiety or depression.

CONCLUSIONS

The current study provided support for the multifaceted nature of COVID-19 distress and demonstrated how different facets of this construct may predict later affective symptoms through varying pathways. These findings have important theoretical and clinical implications for the research and treatment of affective disorders. This study highlights the important role of situational distress and dysfunctional beliefs in contributing to affective symptoms following a community-wide stressor, such as the COVID-19 pandemic. Future research is needed to explore these relationships in the context of other stressful situations, such as natural disasters. These findings also suggest potential targets for the treatment of anxiety and depression during the COVID-19 pandemic. Treatments and interventions focused on reducing feelings of hopelessness and helplessness may be particularly effective at reducing later affective symptoms for persons struggling with distress related to the pandemic. These treatment implications can also be extended to other interpersonal and community-wide stressors. Hopelessness and helplessness may also be important targets to consider for the treatment of affective symptoms following other types of stressors, such as interpersonal violence or a natural disaster. Given the immense impact of the COVID-19 pandemic on mental health, it is extremely important to continue to identify potential targets for the treatment of anxiety and depression during this time.

AUTHOR CONTRIBUTIONS

Hannah C. Broos: Conceptualization; data curation; formal analysis; writing – original draft; writing – review and editing. **Maria M. Llabre:** Funding acquisition; investigation; methodology; project administration; supervision; writing – review and editing. **Patrice G. Saab:** Funding acquisition; investigation; methodology; project administration; supervision; writing – review and editing. **Rafael O. Leite:** Data curation; writing – review and editing. **Jamie H. Port:** Data curation; project administration; writing – review and editing. **Kiara R. Timpano:** Conceptualization; funding acquisition; investigation; methodology; project administration; supervision; writing – review and editing.

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CONFLICT OF INTEREST

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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