RESEARCH ARTICLE

Relationships Between Gratitude and Mental Health Difficulties During the COVID-19 Pandemic in a Southern Region of the United States

Allen C. SHERMAN [iD] [1] [✉], John M. SALSMAN [iD] [2], Crystal L. PARK [iD] [3],
Erick L. MESSIAS [iD] [4], Mark L. WILLIAMS [iD] [5], Benjamin C. AMICK [iD] [6],
Teresa J. HUDSON [7], Stephanie SIMONTON-ATCHLEY [1]

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[1] Behavioral Medicine Division, University of Arkansas for Medical
   Sciences, Little Rock, AR, USA
[2] Wake Forest School of Medicine and the Wake Forest Baptist
   Comprehensive Cancer Center, Winston-Salem, North Carolina, USA
[3] Department of Psychology, University of Connecticut, Storrs,
   Connecticut, USA
[4] Faculty Affairs and Department of Psychiatry, College of Medicine,
   University of Arkansas for Medical Sciences, Little Rock, AR, USA.
   Currently at the Department of Psychiatry and Behavioral Neurosciences,
   Saint Louis University, St. Louis, MO, USA.
[5] Department of Health Promotion and Disease Prevention, Fay W.
   Boozman College of Public Health, University of Arkansas for Medical
   Sciences, Little Rock, AR, USA
[6] Department of Epidemiology, Fay W Boozman College of Public Health,
   University of Arkansas for Medical Sciences, Little Rock, AR, USA
[7] Center for Health Services Research, Department of Psychiatry,
   University of Arkansas for Medical Sciences, Little Rock, AR, USA

✉ Correspondence
Allen C. Sherman
Behavioral Medicine Division, University of Arkansas
for Medical Sciences
Postal Address: #756 4301 W. Markham Street Little Rock, AR 72205
Email: ShermanAllenC@uams.edu

Introduction: The extensive disruptions of the
COVID-19 pandemic have led to heightened con-
cerns about mental health sequelae. There has been
significant interest in identifying factors associated
with psychosocial vulnerability or resilience.
Aims: This study examined associations of trait
gratitude with mental health difficulties among
community residents in a southern state of the US.
Methods: In this cross-sectional online investigation,
543 adults were assessed during an earlier phase of
the pandemic, characterized by the reopening of
facilities but mounting infection rates. Participants
were evaluated using a validated measure of trait
gratitude and clinically relevant screening assess-
ments of depression, anxiety, and trauma symptoms.
Results: After adjusting for a range of pandemic-
associated burdens and sociodemographic factors,
multivariable analyses indicated that gratitude was
significantly related to diminished levels of depres-
sion, anxiety, and trauma. These effects remained
significant after additional adjustment for other
psychosocial resources (religiousness and perceived
support).
Conclusions: Findings provide novel information
regarding relationships between gratitude and re-
duced mental health difficulties among community
residents during a stressful period early in the pan-
demic. Results set the stage for longitudinal research.
A disposition to identify and appreciate beneficial
experiences might contribute to more favorable ad-
aptation to communal crises, and warrants further
investigation.

Keywords: COVID-19 pandemic, mental health,
gratitude, depression, post-traumatic stress

Introduction

The COVID-19 pandemic precipitated a public health crisis of enormous dimensions. The pandemic and ensuing government mitigation efforts have had sweeping effects on the healthcare system, the economy, and social institutions, and led to pervasive alterations in day-to-day life. In the context of these stressful disruptions, notable levels of mental health difficulties have been documented in studies conducted around the globe (e.g., Fisher et al., 2021; Prati & Mancini, 2021; Schafer et al., 2022; Xiong et al., 2020).

Given that individuals vary widely in their adjustment to major stressors, delineating factors that contribute to psychological risk or resilience to the pandemic has attracted considerable interest. Gratitude is a psychosocial resource that has garnered notable attention for its potential salutary effects on mental health in other contexts. Construed as a generalized orientation toward noticing and appreciating positive facets of experience, trait gratitude has been related to diminished distress or greater well-being among community residents assessed during normative circumstances (Disabato et al., 2017; Petrocchi & Couyoumdjian, 2016). Fewer investigations have examined gratitude among adults in the context of crisis or trauma. Nonetheless, some studies reported that trait gratitude was tied to more favorable adjustment in response to personal crises such as medical illnesses (e.g., Millstein et al., 2016; Sherman, Simonton-Atchley et al., 2020) or mixed types of traumatic events (Kim & Bae, 2019; Van Dusen et al., 2015). Even fewer studies have focused on effects of gratitude among adult community residents in the aftermath of socially shared or collective crises, such as natural disasters. Thus far, gratitude has been related to perceived positive changes after communal upheaval (e.g., Zhang et al., 2020), but evidence has been mixed regarding associations with mental health symptoms (e.g., post-traumatic stress) or other aspects of distress (Lies et al., 2014; Zhang et al., 2020).

More recently, there have been indications that some individuals have experienced increased levels of gratitude in response to the challenges of COVID-19 (Yarrington et al., 2021), and a few pioneering investigations have begun to explore its effects among community residents (Bernabe-Valero et al., 2021; Burke et al, 2020; Jiang, 2021; Mead et al., 2021; Miragall et al., 2021; Nelson-Coffey et al., 2021; Pellerin & Raufaste, 2020; Pérez-Rojo et al., 2021; Syropoulos & Markowitz, 2021; Tong & Oh, 2021). The results have varied depending on the types of outcomes assessed; very few of these studies focused specifically on mental health symptoms such as depression, post-traumatic stress, or anxiety. For example, a longitudinal online study in Spain found that increases over time in gratitude were correlated with favorable changes in life satisfaction, positive affect, and negative affect, but not with symptoms of depression, anxiety, or stress (Miragall et al., 2021). Similarly, in a cross-sectional online survey of US residents, various indices of trait gratitude were related to greater levels of positive affect and lower negative affect, but not to a measure of pandemic-related distress (Bernabe-Valero et al., 2021). Among Irish residents, gratitude was associated with greater well-being in some demographic subgroups, but not with indices of depression, anxiety, or stress (Burke et al., 2020). In contrast, another cross-sectional study (Nelson-Coffey et al., 2021) conducted in the US reported significant associations with lower distress and negative affect in addition to enhanced positive outcomes (e.g., thriving, positive affect). Other investigations assessed gratitude as a transient emotional state rather than a more enduring orientation or trait. In a Chinese study that evaluated daily diary ratings, individuals who experienced greater than usual levels of grateful feelings also reported more positive affect and less COVID-related stress on the same day, and less COVID-related stress the next day; there were no associations with negative affect (Jiang, 2021). In a cross-sectional study of Chinese residents in Singapore (Tong & Oh, 2021), grateful feelings were related to greater use of pandemic precautions, perceived benefits from the pandemic, and positive emotions (e.g., joy, pride), but were also associated with greater negative feelings (e.g., anxiety, anger) in bivariate analyses. In sum, there are initial indications that gratitude may be tied to more favorable adjustment among community residents during COVID-19, but thus far data have been limited, and findings regarding distress (as opposed to positive outcomes) have been surprisingly inconsistent. Very little information exists specifically regarding psychiatric symptoms that might hold more immediate relevance from a clinical and public health perspective. To move the field forward, there is a need for additional investigations, particularly those that examine clinically relevant indices of distress or mental health symptoms, and target residents in understudied geographical regions at specific phases of the pandemic. The current study was intended to help address this gap.

This investigation evaluated associations of trait gratitude with a number of clinically important mental health outcomes among community residents of a medically underserved southern state in the US during an early phase of the pandemic. We examined symptoms of depression, anxiety, and trauma, using well-established screening measures. Little information is available regarding adaptation to the stressful disruptions of the pandemic in the country's rural southern regions, though research in rural areas has been identified as a priority (Holmes et al., 2020). Public health outcomes in these regions have been a longstanding concern; relative to other U.S. states, Arkansas ranks poorly across multiple indicators including rates of cardiovascular disease, chronic obstructive pul-

monary disease, and smoking (United Health Foundation, 2021), all of which have implications for vulnerability to COVID-19. We examined responses at an earlier phase of COVID-19, when the state was reopening but infection rates were growing rapidly (Centers for Disease Control and Prevention, n.d.). This period, associated with marked uncertainty, mixed public health messages, and heightened risks for infection, provided a particularly good opportunity to evaluate psychological resources such as gratitude that might contribute to resilience.

We hypothesized that greater levels of trait gratitude would be related to diminished distress on each of the three outcomes (i.e., lower depressive, anxiety-, and trauma-related difficulties), after adjusting for the effects of a range of pandemic-associated burdens and demographic characteristics. This approach was construed as a conservative test of study hypotheses. To further evaluate incremental validity, we also examined these relationships after additionally adjusting for other relevant psychological resource variables (i.e., religiousness, social support). The study was intended to help clarify whether the burden of mental health symptoms was diminished among community residents with a proclivity to appreciate benefits in life, during the early phase of a major public health crisis. Exploratory analyses also assessed whether the salutary effects of gratitude might be more evident among individuals struggling with the greatest disruption in daily life due to the pandemic.

Methods

Participants and Data Collection

These data stem from a larger online project concerning responses to COVID-19 among Arkansas residents. Other reports summarize pandemic-related burdens and associations with religiousness (Sherman, Williams et al., 2020; Sherman et al., 2021), whereas this investigation focused on relationships between gratitude and mental health indices. This was a cross-sectional, registry-based study involving an online survey, administered during a 4½-week interval (May 22-June 24, 2020). This period captured a critical interval (phase 1 and early phase 2) during which businesses were reopened within the state (including partially resuming dine-in services in restaurants as well as reopening hair salons, fitness centers, and sports venues with audiences < 50), but at the same time, COVID-19 case rates were mounting steeply (Centers for Disease Control and Prevention, n.d.). We emailed a study invitation to participants in the Translational Research Center's ARresearch registry at The University of Arkansas for Medical Sciences (UAMS). The registry lists individuals interested in research engagement, and who vary broadly in rural vs. urban, economic, and ethnic/racial characteristics. Participation was voluntary and no compensation was provided. Eligibility criteria required participants to be at least 18 years old, reside within Arkansas, and be listed in the registry as a healthy community resident (and not classified under a particular illness). We used REDCap, a secure web application for online research (Harris et al., 2009), to administer the survey. Potential respondents were informed about the investigation via an information form, and the protocol received exempt status by the UAMS Institutional Review Board.

Measures

Gratitude Questionnaire-6

Trait gratitude was evaluated using the Gratitude Questionnaire-6 (GQ-6; McCullough et al., 2002). This 6-item instrument assesses a generalized tendency to appreciate benevolent experiences in daily life (e.g., "If I had to list everything I felt grateful for it would be a very long list"). Items are rated on a 7-point scale (1 = "strongly disagree," 7 = "strongly agree"). The scale is one of the most commonly employed measures of gratitude, and studies in adult and student samples have supported the internal consistency and construct validity of the instrument (McCullough et al., 2002). In the current sample, Cronbach's alpha was .78.

Patient Health Questionnaire-9

Depressive symptoms were measured using the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). Respondents rate items on a 4-point scale based on frequency (0 = "not at all," 3 = "nearly every day"). This 9-item questionnaire is a widely-used screening instrument, and multiple investigations have supported its internal consistency and construct validity (Kroenke et al., 2001). Cronbach's alpha was .91 in the present sample.

Generalized Anxiety Disorder Questionnaire

Anxiety symptoms were evaluated using the Generalized Anxiety Disorder questionnaire (GAD-7; Spitzer et al., 2006). Individuals respond on a 4-point scale based on frequency (0 = "not at all," 3 = "nearly every day"). Evidence for the reliability and criterion-related validity of this 7-item screening instrument has been reported in studies of primary care patients and the general population (Spitzer et al., 2006). Cronbach's alpha was .93 in the current sample.

PTSD Checklist for DSM-5

The 20-item PTSD Checklist (PCL-5; Blevins et al., 2015) measured trauma symptoms. Items are rated on a 5-point scale (0 = "not at all," 4 = "extremely"), and were keyed to the pandemic. The instrument has demonstrated good internal consistency and convergent validity in diverse samples (Blevins et al., 2015). Cronbach's alpha was .92.

Background Demographic, Resource, and Pandemic-related Variables

Respondents provided information concerning demographic characteristics (e.g., age, education, etc.). *Perceived social support* was assessed using the 5-item version of the ENRICHD social support instrument (ESSI; Mitchell et al., 2003), which evaluates the availability of emotional support (e.g., "Can you count on anyone to provide you with emotional support?"). Items are rated on a 5-point scale (1 = "none of the time" to 5 = "all of the time"). The measure has demonstrated good internal consistency and construct validity regarding medical patients (Mitchell et al., 2003). In the current sample, Cronbach's alpha was .94. We evaluated *general religiousness* with a single item concerning religious commitment ("To what extent do you consider yourself a religious person?"). Participants responded on a 4-point scale (0 = "not at all," 3 = "a great deal"). This commonly used measure derives from the Fetzer Institute/National Institute on Aging Working Group (1999).

A range of pandemic-related burdens was evaluated. We inquired about COVID-19 testing with an item adapted from the University of Southern California (n.d.) Understanding America Study (UAS) Coronavirus Tracking Survey, and about perceived coronavirus exposure using an item derived from the Australian Treatment Outcome Study 18–20 Year Follow-up survey (Marel et al., n.d.). We measured food insecurity (e.g., "Go without eating for a whole day because of lack of money") using three items, and financial insecurity (e.g., missed or delayed payment of utility bills) using two questions adapted from the UAS; responses were coded for analysis as 0 = no or not sure, 1 = yes. Disregard of social distancing provisions (e.g., "Attended a gathering with more than 10 people") was measured with nine items adapted from the UAS; responses were coded for analysis as 0 = no or not sure, 1 = yes, and totaled to provide a summary score.

Disruptions in day-to-day routines and responsibilities due to COVID-19 were assessed using seven items created by the investigators (e.g., "trouble caring for people who depend on you day-to-day," "trouble staying connected with people who are important to you"); these items were rated on a 4-point scale and summed (Cronbach's alpha =.73). Additional items asked about the death or illness of loved ones as a result of the pandemic (coded as 0 = no, 1 = death or illness), effects on access to routine healthcare (coded for the analysis as 0 = no or not sure, 1 = yes), effects on work/income (coded 0 = no change, 1 = loss of job, business, or income), and extent of sheltering in one's residence (coded 0 = leaving at least several times per week, 1 = shelter at home, supplies are delivered and almost never leave residence).

Statistical Analysis

In preliminary bivariate analyses, relationships between mental health outcomes and background demographic- or pandemic-related factors were examined using independent sample t-tests for categorical variables and Pearson correlations for continuous variables. Variables that were significantly related to mental health indices were included as covariates in the primary multivariate analyses. In response to non-normal distributions, log transformations were used for disruption in daily life and the outcome measures (skewness for the transformed variables =.37 for disruption, .72 for depressive symptoms, .71 for anxiety symptoms, .95 for trauma symptoms). The remaining data revealed no substantive problems with normality or multicollinearity.

Multiple regression models were used in the main analyses to examine hypothesized associations between gratitude and each of the three mental health outcomes (i.e., depressive, anxiety, and trauma-related symptoms), after adjusting for significant pandemic-associated and sociodemographic characteristics. Although the mental health variables were highly correlated (r's =.72 to .80), as would be anticipated, we retained them as separate

outcomes in the regression models to ensure ecological validity because they are conceptually distinct from each other and prompt different screening and treatment strategies in real-world clinical settings. $Ps < .017$ were considered statistically significant, to adjust for multiple comparisons (i.e., three outcome variables divided by .05). (The investigation was sufficiently powered (> .98) to support multiple regression analyses with one predictor and as many as 10 covariates accounting for as little as 10% of the variance, at the adjusted p of .017, conservatively assuming a sample of 500 participants.)

In ancillary analyses, we evaluated the incremental validity of gratitude (i.e., beyond the effects of other commonly studied resource variables) in predicting each mental health outcome by additionally controlling for general religiousness and perceived social support. Finally, though not a primary focus of the current paper, we conducted exploratory analyses to examine whether the effects of gratitude on mental health were moderated by the severity of pandemic-related burdens (i.e., buffering effects). In each regression model, we tested statistical interactions between gratitude and the level of disruption in daily life, after centering these variables. The results of ancillary analyses were viewed as preliminary.

Results

Sample Characteristics

The current sample included 543 (32.5%) community residents who enrolled in the study and completed the gratitude measure, out of 1,672 individuals who received emailed notifications regarding the survey. Individuals who completed the study were more likely to be white ($p = .001$) and older ($p = .001$) compared with those who did not. As with most online surveys, no information is available regarding reasons for refusal. We excluded from the analysis an additional 47 respondents who were missing the gratitude questionnaire (which was located later in the packet); these respondents did not differ significantly ($p \geq .096$) from those included in the analysis on any sociodemographic or pandemic-related variables. There was a single outlier on the gratitude measure, and this individual too was excluded. Missing data were not imputed in view of the limited number of missing values.

Demographic and pandemic-related characteristics are summarized in Table 1. The mean age of respondents was 51.45 (14.90) years, 83.64% were white, and 76.80% were female. The jarring effects of the pandemic were vividly illustrated by the participants' responses, as reported more fully elsewhere (Sherman, Williams et al., 2020). Loss of employment or income due to COVID-19 was reported by 21.73% of the participants. Food insecurity was an immediate concern for 13.81%, and 39.78% experienced diminished access to routine healthcare. A number of individuals (17.38%) remained rigorously sheltering at home, relying on delivery of supplies. The vast majority of participants (89.50%) experienced at least some degree of disruption in their usual day-to-day activities and responsibilities as a consequence of the COVID-19. With respect to mental health indices, 20.25% of the participants exceeded established cut-off values for clinically elevated depressive symptoms (≥ 10; Kroenke et al., 2001), 16.02% exceeded cut-off values for elevated anxiety symptoms (≥ 10; Spitzer et al., 2006), and 5.39% exceeded thresholds for trauma-related difficulties (≥ 33; Blevins et al. 2015).

Preliminary Analyses

Initial bivariate analyses using independent sample t-tests indicated that there were significant group differences on all three mental health indices (i.e., depressive, anxiety, and trauma-related difficulties) related to several sociodemographic and pandemic-associated factors. On all three outcomes, greater difficulties were reported by participants of a younger age (all p's < .001), female gender (all p's < .001), lower family income (all p's ≤ .002), previous mental health problems (all p's < .001), loss of work or income due to the pandemic (all p's ≤ .012), greater financial insecurity (all p's < .001), greater food insecurity (all p's < .001), diminished access to healthcare (all p's < .001), and more restrictive sheltering in residence (all p's ≤ .002; see Tables 2 and 3). In Pearson correlation analyses, all three mental health problems were related (all p's < .001) to more marked disruption in day-to-day routines and responsibilities as a result of COVID-19. Additionally, increased depression scores were correlated ($p = .003$) with less education. We included these variables as covariates in the primary multivariable analyses. Mental health indices were not associated (all p's ≥ .03) with ethnicity, perceived coronavirus exposure, social distancing practices, or death or illness of loved ones as a result of the pandemic.

Bivariate analyses using Pearson correlations indicated that gratitude was significantly correlated with each mental health variable, as expected ($r = -.25$ to $-.33$), with roughly medium effect sizes.

Table 1. Sample Characteristics

Characteristic	N (%)		Mean (SD)	
age			51.44	(14.89)
education (years)			15.93	(2.05)
disruption in day-to-day routines (log)			1.16	(0.10)
disregard of social distancing (possible range 0-9)			3.96	(1.67)
gratitude (possible range 6-47)			37.88	(4.51)
PHQ-9 depression (possible range 0-27)			5.22	(5.56)
GAD-7 anxiety (possible range 0-21)			4.92	(5.13)
PCL-5 trauma (possible range 0-80)			8.90	(10.84)
gender				
male	126	(23.20)		
female	417	(76.80)		
race/ethnicity				
majority	454	(83.61)		
non-majority	89	(16.39)		
family income (n =540)				
$0-59,999	177	(32.84)		
≥$60,000	362	(67.16)		
coronavirus testing				
untested	497	(91.53)		
awaiting results	7	(1.29)		
tested negative	36	(6.63)		
tested positive	3	(.55)		
perceived coronavirus exposure	44	(8.12)		
diminished access to routine healthcare	216	(39.78)		
loss of job or income	118	(21.73)		
financial insecurity	60	(11.05)		
food insecurity	75	(13.81)		
death or illness of a loved one	33	(6.08)		
restrictive sheltering in one's residence	94	(17.38)		

Table 2. Correlations of Demographic and Pandemic-Associated Variables with Mental Health Difficulties

Characteristic	depressive symptoms (log)		anxiety symptoms (log)		trauma symptoms (log)	
	Pearson correlation	p-value	Pearson correlation	p-value	Pearson correlation	p-value
age (years)	−.24	.0001*	−.31	.0001*	−.20	.0001*
education (years)	−.13	.003*	−.09	.04	−.05	.23
disruptions in day-to-day						
routines (log)	.34	.0001*	.38	.0001*	.41	.0001*
disregard of social distancing	−.05	.21	−.02	.67	−.08	.06
gratitude	−.33	.0001*	−.25	.0001*	−.26	.0001*

Note: *p < .0167, the adjusted critical p-value

Table 3. Mental Health Scores Based on Differences in Pandemic and Sociodemographic Variables

Characteristic	depressive symptoms (log)			anxiety symptoms (log)			trauma symptoms (log)		
	M (SD)	t	p-value	M (SD)	t	p-value	M (SD)	t	p-value
gender		−3.36	.0009*		−5.52	.0001*		−4.27	.0001*
male	1.12 (.12)			1.10 (.11)			1.17 (.16)		
female	1.17 (.15)			1.17 (.14)			1.24 (.21)		
ethnicity		2.18	.03		1.54	.12		1.78	.08
majority	1.15 (.14)			1.15 (.13)			1.22 (.19)		
non-majority	1.19 (.15)			1.17 (.14)			1.26 (.23)		
family income		4.99	.0001*		3.78	.0002*		3.07	.002*
$0-59,999	1.20 (.16)			1.18 (.14)			1.26 (. 21)		
≥$60,000	1.14 (.13)			1.14 (.13)			1.21 (.19)		
perceived coronavirus exposure		−1.29	20		−1.83	.07		−1.47	.14
no	1.16 (.14)			1.15 (.13)			1.22 (.20)		
yes	1.18 (.16)			1.19 (.14)			1.27 (.22)		
diminished healthcare access		−3.59	.0004*		−3.46	.0006*		−3.67	.0003*
no	1.14 (.13)			1.14 (.13)			1.20 (.19)		
yes	1.18 (.15)			1.18 (.14)			1.26 (.21)		
loss of job or income		−2.81	.006*		−2.54	.012*		−2.77	.006*
no	1.15 (.14)			1.14 (.13)			1.21 (.19)		
yes	1.19 (.16)			1.18 (.14)			1.27 (.23)		
financial insecurity		−5.11	.0001*		−5.01	.0001*		−3.72	.0004*
no	1.15 (.13)			1.14 (.13)			1.21 (.19)		
yes	1.26 (.16)			1.23 (.15)			1.32 (.22)		
food insecurity		−5.66	.0001*		−6.42	.0001*		−5.60	.0001*
no	1.14 (.13)			1.14 (.13)			1.20 (.19)		
yes	1.25 (.16)			1.24 (.14)			1.35 (.21)		
death or illness of loved one		−1.49	.14		−1.66	.10		−1.67	.07
no	1.16 (.14)			1.15 (.13)			1.22 (.20)		
yes	1.19 (.16)			1.19 (.13)			1.28 (.21)		
sheltering in one's residence		3.13	.002*		2.98	.003*		3.12	.002*
restrictive	1.20 (.16)			1.19 (.14)			1.29 (.24)		
relaxed or none	1.15 (.14)			1.14 (.13)			1.21 (.19)		

Note: p-values from independent sample t-tests; *p < .0167, the adjusted critical p-value

Associations between Gratitude and Mental Health Outcomes

The primary multivariate analyses, which controlled for significant pandemic-associated and sociodemographic variables, indicated that increased gratitude was associated with reduced difficulties on all three mental health indices, as hypothesized (see Table 4). Higher *depression scores* were associated with lower trait gratitude, $\beta = -.25$, p <.001, $f^2 = .09$ (95% CI: .04 − .14), as well as younger age, $\beta = -.12$, $p = .001$, prior mental health diagnoses, $\beta = .28$, $p = .001$, and more extensive disruption in day-to-day routines and responsibilities as a result of COVID-19, $\beta = .24$, $p = .001$. Higher *anxiety scores* were related to less gratitude, $\beta = -.17$, p <.001, $f^2 = .04$ (95% CI: .01 −.08), in conjunction with younger age, $\beta = -.19$, $p < .001$, male gender, $\beta = .13$, p <.001, previous mental health

Table 4. Multiple Regression Models Predicting Mental Health Difficulties From Gratitude

predictors	B	SE	β	F	Adjusted R^2	p
depressive symptoms (log)				27.46	.37	<.0001
age	−.001	.000	−.118*			
education	−.003	.003	−.038			
gender	.018	.012	.054			
family income	−.026	.011	−.085			
previous mental health problems	.080	.010	.282*			
disruption in daily routines (log)	.338	.053	.242*			
diminished healthcare access	.003	.011	.009			
loss of job or income	.004	.012	.011			
financial insecurity	.027	.017	.061			
food insecurity	.020	.016	.049			
sheltering in one's residence	−.029	.013	−.078			
gratitude	-.008	.001	−.246*			
anxiety symptoms (log)				27.86	.36	<.0001
age	−.002	.000	−.193*			
gender	.041	.011	.130*			
family income	−.015	.010	−.051			
previous mental health problems	.068	.010	.255*			
disruption in daily routines (log)	.357	.051	.271*			
diminished healthcare access	.000	.010	−.000			
loss of job or income	−.002	.012	−.005			
financial insecurity	.009	.016	.022			
food insecurity	.031	.015	.080			
sheltering in one's residence	−.017	.013	−.048			
gratitude	−.005	.001	−.169*			
trauma-related symptoms(log)				22.93	.31	.0001
age	−.001	.001	−.078			
gender	.045	.017	.096*			
family income	−.011	.016	−.026			
previous mental health problems	.078	.010	.194*			
disruption in daily routines (log)	.654	.078	.333*			
diminished healthcare access	.000	.016	.000			
loss of job or income	.016	.018	.032			
financial insecurity	.003	.026	.005			
food insecurity	.046	.024	.079			
sheltering in one's residence	−.047	.020	−.088			
gratitude	−.009	.002	−.203*			

*Note: p-values from independent sample t-tests; *p < .0167, the adjusted critical p-value*

diagnoses, β = .26, p < .001, and more marked interruption in day-to-day routines, β = .27, p < .001. Similarly, higher *trauma-related scores* were associated with less gratitude, β = −.20, p <.001, f^2 =.05 (95% CI: .02 − .09), in addition to male gender, β = .10, p = .0096, previous mental health diagnoses, β = .19, p < .001, and more pronounced interruption in day-to-day activities, β = .33, p < .001. Effect sizes for gratitude were small-to-medium in these analyses. In sensitivity analyses, the multiple regression models were repeated using a composite index of mental health symptoms instead of the three separate measures, and results were not altered (β = −.22, p < .001).

Exploratory Analyses

Ancillary analyses examined the incremental validity of gratitude by additionally controlling for the effects of two other well-recognized personal resource variables: perceived social support and general religiousness, as well as pandemic-related and demographic factors. Gratitude remained a significant predictor in each model: $\beta = -.18$, $p < .001$ for depression difficulties, $\beta = -.11$, $p = .007$ for anxiety symptoms, and $\beta = -.15$, $p < .001$ for trauma problems. Finally, exploratory analyses tested whether the effects of gratitude on mental health outcomes might be moderated by the extent of pandemic-associated disruption in day-to-day routines. In each regression model, the interaction effects were non-significant: $b = -.02$, $p > .48$ for depression scores; $b = -04$, $p > .27$ for anxiety; $b = -.02$, $p > .31$ for trauma scores.

Discussion

This investigation sought to explore the role of gratitude among community residents confronting the myriad challenges of the COVID-19 pandemic. We evaluated gratitude during an especially unsettling period, when businesses were reopening but case rates were climbing. We focused on its relationship with pragmatic, clinically meaningful measures of distress, as assessed by widely-used screening instruments. Thus far, little is known about associations of trait gratitude with mental health symptoms among adult community residents during COVID-19 (Burke et al., 2020; Miragall et al., 2021) or during other situations of collective upheaval (Lies et al., 2014; Zhang et al., 2020), and available findings have been mixed. Information regarding mental health symptoms, as opposed to broader aspects of adjustment (e.g., negative affect, well-being), has more direct practical implications in view of its importance to clinicians and policy makers. Furthermore, little work has focused on medically underserved southern rural regions of the U.S., where medical and mental health burdens are high and access to primary care remains limited relative to other areas of the country (United Health Foundation, 2021). Consistent with theoretical frameworks (e.g., McCullough et al., 2002; Wood et al., 2010), in the current study gratitude was related to lower levels of mental health difficulties on each of the three indices we examined: symptoms of depression, anxiety, and trauma. These relationships remained significant after accounting for a broad array of pandemic-related burdens and demographic characteristics. Moreover, these associations could not be accounted for by two other conceptually important resource variables – perceived social support and general religiousness – supporting theoretical postulates regarding the unique effects of gratitude (McCullough et al., 2002). Findings were cross-sectional and do not allow for causal interpretations, but they seem consistent with expectations that the capacity to recognize and appreciate good things in life might perhaps have adaptive value in response to communal crises.

In the current study, trait gratitude was related to diminished mental health symptoms regardless of the level of disruption in daily life that individuals experienced as a result of the pandemic. We found no indications of moderator effects, suggesting that gratitude might serve as a general resource even for those who experience fewer stressful changes in daily routines and responsibilities. Future research may offer opportunities to further examine gratitude's potential buffering effects in the midst of a public health crisis (e.g., possible interactions with viral infection, perceived threat, job loss).

Several cognitive, emotional, and social processes exist through which gratitude might, theoretically, contribute to diminished mental health difficulties in response to communal crises. Some writers (e.g., Wood et al., 2008) have posited that gratitude may help ameliorate a "depressogenic" cognitive style, which encompasses reflexively negative interpretations about the self, the world, and the future, and instead may support a more balanced or dialectical accommodation of life's inevitable limitations (Jans-Beken, 2021). Moreover, some investigations have noted that gratitude was associated with diminished self-criticism and greater self-assurance (Petrocchi & Couyoumdjian, 2016), enhanced coping via proactive strategies and cognitive reframing (Lambert et al., 2012), and increased investment in meaningful goals (Otto et al., 2016), each of which might foster better adjustment. Consistent with the broaden-and-build model (Fredrickson, 2004), positive emotions such as gratitude may also help extend the focus of attention beyond an exclusive preoccupation with worry and loss, and widen an individual's typical cognitive and behavioral repertoires to promote more adaptive, flexible, and creative responses. Additionally, gratitude has been associated with higher levels of social support (Feng & Yin, 2021; Sherman et al. 2020; Wood et al., 2008). Notably, in the current investigation, the effects of gratitude could not be accounted for by perceived emotional support. Nonetheless, other relational processes (e.g., increased instrumental support, diminished social constraints, greater responsiveness), as well as cognitive, emotional, and coping factors, represent

viable pathways through which gratitude might reduce mental health symptoms in the context of public health crises, and further research would shed light on these possibilities.

Several other areas would be helpful to pursue in future investigations. The current study employed a widely used self-report measure of gratitude to ensure comparability with other studies, but it would be useful to supplement this approach with data derived concurrently from daily experience sampling (Jiang, 2021) or qualitative interviews. Along similar lines, it would be fruitful to extend the inquiry from generalized or dispositional gratitude to also include situationally specific aspects of appreciation (i.e., particular facets of the pandemic experience for which one is thankful; Burke et al., 2020; Nyugen & Gordon, 2022), and to evaluate behavioral expressions (i.e., what one does to convey gratitude) rather than only cognitive and affective responses (Bernabe-Valero et al., 2021; O'Connell et al., 2017). The current investigation focused on associations of gratitude with clinically salient mental health symptoms, which have received limited attention; further research is needed regarding other pertinent outcomes, including both negative endpoints (e.g., reduced vaccine uptake) and positive ones (e.g., prosocial behaviors, perceived benefits) – work in these areas is beginning (e.g., Nelson-Coffey et al., 2021; Syropoulos & Markowitz, 2021; Tong & Oh, 2021). Of course, distressing or tragic events may sometimes lead to increased levels of gratitude, as individuals are left "sadder but wiser" – both shaken and appreciative. Prospective designs (involving pre-event data collection), though challenging to implement, would be especially helpful in future disaster research, to trace the potential co-occurrence and dynamic interplay of these experiences over time (Jans-Beken, 2021). Finally, it would be helpful to further examine the effects of gratitude interventions, within the wider tapestry of support services available to assist individuals in coping with the demands of the pandemic. In the broader literature, meta-analyses generally have not found strong evidence for the efficacy of various gratitude interventions in improving well-being (e.g., Cregg & Cheavens, 2021; Davis et al., 2016), but little is known about potential benefits within the context of a major public health disaster. A few preliminary studies have begun to evaluate gratitude interventions in response to the pandemic (e.g., Fekete & Deichert, 2022; Oliveira et al., 2021; Ko et al., 2021; Wasil et al., 2021). As these interesting initiatives are further developed, an element of caution may be appropriate to ensure that the burdens of COVID-19 experienced by participants are not compounded by a perceived burden to feel grateful as well.

Strengths and Limitations

This study sought to address important gaps in the literature by focusing on associations of gratitude with clinically relevant endpoints assessed using well-validated measures, in a rural region of the country that has been understudied. Analyses controlled for a broad array of pandemic-related and demographic factors. Notable limitations of the investigation include the cross-sectional design, which offers no information about temporal or causal relationships. There is a need for longitudinal research to evaluate these relationships over the complex trajectory of the pandemic. The hypotheses tested in this study were pre-planned but represented a secondary analysis as part of a larger project (which focused on associations of adjustment with pandemic-related factors and religious/ meaning resources), so findings should be interpreted with caution. Self-report screening measures do not offer diagnoses, for which structured interviews are needed. The survey response rate was modest, though fairly typical of online community surveys (Sinclair et al., 2012), and the sample was not representative of the state population, notwithstanding the diverse background of participants. Further research would be helpful among individuals with more limited education, and those from racial/ethnic minority groups that are at heightened risk from COVID-19.

Conclusion, Implications and Future Directions

A disposition to identify and appreciate benefits in life was related to lower levels of mental health difficulties among community residents in a medically underserved, rural southern area of the US, confronted by the multiple demands of the COVID-19 pandemic. The results offer novel information about relationships between gratitude and mental health functioning during a major public health crisis, and set the stage for longitudinal studies. Gratitude might be a valuable resource during periods of collective upheaval, assisting individuals to weather disruptive changes. Helpful directions for future research might include efforts to further explore situational as opposed to dispositional aspects of gratitude in response to community crises, to better differentiate effects of behavioral expression vs. affective and reflective dimensions, and to further probe some of the multiple pathways potentially linking gratitude to enhanced adaptation.

Author contributions

Allen C. SHERMAN: conceptualization, design, methodology, funding acquisition, investigation, data management, formal analysis, interpretation, writing original draft.
John M. SALSMAN: conceptualization, design, methodology, interpretation, writing review and editing.
Crystal L. PARK: conceptualization, design, methodology, interpretation, writing review and editing.
Erick L. MESSIAS: conceptualization, design, methodology, interpretation, writing review and editing.
Mark L. WILLIAMS: conceptualization, design, methodology, interpretation, writing review and editing.
Benjamin C. AMICK: conceptualization, design, methodology, interpretation, writing review and editing.
Teresa J. HUDSON: conceptualization, design, methodology, interpretation, writing review and editing.
Stephanie SIMONTON-ATCHLEY: conceptualization, design, methodology, interpretation, writing review and editing.
All authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
The study was reviewed and approved by the University of Arkansas for Medical Sciences Institutional Review Board with a waiver of written documentation of consent. An information form was used to inform potential participants about study procedures and confidentiality.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

ORCID

Allen C. SHERMAN   (iD)   https://orcid.org/0000-0001-5457-1659
John M. SALSMAN   (iD)   https://orcid.org/0000-0003-2317-4006
Crystal L. PARK   (iD)   https://orcid.org/0000-0001-6572-7321
Erick L. MESSIAS   (iD)   https://orcid.org/0000-0002-0717-1166
Mark L. WILLIAMS   (iD)   https://orcid.org/0000-0002-4227-761X
Benjamin C. AMICK   (iD)   http://orcid.org/0000-0003-3468-9451

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