



Adjustment to the COVID-19 pandemic: associations with global and situational meaning

Allen C. Sherman¹ · Mark L. Williams² · Benjamin C. Amick³ · Teresa J. Hudson⁴ · Erick L. Messias^{5,6} · Stephanie Simonton-Atchley¹

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Abstract

COVID-19 has created pervasive upheaval and uncertainty in communities around the world. This investigation evaluated associations between discrete dimensions of personal meaning and psychological adjustment to the pandemic among community residents in a southern US state. In this cross-sectional study, 544 respondents were assessed during a period of reopening but accelerating infection rates. Validated measures were used to evaluate theoretically distinct dimensions of perceived global meaning (Meaning-in-Life Questionnaire) and pandemic-specific meaning (Meaning in Illness Scale). Adjustment outcomes included perceived stress, pandemic-related helplessness, and acceptance of the pandemic. In multivariate models that controlled for demographic and pandemic-related factors, stronger attained global meaning (i.e., perceptions that life is generally meaningful) and attained situational meaning (i.e., perceptions that the pandemic experience was comprehensible) were related to better adjustment on all three outcomes (all p 's < .001). In contrast, seeking situational meaning (i.e., ongoing efforts to find coherence in the situation) was associated with poorer adjustment on all indices (all p 's < .001). Results offer novel information regarding theoretically salient dimensions of meaning, which may have direct relevance for understanding how community residents adapt to the challenges of a major public health crisis.

Keywords COVID-19 · Adjustment · Global meaning · Situational meaning · Stress

✉ Allen C. Sherman
ShermanAllenC@uams.edu

¹ Behavioral Medicine Division, University of Arkansas for Medical Sciences, #756, 4301 W. Markham Street, Little Rock, AR 72205, USA

² Department of Health Promotion and Disease Prevention, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, Little Rock, AR, USA

³ Department of Epidemiology, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, Little Rock, AR, USA

⁴ Center for Health Services Research, Department of Psychiatry, University of Arkansas for Medical Sciences, Little Rock, AR, USA

⁵ Faculty Affairs and Department of Psychiatry, College of Medicine, University of Arkansas for Medical Sciences, Little Rock, AR, USA

⁶ Present Address: Department of Psychiatry and Behavioral Neurosciences, Saint Louis University, St. Louis, MO, USA

Introduction

The COVID-19 pandemic has disrupted multiple spheres of day-to-day life for individuals around the globe. In the United States, the healthcare system has been challenged by strained medical capacity, limited contact tracing, and alterations in routine medical care. Widespread economic impacts resulted in jolting unemployment rates and increased financial hardships. Social and recreational activities were upended, and daily routines were dislodged.

Findings from a number of studies conducted around the world have documented an array of psychosocial difficulties among community residents in the context of the pandemic (Alkhamees et al., 2020; Fisher et al., 2021; Liu et al., 2020; Qiu et al., 2020; Pierce et al., 2020; Salari et al., 2020; Tee et al., 2020; Tull et al., 2020; Xiong et al., 2020), and a recent meta-analytic review suggested small but significant increases in levels of anxiety and depression (Prati & Mancini, 2021). Many individuals have struggled with heightened stress and uncertainty, perceptions of limited control or helplessness, and difficulties accommodating the

myriad disruptions imposed by the pandemic (Brailovskaia & Margraf, 2020; Salari et al., 2020; Venuleo et al., 2020; Xiong et al., 2020).

Adaptation to adversity differs widely across individuals; thus identifying factors associated with risk or resilience is a significant concern. A psychological resource variable that has drawn growing attention involves perceptions of personal meaning (George & Park, 2016; Heintzelman & King, 2014; Martela & Steger, 2016). A jarring, life-altering experience such as a global pandemic may fracture important goals or challenge perceptions that life is comprehensible and predictable. Theorists in this area refer to “global meaning” as a general orienting system that encompasses a set of core assumptions about life and hierarchically-ordered personal goals, as well as subjective perceptions of coherence, purpose, and significance (Martela & Steger, 2016; Park, 2010; Reker & Wong, 1988). Across diverse populations, a sizable literature suggests that stronger indices of global meaning are related to improved psychological well-being during the course of daily life (Li et al., 2020; Park et al., 2020; Steger et al., 2009b; Yek et al., 2017), and after personal crises such as severe illness or trauma (Currier et al., 2009; Fischer et al., 2020; Sherman & Simonton, 2012; Sherman et al., 2010). In contrast, protracted searching for meaning (i.e., ongoing efforts to derive a stronger sense of meaning in life) has sometimes been associated with greater rumination and poorer adjustment (Li et al., 2020; Steger et al., 2009b; Yek et al., 2017). In the context of broader, collective crises such as a pandemic, the ability to preserve or restore a sense of global meaning similarly might be expected to enhance coping and diminish distress. Thus far, research on global meaning in response communal upheaval has been limited, and the evidence has been mixed. Stronger perceptions of meaning or purpose were tied to reduced distress or greater well-being in some studies (Chukwuorji et al., 2019; Park, 2016; Toussaint et al., 2017) but not others (Dursun et al., 2016; Lowe et al., 2013). Moreover, in the few studies that have assessed searching for meaning in life in the aftermath of community disasters, some investigators reported relationships with increased distress (e.g., Shannonhouse et al., 2019), whereas others found null or opposite effects (e.g., Chukwuorji et al., 2019; Dursun et al., 2016). The role of global meaning in response to public health crises remains an important area for further research.

Apart from generalized perceptions of meaning in life, more specific efforts to find meaning in the particular disruptive or disorienting situation may be important as well (Horowitz, 1991; Thompson & Janigian, 1988). Writers have distinguished between global meaning and “situational” meaning (i.e., appraisals of specific challenging circumstances) (Park, 2010). Jolting events that violate core expectations may prompt efforts to garner a clearer understanding of the distressing experience and its personal significance.

In particular, in response to the myriad uncertainties of a pandemic, individuals may use a number of strategies to help restore perceptions of order or comprehensibility in the situation (“sense-making”); these responses might include, among others, gathering copious health information about COVID-19, making causal attributions about the rapid dissemination of the virus, comparing themselves to others who are worse off, embracing a religious/spiritual explanatory framework for the disruption, actively deliberating about existential concerns, or pursuing service to others affected by the pandemic. Perceptions of global and situational meaning may have significant implications for adjustment to community health crises. We would expect that higher levels of attained global meaning and attained pandemic-specific meaning would each be associated with more favorable adaptation to COVID-19.

Writers have called for greater attention to the role of perceived meaning in adjustment to the pandemic among community residents (Castiglioni & Gaj, 2020; de Jong, et al., 2020; Van Tongeren & Van Tongeren, 2021; Waters et al., 2021), but as yet research has been limited. Initial studies of college students in Turkey (Arslan et al., 2020) and the general public in central Europe (Schnell & Krampe, 2020; Trzebiński et al., 2020) reported that higher levels of global meaning were related to lower levels of distress and greater well-being. These pioneering investigations offer an important foundation, but questions might be raised about potential confounding of measures of meaning with indices of well-being (e.g., items regarding fear of the future, fulfillment in life, etc.). Moreover, there has been limited research regarding situational meaning, and we are aware of no quantitative studies that have focused specifically on perceptions of coherence or “sense-making” among community residents confronted by the pandemic. Clearly, there is a need for additional research regarding both global and situational meaning among members of the community at large as they struggle with the myriad demands of the pandemic.

The current study evaluated relationships between conceptually-distinct dimensions of personal meaning and psychosocial adjustment to COVID-19 among community residents in a southern U.S. state. Geographic regions across the United States have varied widely in infection rates and local government mitigation efforts; this investigation examined responses among residents in Arkansas during an earlier period of phased reopening, when case rates were climbing appreciably (Centers for Disease Control and Prevention, 2020). Thus far few studies have focused on southern rural regions, though these have been regarded as a priority area for research (Holmes et al., 2020). The current investigation evaluated both negative and positive aspects of adjustment, including (1) general perceived stress, (2) helplessness in response to the pandemic, and (3) acceptance. We sought to test several hypotheses, drawing on prior theoretical

work (e.g., Martela & Steger, 2016; Park, 2010; Thompson & Janigian, 1988). First, we expected that greater found global meaning (as reflected in generalized perceptions that life is meaningful) would be associated with more favorable adjustment, after controlling for relevant pandemic-related and demographic factors. Conversely, we anticipated that greater searching for global meaning might be related to worse adjustment outcomes. Second, we hypothesized that greater found situational meaning (i.e., sense-making) would be associated with more favorable adjustment, and that greater seeking situational meaning (i.e., sense-seeking) would be related to poorer outcomes, after adjusting for pandemic-related and demographic factors. Furthermore, we anticipated that found and seeking situational meaning would demonstrate incremental validity, contributing significantly to the prediction of concurrent adjustment even after accounting for the additional effects of found and seeking global meaning, which represents a stringent test of these relationships.

Methods

Participants

This investigation was a cross-sectional, registry-based study involving an online survey, administered to community residents in Arkansas (USA) regarding their experiences with COVID-19. The sample included 544 (32.5%) community residents who enrolled in the study and completed the meaning measures, out of 1672 individuals who had valid email addresses and were sent notifications about the project. Individuals who completed the survey were more likely to be white ($p=0.001$), female ($p=0.046$), and older ($p=0.001$) than those who did not. An additional 47 respondents completed adjustment measures but were missing meaning questionnaires (located later in the survey) and therefore were not included in the analysis; these respondents did not differ significantly from those included in the analysis on any demographic or pandemic-related variables (all p 's > 0.09).

Sample characteristics are listed in Table 1. Average age of participants was 51.47 (14.90) years (range = 18–92), and the sample was largely white (83.64%), female (76.84%) and well-educated (mean = 15.93 years). The adverse impact of the pandemic was felt keenly by participants. Twenty-two percent were struggling with job loss or reduced income as a result of COVID-19, and 13.97% were experiencing food insecurity. Reduced access to their routine medical care was a problem for many respondents (39.15%). A notable proportion (17.53%) were stringently sheltering at home (having supplies delivered and rarely leaving their residence), and almost all (89.52%) reported at least some level of disruption in their normal responsibilities and activities.

Materials

Psychological adjustment

Perceived stress was assessed by the 10-item Perceived Stress Scale (PSS; Cohen & Williamson, 1988), which evaluates perceptions of life as uncontrollable, unpredictable, and overloading (e.g., “felt nervous and stressed”). Items are answered on a 5-point Likert-type scale (0 = “never,” 4 = “very often”). The instrument has been widely used in clinical and epidemiological research and its psychometric properties are well established (Lee, 2012). Cronbach's alpha was 0.91 in this sample.

Psychosocial adjustment to the pandemic was measured using the 18-item Illness Cognitions Scale (ICS; Evers et al., 2001). We used two subscales assessing helplessness in response to illness (or threat of illness) and acceptance of the situation. Items were keyed to COVID-19 (e.g., “the pandemic controls my life;” “I have learned to live with this pandemic”). Participants respond to items on a 4-point Likert-type scale (1 = “not at all,” 4 = “a great deal”). The instrument has demonstrated evidence of internal consistency and construct validity in medical settings (Evers et al., 2001; Lauwerier et al., 2010). In the current sample, Cronbach's alpha was 0.81 for the helplessness scale and 0.88 for the acceptance scale.

Meaning variables

Global meaning was evaluated with the Meaning in Life scale (Steger et al., 2006), a widely used 10-item instrument that includes two subscales that assess presence of meaning (e.g., “I have a good sense of what makes my life meaningful”) and searching for meaning in life (e.g., “I am seeking a purpose or mission for my life”). Items are rated on a 7-point Likert scale (1 = “strongly disagree” to 7 = “strongly agree”). Evidence supports the internal consistency, factor structure, and convergent validity of this measure (Steger et al., 2006). In the current sample, Cronbach's alpha was 0.91 for found meaning and 0.92 for search.

Pandemic-specific meaning was assessed with the Meaning-in-Illness Scale (Sherman et al., 2013). The instrument includes two scales that evaluate seeking and found situational meaning, respectively, in response to stressful health conditions. The measure focuses on the perceived comprehensibility of the situation (i.e., sense-making and sense-seeking). Item content was intended to minimize confounding by well-being or negative affect. Items are rated on a 4-point Likert-type scale (1 = “not at all,” 4 = “great deal”), and were keyed to COVID-19. Each scale includes six subscales that assess (seeking or found) situationally-important information (e.g., “trying to learn as much as I can about the pandemic”), causal attributions (e.g., “trying

Table 1 Sample characteristics

Characteristic	N (%)	Mean (SD)
Age		51.47 (14.90)
Education (years)		15.93 (2.05)
Disruptions in daily life (log)		1.16 (.10)
Lack of social distancing (possible range 0–8)		3.95 (1.68)
Perceived stress (possible range 0–40)		13.84 (7.73)
Helplessness (possible range 6–24)		11.81 (3.61)
Acceptance (possible range 6–24)		16.90 (3.87)
Found global meaning (possible range 5–35)		26.13 (6.65)
Seeking global meaning (possible range 5–25)		19.60 (8.18)
Found situational meaning (possible range 24–96)		52.81 (12.30)
Seeking situational meaning (possible range 24–96)		46.62 (12.96)
Gender		
Male	126 (23.16)	
Female	418 (76.84)	
Race/ethnicity		
Majority	455 (83.64)	
Non-majority	89 (16.36)	
Income ($n = 540$)		
\$0–59,999	178 (32.96)	
\geq \$60,000	362 (67.04)	
Tested for coronavirus		
Not tested	498 (91.54)	
Results pending	7 (1.29)	
Negative	36 (6.62)	
Positive	3 (.55)	
Perceived exposure ^a	44 (8.10)	
Food insecurity	76 (13.97)	
Financial insecurity	60 (11.03)	
Reduced access medical care	216 (39.71)	
Loss of employment/income	118 (21.69)	
Stringent sheltering at home	95 (17.53)	
Illness/death of loved one	33 (6.07)	

^acoded as not aware of significant exposure vs. perception of significant or prolonged exposure in a social/community setting, work setting, home setting, or other setting

to understand why the pandemic happened”), positive religious framework (e.g., “thinking about whether this might be part of God’s plan”), downward social comparisons (e.g., “comparing myself to others who are worse off”), existential understanding (e.g., “wondering more about my mortality”), and purpose (“trying to find a sense of purpose as a result of this pandemic”). Items are summed to derive total found situational meaning and total seeking situational meaning scores, respectively. The instrument also includes separate subscales assessing seeking and having found a negative religious explanatory framework (e.g., “trying to figure out whether God is punishing me”), which are intended to be analyzed separately—these items capture important aspects of comprehensibility, but the associated effects generally differ from those of the other subscales and mixing them

together would obscure interpretations. The instrument has demonstrated good internal consistency and convergent and discriminant validity in medical settings (Sherman et al., 2013). In the present sample, Cronbach’s alpha was 0.89 for the total found situational meaning scale (with alphas of 0.83–0.98 for each subscale). Cronbach’s alpha was 0.92 for the total seeking situational scale (alpha = 0.84–0.94 for each subscale).

Violations of core assumptions were assessed by three items adapted from Cann et al. (2010) and Park et al. (2016), each rated on a 4-point scale (0 = “not at all,” 3 = “great deal”). The items inquired about the extent to which the pandemic undermined participants’ perceptions of fairness (i.e., “your sense that the things that happen to people are fair”), their perceptions of control (i.e., “the things that happen

to people are controllable”), and their assumptions about the future (“your expectations for the future”). We used the mean of the three items; Cronbach’s alpha was 0.72.

Demographic and pandemic-related variables

The survey included items regarding demographic characteristics (e.g., age, education, prior mental health diagnoses, etc.; see Table 1). For the analyses, age and years of education were coded as continuous variables, race/ethnicity was coded as majority (white) vs. non-majority (all others), and family income was coded as bottom vs. top two tertiles. The survey also assessed a number of important pandemic-related burdens. COVID-19 testing was evaluated using an item adapted from the University of Southern California (2020) Understanding America Study (UAS) Coronavirus Tracking Survey, and perceived viral exposure was assessed using an item adapted from the Australian Treatment Outcome Study (ATOS) 18–20 Year Follow-up study (Marel et al., 2020; see Table 1). Food insecurity (e.g., “worried that you would run out of food”) was assessed using three items, and financial insecurity (e.g., missed or delayed payment of rent/mortgage) was evaluated using two items adapted from the UAS; these items were coded for analysis as 0 = no or not sure, 1 = yes. Absence of social distancing practices (e.g., “attended a gathering with more than 10 people”) was assessed using nine items adapted from the UAS; items were coded for analysis as 0 = no or not sure, 1 = yes, and summed to create a total score.

Disruptions in daily life due to the pandemic were assessed using seven items created by the authors (e.g., “trouble arranging for childcare,” “trouble staying involved with family/friends”); these items were rated on a 4-point Likert scale and summed to derive a total score (coefficient alpha = 0.73). Other items inquired about the impact of the pandemic on access to usual medical care (coded for the analysis as 0 = no or not sure, 1 = yes), effects on employment (coded 0 = no change, 1 = loss of income, job, or business), illness or loss of loved ones due to COVID-19 (coded as 0 = no, 1 = illness or death), and sheltering at home (coded 0 = leave home at least several times per week, 1 = shelter at home, supplies are delivered and almost never leave the residence).

Procedures

The survey was available during a one month interval (May 22nd to June 24th 2020), which represented a period of progressive reopening in the state (phase 1 and early phase 2) but mounting rates of viral infection (e.g., 242% increase in 7-day average case rates in this period; Johns Hopkins Coronavirus Resource Center, 2021; Centers for Disease Control and Prevention, 2020). The state regulations implemented

during this important interval involved reopening of dine-in service in restaurants (one-third capacity during phase 1 and two-thirds during phase 2), along with reopening of fitness centers, hair salons, massage parlors, movie theaters and sports venues with audiences of fewer than 50. A separate report summarizes mental health outcomes and pandemic-related risk-factors (Sherman et al., 2020). The current study focused on relationships between dimensions of personal meaning and adjustment to the crisis. We emailed an invitation with a link to the online survey to participants in the Translational Research Center’s ARresearch registry at University of Arkansas for Medical Sciences (UAMS). The registry includes individuals who have expressed interest in research participation; its membership is diverse regarding socioeconomic status and rural vs. urban geographical distribution within the state. Eligible participants were 18 years old or older, resided in the state, and were listed in the registry as healthy community residents (as opposed to classification under a specific chronic illness). We used REDCap, a secure web application for online research (Harris et al., 2009), to administer the survey.

Ethics Approval

The procedures used in this study adhered to the tenets of the 1964 Declaration of Helsinki and its later addenda. The protocol was approved by the UAMS 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 Analysis

Initial bivariate analyses were conducted using correlations for continuous variables and t-tests for categorical variables to assess demographic and pandemic-related factors that were associated with the three adjustment variables (i.e., perceived stress, pandemic-related helplessness, and acceptance). Significant variables were included as covariates in the main analyses. A log transformation was used for the disruption in daily life variable and the helplessness variable to address their non-normal distributions (skewness for the transformed variables = 0.37 for disruption and 0.09 for helplessness).

In the primary analyses, multiple regression was used to model associations of found and seeking *global meaning* with each adjustment outcome, after controlling for pandemic-related and demographic factors that were significant in bivariate analyses (study hypotheses #1). Separate models were run for each adjustment measure, as these negative and positive outcomes are conceptually distinct from each other and were only moderately correlated (r 's = 0.39 to 0.54). The set of control variables was allowed to differ across the

multivariable models since, not surprisingly, the three outcomes differed somewhat in their relationships with background demographic and pandemic-related factors. Next, a series of multiple regression analyses examined associations of found and seeking *situational meaning* with each of the adjustment outcomes, controlling for significant pandemic-related and demographic variables (study hypotheses #2). To evaluate the incremental validity of our situational meaning constructs (i.e., beyond the effects of global meaning), the analyses were repeated after additionally controlling for found and seeking global meaning. The critical p -value was set at < 0.0167 (i.e., 3 adjustment variables divided by 0.05) to adjust for multiple comparisons. (Conservatively assuming a sample of 500 participants, the study was adequately powered (> 0.98) to support regression analyses with 2 predictor variables accounting for as little as 5% of the variance and as many as 10 covariates accounting for as little as 5% of the variance, at the adjusted p -value of 0.0167.)

A number of exploratory analyses were conducted to further illuminate these relationships. First, if the total score for found or seeking situational meaning was significant in the main analyses, then subsidiary multiple regression analyses were conducted to evaluate which specific dimensions of situational meaning (i.e., which subscales) contributed most to the adjustment indices. These analyses included subscale scores that were significant in bivariate analyses, and adjusted for significant demographic and pandemic-related factors.

Additionally, though not a main focus of this paper, we conducted a set of exploratory moderator analyses. A global health disaster might be expected to violate core goals or beliefs about life, contributing to heightened distress (Park, 2010). However, it is possible that individuals who are able to sustain a high level of global meaning (i.e., perceptions that life is generally meaningful) may be buffered from the adverse effects of these perceived violations, presumably because they have preserved a broader sense of coherence and purpose in other areas of life despite challenges to important expectations. Preliminary analyses examined whether violated beliefs were related to worse adjustment outcomes. Then we tested potential statistical interactions between found global meaning and violated beliefs (after centering these variables), to determine whether found global meaning buffered the adverse effects on adjustment of more severely violated beliefs. Separate regression models were tested to predict each adjustment measure. This set of exploratory analyses was then replicated using the centered situational meaning variable (total score) instead of global meaning, examining potential interactions between found situational meaning and violated beliefs. Finally, since some previous studies have noted interactions between searching for and found global meaning in predicting adjustment (Park et al., 2010; Steger et al., 2009a; Yek et al., 2017),

we tested for these interactions (after centering these variables) in separate models for each outcome. We also checked for interactions between seeking and found situational meaning. Results of ancillary analyses were regarded as impressionistic.

Results

Associations of global meaning with adjustment

Preliminary bivariate analyses indicated that each of the three adjustment measures (i.e., greater stress, greater helplessness, less acceptance) was significantly related to female gender (all p 's < 0.002), lower income (all p 's ≤ 0.013), greater food insecurity (all p 's < 0.001), reduced access to medical care (all p 's < 0.008), and greater disruption in daily life due to the pandemic (all p 's < 0.001). Additionally, greater stress and lower acceptance were related to younger age (all p 's ≤ 0.003) and minority ethnic background (all p 's ≤ 0.006). Greater stress was also associated with a prior history of mental health difficulties ($p < 0.0001$), loss of work or income ($p < 0.003$), and greater financial insecurity ($p < 0.0001$). Finally, greater acceptance was tied to higher education ($p < 0.004$). The primary analyses controlled for these covariates. Adjustment indices were not related to marital status, perceived viral exposure, loss or illness of loved ones due to the pandemic, or social distancing behaviors (all p 's ≥ 0.051).

Correlations among the meaning variables were checked to confirm their discriminant validity. There was only a moderate correlation between found global and found situational meaning ($r = 0.31$, $p < 0.001$), and between seeking global and seeking situational meaning ($r = 0.33$, $p = 0.001$), suggesting that pandemic-specific meaning can be readily differentiated from global meaning. Similarly, there were modest correlations between seeking and found global meaning ($r = -0.25$, $p = 0.001$) and between seeking and found situational meaning ($r = 0.30$, $p = 0.001$), affirming conceptual distinctions between attained meaning and the process of searching for it. Table 2 lists correlations of the found global and situational meaning variables with the adjustment measures, and Table 3 lists the correlations of the seeking meaning measures with adjustment.

In the primary multivariable analyses, which controlled for significant pandemic-related and demographic variables, greater found global meaning was related to more favorable adjustment on all three indices, as anticipated (hypothesis #1): lower levels of perceived stress ($\beta = -0.29$, $p < 0.001$), reduced pandemic-related helplessness ($\beta = -0.16$, $p < 0.001$), and greater acceptance ($\beta = 0.25$, $p < 0.001$; see Table 4). In contrast, seeking global meaning was related to lower acceptance ($\beta = -0.10$, $p = 0.015$). It was not related to

Table 2 Correlations of found global and situational meaning variables with adjustment to COVID-19

	Found global meaning	Found situational meaning	Found situational information	Found situational cause	Found situational social comp	Found situational existential	Found situational purpose	Found situational pos relig	Found situational neg relig
General stress	-.38*	-.13*	-.14*	-.09	-.03	-.16*	-.03	.02	.13*
Helplessness (log)	-.20*	-.06	-.12*	-.09	.02	-.05	.03	.01	.04
Acceptance	.30*	.32*	.20*	.25*	.21*	.26*	.11*	.06	-.04

Cause Causal attributions; *Social comp* Social comparisons; *Existential* Existential understanding; *Pos relig* Positive religious framework; *Neg relig* Negative religious framework; log transformations were used for positive and negative religious framework; * $p < .0167$

Table 3 Correlations of seeking global and situational meaning variables with adjustment to COVID-19

	Seeking global meaning	Seeking situational meaning	Seeking situational information	Seeking situational cause	Seeking situational social comp	Seeking situational existential	Seeking situational-purpose	Seeking situational pos relig	Seeking situational neg relig
General stress	.30*	.24*	.06	.10	.22*	.29*	.22*	.13*	.20*
Helplessness (log)	.22*	.28*	.17*	.20*	.19*	.27*	.20*	.14*	.20*
Acceptance	-.24*	-.11*	.00	-.12*	-.05	-.14*	-.09	-.05	-.11*

Cause Causal attributions; *Social comp* Social comparisons; *Existential* Existential understanding; *Pos relig* Positive religious framework; *Neg relig* Negative religious framework; log transformations were used for positive and negative religious framework; * $p < .0167$

any of the other outcomes (all p 's ≥ 0.0167) but there was a non-significant trend toward greater helplessness ($\beta = 0.09$, $p = 0.017$).¹

Associations of situational meaning with adjustment

Also as anticipated, multiple regression analyses indicated that found situational meaning (total score) was significantly associated with better adaptation on all three outcomes, after controlling for pandemic-related and demographic factors (hypothesis #2): lower perceived stress ($\beta = -0.18$, $p < 0.001$), reduced helplessness ($\beta = -0.16$, $p < 0.001$), and greater acceptance ($\beta = 0.36$, $p < 0.001$; see Table 5). Conversely, seeking situational meaning (total score) was related to poorer outcomes: greater perceived stress ($\beta = 0.19$, $p < 0.001$), greater helplessness ($\beta = 0.20$, $p < 0.001$), and lower acceptance ($\beta = -0.12$, $p = 0.006$; Table 5).¹

To further examine the incremental validity of situational (found and seeking) meaning, the multivariable analyses

were repeated after additionally adjusting for the effects of global meaning, as well as demographic/pandemic factors. In these more stringent analyses, found situational meaning remained significantly related to all three adjustment indices: lower perceived stress ($\beta = -0.09$, $p = 0.012$), reduced helplessness ($\beta = -0.11$, $p = 0.005$), and greater acceptance ($\beta = 0.30$, $p < 0.001$). Seeking situational meaning remained associated with two adjustment outcomes: greater stress ($\beta = 0.16$, $p < 0.001$) and greater helplessness ($\beta = 0.18$, $p < 0.001$). It was no longer tied to acceptance ($p = 0.13$).

Exploratory analyses

To examine which aspects of situational meaning contributed most to levels of adjustment, the multiple regression analyses were repeated using subscale scores that were significant in bivariate analyses, instead of total scores. (We evaluated effects of found and seeking situational meaning separately to limit the number of covariates in the regression models.) A greater sense of having found relevant information (i.e., possessing sufficient information about the pandemic; $\beta = -0.10$, $p = 0.006$), greater found existential understanding (i.e., feeling more reconciled to the cycle of life and death; $\beta = -0.12$, $p = 0.002$), and a more limited negative religious explanatory framework (i.e., less conviction that the pandemic is God's punishment; $\beta = 0.11$, $p = 0.003$) were each uniquely related to lower levels of perceived

¹ Each of the primary multivariable analyses was repeated using a common set of covariates instead of allowing control variables to vary with each of the 3 outcome measures. Results were unchanged, except that in the model predicting helplessness from global searching for and found meaning, the effect of searching for global meaning changed from marginally significant to significant ($\beta = .10$, $p = .008$).

Table 4 Multiple regression predicting adjustment to COVID-19 from global meaning variables

Predictors	B	SE	β	F	Adjusted R^2	p
<i>General stress^a</i>				30.26	.39	< .0001
Age	-.102	.018	-.196*			
Gender	1.408	.630	.077			
Race/ethnicity	-.293	.755	-.014			
Family income	-.608	.588	-.037			
Prior mental health diagnosis	2.949	.558	.190*			
Loss of job/income	-.326	.653	-.017			
Food insecurity	.349	.849	.016			
Financial insecurity	1.367	.922	.056			
Reduced access to medical care	.100	.567	.006			
Disruption in daily life (log)	21.426	2.868	.281*			
Found global meaning	-.340	.041	-.293*			
Seeking global meaning	.080	.034	.085			
<i>Pandemic-related helplessness (log)^a</i>				33.60	.30	< .0001
Gender	.020	.011	.064			
Family income	-.011	.010	-.041			
Reduced access to medical care	.004	.010	.017			
Food insecurity	-.014	.015	-.038			
Disruption in daily life (log)	.614	.051	.483*			
Found global meaning	-.003	.001	-.164*			
Seeking global meaning	.001	.001	.092			
<i>Pandemic-related acceptance^a</i>				15.21	.21	.0001
Age	.005	.010	.021			
Education	.105	.077	.056			
Gender	-1.042	.359	-.114*			
Race/ethnicity	.430	.424	.041			
Family income	.270	.346	.033			
Reduced access to medical care	-.110	.322	-.014			
Food insecurity	-.242	.471	-.022			
Disruption in daily life (log)	-9.764	1.633	-.256*			
Found global meaning	.146	.024	.252*			
Seeking global meaning	-.048	.020	-.101			

* $p < .0167$; ^adependent variables are italicized

Race/ethnicity coded for analysis non-majority vs. majority; family income coded < \$60,000 vs. \geq \$60,000; prior mental health diagnosis, loss of job/income due to pandemic, reduced access to medical care due to pandemic, food insecurity, and financial insecurity each coded no/not sure vs. yes,

stress. Furthermore, greater found information ($\beta = -0.11$, $p = 0.003$) was associated with less pandemic-related helplessness, and greater found existential understanding ($\beta = 0.17$, $p < 0.001$) was related to greater acceptance. On the other hand, several subscales evaluating seeking situational meaning were related to worse adjustment. Greater efforts to seek existential understanding in response to the pandemic ($\beta = 0.12$, $p = 0.006$) were related to increased stress. Moreover, greater search for existential understanding ($\beta = 0.11$, $p = 0.012$) and greater search for a negative religious explanatory framework ($\beta = 0.11$, $p = 0.012$) were related to increased helplessness. None of the remaining situational meaning subscales included in the multivariable

models were independently related to the adjustment indices (all p 's > 0.017).

An additional set of exploratory analyses checked for moderator effects, by evaluating potential interactions between meaning variables and violation of core beliefs due to the pandemic. As expected, preliminary bivariate analyses indicated that greater violation of beliefs was correlated with poorer adjustment: increased stress ($r = 0.33$, $p > 0.001$), increased helplessness ($r = 0.36$, $p > 0.001$), and lower acceptance ($r = -0.31$, $p = 0.001$). Subsequently, we examined whether (centered) found global meaning moderated the adverse effects of (centered) violated beliefs on adjustment measures, after controlling for demographic and

Table 5 Multiple regression predicting adjustment to COVID-19 from situational meaning variables

Predictors	B	SE	β	<i>F</i>	Adjusted <i>R</i> ²	<i>p</i>
<i>General stress</i> ^a				24.39	.34	.0001
Age	-.126	.019	-.242*			
Gender	1.157	.661	.063			
Race/ethnicity	.586	.791	.028			
Family income	-1.495	.609	-.091			
Prior mental health diagnosis	3.457	.577	.223*			
Loss of job/income	.066	.678	.004			
Food insecurity	-.035	.893	-.002			
Financial insecurity	1.217	.963	.050			
Reduced access to medical care	.278	.588	.018			
Disruption in daily life (log)	19.233	3.045	.253*			
Found situational meaning	-.116	.023	-.184*			
Seeking situational meaning	.115	.024	.193			
<i>Pandemic-related helplessness (log)</i> ^a				34.02	.30	.0001
Gender	.015	.011	.049			
Family income	-.021	.010	-.076			
Reduced access to medical care	.006	.010	.022			
Food insecurity	-.022	.015	-.059			
Disruption in daily life (log)	.586	.052	.460*			
Found situational meaning	-.002	.000	-.161*			
Seeking situational meaning	.002	.000	.203*			
<i>Pandemic-related acceptance</i> ^a				18.24	.24	.0001
Age	.013	.010	.049			
Education	.131	.075	.069			
Gender	-.901	.354	-.098			
Race/ethnicity	.023	.416	.002			
Family income	.533	.336	.065			
Reduced access to medical care	-.177	.314	-.022			
Food insecurity	-.198	.466	-.018			
Disruption in daily life (log) -	10.458	1.628	-.274*			
Found situational meaning	.113	.013	.359*			
Seeking situational meaning	-.035	.013	-.117*			

* $p < .0167$; ^adependent variables are italicized

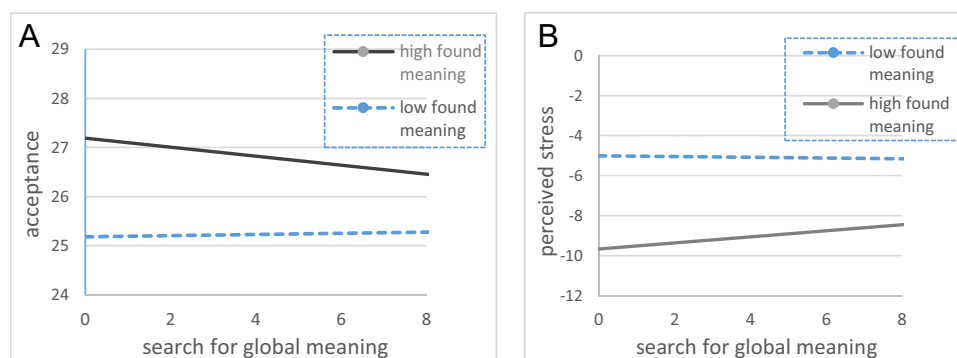
Race/ethnicity coded for analysis non-majority vs. majority; family income coded $< \$60,000$ vs. $\geq \$60,000$; prior mental health diagnosis, loss of job/income due to pandemic, reduced access to medical care due to pandemic, food insecurity, and financial insecurity each coded no/not sure vs. yes,

pandemic factors. In these multivariable analyses, none of the interactions between found global meaning and violations were significant for any of the adjustment measures (all p 's ≥ 0.17). Similarly, none of the interactions between found situational meaning (total score) and violated beliefs were significant (all p 's ≥ 0.04).

A final set of exploratory analyses tested for interactions between (centered) searching for and found global meaning in predicting each adjustment outcome. There was a significant interaction for perceived stress ($b = 0.013$, $p = 0.003$). Simple slopes analysis indicated that at low levels of global meaning (1 SD below the mean), stress was relatively high regardless of the level of searching, whereas at high levels of global meaning (1 SD above the

mean), stress was less pronounced, but increased somewhat with greater searching (see Fig. 1A). There was also a significant interaction for acceptance of the pandemic ($b = -0.008$, $p = 0.002$). Simple slopes analysis suggested the same pattern, with poorer acceptance at low levels of global meaning (-1 SD) regardless of the level of searching, and greater acceptance at high levels of global meaning (+1 SD), but which diminished with greater searching (see Fig. 1B). Notably, the magnitude of these interaction effects was small ($R^2 = 0.02$). The interaction for helplessness was non-significant ($p = 0.13$). None of the interactions between seeking and found situational meaning were significant (all p 's ≥ 0.04).

Fig. 1 Interactions of searching for and found global meaning in relation to adjustment measures



Discussion

The COVID-19 pandemic has threatened the security of communities across the globe and created pervasive upheaval and uncertainty. In these extraordinary circumstances, questions of personal meaning seem especially relevant. The current study was an initial effort to evaluate discrete, theoretically important dimensions of meaning in the context of a global health crisis. We sought to examine whether adjustment to the demands of pandemic was more favorable for those able to sustain perceptions that life is generally meaningful and purposeful (an aspect of global meaning), or to derive a sense that the crisis is somehow coherent and comprehensible (an aspect of situational meaning). These relationships were assessed during an earlier period of reopening (spring 2020) in a southern region of the United States, when participants faced perplexing crosscurrents—increased access to businesses and facilities, as well as increased risk associated with accelerating infection rates. Notably, we sought to explore these questions using measures of personal meaning that were minimally confounded with well-being.

Consistent with theoretical formulations (e.g., Martela & Steger, 2016; Park, 2010), different facets of personal meaning were readily distinguished from each other, demonstrating only modest overlap. Results indicated that stronger attained global meaning and attained situational meaning were related to better adjustment across all three of the indices that were evaluated: general perceived stress, pandemic-related helplessness, and acceptance of the pandemic. These associations were cross-sectional, but consistent across different types of endpoints (negative and positive, generic and situational), and remained significant after accounting for the effects of a range of pandemic-related stressors and demographic characteristics. Conversely, as expected, searching for meaning in the pandemic was related to poorer adjustment. Findings regarding searching for general meaning in life were more limited; it was associated only with poorer acceptance of the pandemic in multivariable analyses.

Found meaning

Previous studies have indicated consistently that stronger *global meaning* is related to better mental health outcomes during ordinary life circumstances (Li et al., 2020; Sørensen et al., 2019; Steger et al., 2006), but findings derived from the midst of disaster have been more equivocal (Dursun et al., 2016; Feder et al., 2013; Lowe et al., 2013). Differences in the measures used, timing of the assessment, and nature of the community disaster make comparisons difficult. Initial investigations of responses to the COVID-19 pandemic in central Europe indicated that community residents who reported stronger global meaning experienced diminished distress (Schnell & Krampe, 2020; Trzebiński et al., 2020). The current study builds on these important investigations by examining the experience of individuals in the United States, employing a measure of global meaning that was not confounded with well-being, and carefully controlling for an array of pertinent covariates—results add to the evidence that global meaning is tied to more favorable adjustment among community members during a major health crisis.

Findings regarding the role of attained *situational meaning* or “sense-making” during a public health crisis represent a more novel contribution. A few previous studies have examined primary appraisals (e.g., perceived threats; Krok & Zarzycka, 2020) or causal attributions (e.g., ascribed responsibility for the event; Sezgin & Punamäki, 2012) in response to a communal disruption, but sense-making is usually construed more broadly and research in this area has been scarce. We are aware of only one prior quantitative study that specifically examined situational coherence or sense-making in response to a collective, socially-shared disaster. In the aftermath of the 9/11 terrorist attacks, individuals who found some way to make sense of the tragedy subsequently reported decreased posttraumatic stress symptoms relative to those who did not (Updegraff et al., 2008). The current investigation extends this work by examining responses to a global pandemic (a proximal health stressor that was interwoven into daily life) rather than a distal

terrorist attack; by using a multidimensional measure of sense-making rather than a single item; and by assessing several aspects of adjustment instead of one. Individuals who found a stronger sense of coherence or comprehensibility in the crisis reported better adaptation on all three indices, effects which persisted after accounting for associations with found global meaning. These results offer new evidence for the incremental validity of attained situational meaning, and suggest that sense-making may play a salient role in adaptation to the burdens of a communal health disaster.

The current study also offered an unusual opportunity to examine the particular dimensions of found situational meaning or sense-making that contributed most to adjustment. Participants with stronger perceptions that they had obtained relevant information about the crisis reported diminished levels of stress and pandemic-related helplessness. In a few previous studies, subjective appraisals of being well-informed about COVID-19 were similarly tied to lower distress (Alkhamees et al., 2020; Jungmann & Witthoft, 2020; Tee et al., 2020). Additionally, in the current study, a stronger sense of existential understanding (i.e., recognition and acceptance of mortality) was related to diminished stress and greater acceptance of the pandemic. Previous descriptive studies have observed that reflecting on the fragility or preciousness of life is among the important strategies that individuals use to find meaning after loss (e.g., Lichtenthal et al., 2013). The current study suggests that procuring adequate information in the midst of ambiguous and conflicting messages, and accepting mortality as part of the cycle of life, are among the types of found meaning that are related to better adjustment to a public health crisis. In future studies, it may be fruitful to further examine the role of these and other dimensions of found meaning (e.g., causal attributions, religious explanatory frameworks, renewed purpose) during the course of a communal disaster.

Seeking meaning

We did not find strong indications that *searching for general meaning* in life was related to our adjustment variables—significant effects emerged on one of three outcomes (poorer acceptance). Thus far, the few prior studies that have evaluated searching for global meaning in response to community disasters have offered mixed results (Chukwuorji et al., 2019; Dursun et al., 2016; Shannonhouse et al., 2019). It is possible that clearer effects might unfold over time and could not be captured adequately in this cross-sectional study, or that the nature of these effects vary across different types of individuals (e.g., those with greater curiosity or openness to experience; Cui et al., 2020) or different social contexts (e.g., those with a more collectivist orientation; Steger et al., 2008). Additional research may help clarify these possibilities.

As expected, however, *seeking situational meaning* (i.e., sense-seeking) was related to poorer adjustment on all three of our indices, even after accounting for pandemic-related and demographic factors. Furthermore, seeking situational meaning remained significantly related to two of these indices, general stress and pandemic-related helplessness, after additionally adjusting for the effects of seeking global meaning, again suggesting that this construct may contribute unique information and merits further empirical attention. This study is among the first to explore relationships between sense-seeking and adjustment to a public health crisis. However, a previous body of work that focused on personal crises (such as severe illness, bereavement, or trauma) similarly reported that individuals engaged in ongoing unsuccessful efforts to understand the situation often experienced poorer adjustment (e.g., Davis et al., 2000; Roberts et al., 2006), highlighting the unsettling nature of protracted attempts to find coherence in catastrophe. How these relationships might change over time is an important question that has received less scrutiny (e.g., Bonanno et al., 2004, Coleman & Neimeyer, 2010; Davis et al., 2000), particularly in response to a community crisis. Some individuals ultimately may find the understanding they seek, some may continue a troubled search with no resolution, and some may find that these concerns eventually become less pressing, perhaps eclipsed by discovering other types of situational meaning (e.g., unexpected benefits or “silver linings”) or by a greater tolerance for uncertainty. These diverse trajectories may differ in their relationships with mental health outcomes. Clearly, there is a need for further longitudinal research to explore changes in sense-seeking in response to communal health crises, and their associations with adjustment.

Ancillary analyses offered a closer look at some of the specific types of seeking situational meaning that were related to adjustment (see [Exploratory analysis](#) section). Efforts to understand the situation in terms of a negative religious explanatory framework (i.e., as punishment from God) were associated with greater helplessness. Notably, those who had developed a more definitive conviction about this explanation (i.e., having embraced a negative religious framework rather than tentatively searching for one) experienced poorer adjustment as well. Efforts to construe troubling circumstances as divine punishment have been tied to greater distress rather consistently in prior studies of individuals facing personal misfortune (Exline, 2013; Sherman et al., 2015) or community disasters (Feder et al., 2013; Ochu et al., 2018). It seems evident that some meaning-making strategies provide a measure of coherence, but not comfort. Additionally, seeking greater existential understanding (i.e., a struggle to come to terms with mortality in response to the pandemic) was related to increased stress and helplessness. This finding further underscores the potential importance of disconcerting, unresolved existential concerns

or mortality salience among individuals confronting a public health crisis (Cui et al., 2020; Pyszczynski et al., 2020).

In sum, different facets of personal meaning were related to relevant aspects of positive and negative adjustment in a manner consistent with theoretical models (Martela & Steger, 2016; Park, 2010; Reker & Wong, 1988; Thompson & Janigian, 1988). Results may have pragmatic clinical implications, in view of the elevated levels of mental health problems that have been documented around the world in response to the pandemic (Fisher et al., 2021; Liu et al., 2020; Pierce et al., 2020; Qiu et al., 2020; Salari et al., 2020; Tull et al., 2020), and the anticipated rise in demand for mental health services (Figueroa & Aguilera, 2020). A growing number of therapeutic interventions have been developed that focus explicitly on meaning-making strategies (e.g., Brietbart & Poppito, 2014; Voss et al., 2015; Wong, 2010), and some of these might be usefully adapted as part of the range of services offered to assist individuals in coping with the enduring disruptions of COVID-19 (Castiglioni & Gaj, 2020; de Jong et al., 2020).

Moderator effects

Though not a focus of the current study, potential moderator effects were examined in exploratory analyses. We assessed whether stronger attained global meaning, or stronger attained situational meaning, might buffer the adverse effects of violated core beliefs. As anticipated, individuals who perceived that the pandemic had violated their central beliefs (regarding fairness in life, control over circumstances, and future expectations) experienced poorer adjustment than those who more readily assimilated the situation into their existing worldviews. However, there were no indications that found global meaning, or found situational meaning, moderated these relationships. It is possible that our brief measure of violations was not sufficiently sensitive. Interestingly, a previous study reported that higher posttraumatic stress symptoms among college students were associated with an interaction of global meaning with violation of important life goals, but not with violation of beliefs (Appel et al., 2020). Additional investigations encompassing a broader range of personal goals and beliefs might yield further insight into these interactions.

We found a modest negative correlation ($r = -0.25$) between seeking and found global meaning in this investigation, but a modest positive correlation ($r = 0.30$) between seeking and found situational meaning. This seems reasonable on an intuitive level, in that individuals who had well established core beliefs and a strong sense that life was generally meaningful may have felt little impetus to search for further global meaning (as reflected in the negative correlation). On the other hand, in the midst of an acute and rapidly evolving community crisis, individuals who found

some coherence or understanding in the situation might still be actively seeking additional answers as circumstances unfolded (as reflected in the positive correlation). Previous studies have reported conflicting associations between seeking and found global meaning in general adult and student populations (e.g., Aftab et al., 2020; Chu & Fung, 2020; Hallford et al., 2018; Van der Heyden et al., 2015), and this remains an important area of inquiry.

Some previous investigations have reported interactions between searching for and found global meaning in predicting aspects of adjustment (e.g., Park et al., 2010; Steger et al., 2009a; Yek et al., 2017). In the current study, we found interaction effects for two of our outcomes, stress and acceptance; however, the magnitude of these effects was quite small. Individuals with low levels of found global meaning fared most poorly, regardless of how much they searched. In contrast, those with high levels of found global meaning had more favorable outcomes, but these indices declined somewhat if they were concurrently striving to find additional meaning in life. These results are generally consistent with the notion that a high level of global meaning may be tied to greater wellbeing, whereas a protracted search for global meaning may be a marker for poorer adjustment (see also Chu & Fung, 2020; Newman et al., 2018; Van der Heyden et al., 2015).

Study limitations and future directions

The current study provides novel information about adjustment to COVID-19 among community residents during an earlier period of reopening of businesses and facilities. It is among the first investigations to focus on the experience of residents in a southern region of the United States. It was intended to address a notable gap in the literature by evaluating conceptually discrete dimensions of personal meaning, encompassing both global and situational dimensions, as well as both seeking and found meaning in the context of a public health crisis. Among the significant limitations of the study are the cross-sectional design, which precludes interpretations regarding temporal or causal relationships. As noted, longitudinal investigations are needed to examine changes in these associations over the protracted course of the pandemic and recovery. We captured theoretically salient dimensions of meaning, but of course there was no pretense of assessing all aspects of these multidimensional constructs, the contours of which remain subject to evolution and debate. For example, the role of perceived significance or “mattering” (a component of global meaning) and benefit-finding (an element of situational meaning) were beyond the scope of the current study and merit separate attention, as does the use of meaning-focused coping strategies (e.g., Eisenbeck et al., 2021). We selected validated measures of meaning that were designed to minimize confounding with

distress or well-being. In future studies, however, it would be helpful to supplement these findings with rich data drawn from other assessment approaches, such as daily experience sampling (e.g., Newman et al., 2018) and narrative reports (Venuleo et al., 2020), and from other analytic approaches, such as cluster analytic comparisons of individuals with differing typologies of seeking and found meaning (e.g., DeZutter et al., 2015). The sample of volunteers in this study was not representative of the state, though it was diverse with respect to income and geographical dispersion, and the response rate to the survey was modest (33%), though generally in keeping with responses to web-based community surveys (Porter & Whitcomb, 2003; Sørensen et al., 2019). Further investigations focusing on the experience of younger residents, men, and those with more limited education would be useful. More broadly, additional research is needed to explore some of the important cultural, religious, and ethnic variations in the construction and correlates of personal meaning during the course of a communal health crisis. For example, the value ascribed to searching for personal meaning, and the particular strategies used to find it, might be expected to differ in cultural groups that are more highly religious versus secular (Ahmadi et al., 2017), more collectivist versus individualistic (Steger et al., 2008), or more dialectical versus analytical (Boyraz et al., 2013). Finally, it would be helpful to examine how meaning may be related to a range of other important health outcomes during the course of the pandemic, including negative endpoints (e.g., non-adherence to guidelines regarding masks and social distancing, depression) and positive ones (e.g., vaccination uptake, altruism, growth) (Van Tongeren & Van Tongeren, 2021; Waters et al., 2021).

Conclusions

This study contributes to the literature by examining important aspects of both global and situational meaning in the context of a collective health crisis. Results suggest that distinct facets of personal meaning have differential associations with adjustment. Perceptions that life is generally meaningful, and that the pandemic experience is somehow comprehensible, were tied to diminished stress and helplessness and greater acceptance of the situation. Conversely, ongoing efforts to find coherence or understanding in the experience were related to poorer adjustment. Findings help illuminate the role of global and situational meaning in how individuals adapt to the multiple demands of a public health crisis, and offer a useful foundation for further research.

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Data availability The data that support this study are available from the corresponding author, ACS, upon reasonable request.

Code availability not applicable

Declarations

Ethics approval This protocol was approved by the Institutional Review Board of the University of Arkansas for Medical Sciences, and the procedures used adhere to the tenets of the Declaration of Helsinki.

Consent to participate and to publish All participants received an information form regarding this observational study; the protocol was approved with waiver of documentation of written consent.

Conflicts of interest The authors have no conflicts of interest to declare relevant to the content of this article.

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