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RESEARCH BRIEF

Resilience and Mental Health in Southwest Ohio During the COVID-19 Pandemic

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ABSTRACT

Background: During the COVID-19 pandemic, anxiety and depression rates spiked across the United States and continued to climb after August 2020. Research from the early months of the COVID-19 pandemic suggests that resilience and meaning-and-purpose were associated with positive mental health outcomes in this context. Little is understood about how this association persists after more than 5 months of ongoing disaster exposure, as was the case for the COVID-19 pandemic. The goal was to examine this relationship in adults in Southwest Ohio.

Methods: Resilience, meaning-and-purpose, anxiety, and depression symptom surveys were completed electronically from August 1, 2020, to November 30, 2020. Regression analyses examined relationships between these factors and sociodemographic variables.

Results: Participants (N=98) reported anxiety and depression in mild ranges. Age was negatively associated with anxiety (p=.03). Meaning-and-purpose was negatively associated with both anxiety (p=.002) and depression (p<.001). Resilience was negatively associated with depression (p=.001). Further, reporting a mental health condition moderated the relationship between resilience and anxiety (p=.03), such that higher resilience was associated with higher anxiety in individuals reporting a mental health condition.

Conclusion: Our study found associations between anxiety and depression symptoms and meaning-and-purpose. Our study also found associations between anxiety and depression symptoms and resilience. The moderated relationship between resilience and anxiety symptoms supports the importance of assessing mental health status, particularly during public health emergencies. Regardless of mental health status, higher meaning-and-purpose was associated with lower anxiety and depression. Additional research is needed to better understand the role of meaning-and-purpose and resilience during future public health challenges.

Keywords: Brief Resilience Scale; Meaning and purpose; COVID-19 pandemic; Disaster; Mental health

INTRODUCTION

Consistent with previous epidemics,[1–3] the COVID-19 pandemic had a major impact on adult mental health across the United States (US).[4] From April 2020 to December 2020, clinically significant anxiety and depression was present in 31.5% to 45.8% and 21.8% to 39.0% of adults, respectively.[5–8] This was a dramatic increase from previous 12-month estimates for generalized anxiety disorder and major depressive episodes (2.9% and 9.3%, respectively).[5,9] National and state trends demonstrated a continual rise of reported depression and anxiety symptoms peaking in December 2020 to January 2021.[10,11] In Ohio, increases in the severity of anxiety and depression scores between August 2020 and December 2020 averaged 1.5% and 1.8%, respectively.[10] One longitudinal study using data from the Ohio Medicaid Assessment Survey, found the prevalence of mental health impairment (MHI), a severe indicator of disruption in functioning, rose to 8.2% in 2021, compared with 7.5% in 2019. Increases in MHI during that year were steepest for Black adults, females, and those aged 19 to 24 years.[12]

A much smaller body of research has explored how strengths-based factors—characteristics, including resilience and meaning and purpose, indicative of effective psychological coping with stressful events—are impacted. Resilience, the ability to "bounce back" from stressful events without prolonged disruptions in functioning, has been found to be the most common psychological response to the stress of disasters.[13,14] In a recent study during the COVID-19 pandemic, Wong et al[15] found 72.8% of a global sample reported normal-to-high levels of resilience using the Brief Resilience Scale (BRS), whereas in the Americas and Europe this was reported in only 63.6% of the population. Factors related to resilience in a disaster include older age and social support.[4,15–18] Pre-COVID-19-pandemic resilience has been associated with lower COVID-19-related anxiety and depression.[19,20] In one study of 1270 older adults (aged 55 years and older), resilience was associated with better mental health outcomes at 5 subsequent timepoints between April 2020 and June 2020.[21] Meaning and purpose (meaning-and-purpose), the degree to which a person feels their life has meaning, purpose, fulfillment, and a sense of direction, has been associated with better mental health outcomes following stressful events,[22] and was found to be a latent protective factor for developing depression symptoms during the pandemic.[23]

Much of the data investigating associations between resilience, meaning-and-purpose, and mental health were collected during the first few months of the pandemic; little is known about the relationship of these factors specifically in Ohio. Disaster-exposures typically are not prolonged, with resilience and decreases in psychological symptoms observed within 1-6 months following exposure.[13,14,16,24] However, in the case of the COVID-19 pandemic, estimates of anxiety and depression continued to rise nationally as well as in Ohio more than 5 months following the US emergency declaration.[10] It is unclear whether associations between resilience, meaning-and-purpose, and mental health would remain after 5 or more months of continuous disaster exposure, prior to effective treatments or vaccines, and while emergency governmental supports were expiring.[11,25,26]

The aim of the current study is to examine the relationship between strengths-based psychological factors (resilience and meaning-and-purpose) and anxiety and depression symptoms in a sample of Southwestern Ohio adults, 5 to 8 months following the COVID-19 emergency declaration in the US[11] (August–November, 2020). We hypothesized that resilience[17,19,21,27,28] and meaning-and-purpose[22,23,29,30] would have a significant, negative association with anxiety and depression symptoms beyond relevant sociodemographics, such as age, gender, racial/ethnic identity, self-reported mental health condition, and neighborhood distress.[4,15–18] We also hypothesized that these associations would be moderated by self-report of a preexisting mental health condition.[17,19,27,31]

METHODS

Data from the current study come from a larger prospective cohort study conducted during the COVID-19 pandemic by Hood and colleagues[32] with cohorts in the US, United Kingdom (UK), and Mexico. The use of multiple cohorts was intended to enable analysis of differing attitudes toward COVID-19, helping to gauge health policy effectiveness and public perception. Participants completed mental health and strengths-based measures monthly, and poll questions daily about the COVID-19 pandemic (eg, did you have difficulty following masking recommendations today?). The current study uses data (anxiety, depression, resilience, and meaning-and-purpose measures) from the US cohort collected August to November 2020.

Participants

Participants were recruited via flyers, cultural brokers, social media, websites, word of mouth and local agencies serving Black and Latine/Hispanic populations. The goal was to have demographics that reflected the major metropolitan municipality in the region (ie, Cincinnati, Ohio; targets 41% Black and 4% Latine/Hispanic, respectively).[33] Participants were eligible if they were age 18 years and older, US residents, could read in English or Spanish, and had access to a phone, computer/ tablet to complete measures electronically. A convenience sample was recruited among adults who lived or worked in Cincinnati, Ohio, and included those with residences across the tri-state (Ohio-Kentucky-Indiana). All participants reviewed the informed consent form and provided their electronic signature before completing study measures. The cohort study was reviewed and found to be exempt by the Cincinnati Children's Hospital Medical Center's institutional review board.

Measures

Baseline sociodemographic data included age, gender, race/ethnicity, relationship status, education, employment, essential worker status, and caregiver status. Self-reported, preexisting mental health condition (*mental health condition* hereafter) was collected as a yes-no question. Measures included in the analyses for the present study were the Patient-Reported Outcomes Measurement Information System (PROMIS) Short Form Anxiety v1.0 (7a),[34] Patient Health Questionnaire-9 (PHQ-9),[35,36] Brief Resilience Scale (BRS),[28] and PROMIS Short Form Meaning and Purpose v1.0 (4a).[37] Distressed Communities Index (DCI) scores were assigned based on zip code.[38] Participant characteristics are shown in Table 1.

Table 1. Participant Characteristics (n=98)[a-e]

Characteristic	Value		Characteristic	Value
Age in years (18-73, *n*=96), *M*(SD)	46.24 (14.07)		**County area, *n*(%)**	
Racial/Ethnic identity, *n*(%)			Cincinnati Metro	88 (89.8)
Asian	1 (1)		Other	4 (4.1)
Black, Non-Hispanic	46 (46.9)		Missing	6 (6.1)
Latine/Latinx/Hispanic	7 (7.1)		**State, *n*(%)**	
White, Non-Hispanic	39 (39.8)		Ohio	81 (82.7)
Mixed/Multiple groups	3 (3.1)		Kentucky	10 (10.2)
Missing	2 (2)		Indiana	1 (1)
Gender identity, *n*(%)			Missing	6 (6.1)
Female	73 (74.5)		**Caregiver status, *n*(%)**	**30 (30.6)**
Male	23 (23.5)		Parent	28 (28.6)
Missing	2 (2)		Grandparent	1 (1)
Distressed Communities Index (DCI) quintile, *n*(%)			Other	1 (1)
1-Resourced	23 (23.5)		**Relationship status, *n*(%)**	
2	15 (15.3)		In a relationship	19 (19.4)
3	15 (15.3)		Married	44 (44.9)
4	22 (22.4)		Single	32 (32.7)
5-Distressed	17 (17.3)		Widowed	1 (1)
Missing	6 (6.1)		Missing	2 (2)
Mental health condition (MHC), *n*(%)			**Education, *n*(%)**	
Yes	15 (15.3)		< High school	2 (2)
No	80 (81.6)		High school	7 (7.1)
Prefer not to say	1 (1)		Some college	19 (19.4)
Missing	2 (2)		College graduate	35 (35.7)
			Post graduate degree	33 (33.7)
Measure scores	***n***	***M*(SD)**	Missing	2 (2)
Patient Reported Outcome Measurement System (PROMIS) anxiety	**93**	**55.29 (9.47)**	**Employment status, *n*(%)**	
Mental health condition	14	63.80 (9.35)	Employed	72 (73.5)
No mental health condition	79	53.79 (8.72)	Unemployed	7 (7.1)
Patient health questionnaire-9 (PHQ-9)[c]	**92**	**5.34 (5.14)**	Disabled	2 (2)
Mental health condition.	14	11.00 (6.39)	Retired	5 (5.1)
No mental health condition	78	4.33 (4.22)	Homemaker	3 (3.1)
Brief Resilience Scale[d]	**93**	**3.72 (0.81)**	Student	1 (1)
Mental health condition	14	3.00 (1.08)	Other	2 (2)
No mental health condition	79	3.84 (0.69)	Missing	6 (6.1)
PROMIS meaning and purpose	**94**	**55.20 (10.34)**	**Essential worker, *n*(%)**	
Mental health condition	14	45.94 (13.90)	Yes	40 (40.8)
No mental health condition	80	56.82 (8.74)	No	37 (37.8)
			Missing	21 (21.4)

[a] Table 1 includes the total number in each group followed by the percentage in each group in parentheses for categorical variables. Age and Measure Scores are presented as mean (standard deviation). PROMIS = Patient Reported Outcomes Measurement Information System. DCI = Distressed Communities Index. Mental Health Condition = self-reported, preexisting mental health condition.
[b] PROMIS Anxiety Scoring[34]: Less than 55=None to slight; 55.0-59.9=Mild; 60.0-69.9=Moderate; 70 and over=Severe. Total: *n*=93; Mental Health Condition, *n*=14; No Mental Health Condition, *n*=79. Test for significant difference: Mental Health Condition mean was significantly higher, $t_{17.89}$=3.73, *p*=.002; 95%CI 4.37, 15.65.
[c] PHQ-9 Scoring[35,36]: 0-4=None; 5-9=Mild; 10-14=Moderate; 15-19=Moderately Severe; 20-27=Severe. Total: n=92; Mental Health Condition, n=14; No Mental Health Condition, *n*=78. Test for significant difference: Mental Health Condition mean was significantly higher, $t_{15.42}$=-3.76, *p*=.002; 95%CI -10.43, -2.90.
[d] Brief Resilience Scale Scoring[28]: Range 1-5; higher scores indicate greater resilience. Total: *n*=93; Mental Health Condition, *n*=14; No Mental Health Condition, *n*=79. Test for significant difference: Mental Health Condition mean was significantly lower, $t_{15.23}$=2.82, *p*=.01; 95%CI 0.21, 1.48.
[e] PROMIS Meaning and Purpose Scoring[37]: The United States M(SD)=50(10); higher scores indicate greater meaning and purpose. Total: *n*=94; Mental Health Condition, *n*=14; No Mental Health Condition, *n*=80. Test for significant difference: Mental Health Condition mean was significantly lower, $t_{15.13}$=2.83, *p*=.01; 95%CI 2.69, 19.06.

Data Analysis

Descriptive statistics were computed for all demographic variables as well as the primary outcome variables. To test the hypothesis that resilience and meaning-and-purpose would have a significant, negative association with anxiety and depression, and that the associations between anxiety or depression and resilience and meaning-and-purpose would be moderated by whether or not the participant reported a mental health condition, we conducted several linear regression models:

Model 1a. PROMIS anxiety scores were the outcome and the primary predictors were PROMIS meaning-and-purpose and BRS scores, with age, DCI, gender, race/ethnicity, and mental health condition as covariates.
Model 1b. Same as 1a, with a moderation of BRS scores by mental health condition added.
Model 1c. Same as 1a, with a moderation of PROMIS meaning-and-purpose scores by mental health condition added.
Model 2a. PHQ-9 scores as the outcome and the primary predictors were PROMIS meaning-and-purpose scores and BRS scores, with age, DCI, gender, race/ethnicity, and mental health condition as covariates in the model.
Model 2b. Same as 2a, with a moderation of BRS scores by mental health condition added.
Model 2c. Same as 2a, with a moderation of PROMIS meaning-and-purpose scores by mental health condition added.

All analyses were conducted in Stata, Version 18.[39] Multiple imputation in Stata with 100 imputed datasets was used to address intermittent missing data, assumed to be missing at random.

RESULTS

Participant Characteristics

The participants *(N*=98) were from the tri-state region of Ohio, *n*=81(82.7%), Kentucky, *n*=10(10.2%), and Indiana, *n*=1(1%), with most residing in the Greater Cincinnati Metro area, *n*=88 (89.8%). The majority identified as female, *n*=73(74.5%), and reported their racial/ethnic identity as Asian, *n*=1(1%), Black, *n*=46(46.9%), Latine/Hispanic, *n*=7(7.1%), White, *n*=39(39.8%), and Mixed/Multiple, *n*=3(3.1%). Most reported employment, *n*=72(73.5%), and nearly half, *n*=44(44.9%), reported being married. There was representation from all 5 quintiles in the distribution of community distress. See Table 1.

Overall, participants' (*n*=93) average PROMIS anxiety scores fell in the mild range, *M*(SD)=55.29(9.47). Those reporting a mental health condition (*n*=14) had a mean anxiety score in the moderate range, *M*(SD)=63.80(9.35)—significantly higher than that of those without a mental health condition *n*=79, *M*(SD)=53.79 (8.72); $t_{17.89}$=3.73, *p*=.002; 95%CI 4.37, 15.65.

On average, participants (*n*=92) reported PHQ-9 depression scores in the mild range, *M*(SD)=5.34(5.14). Those reporting a mental health condition (*n*=14) had a mean PHQ-9 in the moderate range, *M*(SD)=11.00(6.39)—significantly higher than that of those without a mental health condition, *n*=78, *M*(SD)=4.33 (4.22); $t_{15.42}$=-3.76, *p*=.002; 95%CI -10.43, -2.90. Table 1 shows psychometrics.

Regression and Moderation Analyses

In Model 1a analyses, Age, *M*(SD)=46.24(14.07), was significantly, negatively associated with anxiety, *b*=-0.15, *p*=.03, 95%CI=-0.28, -0.01; no other sociodemographic variables were significant predictors. Meaning-and-purpose, *M*(SD)=55.20(10.34), was significantly, negatively associated with anxiety, *b*=-0.29, *p*=.002, 95% CI=-0.46, -0.11. Resilience, *M*(SD)=3.72(0.81), was not significantly associated with anxiety (see Appendix).

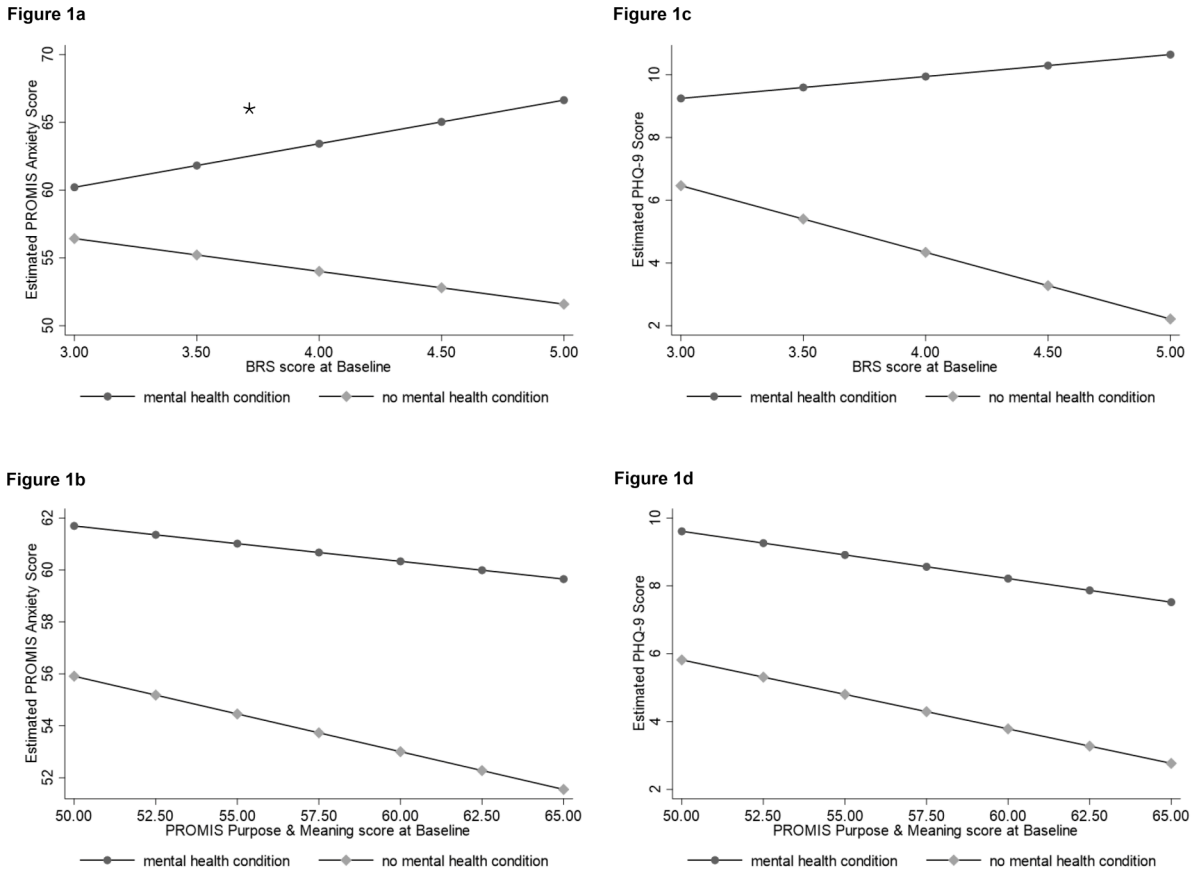
Model 1b, testing the moderation between resilience and mental health condition, was significant for anxiety, *b*=5.16, *p*=.03, 95% CI=0.39, 9.94, such that when a mental health condition was *not* reported, higher resilience was associated with lower anxiety, whereas when a mental health condition *was* reported, higher resilience was associated with higher anxiety. In Model 1c, the moderation for meaning-and-purpose was not significant (Figure 1; see also Appendix).

In Model 2a analyses, sociodemographic variables were not significantly associated with depression scores. Meaning-and-purpose, *b*=-0.21, *p*<.001, 95%CI=-0.29, -0.13, and resilience, *b*=-2.09, *p*=.001, 95%CI=-3.34, -0.84 were both significantly, negatively associated with depression. Model 2b moderation analyses were not significant (Figure 1; see also Appendix). In Model 2c analyses, the moderation for meaning-and-purpose was not significant.

DISCUSSION

The current study assessed associations between the strengths-based factors of resilience and meaning-and-purpose, and anxiety and depression in Southwestern Ohio adults 5 to 8 months into the COVID-19 emergency in the US. Consistent with data collected during the first few months of the pandemic,[23] having a higher sense of meaning-and-purpose was significantly associated with lower depression. Our study additionally found an association between higher meaning-and-purpose and lower anxiety. These associations rose to significance over and above relevant sociodemographic variables, except for age, where younger age predicted higher anxiety.

Similar to meaning-and-purpose, higher resilience was associated with lower depression. Resilience was also associated with lower anxiety, however this was dependent upon whether a mental health condition was reported. For those *without* a mental health condition, higher resilience was associated with lower anxiety as expected. For those *with* a mental health condition, higher resilience was associated with higher anxiety. At the same time, resilience was lower overall in participants with a mental health condition, compared to those without.



* Denotes a significant moderation effect.
[a] Figure 1 depicts self-reported mental health condition as a moderator between resilience or meaning-and-purpose and mental health outcomes (depression and anxiety symptoms): Top row (a, c) depicts moderation between resilience and mental health scores; bottom row (b, d) depicts moderation between meaning-and-purpose and mental health scores; left-hand column (a, b) depicts moderation with PROMIS anxiety scores; right hand column (c, d) depicts moderation with PHQ-9 depression scores. Graphs were made using Stata.

Figure 1. Graphed Moderations

Studies of COVID-19 indicate that higher-than-normal anxiety and depression symptoms persisted well into this prolonged disaster.[6,12,40] It is possible that those with a mental health condition may have a different experience during a disaster with respect to anxiety and depression. For example, Castellvi and colleagues found significant differences in resilience during the pandemic based on mental health condition status (ie, none, incidence, persistence, recovering), such that those experiencing a persistent mental health condition reported lower resilience.[27] It could be that those with a mental health condition require additional supports to foster resilience whereas those without are able to reap more benefits from an internal sense of resilience. Additional research is needed to understand this relationship, especially in the context of long-term disaster exposures (eg, a global pandemic).

Limitations and Future Directions

This study has several limitations. Although virtual survey collection allowed participation from a geographic area larger than Cincinnati, Ohio, a small sample size limits generalizability. This sample included high proportions of Black and Latine/Hispanic participants exceeding the percentages for Cincinnati residents, however, the sample included fewer members of other racialized groups.[33] Finally, the cross-sectional nature of the study limits the ability to draw inferences over time. Future studies with longitudinal data are needed given the potential that resilience interventions might be beneficial (Chen and Bonanno[41]).

Conclusion

The current study found that 5 to 8 months into the COVID-19 emergency, regardless of mental health condition, higher meaning-and-purpose was associated with lower anxiety and depression. Higher resilience was also associated with lower depression; however higher resilience was only associated with lower anxiety in those without a mental health condition. The only sociodemographic variable to show a significant association with mental health symptoms was age, with younger age predicting higher anxiety. Taken together, in situations of prolonged disaster, meaning-and-purpose, resilience, and the presence of a preexisting mental health condition may be effective targets for intervention in Southwest Ohioans.

PUBLIC HEALTH IMPLICATIONS

Emphasizing meaning-and-purpose during disasters may improve management of symptoms and well-being. This study

demonstrates that embedding meaning-and-purpose and resilience strategies into public health messaging and communications (eg, town halls) during prolonged periods of disaster uncertainty may be beneficial.

CONFLICTS OF INTEREST

The authors report no conflicts of interest.

AUTHOR CONTRIBUTION

All authors made substantial contributions to the conception or design of the work or the acquisition, analysis, or interpretation of data for the work, contributed to drafting the work or revising it critically for important intellectual content, 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.

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APPENDIX

Regressions Predicting Anxiety and Depression (N=98)[a-c]				
	Coefficient	SE	*p*	95%CI
Anxiety predictors				
Variable (Model 1a)[a-c]				
Gender	0.12	2.03	.95	-3.92, 4.16
Race	0.43	1.95	.83	-3.45, 4.32
Age	*-0.15**	*0.07*	*.03*	*-0.28, -0.01*
Distressed Communities Index (DCI)	-0.07	1.93	.97	-3.90, 3.77
Mental Health Condition (MHC)	-11.30	8.50	.19	-28.21, 5.62
Meaning and Purpose (M&P)	*-0.29***	*0.09*	*.002*	*-0.46, -0.11*
Resilience	-2.22	1.36	.11	-4.93, 0.48
Moderation[c]				
Resilience x MHC (Model 1b)	*5.16**	*2.40*	*.03*	*0.39, 9.94*
M&P x MHC (Model 1c)	0.14	0.21	.51	-0.27, 0.55
Depression predictors				
Variable (Model 2a)[a-c]				
Gender	-0.81	1.05	.44	-2.90, 1.28
Race	-0.84	0.92	.37	-2.67, 1.00
Age	-0.02	0.03	.60	-0.08, 0.05
Distressed Communities Index	-0.19	0.83	.82	-1.85, 1.46
Mental Health Condition. (MHC)	-5.13	5.63	.37	-16.34, 6.08
Meaning and Purpose (M&P)	*-0.21****	*0.04*	*<.001*	*-0.29, -0.13*
Resilience	*-2.09***	*0.63*	*.001*	*-3.34, -0.84*
Moderation[c]				
Resilience x MHC (Model 2b)	2.68	1.99	.18	-1.28, 6.65
M&P x MHC (Model 2c)	0.07	0.14	.62	-0.20, 0.34

*$p < .05$, **$p < .01$, ***$p < .001$

[a] DCI=Distressed Communities Index. Mental health condition (MHC)=self-reported, preexisting mental health condition. Significant associations are italicised with asterisks.

[b] Gender is dichotomized female/male. Race is dichotomized White/Black. DCI is dichotomized categories 1-3 and 4-5. MHC is dichotomized yes/no whether someone has reported a preexisting mental health condition. Significant predictors: Anxiety (Age, M&P, and Resilience x MHC Moderation); Depression (M&P, and Resilience). Prediction trend, but nonsignificant: Anxiety (Resilience, and MHC); Depression (Resilience x MHC Moderation).

[c] Model 1 is inclusive of all predictors and a Resilience x MHC moderation effect (significant for anxiety; similar, but nonsignificant, trend for depression). Model 2 is inclusive of all predictors and a M&P x MHC moderation effect (nonsignificant for both anxiety and depression).