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A Post-Pandemic Wellness Experiences Scale: Demographic Variation and Influences on Depression

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Abstract

We developed a post-pandemic wellness scale (PPWS) to help understand some of the specific reasons why the pandemic may have differentially impacted the mental health of people from various sociodemographic groups. With an initial sample of 404 adults (74.3% White) collected in 2021 and in close proximity to the pandemic, we established adequate fit for a four-factor model of post-pandemic experiences including financial stress, social stress, and existential stress, and positive reframing experiences, which each predicted depression in the expected directions. In this initial sample, we found some evidence of race-based differences in post-pandemic experience as they related to mental health. In the interest of replicating these findings with more robust samples of non-White racial and ethnic groups, we collected a second sample of 462 adults (26% White) in 2024. Although we failed to replicate our race-based findings, we were able to verify the fit of the four-factor model. Moreover, some exploratory findings related to participant demographics were consistent across sample cohorts, including the influences of age and gender on post-pandemic experiences. In addition, all four PPWS subscales continued to predict depression in the expected directions. Thus, in two samples assessed in proximity to and more distally from the fallout of the coronavirus pandemic, we find evidence for the psychometric stability and predictive validity of our scale for mental health. We expect this scale to be useful to future researchers and clinicians attending to the pervasive impact of the pandemic on mental health and wellbeing.

Introduction

The impact of the Covid-19 pandemic has had far reaching consequences on mental health. Factors such as social isolation, financial stress, death anxiety, and one's own outlook during the pandemic have been found to impact mental wellness[1-8]. Rates of depression specifically have been impacted and found to be related to social isolation, fear of Covid-19, and financial uncertainties[9-11]. Moreover, the disparate impact of the pandemic on various sociodemographic groups, for example related race, gender, and age have already been well documented[9-22].

We were particularly keen on examining the impact of the pandemic on diverse racial groups, given that a number of studies have found disproportionate impacts of the coronavirus pandemic on the well-being and depression rates of underrepresented racial and ethnic groups[10,12,13,15,19]. Research specifically examining depression and anxiety rates since the pandemic suggests that underrepresented racial and ethnic groups have been disproportionately impacted by the pandemic relative to White Americans[10,20]. Thomeer et al. (2023), for example, examined depression and anxiety rates from 2019 (pre-pandemic) using the National Health Institute Survey (NHIS),

compared to April 2020 – April 2021 (post-pandemic) using the Household Pulse Survey (HPS). Ettman and colleagues (2020) determined baseline depression rates from National Health and Nutrition Examination survey data collected in 2017 and 2018 and compared these to data collected in late March and early April 2020 (during the pandemic). These researchers found that depression symptoms rose from 8.4% to 34.0% among Hispanic Americans, from 4.4% to 23.1% among Asian Americans, from 8.4% to 24.2% among Black Americans, and from 8.4% to 26.5% among White Americans. Although Asian Americans demonstrated the sharpest increase in depression rates during the pandemic; notably, their overall depression rates (baseline and pandemic) were lower than all other racial groups.

The disproportionate impact of the coronavirus on well-being and depression rates for underrepresented racial and ethnic groups may be, at least in part, related to the specific social experiences of underrepresented group members' including their experiences of racial discrimination[10,23]. For example, in a study by Fuller-Rowell et al. (2022), Black students experienced increases in discrimination relative to White students following the onset of the pandemic. Asian Americans in particular experienced acute increases in discrimination during the pandemic related to being scapegoated and blamed for the coronavirus pandemic[4,10,15]. Among Black Americans, studies have attributed increases in depression to the co-occurring media coverage of police brutality against Black Americans, most notably the murder of George Floyd[24,25]. Not surprisingly, increases in experiences of discrimination and vicarious racism were found to account for increases in emotional distress, including depression, anxiety, and incidences of mental illness, among Asian Americans and Black Americans[10,15,24-26].

In addition to these racial and ethnic group-specific experiences, such as experiences of scapegoating, it is also important to consider how underrepresented racial and ethnic groups may be disproportionately impacted by more general coronavirus stressors that are likely to be shared by everyone, such as financial strain[27], loss of social support[27], and even fear of death or extinction[28]. For example, in one study conducted in the context of the pandemic, Black women experienced greater financial strain, and financial strain had more adverse impacts on Black women's mental health compared to White women[29]. More research is needed that examines the intersectional impacts of race and more general coronavirus stressors on underrepresented racial and ethnic groups' well-being.

In this study, we developed a multidimensional scale for assessing these more general coronavirus stressors such as self-perceived financial, social, and existential impacts of the pandemic. We also included statements that intended to assess the extent to which a person believes they have been able to reframe their coronavirus pandemic experiences as having had a positive impact on their lives. We developed an item-pool of statements that were intended to assess the extent to which a person believes the coronavirus impacted them in each of these areas. These items were primarily developed by paraphrasing anecdotal experiences that we were becoming aware of through news and media as well as personal reflection as the pandemic was unfolding in 2020. Since developing these items, we have become aware of some research to support the impacts of these experiences on mental health as well as some racial disparities across these experiences. We review these studies below. We expected this multidimensional assessment to be valuable in helping us understand which post-pandemic experiences are particularly salient to each racial group, and how each of the post-pandemic experiences may uniquely contribute to mental health outcomes.

Post-Pandemic Experiences

Previous research describes a variety of post-pandemic stressors including financial strain[27], loss of social support[27], fear of death or extinction[28], as well as positive-reframing experiences[30,31]. Some research suggests detrimental impacts of these experiences on mental health as well as some racial disparities across these experiences.

Financial Strain

Research conducted within the context of the pandemic has found depressive symptoms to be correlated with financial strain, which encompasses both objective financial hardship such as income loss and job loss, as well as subjective financial strain, including concerns about personal finances and senses of financial insecurity[2,3,5,32]. Moreover, financial strain has been found to disproportionately affect underrepresented racial and ethnic groups, who experienced more Covid-induced income loss and job cuts compared to White Americans. As of April 2020, 61% of Hispanic Americans and 44% of Black Americans reported job and wages loss, compared to 38% of White Americans[33]. In April 2020, it was reported that 44% of Black Americans and 66% of Hispanic Americans had someone in their household experience job or wage loss[33].

Social Stress

Social stress refers to concerns over interpersonal relationships or social connections, which may have arisen from social distancing guidelines implemented in the United States, starting in March 2020, in response to the Covid-19 pandemic. Social isolation during Covid-19 has been found to trigger boredom, loneliness, and anger[18]. Also, previous research observed positive associations between social isolation and depressive symptoms[34]. People with supportive social networks and close-knit relationships

have demonstrated fewer depressive symptoms compared to those with fewer social connections during the pandemic[18,32,34,35]. We are not aware of research specifically examining racial disparities in social support in the context of the pandemic.

Existential Stress

The pandemic may contribute to a number of existential stressors. In addition to literal fear of extinction, the pandemic ushered in increases in people's awareness of the own mortality as well as challenges related to restrictions on freedoms and personal control, and a global sense of uncertainty[36]. Indeed, in one study Chinese college students, a sense of existential meaninglessness was positively correlated with suicidal ideation and loneliness. Yet, existential meaning-making may also buffer psychological distress during the pandemic, serving as a tool for resilience or boosting life satisfaction[37-39], and helping people restore a sense of certainty and control[37]. For example, Asadi et al., (2023) studied the relationship between meaning in life and death attitudes in discharged Covid-19 patients in Iran and found a negative relationship between participants' spiritual health and death anxiety.

Positive Reframing Experiences

Lastly, some research has examined people's positive or resilience-based perspectives on the coronavirus pandemic[1,4] such as seeing the pandemic as an opportunity for a career change or developing a renewed appreciation for life[1]. Coping strategies that shape a person's perception of a negative event have been shown to protect one from depressive symptoms[18,30,31,40]. For example, positive adaptation of traumatic events to one's existing belief system, was found to buffer depressive symptoms in young adults[40]. Other attributes that influence understanding of life events, such as gratitude[30] and compassion towards or from others[31], have also been found to buffer depressive symptoms. According to one study conducted in Hispanic young adults from a socioeconomically disadvantaged region, only internal sources like resilience, rather than perceived social support, buffered the negative impacts of Covid-19-relevant stress[3].

In the first study, we developed a multidimensional scale of post-pandemic experiences including self-perceptions of financial stress, social stress, existential stress and positive reframing experiences related to the pandemic. We expected that this multidimensional assessment would be valuable in helping us understand which post-pandemic experiences were particularly salient to each racial group, and how each of the post-pandemic experiences may uniquely contribute to mental health outcomes.

Hypothesis and Research Question

1. Asian, Latino/a, and Black participants will have higher levels of depression than White participants.
2. The mediating role of post-pandemic wellness experiences on the relationship between participant race and depression will be explored.

Study One: Method

Procedures

Participants were recruited on Prolific.co. Following completion of an informed consent form, participants completed a series of clinical scales to assess participants for levels of mental health challenges (e.g., stress, anxiety, depression) and indicators of well-being (e.g., resilience, vitality). Prolific.co recommends paying participants between $6.50 and $9.60 per hour; for this study, participants were paid $5.00 for completing the study. The average time it took participants to complete the survey was 712.27 (*SD* = 606.86) seconds (approximately 12 minutes). The original intent of this data collection effort was to develop a dataset for lab students in an Advanced Statistics class. This paper comprises a secondary data analysis of from this dataset. Prior to beginning analyses, the final dataset was examined for inattentive response patterns aided by the response entropy index [REI;[41]]. As recommended, REI scores greater than 2 standard deviations above or below the mean were manually examined. Two response sets were removed, in both cases, the participant responded to all items with the same value (e.g., all 1's). In addition, eight participants who identified racially as American Indian/ Native American were removed from the dataset because this participant subgroup would have insufficient power to examine racial differences in post-pandemic wellness experiences.

Participants

The final, cleaned dataset included 404 participants. Participants self-identified racial group memberships included: Black (*n* = 27), Asian (*n* = 38), Latino/a (*n* = 28), and White (*n* = 300). Analyses related to gender were limited to male (*n* = 200) and female (*n* = 188) participants; nonbinary participants (*n* = 13) comprised a small group with insufficient power for significance testing. The average age of participants was 35.23 (*SD* = 12.43).

Measures

Depression

Depression was measured with a 10-item version of the Center for Epidemiological Studies' Depression Scale[42]. Items focus on cognitive, affective, and behavioral symptoms of depression, and participants are asked to endorse the frequency in which they experience these symptoms during the course of the week. Item responses range from "rarely or none of the time" (1) to "all of the

time" (4) and are averaged across participants. Sample items include: "I felt that everything I did was an effort" and "My sleep was restless." This scale has demonstrated good construct validity and reliability with a general sample of middle-aged adults [mean age: 44.9 (*SD* = 10.3);[43]]. With the current sample, total scores ranged from 1 to 3.90 (*M* = 2.06; *SD* = .68). The Cronbach alpha coefficient with this sample was .89.

Post Pandemic Wellness

A total of 20 items measuring various post-pandemic wellness experiences were developed by the first author and his research team. Remotely, we first brainstormed the variety of experiences that we were becoming aware of through news and media as well as personal reflection as the pandemic unfolded. We then thematically organized these experiences into economic and social stress, existential impact, and positive reframing experiences. In the next step, we drafted first-person statements that were intended to capture each of these experiences. We then edited items to make them as concise as possible while still retaining their original meaning and colloquial (non-jargon) tone in order to make them relatable to participants. We also edited or removed items that we found to be ambiguous or "double-barreled" (asking about more than one thing) with a goal of retaining approximately 4 or 5 items per theme[44]. Our ultimate goal was a 16-20 item scale which could be completed in a relatively brief time but still have enough power for factor analyses[45]. These items were then submitted to both an exploratory and confirmatory factor analysis in order to establish a four-factor model of post-pandemic wellness experiences.

We first split the total sample by randomly assigning cases to either EFA or CFA. With the EFA sample (n = 218), PPW items were distributed relatively normally (Shapiro-Wilks scores ranged from .90 to .94), thus, the exploratory factor analysis (EFA) was conducted using a maximum likelihood estimation with a Direct Oblimin rotation[45]. A varimax rotation was selected because it was not anticipated that factors would necessarily correlate[45]. A Kaiser-Meyer-Olkin score of .84 indicated that the sample size was acceptable[46]. Based on Kaiser criterion (eigenvalues of greater than 1.0) and examination of a scree plot, a four-factor model was recommended[45]. In the next step, both the factor loadings and content of the items recommended by the EFA were examined (Table 1). Item 8 was dropped, in part because it had notably lower factor loading than other items within the economic stress factor, but also because participants may have been interpreting the statement in relation to their occupation more generally (e.g., the health care industry) and not necessarily their personal experience of employment. Item 15 was dropped because it had a loading of less than .40[45] on its expected factor (social stress). Thus, our final model included 5 items (a = .82) assessing people's tendency to find the "silver lining" in the pandemic (positive reframing), 4 items (a = .87) assessing people's economic struggles following the pandemic (economic stress), 4 items (a = .91) assessing people's sense of isolation and social challenges following the pandemic (social stress), and 5 items (a = .88) assessing people's sense of angst and mortality salience following the onset of the pandemic (existential impact).

Table 1: Factor Loadings for PPW Items

		F1	F2	F3	F4
Positive Change	1. The coronavirus pandemic has provided me an opportunity to make important changes in my life.	.10	.16	-.06	.70
	2. There are ways in which I am happier since the coronavirus pandemic.	-.05	.08	-.05	.84
	3. I have come to appreciate life more since the coronavirus pandemic	.01	.28	-.03	.71
	4. My work life has improved since the coronavirus pandemic.	.04	.04	-.11	.55
	5. I have new hobbies and passions since the coronavirus pandemic.	.01	.22	.01	.57
Economic Stress	6. The economic fallout of the coronavirus pandemic has negatively impacted the quality of my life	.01	.11	.81	-.10
	7. My life is much less affordable since the coronavirus pandemic	.18	.08	.83	-.02
	8. My occupation has been adversely impacted by the coronavirus pandemic	.11	.14	.55	.04
	9. Since the coronavirus pandemic I can no longer afford to live as comfortably	.14	.04	.82	-.04
	10. The coronavirus pandemic has not personally impacted me economically (reverse)	-.10	-.06	-.69	.18
Social Stress	11. I have been much lonelier since the coronavirus pandemic	.78	.24	.14	-.01
	12. I no longer feel as connected to people as I did before the coronavirus pandemic	.88	.14	.14	.00
	13. I have fewer friends since the coronavirus pandemic	.79	.15	.13	.07
	14. My close relationships have suffered since the coronavirus pandemic	.86	.14	.15	.00
	15. I prefer my current social life compared to my social life before the coronavirus pandemic (reverse)	-.38	-.10	-.05	.46
Existential Impact	16. I spend more time thinking about human mortality since the coronavirus pandemic.	.16	.67	.09	.14
	17. I have questioned the meaning of life more since the coronavirus pandemic.	.09	.93	.10	.10
	18. My overall meaning of life has changed since the coronavirus pandemic	.23	.78	.15	.18
	19. The coronavirus pandemic has made me question my purpose in life	.15	.74	.11	.16
	20. I am a different person than I was before the coronavirus pandemic	.29	.45	.10	.33

The overall fit of the model was then tested using confirmatory factor analyses (CFA). Given that all subscales were significantly correlated (with the exception of positive reframing experience and social stress), we opted for an oblique rotation method. We specifically examined five model-fit indices and their guidelines: The ratio of the Chi-Square statistic to degrees of freedom should range between 1 and 3; Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square (SRMR) should approach statistical significance ($p < .05$); and Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) scores should reach between .90 and .95[47-49]. The fit of the model was borderline adequate on all indices (Table 2). Modification indices were examined in order to improve the fit of the four-factor model by including correlated error variances between item or factor pairs. The use of modification indices can be justified when used sparingly and when modifications are theoretically plausible[47]. Based on modification indices we allowed two items (16 and 17) to correlate. The modified four-factor model was adequate as indicated by all five fit statistics.

Table 2: Model Fit Statistics

Model	X^2	X^2/df	CFI	TLI	RMSEA	SRMR
2021	242.93**	1.88	.94	.93	.07	.06
2021 (modified)	215.29**	1.68	.96	.95	.06	.06
2024	467.46**	3.62	.92	.91	.08	.07
2024 (modified)	407.81**	3.19	.94	.93	.07	.07

** $p < .01$

Note. X_2 = Chi Square; X_2/df = Chi Square / degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square.

Results

Preliminary Analyses

Using Analyses of Variance (ANOVA), we examined how the four post-pandemic wellness experiences varied among diverse gender and racial groups. Results from these ANOVAs are summarized in Table 3a. Notably, women experienced higher social and existential stress than men, and Asian participants experienced higher existential stress than White participants. Age was negatively correlated with positive experiences ($r = -.18$; $p < .01$), social stress ($r = -.15$; $p < .01$), and existential stress ($r = -.25$; $p < .01$).

Because race was our independent variable in our hypotheses, we then examined how gender and age distributed across racial groups. Our intention was to introduce any sociodemographic variable that distributed unevenly across racial groups into later models as a control variable. Chi square analyses determined that gender ($X^2 = .64$; $p > .05$) was equally distributed across participant racial groups. An analysis of variance determined that Asian participants ($M = 30.11$; $SD = 9.86$) and Latino/a participants ($M = 28.14$; $SD = 8.31$) were younger than White participants ($M = 36.86$; $SD = 12.74$) and these age differences were significant [$F(3, 389) = 7.25$; $p < .05$; $n_p^2 = .05$). Thus, age was controlled in later analyses that included race as an independent variable.

Table 3a: Means and standard deviations for demographic subgroups for proximal 2021 sample

	Positive Experience	Economic Stress	Social Stress	Existential Stress
Gender				
Male (n = 200)	18.12 (5.68)	17.51 (6.27)	*11.66*^{a} (5.55)	*15.42*^{a} (6.23)
Female (n = 188)	17.58 (5.18)	17.60 (5.87)	*13.04*^{b} (5.45)	*17.13*^{b} (6.21)
Race				
Asian (n = 38)	18.16 (5.56)	17.55 (4.68)	*14.34*^{c} (5.35)	*18.87*^{a} (6.01)
Black (n = 27)	19.41 (4.34)	18.52 (5.77)	13.67 (5.44)	16.82 (5.91)
Latino /a (n = 28)	19.57 (5.33)	16.61 (4.84)	12.57 (4.76)	16.29 (5.62)
White (n = 300)	17.47 (5.52)	17.56 (6.29)	*11.93*^{d} (5.62)	*15.89*^{b} (6.31)

$a - b$ = means are significantly different at $p < .05$

$c - d$ = means are significantly different at $p < .10$

Primary Analyses

In our primary analyses, we tested the hypothesis that Asian, Black, and Latino/a participants would have significantly higher levels of depression than White participants, and explored how the relationship between race and depression was mediated by the four PPW subscales. Levels of depression did not significantly differ by participant race [$F(3, 388) = .98$; $p > .05$; $n_p^2 = .01$], even with age [$F(3, 386) = 1.46$; $p > .05$; $n_p^2 = .01$] included as a covariate. Hypothesis 1 was not supported. Because we ruled out the potential confound of age on the relationship between race and depression, we did not further control for age in our tests of hypothesis 2.

Prior to testing hypothesis 2, we examined primary relations between each of the four post-pandemic experiences and depression (Table 4a). Economic, social, and existential stress were all positively related to depression, and positive reframing experiences were negatively related to depression. Parallel mediation analyses were used to explore how the relationship between race and depression was mediated by the four PPW subscales and was examined using the bootstrapping method aided by PROCESS version 4, model number 4[50]. Bootstrapping provides an estimate of both the direct path (i.e., the relation between the predictor and outcome variable while controlling for the effect of the mediation variables) and the indirect paths (i.e., the path from the predictor to the outcome, through each mediation variable). Each analysis was based on 10,000 resamples of the dataset with a bias corrected 95% confidence interval. In this method, the indirect effect is considered significant at $p < .05$ if the provided confidence interval does not contain the value of 0[50,51].

Table 4a: Correlations among post-pandemic wellness subscales and depression for 2021 sample

	POS	ECO	SOC	EXI	DEP
POS	-	-.17**	.04	.36**	-.27 **
ECO		-	.31**	.24**	.36**
SOC			-	.41**	.38**
EXI				-	.31**
DEP					-

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

Note. POS = Positive experience; ECO = Economic stress; SOC = Social stress; EXI = Existential impact; DEP = Center for Epidemiological Studies' Depression Scale (Andersen et al., 1994).

For these mediation analyses, three dichotomous participant race variables were created: 1. Asian vs. White (AW); 2. Black vs. White (BW); and 3. Latino/a vs. White (LW). Each of these dichotomized variables served as the independent variable for three separate models. Then, for each of these three models, all four PPW subscales were included as mediators in parallel, and depression was included as the dependent variable.

In the first model, with AW as the independent variable, the direct effect (i.e., the effect of participant race on depression, while controlling for the PPW subscales) was not significant, however the indirect effect through existential impact was significant. The direction of the coefficients suggests that relative to White participants, the post-pandemic experience for Asian participants had a greater existential impact and in turn greater existential impact was related to more depression. In the second model, with LW as the independent variable, neither the direct effect nor any of the indirect effects were significant. In the third model, with BW as the independent variable, the direct effect was not significant, however the indirect effect through positive experiences was significant. The direction of the coefficients suggests that relative to White participants, Black participants had more positive post-pandemic experiences and in turn more positive experiences was related to less depression (Table 5). In order to confirm these findings with more robust samples of underrepresented racial and ethnic groups, we collected an additional dataset using these same variables in 2024, more distally to the fall out of the pandemic.

Study Two: Hypothesis and Research Question

1. Asian participants will have significantly higher post-pandemic existential stress than White participants.
2. Differences between Asian and White levels of depression will be mediated by post-pandemic existential stress.
3. Differences between Black and White levels of depression will be mediated by post-pandemic positive experiences.

Table 5: Parallel mediation of PPW subscales on the relationship between participant race and depression with 2021 sample

	Coeff	SE	LLCI	ULCI
Direct Effect				
Asian vs. White	-.07	.32	-.71	.57
Indirect Effects				
Positive Experience	.03	.09	-.13	.21
Social Stress	.19	.12	-.02	.46
Economic Stress	-.11	.10	-.32	.08
Existential Impact	.19*	.11	.003	.43
Direct Effect				
Latina/o vs. White	-.26	.39	-1.03	.52
Indirect Effects				
Positive Experience	-.13	.12	-.39	.07
Social Stress	.14	.13	-.09	.41
Economic Stress	-.12	.12	-.38	.09
Existential Impact	-.03	.13	-.29	.21
Direct Effect				
Black vs. White	.29	.38	-.45	1.05
Indirect Effects				
Positive Experience	-.20*	.11	-.46	-.02
Social Stress	.16	.15	-.12	.47
Economic Stress	.07	.14	-.19	.35
Existential Impact	-.10	.13	-.36	.13

4. Racial differences on all post-pandemic wellness subscales will be explored.
5. The mediation of all post-pandemic wellness subscales on the relationship between race and depression will be explored.

Study Two: Methods

Procedures

Based on power analyses, we determined that we would recruit 115 participants per group (Asian, Black, White, and Latino/a) for a total of 460 participants. This sample size would be comparable to our first study, and should allow us to replicate both the differences in post-pandemic existential stress between Asian participants and White participants, and the indirect effect of existential stress on the relationship between participant race (Asian vs. White) and depression.

Following completion of an informed consent, participants completed the same measure of depression, post-pandemic wellness items, and sociodemographic variables as study one. Prolific.co recommends paying participants between $6.50 and $9.60 per hour; for this study, participants were paid $1.00 for completing the study. The average time it took participants to complete the survey was 248.73 (*SD* = 176.54) seconds (approximately 4 minutes). Prior to beginning analyses, the final dataset was examined for inattentive response patterns aided by the response entropy index [REI;[41]]. As recommended, REI scores greater than 2 standard deviations above or below

the mean were manually examined. Seven response sets were removed, in each case, the participant responded to all items with the same value (e.g., all 1's).

Participants

The final, cleaned dataset included 462 participants. Participants self-identified racial group memberships included: Black (n = 117), Asian (n = 117), Latino/a (n = 108), and White (n = 120). Analyses related to gender were limited to male (n = 228) and female (n = 223) participants; nonbinary participants (n = 15) comprised a small group with insufficient power for significance testing. The average age of participants was 35.34 (SD = 11.81).

Measures

Depression

The same measure of depression[42] used in study one was used in study two. The Cronbach alpha coefficient with this sample was .82.

Post Pandemic Wellness

With the 2024 sample, Cronbach alpha reliability estimates for all four subscales ranged from adequate to good: positive change (a = .83), economic stress (a = .83), social stress (a = .92), and existential impact (a = .87). The overall fit of the model for the 2024 sample was then tested using confirmatory factor analyses (CFA), using the same model-fit indices as the 2021 sample (Table 2). The fit of the model appeared slightly below threshold for adequate fit on all indices. Thus, modification indices were examined in order to improve the fit of the four-factor model by including correlated error variances between item or factor pairs. The use of modification indices can be justified when used sparingly and when modifications are theoretically plausible[47]. Based on modification indices we allowed two items (16 and 17) to correlate. The modified four-factor model was adequate as indicated by four of the five fit statistics (Table 2).

Results

Preliminary Analyses

Similar to the 2021 sample, we examined how the four post-pandemic wellness experiences varied among diverse gender and racial groups. Results from these ANOVAs are summarized in Table 3b. Women experienced higher existential stress than men, and Asian participants experienced lower economic stress than White participants. Age was negatively correlated with positive experiences (r = -.14; p < .01), social stress (r = -.14; p < .01), economic stress (r = -.14; p < .01), and existential impact (r = -.18; p < .01). Chi square analyses determined that gender (X^2 = .30; p > .05) was equally distributed across participant racial groups. An analysis of variance determined that Asian participants (M = 33.24; SD = 11.11) and Latino/a participants (M = 31.11; SD = 8.33) were younger than White participants (M = 38.70; SD = 14.47) and Black participants (M = 38.11; SD = 10.76) and these age differences were significant [F(3, 451) = 11.85; p < .05; n_p^2 = .07). Thus, age was controlled in later analyses that included race as an independent variable.

Table 3b: Means and standard deviations for demographic subgroups for distal 2024 sample

	Positive Experience	Economic Stress	Social Stress	Existential Stress
Gender				
Male (n = 221)	19.02 (5.55)	15.19 (4.99)	12.26 (5.62)	*16.19*^{a} (6.06)
Female (n = 221)	19.02 (5.18)	15.63 (4.91)	12.47 (5.78)	*17.84*^{b} (6.02)
Race				
Asian (n = 114)	19.49 (5.26)	*14.57*^{a} (4.17)	*11.54*^{c} (4.83)	16.60 (5.28)
Black (n = 114)	19.07 (5.80)	*14.90*^{d} (4.97)	11.65 (5.90)	16.77 (6.59)
Latino/a (n = 107)	19.05 (5.31)	15.87 (4.83)	13.20 (5.64)	17.49 (5.92)
White (n = 118)	18.51 (5.35)	*16.47*^{bc} (5.61)	*13.12* (6.14)	17.42 (6.60)

a – b = means are significantly different at p < .05

c – d = means are significantly different at p < .10

Primary Analyses

For primary hypothesis testing, three dichotomous participant race variables were created: 1. Asian vs. White (AW); 2. Black vs. White (BW); and 3. Latino/a vs. White (LW). In this sample, Asian participants did not have significantly higher levels of existential stress than White participants [F (1, 230) = .98; p > .05; n_p^2= .01], even with age [F (1, 229) = 3.31; p > .05; n_p^2= .01] included as a covariate. Hypothesis 1 was not supported.

For hypotheses 2 and 3, we used the bootstrapping method aided by PROCESS version 4, model number 4[50]. Each analysis was based on 10,000 resamples of the dataset with a bias corrected 95% confidence interval. In this sample, existential stress did not mediate differences between Asian and White depression [*indirect effect* = .02; *CI(95)* = -.19 ~ .27] even with age included as a covariate [*indirect effect* = -.03; *CI(95)* = -.25 ~ .21]. Thus hypothesis 2 was not supported. In this sample, positive reframing experiences did not mediate differences between Black and White depression [*indirect effect* = -.03; *CI(95)* = -.15 ~ .07] even with age included as a covariate [*indirect effect* = -.04; *CI(95)* = -.17 ~ .10]. Thus hypothesis 3 was not supported.

To address our research question examining differences in depression by race, White participants (M = 22.28; SD = 5.77) had higher levels of depression than Asian participants (M = 20.15; SD = 4.73) and this difference was significant [F (3, 449) = 3.14; p < .05; n_p^2= .02] even when age was included in the model as a covariate [F (3, 448) = 6.65; p < .05; n_p^2= .04]. Economic, social, and existential stress were all positively related to depression, and positive reframing experiences were negatively related to depression (Table 4b). Parallel mediation analyses were

Table 4b: Correlations among post-pandemic wellness subscales and depression for 2024 sample

	POS	ECO	SOC	EXI	DEP
POS	-	-.32**	-.14**	.22**	-.16 **
ECO		-	.35**	.27**	.39**
SOC			-	.41**	.36**
EXI				-	.35**
DEP					-

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

Note. POS = Positive experience; ECO = Economic stress; SOC = Social stress; EXI = Existential impact; DEP = Center for Epidemiological Studies' Depression Scale (Andersen et al., 1994).

used to explore how the relationship between race and depression was mediated by the four PPW subscales and was examined using the bootstrapping method aided by PROCESS version 4, model number 4 (50). Each analysis was based on 10,000 resamples of the dataset with a bias corrected 95% confidence interval.

For these mediation analyses, three dichotomous participant race variables [Asian vs. White (AW); 2. Black vs. White (BW); and 3. Latino/a vs. White (LW)] served as the independent variable for three separate models. Then, for each of these three models, all four PPW subscales were included as mediators in parallel, and depression was included as the dependent variable. Age was included as a covariate for all models. None of the models revealed any significant indirect effect of PPW on the relationship between participant race and depression (Table 6).

Table 6: Parallel mediation of PPW subscales on the relationship between participant race and depression with 2024 sample (age included as a covariate)

	Coeff	SE	LLCI	ULCI
Direct Effect				
Asian vs. White	-.93	.33	-1.58	-.29
Indirect Effects				
Positive Experience	.04	.07	-.09	.20
Social Stress	-.13	.11	-.38	.08
Economic Stress	-.22	.13	-.49	.01
Existential Impact	.06	.15	-.19	.39
Direct Effect				
Latina/o vs. White	-.79*	.31	-1.40	-.18
Indirect Effects				
Positive Experience	.05	.07	-.09	.21
Social Stress	.08	.11	-.13	.33
Economic Stress	-.09	.13	-.35	.15
Existential Impact	.02	.12	-.21	.26
Direct Effect				
Black vs. White	.09	.27	-.44	.62
Indirect Effects				
Positive Experience	.01	.08	-.14	.18
Social Stress	-.11	.10	-.33	.08
Economic Stress	-.19	.11	-.43	.01
Existential Impact	.01	.09	-.16	.23

Discussion

To briefly summarize our results, across two samples assessed more proximally (2021) and more distally (2024) to the fallout of the Coronavirus pandemic, we found psychometric support for a four-factor model of post-pandemic experiences. Moreover, in both the 2021 and 2024 samples, each of these four factors predicted depression in their expected directions (Table 4); specifically, greater social, financial, and existential stress related to higher levels of depression, and greater positive reframing experiences related to lower levels of depression. In the 2021 sample we found existential stress to account for differences between Asian and White levels of depression, and marginally found positive reframing experiences to account for differences between Black and White levels of depression. We were not able to replicate these race-based findings in our 2024 sample. Although not hypothesized, we did find some sociodemographic differences to be consistent across samples; specifically, women experienced more existential stress than men, and the younger participants were, the less positive reframing, more social stress, and more existential stress they experienced. Below, we examine how these patterns of findings converge with current research. We explore some of our own possible explanations for these findings, as well as consider the potential clinical relevance and application of our scale to future research questions.

Race and Post-Pandemic Wellness

In our 2021 sample, we found that Asian participants had higher levels of existential stress than White participants, which was related to higher levels of depression for Asian participants. This indirect effect of existential stress on depression was no longer supported in the 2024 cohort. Given that our studies did not comprise a longitudinal design, we interpret this change in findings very cautiously. However, it is worth considering that the heightened levels of blame and hate crimes directed at Asian Americans immediately following the onset of the pandemic may have accounted for the increased level of existential stress among Asian Americans in the 2021 sample, and its role in depression[52-57].

Our findings also suggest that perhaps in it is worthwhile to differentiate negative existential impact (*stress*) and positive existential impact (*meaning making*,) as the latter may serve as a coping mechanism for global stressors such as the pandemic. Curiously, in both of our samples we found that higher levels of existential stress were related to *higher* levels of positive reframing. Thus, even though existential stress was related to more depression, it is possible that at least for some people existential stress may also precipitate a shift towards positive reframing and eventually resolve in more positive mental health outcomes. Our curious

findings of a positive association between existential stress and positive reframing are buttressed by studies in multiple countries, in which existential meaning-making buffered psychological distress during the pandemic, serving as a tool for resilience or boosting life satisfaction[37-39]. Asadi et al., (2023), for example, studied the relationship between meaning in life and death attitudes in discharged Covid-19 patients in Iran and found a negative relationship between participants' spiritual health and death anxiety. Existential meaning-making may also help people restore a sense of certainty and control[37]. Future researchers could examine how the relationship between existential stress and positive reframing differs among various cultural and ethnic groups.

Gender and Post-Pandemic Wellness

In both studies, female participants experienced higher levels of existential stress than male participants. This is consistent with past studies which found that women experienced more death anxiety than men during the Covid-19 pandemic[17,22]. Other previous studies have found that within a post-pandemic context, cisfemales demonstrated more anxiety symptoms than cismales[14,18], which Song and colleagues (2021) suggest may be due to multiple societal roles women have been expected to fulfill during the pandemic such as being a professional, a mother and caretaker, and a wife. Items in our scale such as "the coronavirus pandemic has made me question my purpose in life" may be tapping these specific sources of women's angst in this post-pandemic context. Given that in both of our samples greater existential stress was also related to depression, these findings warrant further investigation in future studies, perhaps particularly as they relate to women's health and mental health intervention.

Age and Post-Pandemic Wellness

We also found in both studies that younger participants experienced lower levels of positive reframing, higher levels of social stress, and higher levels of existential stress compared to older participants. Indeed, there are a number of reasons why younger adults experienced more stress during the pandemic. For example, younger adults may experience greater degrees of exposure to depression-triggering information on social media and life experiences[32]. Moreover, young adults frequently enjoy more transient and diverse social connections, while older adults may prefer relationships to be more stable and emotional-supporting[58,59]. Certainly, the pandemic lockdown was less conducive to people who prefer more transient and diverse social relationships.

Consistently, in previous research younger adults in the context of the pandemic have been shown to have higher levels of depressive symptoms compared to older adults and compared to before the pandemic[11,14,32,59,60]. Other studies have also linked poor mental wellness to the similar concepts we explored with our post-pandemic wellness scale. For example, one study found that among young adults during the Covid-19 pandemic, experiencing death anxiety was associated with lower psychological well-being[6]. Another study found that among young adults during the Covid-19 pandemic, experiencing existential stress as defined by "loss of meaning" was associated with symptoms of depression[8]. These findings, in conjunction with our own, should encourage future researchers to continue to examine how the pandemic continues to impact our younger generations.

Methodological Challenges and Future Directions

In this section we consider some methodological challenges related to our scale and some more general future directions. In both of our samples, we did not as we expected find Black Americans, Asian Americans, nor Latino/a Americans to have higher levels of depression than White Americans. In fact, in study 2, White participants had higher levels of depression compared to our Asian participants. Perhaps Asian Americans in the 2024 sample had returned to relatively lower prevalences of depression compared to other racial groups that was characteristic of pre-pandemic data[61,62]. It is also important to consider that varying depression rates may reflect cultural differences in self-reporting. For instance, there is evidence that suggests that depression may be expressed differently in Asian Americans and Black Americans as compared to White Americans[63]. In many studies comparing Asian Americans and White Americans, people of Asian descent are more likely to express somatic symptoms of depression, such as headaches and fatigue[64-66].

Despite these challenges, our scale may aid future research and efforts to uncover ways in which the pandemic has impacted our diverse populations. Across two samples, we have provided some initial psychometric evidence towards establishing the factor structure, internal reliability, and predictive validity of our scale specifically for depression. Nonetheless, there are a number of psychometric properties that remain to be established in future research[67,68]; for example, a repeated measures design using this scale across at least two points would provide evidence of test-retest reliability and, potentially, its sensitivity to change across time. Studies examining the relation of the post-pandemic wellness subscales to previously established measures of constructs such as resilience, economic stress, social isolation, and mortality salience could for example contribute to supporting the construct validity of our scale. More recently, particularly with public health science, attention has been directed towards implementation science, and specifically towards establishing the extent to which scales are not only psychometrically valid and reliable, but also the extent to

which they are pragmatic for public health researchers and service providers[67,68]. Future research could also help determine the extent to which our scale is perceived as accessible, brief, and clearly written for relevant stakeholders.

With respect to content, our scale presents the protective nature and significance of social support and positive reframing, and supports previous findings that both social support and positive reframing contribute to the prevention of harmful responses to stressors[69]. The effects of financial strain, social stress, and other significant post-pandemic experiences highlight a need to further explore the impact of the pandemic on mental wellness. Observing the effects of disasters before, during, and after they occur is crucial for identifying their full impact and potential interventions. Canino et al. (1990) describe the process by which disasters impair mental functioning, and highlight that people with lower income or less education are at greater risk for experiencing mental health challenges and adverse effects in response to disasters[70]. Identifying these risk factors across all groups is essential for developing targeted interventions, and our objective was to explore why various sociodemographic groups report both shared and distinct experiences. Bakal et al. (2024) found that mothers of Mexican origin in largely agricultural areas reported high levels of stress during the pandemic, a phenomenon exacerbated by adversities such as unemployment, single motherhood, and citizenship status[71]. However, community engagement and *familismo*–a Latino value based upon family loyalty and the importance of contributions to familial and kinship networks–served as buffers during these challenging periods. These findings, along with our results, suggest that coping strategies and positive reframing can be effective in managing mental health and well-being.

Conclusion

In two studies we developed and provided some psychometric support for a post-pandemic wellness scale (PPWS) to help understand some of the specific reasons why the pandemic may have differentially impacted the mental health of people from various sociodemographic groups. With our first sample collected during the immediate aftermath of the pandemic (i.e., 2021), we established adequate fit for a four-factor model of post-pandemic experiences including financial stress, social stress, and existential stress, and positive reframing experiences, which each predicted depression in the expected directions, and some evidence of race-based differences in post-pandemic experience as they related to mental health. Although we failed to replicate our race-based findings in a subsequent sample collected in 2024, we were able to verify the fit of the four-factor model and all four PPWS subscales continued to predict depression in the expected directions. Moreover, findings related to the impacts of age and gender on post-pandemic experiences were consistent across 2021 and 2024 cohorts. In addition, all four PPWS subscales continued to predict depression in the expected directions. We expect this scale to be useful to future researchers and clinicians attending to the pervasive impact of the pandemic on mental health and wellbeing.

As we seek to deepen our understanding of how depression manifests at both individual and community levels, the PPW scale offers a tool to capture the unique interplay of stress factors and experiences that may influence depression, particularly in a post-pandemic context. A comprehensive lens is particularly relevant in medical and mental health settings, where psychologists and psychiatrists may benefit from a multidimensional approach to identify risk factors for depression and tailor suitable interventions. While the economic and social stressors related to the pandemic were well documented[18,33], health service providers may be less inclined to think about abstract aspects of the post-pandemic experience such as existential angst and individual capacities for positive reframing during traumatic events. And yet, our findings suggest that both factors have significant impacts on depression. These findings highlight the importance of addressing not only external stressors but also the internal processes of meaning-making and resilience.

In application, the PPW scale may help service providers identify the unique barriers, relationships, and coping mechanisms faced by different groups. It also serves as a practical tool in social work and community service settings, where social workers may find support in the identification of the mediating factors contributing to depression among different groups, facilitating the provision of culturally sensitive care. In addition to adult populations, the format of the PPW scale is well-suited for school counselors to assess students' well-being and identify specific interventions, such as creating peer support and encouraging positive reframing techniques.

After psychometric validation of the scale with two cohorts at different time points, the PPW scale demonstrates content validity; participants across diverse demographics appear to have found the questions meaningful and engaged with them in ways that allowed for some insight into their post pandemic experiences. These findings underscore the scale's ability to capture differential impacts across demographic groups, enabling service providers to identify populations that may be at greater risk for various post-pandemic indicators of wellness, such as women and younger adults. By integrating the lived experiences of diverse populations alongside traditional diagnostic assessments, the PPW scale contributes to the advancement of culturally informed research and equitable mental health treatment.

Data Accessibility

All data, syntax for analyses, and pre-registration of hypothesis are available to view at the Open Science Framework: https://osf.io/6djpk/?view_only=0166b2267170466187526a3ad0dc2222

Conflict of Interest

The authors have no conflicting interests that might be interpreted as influencing the research, and APA ethical standards were followed in the conduct of this study.

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