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## Original Research

# Estimating influences of unemployment and underemployment on mental health during the COVID-19 pandemic: who suffers the most?

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## ABSTRACT

**Objectives:** The aim of the study was to evaluate whether unemployment and underemployment are associated with mental distress and whether employment insecurity and its mental health consequences are disproportionately concentrated among specific social groups in the United States during the COVID-19 pandemic.

**Study design:** This is a population-based longitudinal study.

**Methods:** Data came from the Understanding America Study, a population-based panel in the United States. Between April and May 2020, 3548 adults who were not out of the labor force were surveyed. Analyses using targeted maximum likelihood estimation examined the association of employment insecurity with depression, assessed using the 2-item Patient Health Questionnaire, and anxiety, measured with the 2-item Generalized Anxiety Disorder scale. Stratified models were evaluated to examine whether employment insecurity and its mental health consequences are disproportionately concentrated among specific social groups.

**Results:** Being unemployed or underemployed was associated with increased odds of having depression (adjusted odds ratio [AOR] = 1.66, 95% confidence interval [CI] = 1.36–2.02) and anxiety (AOR = 1.50, 95% CI = 1.26, 1.79), relative to having a full-time job. Employment insecurity was disproportionately concentrated among Hispanics (54.3%), Blacks (60.6%), women (55.9%), young adults (aged 18–29 years; 57.0%), and those without a college degree (62.7%). Furthermore, Hispanic workers, subsequent to employment insecurity, experienced worse effects on depression (AOR = 2.08, 95% CI = 1.28, 3.40) and anxiety (AOR = 1.95, 95% CI = 1.24, 3.09). Those who completed high school or less reported worse depression subsequent to employment insecurity (AOR = 2.44, 95% CI = 1.55, 3.85).

**Conclusions:** Both unemployment and underemployment threaten mental health during the pandemic, and the mental health repercussions are not felt equally across the population. Employment insecurity during the pandemic should be considered an important public health concern that may exacerbate pre-existing mental health disparities during and after the pandemic.

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## Introduction

With a death toll of 678,815 in September 2021,<sup>1</sup> the COVID-19 pandemic has triggered massive employment insecurity<sup>2,3</sup> in the United States. Nationwide, the unemployment rate climbed to 14.7% in April from 3.9% in February,<sup>4</sup> marking the steepest month-over-month increase in unemployment in US history.<sup>4</sup> Rising

employment insecurity has strong potential to threaten mental health during and after the pandemic.<sup>5–8</sup> Early evidence has reported substantial deterioration of mental health during the pandemic.<sup>9</sup> The prevalence of depression symptoms early in the pandemic was 27.8%, more than three times higher than before the pandemic (8.5%).<sup>10</sup> However, little is known about whether the nation's plummeting mental health is attributable to rising employment insecurity during the pandemic in the United States, with few notable exceptions.<sup>9,11</sup> Yet a prior study<sup>11</sup> focused on adults aged  $\geq 55$  years, limiting the field's ability to accurately estimate the full scope of the mental health repercussions of rising employment insecurity at a national level. Furthermore, as with

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most existing studies,<sup>12,13</sup> a prior study<sup>9</sup> made a simple distinction between having a job vs not having a job; therefore, another critical type of employment insecurity, that is, underemployment, has been overlooked. Underemployment occurs when people are employed but worked fewer hours than desired (e.g. involuntarily part-time).<sup>12</sup> Relevant studies have generated mixed findings regarding whether underemployment mirrors unemployment<sup>14–16</sup> or secure employment<sup>17,18</sup> regarding effects on mental health.<sup>12</sup> We are not aware of studies that have examined this question during the COVID-19 pandemic. Underemployment rates have been consistently rising,<sup>13,19</sup> and even more so during COVID-19,<sup>20</sup> in the United States, warranting an urgent systematic inquiry to accurately estimate the breadth of its triggered mental health burden.

Further, the field has not reached a consensus on the nature of the association between employment insecurity and mental health.<sup>21,22</sup> The debate is between social causation (i.e. employment insecurity undermines mental health) vs social selection (i.e. pre-existing mental health problems threaten employment insecurity).<sup>22,23</sup> Because existing empirical evidence supports both social causation<sup>24,25</sup> and social selection,<sup>26</sup> it is critical to investigate the impact of employment insecurity on mental health while minimizing the potential for social selection.<sup>27,28</sup>

Importantly, less is known about whether employment insecurity generates differential impacts on mental health across the population.<sup>29</sup> Belonging to historically disadvantaged social groups may condition the association between employment insecurity and mental health.<sup>30–32</sup> Specifically, less privileged social groups (e.g. racial and ethnic minorities,<sup>33</sup> women,<sup>34</sup> young adults,<sup>15,35</sup> and people with low socio-economic status<sup>31,32</sup>) may be more likely to experience stressors, such as employment insecurity (i.e. differential exposure).<sup>31,32,36</sup> In addition, the detrimental impact of a given stressor will be more activated for less privileged social groups, resulting in worse consequences, because of their limited financial resources<sup>33</sup> and access to social resources that can mitigate the mental health repercussions of stressors (i.e. differential vulnerability).<sup>31,32,37</sup> Supporting such conceptual speculation, early evidence on unemployment rates during the pandemic shows that the economic turmoil most affected workers who are racial and ethnic minorities,<sup>38–40</sup> women,<sup>38,41</sup> young adults,<sup>38</sup> and people with low socio-economic status.<sup>38</sup> It remains unclear whether these social groups also experienced disproportionately higher rates of underemployment. Furthermore, no identified studies have examined differential vulnerability. Consequently, it is unknown whose mental health has been most threatened by employment insecurity during the pandemic.<sup>9,42</sup>

To address these gaps, the present study focused on three central research aims. First, it assessed the association between employment insecurity, including both unemployment and underemployment, and depression and anxiety, using nationally representative data in the United States. We used the targeted maximum likelihood estimation (TMLE) method,<sup>43,44</sup> a well-established statistical method designed to estimate causal effects in observational data. The estimation controlled for mental health status before the pandemic, further minimizing the possibility of social selection (i.e. compromised mental health threatens employment security). Second, we evaluated whether employment insecurity was disproportionately concentrated among specific race and ethnicity, gender, age, and education (a key indicator of socio-economic status that is applicable across varying ages<sup>43</sup>) groups (i.e. differential exposure). Third, we conducted stratified analyses by race and ethnicity, gender, age, and education level to evaluate whether the mental health consequences of employment insecurity are worse for certain social groups (i.e. differential vulnerability). These stratified analyses will advance the field's ability to locate segments of population with heightened risk

exposure and vulnerabilities and enhance our capacity to allocate public health resources adequately to disrupt the escalation of pre-existing mental health disparities in the United States.

## Methods

### Study population

Data for this study came from the Understanding America Study (UAS), a nationally representative probability-based internet panel in the United States.<sup>45</sup> Participants are randomly selected from the US postal delivery sequence files and recruited by an elaborate process using a sequence of postal mailings.<sup>45</sup> Eligible participants are adults aged  $\geq 18$  years in contacted households. Following the established protocol in the UAS, selected households were first notified through mail, followed with a priority mail invitation letter in English and Spanish providing the study overview, a brief survey asking about sociodemographic information, and \$5 compensation for reviewing the packet, with a promise of a \$15 incentive for completing the sociodemographic survey. Those who completed the sociodemographic survey received a phone call, identity verification, informed consent form, the \$15 incentive, a brochure, a tablet and broadband internet connection mechanisms when needed (provided at no cost), and instructions to login into the UAS internet interface for an additional \$20 incentive for completing a more extensive “my household” sociodemographic survey. Household survey completers are considered UAS panel members.

Since March 10, 2020, the UAS has instituted a tracking survey asking COVID-19-related questions biweekly. Respondents are asked to respond on a specific day of the 14-day cycle with 2 weeks to respond. Approximately 81% of respondents answered questions on their assigned day, so the vast majority of responses are realized during the first 2 weeks of the survey period. A description of the data and links for download are available at <https://uasdata.usc.edu/covid19>.

The current analysis used data from early waves of the UAS tracking surveys: UAS235 (April 1 to April 28, 2020; response rate = 97.04%; 5645 invited to participate, 5478 completed the survey) and UAS242 (April 29 to May 26, 2020; response rate = 91.46%; 7002 invited to participate, 6403 completed the survey). These periods of data collection paralleled the peak period of employment insecurity during the pandemic in the United States.<sup>44</sup> Of all participants invited to at least one of these two COVID-19 surveys ( $n = 7008$ ), 5262 participants completed these two COVID-19 surveys. Because employment insecurity was the focal predictor, participants who were retired, full-time students, or not in the labor force for any other reasons were excluded from the analyses, bringing the final analysis sample to 3548 participants. We augmented these two COVID-19 waves with two prepandemic UAS data sources to establish a robust set of covariates, including the first wave of UAS taken by all new respondents and the most recent biannual regular assessment taken by all respondents, before the pandemic. The affiliated university's institutional review board approved this study.

### Measurements

#### *Depression and Anxiety (UAS Wave 242, May 2020)*

Depression was assessed using the 2-item Patient Health Questionnaire<sup>46</sup> that measures the frequency of two core depressive symptoms in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (i.e. anhedonia and depressed feeling) in the last 2 weeks (“not at all,” “several days,” “more than half the days,” and “nearly every day”). Anxiety was measured with the 2-item Generalized Anxiety Disorder scale,<sup>47</sup> which includes similar

4-point Likert scales for anxious feeling and non-stop worrying. Following the established guideline,<sup>46,48</sup> these two measures were dichotomized, using a total score of 3 or higher as the threshold to classify clinically meaningful depression and anxiety.

#### Employment Security (UAS Wave 235, April 2020)

Insecure employment status included unemployment and hour-related underemployment<sup>47</sup> (i.e. involuntary reduction in number of working hours). Secure employment represents having a job without any reduction in working hours during the pandemic.

#### Covariates

Covariates included earlier depressive symptoms assessed in the most recent biannual regular assessment before the pandemic, measured by the Center for Epidemiologic Studies Depression Scale (8 items).<sup>49</sup> COVID-19-related symptoms were assessed using a 9-item survey. COVID-19-related discrimination was measured by a 4-item survey (e.g. being threatened or harassed due to others thinking the participant has COVID-19). Personality was assessed by the big-five personality traits (e.g. extroversion and conscientiousness).<sup>50,51</sup> Health insurance was assessed by whether participants currently had health insurance. Sociodemographic covariates included (1) race and ethnicity (Latino or Hispanic, non-Hispanic Black, non-Hispanic Asian, non-Hispanic White, and other), (2) gender (female or male), (3) age group (18–29, 30–44, and  $\geq 45$  years), (4) education level (high school or below, some college, college graduate, and postgraduate), and (5) married (yes or no).

#### Statistical analysis

First, we clustered COVID-19-related symptoms into a symptomatic group and an asymptomatic group using the k-mean clustering algorithm,<sup>52</sup> which reduced the dimensions of covariates and avoided the potential collinearity problem caused by the intercorrelations among COVID-19-related symptoms. Second, we derived double-robust estimation using the TMLE method<sup>53,54</sup> to evaluate the associations between employment insecurity and two mental health measures. The covariates include the clusters of COVID-19-related symptoms derived from the analysis in step one and all other covariates. Under standard assumptions, the estimates derived using TMLE can be interpreted as causal effects<sup>53,54</sup> (for more technical details, see the [online supplement](#)). Third, we evaluated the possibility of differential exposure across race and ethnicity, gender, age, and education levels using Chi-squared tests. We then conducted stratified TMLE models by race and ethnicity, gender, age, and education level to evaluate differential vulnerability across social groups. Sampling weights were calculated using a two-step approach established in UAS<sup>45</sup> and incorporated in all analyses, including TMLE that followed the procedure established in a prior study,<sup>53</sup> maintaining the sample representativeness and addressing missingness. The analysis was conducted using the “tmle” package in R.<sup>57</sup>

## Results

**Table 1** summarizes the descriptive statistics; 50.7% of participants were female, and the weighted mean age was 44.95 years. TMLE results are summarized in **Table 2**, which show that insecure employment (unemployment and underemployment combined) was significantly associated with increased depression (adjusted odds ratio [AOR] = 1.66, 95% confidence interval [CI] = 1.36, 2.02) and anxiety (AOR = 1.50, 95% CI = 1.26, 1.79). We conducted an additional TMLE analysis, evaluating whether effects for underemployed people were similar to the effects for unemployed people. The results revealed that underemployed and unemployed people were

similar regarding depression (AOR = .91, 95% CI = .71, 1.17) and anxiety (AOR = 1.26, 95% CI = .99, 1.60). With no significant observed differences between underemployment and unemployment, these two categories remained combined in subsequent analyses.

Next, we evaluated whether employment insecurity was disproportionately concentrated among specific social groups (i.e. differential exposure). As shown in **Table 3**, exposure to insecure employment was significantly associated with race and ethnicity, gender, age, and education. Specifically, 54.3% of Hispanics and 60.6% of non-Hispanic Blacks compared with 48.3% of Whites, 55.9% of women compared with 45.7% of men, 57.0% of young adults (aged 18–29 years) compared with 44.4% of those in the 30–44 years age group; and 62.7% of people who completed high school or lower compared with 29.1% of those with an advanced degree experienced either unemployment or underemployment during COVID-19.

Furthermore, as shown in **Table 2**, stratified TMLE analyses revealed that coefficients representing the impacts of employment insecurity were statistically significant in most stratified subgroups except for non-Hispanic Blacks, non-Hispanic others, and young adults for both mental health measures and women and those with some college education for anxiety. However, the results also indicate heightened odds of experiencing depression or anxiety or both among certain subgroups—Hispanics (depression: AOR = 2.08, 95% CI = 1.28–3.40; anxiety: AOR = 1.95, 95% CI = 1.24–3.09), men (depression: AOR = 2.15, 95% CI = 1.50–3.08; anxiety: AOR = 2.05, 95% CI = 1.48–2.83), those aged  $\geq 45$  years (depression: AOR = 1.90, 95% CI = 1.39–2.62), and those who completed high school or lower (depression: AOR = 2.44, 95% CI = 1.55–3.85).

## Discussion

Confirming speculation,<sup>5,6</sup> data from this nationally representative panel revealed that employment insecurity has threatened mental health in the United States during the pandemic, and mental health repercussions are not felt equally across the population.

#### Unemployment, underemployment, and mental health

Our study results corroborate that underemployed people mirror unemployed people, rather than those who kept their full-time job, regarding their mental health. The current findings are consistent with some prior studies<sup>14,15</sup> and contradict others.<sup>11,17</sup> However, contradictory prior studies<sup>17</sup> operationalized underemployment in relation to workers' overqualification for jobs and was conducted in macroconditions without any major economic contraction or focused on workers aged  $\geq 55$  years.<sup>11</sup> The discrepancies in findings may stem from differences in the operationalization of underemployment, macroeconomic context, or target age group, hinting at the importance of examining varying dimensions of underemployment across different economic contexts and age groups.

The similarity between unemployed and underemployed people regarding mental health observed in the present study suggests that the widely used operationalization of employment insecurity as a simple distinction between unemployment and any employment likely underestimates the breadth of mental health problems attributable to employment insecurity. In April 2020, 10.9 million Americans were underemployed.<sup>55</sup> Our study findings highlight the importance of drawing attention to underemployed people who suffer the mental health consequences of employment insecurity, yet have been largely overlooked in empirical studies and practice discussions. The general upward trend of underemployment<sup>13,19</sup> further highlights the importance of examining underemployment as a public health and mental health concern. Employment insecurity may negatively affect mental health for

**Table 1**  
Descriptive statistics of the study sample (n = 3548).

Constructs	Unweighted	Weighted
	M (SD) or n (%)	M (SD) or n (%)
Employment security		
Secure employment	1790 (50.5)	1790 (49.1)
Insecure employment		
Unemployment	1229 (34.6)	1303 (35.8)
Underemployment	529 (14.9)	549 (15.1)
Depression (PHQ-2 ≥ 3)	442 (12.5)	447 (12.4)
Anxiety (GAD-2 ≥ 3)	550 (15.6)	538 (14.9)
Race and ethnicity		
Hispanic	590 (16.6)	671 (18.4)
Non-Hispanic White	2414 (68.0)	2245 (61.6)
Non-Hispanic Black	326 (9.2)	508 (13.9)
Non-Hispanic other	218 (6.1)	219 (6.0)
Gender <sup>a</sup>		
Female	2050 (57.8)	1847 (50.7)
Male	1497 (42.2)	1794 (49.3)
Age group <sup>a</sup>		
18–29	355 (10.0)	409 (11.2)
30–44	1227 (34.6)	1479 (40.6)
≥45	1963 (55.4)	1753 (48.1)
Education level		
High school or less	779 (22.0)	1384 (38.0)
Some college education	1254 (35.3)	964 (26.5)
Bachelor's degree	907 (25.6)	723 (19.9)
Advanced degree	608 (17.1)	571 (15.7)
Health insurance (no)	359 (10.1)	444 (12.2)
Marital status (yes)	1902 (53.6)	1956 (53.7)
Depressive symptoms before pandemic (CES-D) <sup>b</sup>	1.78 (2.20)	1.84 (2.19)
Presence of COVID-related symptoms	1102 (31.3)	1115 (30.9)
COVID-related discrimination		
Received poorer service	87 (2.5)	102 (2.8)
Threatened or harassed	54 (1.5)	62 (1.7)
Treated with less courtesy and respect	163 (4.6)	161 (4.4)
Other people acted afraid of you	340 (9.6)	334 (9.2)
Personality scores		
Extroversion	25.51 (6.37)	25.42 (6.21)
Conscientiousness	35.68 (5.71)	35.33 (5.82)
Neuroticism	21.88 (6.44)	22.03 (6.37)
Agreeableness	35.33 (5.67)	35.16 (5.75)
Openness	35.48 (6.33)	35.16 (6.11)

<sup>a</sup> Sum of frequencies in subcategories not equal to the total sample size due to missing values.

<sup>b</sup> Minimum: 0; 1st quartile: 0; median: 1; 3rd quartile: 3; maximum: 8.

years, known as “scarring effects,”<sup>24,56,58</sup> warranting the activation of mental health services for unemployed and underemployed people to alleviate the mental health repercussions of employment insecurity during the pandemic, including long-term follow-up.

*Differential exposure and differential vulnerability*

Supporting the differential exposure hypothesis<sup>31,32,36</sup> and earlier evidence on unemployment rates during the pandemic,<sup>38–41</sup> the present study revealed that employment insecurity, including both unemployment and underemployment, hits those who hold a less privileged social status the most—employment insecurity was disproportionately concentrated among Hispanic and non-Hispanic Blacks, women, young adults (aged 18–29 years), and those without a college degree. This unequal burden among these segments of the population reflects the virus’s differential impact on sectors with a higher percentage of workers from historically marginalized communities.<sup>59,60</sup> Furthermore, our stratified analyses show that certain disadvantaged social groups suffered worse consequences (i.e. differential vulnerability) in addition to experiencing more job loss or work-hour reduction (i.e. differential exposure). Hispanic workers, in addition to their higher probability of experiencing employment insecurity, experienced worse effects on their mental health when experiencing employment insecurity compared with any other racial or ethnic

group. Similarly, those who completed high school or less reported higher odds of experiencing depression subsequent to employment insecurity, along with a heightened risk of employment

**Table 2**  
Targeted maximum likelihood estimates of the relationships between insecure employment and depression and anxiety in the full and stratified samples.

Group	Depression (PHQ-2 ≥ 3)		Anxiety (GAD-2 ≥ 3)	
	AOR (95% CI)	P	AOR (95% CI)	P
Full sample	1.66 (1.36–2.02)	<.001	1.50 (1.26–1.79)	<.001
Stratified				
Race and ethnicity				
Hispanic	2.08 (1.28–3.40)	.003	1.95 (1.24–3.09)	.004
Non-Hispanic White	1.63 (1.29–2.07)	<.001	1.42 (1.15–1.75)	.001
Non-Hispanic Black	1.20 (.63–2.28)	.58	1.38 (.69–2.79)	.36
Non-Hispanic other	1.22 (.62–2.41)	.57	1.25 (.62–2.51)	.53
Gender				
Male	2.15 (1.50–3.08)	<.001	2.05 (1.48–2.83)	<.001
Female	1.46 (1.15–1.86)	.002	1.19 (.96–1.47)	.12
Age				
18–29	1.45 (.86–2.45)	.16	1.14 (.71–1.84)	.59
30–44	1.54 (1.14–2.09)	.005	1.58 (1.20–2.07)	.001
≥45	1.90 (1.39–2.62)	<.001	1.59 (1.20–2.10)	.001
Education				
High school or less	2.44 (1.55–3.85)	<.001	1.71 (1.12–2.62)	.01
Some college	1.45 (1.05–1.99)	.02	1.15 (.85–1.55)	.37
Bachelor's degree	1.81 (1.20–2.75)	.005	1.68 (1.20–2.35)	.003
Advanced degree	1.78 (1.08–2.95)	.02	1.58 (1.01–2.48)	.05

**Table 3**  
Weighted frequency and proportion of insecure employment stratified by age group, gender, race and ethnicity, and education.

Subgroup	Insecure employment (Weighted n = 1852)		Secure employment (Weighted n = 1790)
	Unemployment	Underemployment	
	n (%)	n (%)	n (%)
<b>Race and ethnicity<sup>a</sup></b>			
Hispanic	263 (39.2)	101 (15.1)	307 (45.8)
Non-Hispanic White	743 (33.1)	340 (15.2)	1161 (51.7)
Non-Hispanic Black	240 (47.2)	68 (13.4)	200 (39.4)
Non-Hispanic other	57 (26.0)	41 (18.7)	121 (55.3)
<b>Gender<sup>a</sup></b>			
Male	551 (30.7)	269 (15.0)	974 (54.3)
Female	752 (40.7)	280 (15.2)	815 (44.1)
<b>Age group<sup>a</sup></b>			
18–29	163 (39.9)	70 (17.1)	176 (43.0)
30–44	419 (28.3)	245 (16.6)	814 (55.1)
≥45	720 (41.1)	234 (13.4)	798 (45.5)
<b>Education level<sup>a</sup></b>			
High school or less	700 (50.6)	168 (12.1)	516 (37.3)
Some college education	384 (39.8)	167 (17.3)	413 (42.8)
Bachelor's degree	155 (21.4)	113 (15.6)	455 (62.9)
Advanced degree	65 (11.4)	101 (17.7)	406 (71.0)

\*P < .01.

<sup>a</sup> The sum of weighted frequencies in subcategories is not equal to the total weighted sample size due to rounding.

insecurity. Taken together, the current findings suggest that Hispanics and those with low education levels will likely suffer the most because both mechanisms driving health disparities, differential exposure and vulnerability, are patterned unfavorably for these two groups. Considering that upward mobility in employment (i.e. securing a new job or adequate employment) are harder for these groups,<sup>61,62</sup> the confluence of differential exposure and differential vulnerability likely further deepen the existing disparities in mental health for racial and ethnic minorities and those with low socio-economic status.<sup>63,64</sup> Strengthening mental health services for unemployed and underemployed people, particularly workers from historically marginalized backgrounds,<sup>65</sup> such as Hispanic workers and those with low education levels, is imperative to avert the possible “perfect storm” of mental health challenges that is poised to hit the vulnerable members of our society the most.

**Limitations**

This study relied on self-reports, possibly introducing reporting bias.<sup>66</sup> Second, the present study focused on hours-based underemployment. As such, other forms of underemployment—income- or skills-based underemployment<sup>15</sup>—were not considered, which is likely to underestimate the scope and effects of underemployment on health.<sup>67</sup> Considering other types of underemployment and examining unique and joint impacts of varying underemployment status on mental health may be a fruitful future direction to further clarify the impacts of this ever-rising type of employment insecurity on mental health and identify which specific type of underemployment should be prioritized as a means to curb rising mental health problems. Third, although the present study contributed to the debate between social selection vs social causation by implementing TMLE and controlling for earlier mental health status before the pandemic, it is not our intention to claim that the possibility of reverse causality has been completely eliminated. Mental health problems in childhood, for example, could not be included as a covariate because such information was not available in the UAS data. Although the incorporation of mental health measures before the pandemic ease the concern of not

having childhood mental health measure, the unique influence of childhood mental health problems could not be controlled. Relatedly, causal interpretation of the results from stratified analyses warrants particular caution because the smaller sample size may threaten the assumptions needed to interpret coefficients from TMLE as causal effects.<sup>53,54</sup>

**Conclusions**

The present study expands the body of literature concerning mental health consequences during the pandemic in four important ways. First, the study used nationally representative data that were collected during the peak period of employment insecurity during the pandemic in the United States.<sup>44</sup> Second, by leveraging a novel statistical method and rich prospective data, the study contributes to the ongoing debate regarding social causation vs social selection. Third, the present study revealed that being underemployed is similar to being unemployed in terms of their effects on mental health, clarifying the existing mixed findings and advocating for the mental health needs of underemployed people. Finally, the present study systematically evaluated differential exposure (i.e. who experienced more employment insecurity) and differential vulnerability (i.e. who experienced worse consequences subsequent to employment insecurity), revealing the possibility of worsening disparities in mental health triggered by the recent economic turmoil. No other identified studies appear to integrate these unique strengths.

In conclusion, the present study findings reveal that employment insecurity, not just unemployment but also underemployment, threatens the public’s mental health during the pandemic. In the domain of social policies, providing a more generous unemployment benefit package is likely to reduce economic hardship and distress and thus mitigate the impact of employment insecurity on mental health.<sup>7</sup> A recent study reported that receiving unemployment insurance was associated with decreased mental health problems among those who experienced job loss during the pandemic.<sup>68</sup> Furthermore, the study findings suggest a needed shift in policy and service targets from an exclusive focus on unemployed people to include underemployed people.

Currently, rules for underemployed workers' eligibility for unemployment insurance benefits vary across states. Adjusting the eligibility criteria during the pandemic and providing additional support for underemployed people who do not meet a given state's eligibility criteria will likely ease mental distress in this group. Importantly, our study findings indicate that the economic upheaval was not felt evenly across social groups. Particularly, Hispanics and those with low education levels will likely confront worse mental health repercussions subsequent to employment insecurity during the pandemic, further exacerbating pre-pandemic disparities in mental health. Policies and interventions that make mental health services more affordable and accessible to low-resourced members of our society will be critical because Hispanics<sup>69</sup> and people with low education levels<sup>70</sup> tend to have fewer resources. Smartphone-based interventions, for example, have shown promising effects on depression.<sup>71</sup> Providing such an intervention to those experiencing employment insecurity, particularly those who lost health insurance along with their job or do not have a sufficient financial reservoir to cover treatment, may alleviate the deleterious impacts of employment insecurity on mental health and avoid deepening existing disparities in mental health during and after the pandemic.

## Author statements

### Ethical approval

The study followed the principles outlined in the Declaration of Helsinki, and the University of Southern California's institutional review board approved the study.

### Funding

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### Competing interests

None.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.puhe.2021.09.038>.

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