

Residential Move During COVID-19 Pandemic and Psychological Health Among College Students: The Role of Perceived Social Support

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Research has widely documented the high stress levels posed to college students by the Coronavirus Disease 2019 (COVID-19). However, the role of social support in mitigating the mental health impacts of stressors like residential instability among college students is less well-researched. Using data from a multi-campus online survey of college students' experiences during the COVID-19 pandemic ($n = 2,486$), this study examines the role of social support in the association between residential move during COVID-19 pandemic and college students' reports of depressive symptoms and anxiety. We tested whether perceived social support was more significantly related to depressive symptoms among students who moved in response to COVID-19. The results show significantly higher levels of depressive symptoms and higher prevalence rates of severe anxiety among college students with COVID-19-related move relative to those who did not move during the pandemic. Irrespective of their residential status, college students who received less support than needed during the pandemic had significantly higher levels of depressive symptoms and higher odds of severe anxiety. The findings add to the existing studies showing how the COVID-19 pandemic compounds the problems of depression and anxiety among college students, particularly those experiencing residential instability and with limited social support.

Keywords: COVID-19, pandemic, residential instability, housing instability, mental health, depression, anxiety

INTRODUCTION

The extraordinary stress levels posed to college students by COVID-19 pandemic is well-documented in extant literature. Among other factors, students experienced pandemic-related stress emanating from the shift to online learning, academic and other challenges associated with remote learning, threats to

livelihoods, loss of employment, distressing COVID-19-related news, and social isolation (Fruehwirth et al., 2021; Huckins et al., 2020; Jones et al., 2021; Kecojevic et al., 2020; McNaughtan et al., 2023; Wang et al., 2020). Policy interventions to curb the spread of COVID-19 virus – popularly called quarantine or lockdown measures - were particularly impactful on college students' living arrangements. Forced relocation was not only common among college students during the pandemic but it was also linked to poor mental health outcomes (Conrad et al., 2021). Students who were mandated to relocate reported more COVID-19-related grief, loneliness, and generalized anxiety symptoms (Conrad et al., 2021). Housing insecurity during the pandemic (and concerns about housing in general) was also linked to depression and symptoms of anxiety disorder (Jones et al., 2021; Soria, 2023).

Although a growing body of research shows that residential instability is important to college students' mental health, the role of social support in mitigating the mental health impacts of residential instability during the COVID-19 pandemic remains understudied. Drawing on Glover et al.'s (2020) framework for identifying and mitigating the equity harms of COVID-19 policy interventions, this study examines the role of social support in the association between residential move during the COVID-19 pandemic and college students' reports of depressive symptoms and anxiety. The study builds on existing work on the mental health impacts of housing insecurity among college students during the COVID-19 pandemic by differentiating between forced relocations that are directly linked to COVID-19 and non-COVID-19-related moves.

Bourgeoning research points to housing insecurity as a major concern among students attending higher education institutions in the United States (Hallet et al., 2019). Residential instability has significant implications for students' academic performances and overall wellbeing (Conrad et al., 2021; Jones et al., 2021). College students who experience housing instability experience significant barriers to academic goal achievement and significant stress and distress (Goldrick-Rab, et al., 2015). Cruz (2018) examined the relationship between housing instability and stress among college students and found significantly higher stress scores for students who reported housing instability in the past 12 months than those with housing stability. Related research also demonstrates the relationship between residential instability and educational outcomes, particularly among historically marginalized minorities. Academic consequences of housing insecurity include lower GPAs (Crutchfield & Maguire, 2018), being less likely to graduate (Broton & Goldrick-Rab, 2016; Khosla et al., 2020) poor class attendance (Silva et al., 2017), and decreased retention (Silva et al., 2017). Housing insecurity undoubtedly has far-reaching effects on different aspects of students' lives, but considering the co-occurrence or duality of housing insecurity and mental health problems (Broton et al., 2022), the present study examines the mental health ramifications of residential instability during the COVID-19 pandemic.

Housing insecurity has been linked to worse mental health outcomes, including depressive symptoms and anxiety (Conrad et al., 2021; Hatem et al., 2020; Soria, 2023), even though the reverse relationship is also possible (Padgett, 2020). Residential instability is important to mental health because it relates to an individual's sense of safety, sense of privacy, stability in their day-to-day life, and their identity development (Padgett, 2007). Moving can be physically, financially, and emotionally tasking, particularly among persons with limited access to resources (The Hope Center for College, Community, and Justice, 2021). Sudden relocation following a potentially traumatic experience (like the onset of the COVID-19 pandemic and the associated "lockdown" measures) can lead to worse psychological outcomes and limit access to coping resources (Uscher-Pines, 2009). During the COVID-19 pandemic, hundreds of thousands of college students likely returned to live with parents, other family members, or nonrelatives, with relatively little time to prepare for the change; universities typically attract students from places that make it difficult for some students to return home during crises (McNaughtan et al., 2023). Many states imposed stay-at-home orders—commonly called quarantines—that restricted individuals' ability to leave their homes for work and recreation. Quarantine-related restrictions could cut students off from campus-based or local resources that prevent or manage mental health struggles (Hall & Zygmunt, 2021). Hall and Zygmunt (2021) also propose that the stay-at-home order (*which impacts relocation and/or residential mobility*) could severely limit or eliminate leisure and employment opportunities through which students express distinct, non-home-based identities and develop independence and competence. Some students

potentially returned to (or remained in) problematic or unsafe home situations while living under restrictive quarantine conditions (Hall & Zygmont, 2021; The Hope Center for College, Community, and Justice, 2021). Compared to students who maintained independent living, German university students who returned to their parental home during the COVID-19 pandemic reported significantly lower life satisfaction (Preetz et al., 2022). Returning to the parental home could also heighten relationship tension among family members and lead to reduced autonomy (Hall & Zygmont, 2021).

Forced relocation during the COVID-19 pandemic may be particularly detrimental to students' mental wellbeing. Among college students surveyed by Conrad et al. (2021) between April and August 2020, one-third reported being mandated to relocate. These students (with COVID-19-related moves) reported more COVID-19-related grief, loneliness, and anxiety relative to those who did not move. In a study of college freshmen and their adaptation to college life in Puerto Rico, students reported that relocation is a stressful life event that is associated with higher prevalence rates of depressive symptoms (Reyes-Rodriguez et al., 2013). Similarly, among City University of New York (CUNY) students surveyed by Jones and colleagues in April 2020, those who reported concerns about their ability to pay for housing had significantly higher risks of depression and anxiety (Jones et al., 2021). Soria (2023) found that students who reported housing insecurity in 2020 were significantly more likely to experience moderate to severe major depressive disorder and generalized anxiety disorder symptoms.

Sudden relocation due to COVID-19 and the associated "lockdown" measures may precipitate psychological stress and limit access to coping resources (Uscher-Pines, 2009). However, for students who could access the needed support, disruptions to their lives, livelihood, and living arrangement may be less impactful on their health. In times of crisis such as COVID-19 pandemic, community, friends, and family can serve as sources of emotional, psychological, and material support (Broton et al., 2022), helping to mitigate the mental health impacts of such crisis (Wang et al., 2020). Social support may be particularly important to mental health of students facing COVID-19-related moves, partly because students experiencing housing insecurity tend to be more reliant on support from friends and family (Broton et al., 2022). Social support plays a critical role in mitigating mental health risks, yet pandemic-era social distancing and isolation strategies may have restricted this coping strategy. This study examines how social support may have mitigated the impacts of residential move during COVID-19 pandemic on college students' reports of depressive symptoms and anxiety.

Understanding how COVID-19 further exacerbated the issue of residential instability and its impact on the health and well-being of college students is crucial. Before the pandemic, universities were already struggling with a growing mental health crisis on their campuses. The rate of mental health treatment across 196 campuses sampled by Lipson et al. (2018) increased from 19% in 2007 to 34% in 2017, driven in part by the increased prevalence of mental health problems. Yet, research suggests that the pandemic led to even greater increases in reports of mental health disorders among college students. For instance, a COVID-19 survey by the Student Experience in the Research University (SERU) Consortium showed that the prevalence rates of major depressive disorder among graduate and professional students doubled between 2019 and 2020 (Chirikov et al., 2020). Other studies (e.g. Fruehwirth et al., 2021; Huckins et al., 2020) have reported similar increased anxiety and depressive symptoms among other groups of students.

Drawing on Glover et al.'s framework for identifying and mitigating the equity harms of COVID-19 policy interventions, we analyzed the role of social support in the association between residential move during COVID-19 pandemic and college students' reports of depressive symptoms and anxiety. According to this framework, COVID-19 and the policy interventions to curb the spread of the virus disproportionately impacted vulnerable groups, thereby compounding pre-existing inequities across social groups (Glover et al., 2020). In other words, socioeconomic and health harms tend to be concentrated within certain groups, and the pandemic may have exacerbated those negative experiences. Building on this multiplicative and interactive nature of social disadvantages during the pandemic, this study examines reports of depressive symptoms and severe anxiety among college students, a group with very high prevalence rates of mental disorders even before the COVID-19 pandemic (Lipson et al., 2018). We analyzed 1) how "lockdown" measures during the pandemic may have put members of this vulnerable population in precarious residential situations, 2) how inequities in accessing needed support during the pandemic influenced two mental health

outcomes – depressive symptoms and severe anxiety, and 3) the extent to which access to social support serve as a buffer to students with varying experiences of residential (in)stability. In our model, residential instability (an adverse effect of COVID-19 pandemic) interacts with social support (an equity domain) to influence depressive symptoms and anxiety (psychological harms) among college students.

DATA AND METHODS

Data

We analyzed data from a multi-campus online survey of college students' experiences during the COVID-19 pandemic. The survey protocol was reviewed and approved by the Institutional Review Board at the University of Colorado Colorado Springs (UCCS), St. Mary's University (StMU) Texas, and Southern Oregon University (SOU). All students enrolled at UCCS and StMU in the 2021 spring semester were invited to participate in the survey. The survey was administered to a quarter of the student population at SOU in Spring 2021. For survey administration, SOU randomly assigned students to one of four quadrants. Using the Qualtrics platform, the survey was administered across all three campuses between April 2021 and May 2021 (30 respondents from SOU finished the survey between June 1, 2021 and June 3, 2021).

The principal investigators were affiliated with the three universities selected for the survey. The three universities differ in their sociodemographic characteristics. UCCS is a mid-size public research university in the western region with a total student population of about 12,000, 83% undergraduate students, and 29% first-generation college students. StMU is a relatively smaller private Marianist liberal arts institution in Southwestern part of the U.S., with a student population size under 3,500, 62% being undergraduates, and about a third having no parent with associate degrees. SOU, a public university in the West, enrolled about 4,000 students in fall 2020. More than 85% of enrolled students at SOU were undergraduates and 13% were first-generation college students. All three institutions serve substantial shares of minoritized students—35% at UCCS, 68% at StMU, and about 30% at SOU. StMU is a Hispanic-serving institution.

Sample

Nearly 3,000 (2,899) students completed the survey; 2,186 from UCCS, 474 from StMU, and 239 from SOU. We excluded 201 respondents with missing information on the key variables included in the analysis—depressive symptoms, anxiety, residential move during the COVID-19 pandemic, and social support. We also dropped 212 students with nonvalid responses on other covariates included in our models—age, loss of employment during the pandemic, union status, sexual orientation, college grade level, and self-rated health. The final analytic sample comprises 2,486 students; 1,878 students at University of Colorado Colorado Springs, 405 from St. Mary's University, and 203 students enrolled at Southern Oregon University.

Measures

We examined two mental health indicators—depressive symptoms and severe anxiety. Depressive symptoms are measured using a six-item version of the Center for Epidemiologic Studies Depression (CES-D) scale (Radloff, 1977). Respondents were asked how often they experienced the following during the week preceding the survey: 1) "felt you just couldn't get going"; 2) "felt that you could not shake off the blues"; 3) "had trouble keeping your mind on what you were doing"; 4) "felt lonely"; 5) "felt sad"; and 6) had trouble getting to sleep or staying asleep." Responses range from never (1) to everyday (8). The sum of the scores on all six items ranges from 6 to 48 (alpha reliability coefficient of 0.88), with higher scores indicating higher levels of depressive symptoms.

We employed a binary measure of severe anxiety that is based on two items. The first question asks, "How often do you feel worried, nervous or anxious? Would you say daily, weekly, monthly, a few times a year, or never?" Responses range from daily (1) to never (5). Respondents who reported ever feeling worried, nervous, or anxious were then asked a follow-up question about the severity of their anxiety. The question reads, "Thinking about the last time you felt worried, nervous or anxious, how would you describe

the level of these feelings? Would you say a little, a lot, or somewhere in between?" Respondents were categorized as having severe anxiety if they reported feeling worried, nervous, or anxious daily, and if they reported having these feelings a lot or somewhere in between a little and a lot. We considered a higher frequency of anxiety than daily, but the rates of anxiety in the study population (45%) was already high using daily as the benchmark.

The main independent variables are residential move during the COVID-19 pandemic and perceived social support. Respondents who reported one or more residential moves or relocations within one year of the survey (between April/May 2020 and April/May 2021) were asked whether COVID-19 was a factor in their decisions to move or relocate. We compared respondents who did not move or relocate (reference) to those who moved or relocated but for reasons other than COVID-19(1), and those whose move or relocation was COVID-19 related (2). We employed two measures of social support. The first, perceived social support from friends and relatives, is the average scores on two items— "How much are your friends and relatives willing to listen when you need to talk about your worries or problems?" and "On the whole, how much do your friends and other relatives make you feel loved and cared for? Would you say a great deal, quite a bit, some, a little, or not at all?" Responses to both items range from a great deal (1) to not at all (5). Perceived social support from friends and relatives is a mean scale of the above two questions, with alpha reliability coefficient of 0.82.

The second measure of social support captures perceived support during the COVID-19 pandemic. Respondents were asked, "Since the COVID-19 pandemic, could you have used more emotional support than you received?" We compared respondents who reported receiving the needed support during the pandemic to those who reportedly received less support than needed.

Other covariates included in the analysis include gender, age, race/ethnicity, mother's education, loss of employment during the COVID-19 pandemic, union status, sexual orientation, college grade level, and college campus. We compared male and female students and included a third category to capture non-binary and other gender categories. Age is measured in five categories—less than 20 years (reference), 20-24, 25-29, 30-39, and 40 and older. We included four racial/ethnic categories: non-Hispanic white (reference), non-Hispanic black, non-Hispanic Asian, and Hispanic. The fifth category includes respondents with other racial/ethnic identities. We compared respondents whose mothers graduated college (0) to those with mothers having no high school diploma (1), high school diploma (2), or some college education (3). Due to an error in the skip pattern in the survey, a substantial share of the sample (>15%) did not report their mom's education. We included a fifth category to control for this group. We also controlled for any loss of employment during the COVID-19 pandemic. For marital status, respondents reported being married (0), cohabiting (1), or single (2). Respondents were assigned a value of "1" if they identified as heterosexual or straight, and "0" if otherwise. We captured five college grade levels—freshman (0), sophomore (1), junior (2), senior (3), and graduate (4), and sampled respondents from three campuses—UCCS, StMU, and SOU. Lastly, we controlled for respondents' general health. We compared respondents with fair or poor self-rated health to those who reported excellent, very good, or good health.

Analytical Strategy

At the bivariate level, we describe respondents' scores on mental health indicators and their sociodemographic characteristics. We compared mental health and sociodemographic characteristics by residential move during COVID-19 pandemic. For the multivariate analyses, we used Ordinary Least Squares (OLS) regression to examine the association between residential move during COVID-19 pandemic and college students' reports of depressive symptoms (Table 2). Using logistic regression, we examined the relationship between residential move during the pandemic and anxiety (Table 3). In each analysis, Model 1 is a zero-order model including only the indicator of residential instability during the COVID-19 pandemic. In Model 2, we controlled for a wide range of sociodemographic characteristics associated with mental health outcomes in the student population. In Model 3, we added the two indicators of perceived social support, testing their effects on the mental health outcomes net of other covariates and their mediating effects on the association between residential move during the pandemic and students' mental health. We assessed differences in the effects of perceived social support on each mental health

outcome (depressive symptoms and anxiety) by residential move during the COVID-19 pandemic. We included interaction terms between the indicators of residential move during the COVID-19 pandemic and each measure of perceived social support. We reported the only significant interaction (between residential move during the COVID-19 pandemic and perceived support during the pandemic) in Model 4 of Table 2.

RESULTS

Descriptive Results

Table 1 presents the summary scores on mental health indicators and other covariates included in the study, for all respondents and separately by residential move during the COVID-19 pandemic. The results show significantly higher depressive symptoms score and higher prevalence rate of anxiety among respondents with COVID-19-related move, relative to those who did not move. Also, compared to those without COVID-19-related move, a smaller share of respondents with COVID-19-related move reported receiving the needed support during the pandemic. However, perceived social support from friends and relatives varied little by residential move during the COVID-19 pandemic, though it was slightly lower for those reporting COVID-19-related move.

TABLE 1
DESCRIPTIVE STATISTICS, MEANS/PERCENTAGES

	All responde nts	Residential move during COVID-19 pandemic		
		Did not move	Non-COVID-19- related move	COVID-19- related move
Depressive symptoms (6-48)	23.64 (10.94)	22.08 (10.75)	23.57 (11.24)	26.18 (10.56)
Anxiety (%)	45.13	41.22	44.74	51.66
Perceived social support from friends and relatives (0-4)	2.93 (0.96)	2.93 (0.97)	3.00 (0.93)	2.88 (0.96)
Received needed support during COVID-19 pandemic (%)	34.92	39.22	35.53	27.62
Gender (%)				
Male	30.01	32.64	29.89	25.90
Female	67.46	65.28	67.29	71.05
Others	2.53	2.08	2.82	3.05
Age (%)				
Less than 20	19.51	14.99	23.50	23.90
20-24	47.22	39.38	45.86	60.69
25-29	13.03	13.66	17.11	9.16
30-39	13.19	19.57	9.96	5.31
40 and older	7.04	12.41	3.57	0.93
Race/ethnicity (%)				
Non-Hispanic white	58.17	56.54	61.09	58.70
Non-Hispanic black	3.78	3.91	4.14	3.32
Non-Hispanic Asian	5.11	6.00	4.70	3.98
Hispanic	26.71	26.23	23.68	29.61

Non-Hispanic other	6.23	7.33	6.39	4.38
Mother's education (%)				
No high school diploma	4.79	5.66	3.95	3.98
High school graduate	13.19	15.49	10.53	11.42
Some college	23.69	22.56	23.87	25.37
College or higher	39.54	37.72	40.23	41.97
Unknown mother's education	18.79	18.57	21.43	17.26
Lost job to COVID-19 pandemic (%)	25.95	20.15	22.18	37.85
Union status (%)				
Married	16.93	25.15	14.47	5.58
Cohabiting	15.73	11.66	21.43	18.19
Single	67.34	63.20	64.10	76.23
Heterosexual/straight (%)	75.30	78.52	75.00	70.39
Grade level (%)				
Freshman	14.60	11.91	21.05	14.34
Sophomore	15.33	11.41	15.04	21.78
Junior	24.86	24.90	23.50	25.76
Senior	24.38	25.90	19.36	25.50
Graduate	20.84	25.90	21.05	12.62
College campus (%)				
UCCS	75.54	77.69	80.26	68.79
StMU	16.29	15.49	11.65	20.85
SOU	8.17	6.83	8.08	10.36
Fair or poor self-rated health	26.67	23.98	25.75	31.61
Sample size (% of total sample)	2,486 (100.00)	1,201 (48.31)	532 (21.40)	753 (30.28)

Source: A multi-campus online survey of college students' experiences during COVID-19 pandemic; standard deviation in parentheses

Female students were overrepresented in our sample. This is partly due to higher college enrollment rates among American women (Flashman, 2013), and partly because of higher survey participation rates among female college students in our sample. Other surveys conducted during COVID-19 pandemic (Kecojevic et al., 2020) had similarly high female participation rates. Nonetheless, compared to other residential move categories, we have a greater representation of female students among respondents with COVID-19-related moves. Respondents who moved in response to the pandemic were also relatively younger than those with residential stability during the pandemic. Racial/ethnic minoritized students account for two-fifths (42%) of our sample. Compared to 26% of those who did not move, nearly two-thirds (30%) of students with COVID-19-related moves identified as Hispanics. As indicated earlier, a fairly large share (>15%) of our sample did not report their mother's education due to an erroneous skip pattern in the survey. Nonetheless, the sample appears socioeconomically advantaged, with 40% having a college-educated mother. Mother's education did not seem to be a major factor in residential instability among college students during the pandemic. Rather, respondents' own economic circumstance seems paramount. Whereas only a quarter (26%) of our sample reported losing jobs during the pandemic, nearly two-fifths (38%) of those with COVID-19-related moves experienced job loss.

Most students in our sample were either single (67%) or cohabiting (16%). Even so, students with COVID-19-related moves were disproportionately unmarried; only 6% of students who moved in response to COVID-19 were married. Our sample appears more sexually diverse than the general U.S. population; one out of every four students in our sample identified as a sexual minority. Respondents are fairly distributed across grade levels, with 79% reporting undergraduate status, and 21% graduate students. Residential instability may have impacted undergraduate students more than graduates. Compared to 74% of those who did not move during the pandemic, 87% of those with COVID-19-related moves were undergraduate students. Seventy six percent of the students were enrolled at UCCS, 16% at StMU, and 8% attended SOU. Relative to those who did not move and those who moved for reasons other than COVID-19, UCCS students were less represented among students with COVID-19-related moves. Lastly, more than a quarter (27%) of our sample rated their health as fair or poor, and this percentage is even larger among those who moved due to the COVID-19 pandemic—32%.

Residential Move During COVID-19 Pandemic and Depressive Symptoms

Next, we examined the association between residential instability during the COVID-19 pandemic and mental health among college students in a series of regression models. Table 2 presents OLS regression models for the association between residential move during the COVID-19 pandemic and depressive symptoms. The results of the zero-order model showed significantly higher levels of depressive symptoms among college students who reported residential move during the COVID-19 pandemic, whether COVID-19-related or not (Model 1). Other predictors in the model explained the significant association between non-COVID-19-related moves and depressive symptoms (Model 2). However, the coefficients of COVID-19-related move remained significant across models, suggesting that irrespective of their sociodemographic characteristics, college students who were forced to move during the COVID-19 pandemic experienced significantly worse symptoms of depression. Perceived social support from friends and relatives and perceived social support during the COVID-19 pandemic were both negatively associated with depressive symptoms, net of other covariates included in Model 3 (Table 2). Other significant predictors of depressive symptoms in Model 3 include gender, age, sexual orientation, college grade level, and self-rated health. Female students had significantly higher levels of depressive symptoms than their male counterparts. Compared to teenagers, respondents in their mid-to-late twenties reported significantly higher levels of depressive symptoms, while those aged 30 and older reported lower depressive symptoms (nonsignificant). We found significantly lower levels of depressive symptoms among heterosexual or straight students than among sexual minorities. Respondents with junior college standing and graduate students reported significantly lower depressive symptoms than freshmen. Students who rated their health as fair or poor also had elevated levels of depressive symptoms.

TABLE 2
**REGRESSION MODELS FOR THE RELATIONSHIP BETWEEN RESIDENTIAL MOVE
 DURING COVID-19 PANDEMIC AND DEPRESSIVE SYMPTOMS (n = 2,486)**

	Model 1	Model 2	Model 3	Model 4
Residential move during COVID-19 pandemic (0 = Did not move)				
Non-COVID-19-related move	1.492** (0.562)	0.403 (0.518)	0.608 (0.471)	1.445* (0.587)
COVID-19-related move	4.103*** (0.502)	1.932*** (0.483)	1.682*** (0.440)	1.763*** (0.516)
Perceived social support from friends and relatives			-2.692*** (0.200)	-2.699*** (0.200)

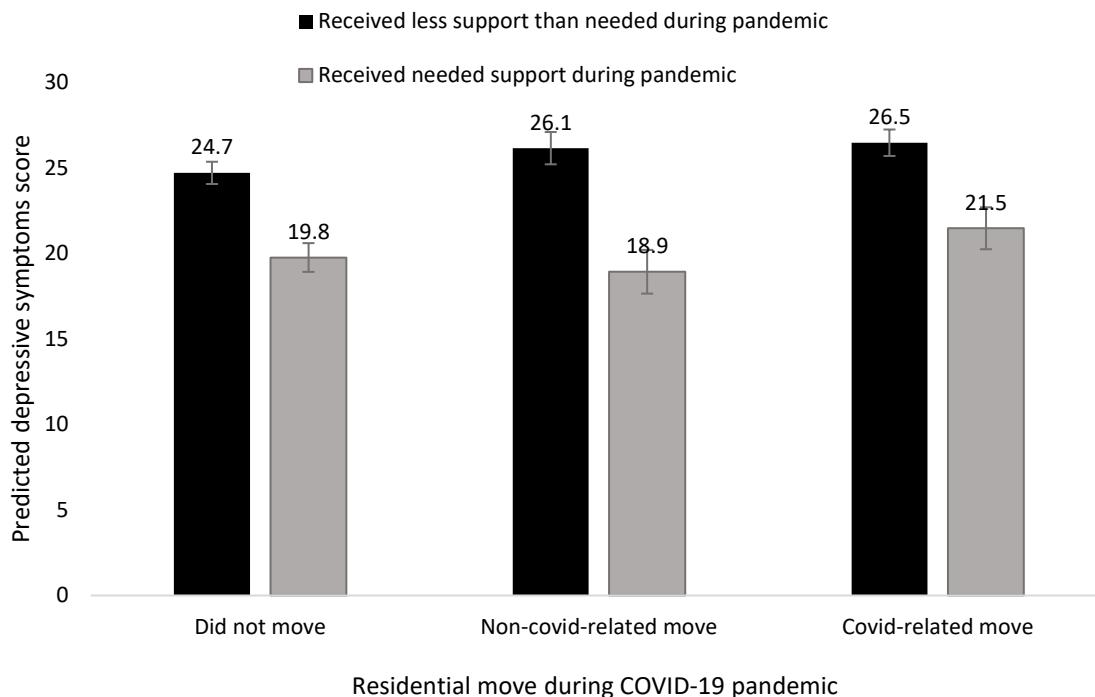
Received needed support during COVID-19 pandemic	-5.459*** (0.405)	-4.946*** (0.543)
Residential move during the pandemic x Received needed support		
Non-COVID-19-related move x Received needed support	-2.279* (0.954)	
COVID-19-related move x Received needed support	-0.053 (0.887)	
Gender (0 = male)		
Female	1.501*** (0.432)	0.911* (0.396)
Others	3.646** (1.320)	2.456* (1.203)
Age (0 = Less than 20)		
20-24	-0.103 (0.752)	0.167 (0.684)
25-29	1.952* (0.932)	1.721* (0.849)
30-39	-0.497 (0.997)	-0.231 (0.908)
40 and older	-1.500 (1.164)	-1.224 (1.060)
Race/ethnicity (0 = Non-Hispanic white)		
Non-Hispanic black	0.155 (1.037)	0.549 (0.943)
Non-Hispanic Asian	-1.035 (0.904)	-0.376 (0.824)
Hispanic	0.033 (0.524)	-0.117 (0.477)
Non-Hispanic other	0.861 (0.819)	1.072 (0.745)
Mother's education (0 = No high school diploma)		
High school graduate	0.199 (1.041)	0.940 (0.947)
Some college	0.357 (0.983)	1.270 (0.894)
College or higher	-0.098 (0.960)	1.105 (0.874)
Unknown mother's education	0.304	1.403
		1.384

	(1.024)	(0.932)	(0.931)
Lost job to COVID-19 pandemic	1.211** (0.457)	0.754 (0.416)	0.760 (0.416)
Union status (0 = Married)			
Cohabiting	1.298 (0.752)	0.859 (0.684)	0.798 (0.684)
Single	1.585* (0.652)	1.004 (0.594)	0.953 (0.594)
Heterosexual/straight	-5.023*** (0.476)	-3.964*** (0.435)	-3.984*** (0.435)
Grade level (0 = Freshman)			
Sophomore	-1.585 (0.824)	-1.249 (0.750)	-1.172 (0.750)
Junior	2.580** (0.869)	-2.021* (0.791)	-1.945* (0.790)
Senior	-1.907* (0.901)	-1.285 (0.821)	-1.211 (0.821)
Graduate	-4.864*** (0.959)	-4.018*** (0.875)	-3.994*** (0.874)
College campus (0 = UCCS)			
StMU	0.395 (0.623)	0.327 (0.567)	0.343 (0.567)
SOU	-0.492 (0.731)	-0.487 (0.665)	-0.538 (0.665)
Fair or poor self-rated health	7.094*** (0.448)	5.268*** (0.415)	5.269*** (0.415)
Intercept	22.079*** (0.312)	24.329*** (1.373)	33.168*** (1.340)
R-squared	0.026	0.233	0.367
	0.368		

Source: A multi-campus online survey of college students' experiences during the COVID-19 pandemic

In Model 4, we tested whether perceived social support during the COVID-19 pandemic was strongly related to depressive symptoms among students who moved in response to COVID-19 than those who did not move. We present the results of the interaction terms (between residential move during the COVID-19 pandemic and perceived support during the pandemic) in Figure 1. Regardless of residential instability, respondents who reportedly received less support than needed during the COVID-19 pandemic had significantly higher levels of depressive symptoms than those who received the needed support. Contrary to our expectation, perceived social support during the pandemic appears significantly more important to depressive symptoms among respondents who moved for reasons other than COVID-19 than those who did not move and those who moved in response to COVID-19. It could be that these students had experiences of residential instability and perhaps other problems before the COVID-19 pandemic.

FIGURE 1
PREDICTED DEPRESSION SCORES AND MARGINS OF ERROR BY RESIDENTIAL INSTABILITY AND PERCEIVED SOCIAL SUPPORT DURING COVID-19 PANDEMIC



Residential Move During the COVID-19 Pandemic and Anxiety

Table 3 presents the results (odds ratios) of logistic regression analysis of the association between residential move during the COVID-19 pandemic and reports of anxiety. In the zero-order model (Model 1, Table 3), COVID-19-related move was significantly and positively related to anxiety. However, including sociodemographic characteristics in Model 2 reduced COVID-19-related move to non-significance, suggesting that sociodemographic disadvantages explained the significantly higher odds of anxiety among students who moved in response to COVID-19. As shown in Model 3, perceived social support from friends and relatives and perceived support during the pandemic were significantly associated with lower odds of severe anxiety. As noted earlier, none of the interaction terms between residential move during the COVID-19 pandemic and perceived social support were significant, suggesting that perceived social support had similar effects on anxiety for movers and non-movers.

TABLE 3
ODDS RATIOS AND CONFIDENCE INTERVALS, LOGISTIC REGRESSION MODELS FOR THE RELATIONSHIP BETWEEN RESIDENTIAL MOVE DURING COVID-19 PANDEMIC AND ANXIETY (n = 2,486)

	Model 1	Model 2	Model 3
Residential move during COVID-19 pandemic (0 = Did not move)			
Non-COVID-19-related move	1.15 (0.94 - 1.42)	1.04 (0.83 - 1.30)	1.06 (0.84 - 1.33)
COVID-19-related move	1.52***	1.19	1.14

	(1.27 - 1.83)	(0.96 - 1.46)	(0.92 - 1.42)
Perceived social support from friends and relatives		0.76*** (0.69 - 0.84)	
Received needed support during COVID-19 pandemic		0.40*** (0.32 - 0.48)	
Gender (0 = male)			
Female	1.67*** (1.38 - 2.01)	1.54*** (1.27 - 1.87)	
Others	1.83* (1.02 - 3.30)	1.50 (0.82 - 2.74)	
Age (0 = Less than 20)			
20-24	0.96 (0.69 - 1.32)	1.01 (0.72 - 1.41)	
25-29	0.94 (0.63 - 1.40)	0.93 (0.61 - 1.41)	
30-39	0.75 (0.49 - 1.16)	0.79 (0.51 - 1.23)	
40 and older	0.85 (0.52 - 1.42)	0.92 (0.55 - 1.56)	
Race/ethnicity (0 = Non-Hispanic white)			
Non-Hispanic black	0.76 (0.48 - 1.21)	0.80 (0.50 - 1.29)	
Non-Hispanic Asian	0.50** (0.32 - 0.76)	0.54** (0.35 - 0.84)	
Hispanic	0.93 (0.74 - 1.17)	0.92 (0.73 - 1.16)	
Non-Hispanic other	0.96 (0.67 - 1.36)	1.00 (0.69 - 1.44)	
Mother's education (0 = No high school diploma)			
High school graduate	1.00 (0.64 - 1.58)	1.13 (0.71 - 1.81)	
Some college	1.02 (0.66 - 1.57)	1.18 (0.76 - 1.84)	
College or higher	1.05 (0.69 - 1.59)	1.23 (0.80 - 1.90)	
Unknown mother's education	1.04 (0.66 - 1.63)	1.21 (0.76 - 1.93)	
Lost job to COVID-19 pandemic	1.22 (1.00 - 1.48)	1.16 (0.94 - 1.42)	

Union status (0 = Married)		
Cohabiting	1.13 (0.82 - 1.57)	1.07 (0.76 - 1.50)
Single	0.98 (0.74 - 1.31)	0.90 (0.67 - 1.21)
Heterosexual/straight	0.55*** (0.45 - 0.68)	0.62*** (0.50 - 0.76)
Grade level (0 = Freshman)		
Sophomore	0.86 (0.60 - 1.22)	0.86 (0.60 - 1.25)
Junior	0.82 (0.56 - 1.19)	0.85 (0.58 - 1.26)
Senior	1.10 (0.74 - 1.62)	1.16 (0.78 - 1.74)
Graduate	0.70 (0.46 - 1.06)	0.74 (0.48 - 1.14)
College campus (0 = UCCS)		
StMU	1.02 (0.78 - 1.34)	1.00 (0.76 - 1.32)
SOU	0.99 (0.72 - 1.36)	0.99 (0.71 - 1.37)
Fair or poor self-rated health	2.74*** (2.25 - 3.32)	2.28*** (1.86 - 2.79)
Intercept	0.70*** (0.63 - 0.79)	0.76 (0.42 - 1.39)
		2.06* (1.06 - 3.99)

Source: A multi-campus online survey of college students' experiences during the COVID-19 pandemic

Similar to the results for depressive symptoms, female students were significantly more likely to report anxiety than male students. Also, non-Hispanic Asian students had significantly higher odds of anxiety than their non-Hispanic white counterparts. Students who identified as heterosexual or straight were significantly less likely to report severe anxiety than those who identified with various sexual minority groups. Lastly, students with fair or poor self-rated health were more than twice as likely as those with excellent, very good, or good health to report severe anxiety.

DISCUSSION

There is growing research linking housing insecurity during the COVID-19 pandemic to negative mental health outcomes among college students in the U.S. (Conrad et al., 2021; Soria, 2023). Pandemic-era quarantine measures that either forced college students out of their college residences or heightened their housing concerns precipitated COVID-19-related grief, loneliness, anxiety, and depression (Conrad et al., 2021; Jones et al., 2021) in a population that was dealing with mental health crisis pre-pandemic (Chirikov et al., 2020; Lipson et al., 2018). However, the role of social support in mitigating the mental health impacts of forced relocation during the pandemic is understudied. In this study, we examined how residential instability and social support relate to depression and anxiety among college students during the COVID-19 pandemic. The current analysis is unique in the sense that it makes a distinction between

relocations among college students that were unrelated to COVID-19, and COVID-19-related moves. It also examines the buffering effects of social support on mental health among students with varying experiences of housing instability.

In line with previous studies (e.g. Conrad et al., 2021), the results show significantly higher depressive symptoms and higher risks of severe anxiety among college students with COVID-19-related moves, relative to those who did not move during the pandemic. Social support was also significantly and negatively related to depression and anxiety. Irrespective of a residential move, students who received less support than needed during the pandemic reported worse mental health. Contrary to our expectations, perceived social support was similarly related to mental health for movers and non-movers. Rather than students with COVID-19-related moves, perceived social support appeared to be more significantly related to depression among students who moved for reasons other than COVID-19. We suspect that these are students who had experiences of residential instability and perhaps other social disadvantages prior to the COVID-19 pandemic. According to Glover et al.'s (2020) framework for identifying and mitigating the equity harms of COVID-19 policy interventions, the physical, social, and psychological harms of the COVID-19 pandemic were inequitably distributed across social groups, and were exacerbated by policy interventions like the lock-down measures. In this study, students who experienced forced relocation due to COVID-19 were more represented among disadvantaged social groups (e.g. Hispanics, female students, students with job losses, and sexual minoritized students). Therefore, residential instability may have worsened mental health issues among these groups. Also, based on our findings, students who experienced residential instability during the pandemic were less likely to have received the needed support during the pandemic.

The culmination of higher risks of instability and limited access to social support predisposes certain groups of students to elevated risks of mental health struggles. Pandemic-era lockdown measures may have eased, but its associated harms, such as residential instability, depression, and anxiety may persist as long-term stressors among college students. Our findings call for a targeted approach in addressing the negative impacts of COVID-19 on college students. Mental health resources like tele-mental health counseling are important tools for combating depression and anxiety among students. But such effort should include special consideration for preexisting social disadvantages that may render some groups of students more vulnerable to experiences of residential instability, reduced access to social support, and adverse mental health outcomes.

This study contributes to existing work on housing insecurity and mental health among college students by documenting the critical role of social support in mental health outcomes, both for movers and non-movers alike. However, there are few important limitations. Due to the cross-sectional nature of the data used, we could not establish causal link between residential instability and mental health in this study. In the general population, the relationship between mental health and housing instability is bi-directional (Padgett, 2020). Worse mental health may have exposed some students to higher risks of residential instability. Poor mental health may also limit students' access to social support, particularly during the initial period of the pandemic when tensions were heightened for all groups. We also could not account for the possible effects of COVID-19 infections on the analysis, whether of respondents or persons within their social networks. Given the controversial nature of COVID-19 vaccines in the study context, respondents' experiences with COVID-19 vaccines represent an important omitted variable in this study. Our data come from a fairly large population of students sampled from three universities across multiple regions in the U.S. Nonetheless, the sample is non-representative of all college students, and our findings are limited in their generalizability to the larger student population across the U.S. Lastly, we call on future studies to extend this analysis to other groups of students, including international students and student veterans.

Residential instability and other fallouts of COVID-19 pose significant risks to students' mental health, both short-term and long-term. Efforts aimed at addressing the mental health crisis among college students should include bridging the gaps in access to stable, affordable, and safe housing as well as social support.

Data Availability

The datasets generated and analyzed during the current study are available from the corresponding author on a reasonable request

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