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Exploring the roles of childhood trauma, psychological distress, and resource use in the context of a climate change-induced disaster

Savannah B. Simpson, Maria Kornbluh, Samuel D. McQuillin, & Jyoti Mishra

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Author Biographies: *Savannah B. Simpson,* is a Doctoral Candidate in the Clinical-Community Psychology program at the University of South Carolina. Savannah's research program seeks to promote positive youth development and social change in formal mentoring programs, with a complementary focus on improving mental health outcomes among college students. By examining the intersections of mentoring relationships, cultural responsiveness, and well-being, her work aims to inform practices that foster resilience and psychological well-being in both youth and young adults. *Mariah Kornbluh,* is an Associate Professor in Community Psychology at the University of Oregon. Her scholarship explores how student-led research can inform school decision-making in effective and sustainable ways. *Samuel McQuillin*, is an Associate Professor in School Psychology at the University of South Carolina. He is interested in how communities and schools can work together to help empower young people to succeed in school and in life. Dr. McQuillin is particularly interested in how relationships between adult helpers and young people influence positive youth development. In his work, he hopes to improve these positive influences by equipping helpers with skills and practices gleaned from research evidence. Dr. McQuillin also serves as a quantitative methodologist on a broad range of research projects. *Jyoti Mishra,* is an Associate Professor in the department of Psychiatry at the University of California San Diego. She

is the founder and director of the NEATLabs and also the co-director of the University of California wide Climate Resilience Initiative (https://www.climateresilience.online/). Dr. Mishra has research expertise in the study of climate trauma and resilience as well as scalable digital mental health interventions and precision psychiatry. Her research has been widely featured in popular media, including features in CNN, TIME magazine, the BBC, NPR, Washington Post, World Economic Forum, and Scientific American, among others, and has also been cited by the National Climate Assessment as the first empirical evidence of climate disaster impacts on mental health and well-being.

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Corresponding Author: Savannah B. Simpson, University of South Carolina, email: sbs16@email.sc.edu.

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Abstract

Aims: This cross-sectional study examined the relationship between childhood trauma and psychological distress (i.e., depression and anxiety symptoms) and the moderating role of resource use during and after the deadliest wildfire in California among a sample of college students.

Method: Participants (N = 473) completed well-validated measures six months after the 2018 Camp Fire exploring retrospective childhood trauma, current psychological distress, and resource use during and after the fire.

Results: Multiple regression and moderation analyses revealed that greater exposure to childhood trauma predicted increased depression and anxiety symptoms following the fire. However, using community-based (off-campus) mental health services during and after the fire buffered the effects of childhood trauma on depression and anxiety symptoms.

Conclusion: Youth exposed to childhood trauma are more susceptible to depression and anxiety symptoms post-disaster, yet using community-based mental health services may protect against the development of aggravated symptoms with greater childhood trauma.

Introduction

Young adults are increasingly being exposed to environmental disasters (Centre for Research on the Epidemiology of Disasters, 2022). In fact, the severity and frequency of these disasters, particularly wildfires, have been on the rise due to climate change (Jones et al., 2022). Climate change appears to be leading to weather conditions that are more conducive to the occurrence and spread of fires. These conditions create an environment that facilitates the ignition, rapid spread, and difficulty in extinguishing fires (Jones et al., 2022). Consequently, the heightened occurrence of climate change-induced disasters presents significant threats to both physical and mental well-being (Adams et al., 2022; Lowe et al., 2019). When weather conditions become unfavorable, such as during long periods of extreme heat or flooding, it can create a range of challenges and hardships (Cianconi et al., 2020). These conditions often disrupt daily routines, damage infrastructure, and pose threats to personal safety and mental health. As a result, the general population may experience increased stress levels and feelings of anxiety and/or depression due to these adverse circumstances (Charlson et al., 2021; Cianconi et al., 2020; Crandon et al., 2022; To et al., 2021). However, for individuals who have pre-existing vulnerabilities like anxiety and/or depressive disorders, the impact of adverse weather conditions can be even more significant. Exposure to extreme and

prolonged weather conditions may further intensify existing emotional struggles, exacerbating symptoms and making it more difficult to effectively cope with mental health conditions (Berry et al., 2010; Taylor, 2020). Individuals exposed to childhood trauma may also be significantly impacted by climate change-induced disasters given childhood trauma can increase vulnerability to the mental health effects of stressful life events (McLaughlin et al., 2010; Silveira et al., 2021). Childhood trauma, which encompasses experiences such as abuse, neglect, or witnessing violence, can have long-lasting impacts on individuals' psychological well-being (Downey & Crummy, 2022). Exposure to childhood trauma can lead to disruptions in typical developmental processes and can shape how individuals perceive and respond to subsequent stressors throughout their lives (Dye, 2018). When individuals who are exposed to childhood trauma encounter climate change-induced disasters, the combination of their previous trauma and the overwhelming nature of the disaster can exacerbate mental health symptoms (Silveira et al., 2021).

Moreover, climate change-induced disasters disproportionately affect individuals of lower socio-economic status (SES; Lowe et al., 2019) and have a more pronounced effect on women, the young and elderly, and people of color (Ibarrarán et al., 2009; Tang et al., 2014). Access to resources becomes particularly important for minoritized individuals, as they face additional barriers in recovering from the impact of climate change-induced disasters. This is especially crucial because the conservation of resources model suggests that the use of post-disaster resources, including mental health services, can act as a protective factor in mitigating distress (Hobfoll, 1989). According to this model, distress emerges when individuals experience significant losses in tangible (e.g., money, possessions) and/or intangible (e.g., social support, self-esteem) resources. Following climate change-induced disasters, significant losses are common, increasing the probability of experiencing distress (Hobfoll et al., 2016). Using post-disaster resources (e.g., disaster relief aid, counseling and psychological support, community support and engagement) can help mitigate distress by providing the necessary support, assistance, and coping mechanisms during the challenging aftermath of a disaster. In fact, there is typically an increase in use of mental health services following climate change-induced disasters (Reifels et al., 2015).

While there is extensive literature exploring the effects of climate change-induced disasters on the mental health of adults and children (Charlson et al., 2021; Crandon et al., 2022; Lowe et al., 2019; To et al., 2021), there is much less research focusing on the impact of these disasters on college students. This research gap is important to address as emerging adulthood, the phase in which college students are typically in, is a critical time in development (Wood et al., 2018). It is during this phase that individuals experience numerous transitions and challenges while shaping their identity and navigating their future paths. Therefore, it is important to recognize that college-going youth also face significant hardship in the aftermath of such events, often relying on their communities for support (Carales & López, 2022). Gaining insight into the ramifications of climate change-induced disasters and the resources that students use can assist institutions of higher education in developing strategies to best support these youth. To effectively respond to emergencies and cater to the well-being of college students with pre-existing vulnerabilities, it is crucial to understand which post-disaster resources are beneficial. Therefore, the current study examined

whether exposure to childhood trauma (before the age of 18 years) predicted psychological distress among a sample of college students living in close proximity to the deadliest wildfire in California, the 2018 Camp Fire; prior work has shown that this extreme event was a climate change-induced wildfire (Duffy et al., 2019). We also explored the moderating role of resource use (e.g., mental health services, disaster relief aid, food pantry) by students during and after the fire. By examining these factors, the study aimed to shed light on the effectiveness of various resources in mitigating psychological distress and supporting college students with pre-existing vulnerabilities in the face of the climate change-induced disaster.

Given that prior literature indicates individuals with pre-existing vulnerabilities are more likely to experience mental health challenges following a disaster (Berry et al., 2010; Taylor, 2020), we hypothesized that participants who report increased exposure to childhood trauma will have greater depression and anxiety symptoms after the Camp Fire. We also hypothesized that the effect of childhood trauma on depression and anxiety symptoms will be moderated by student resource use during and after the Camp Fire (i.e., the relationship between childhood trauma and depression and anxiety symptoms is different for students who used resources). The current study offers a unique contribution to the literature by examining the intersection of mental health, climate change-induced disasters, and the role of resource use with a sample of college youth—an understudied population in this realm of research.

Method

Participants

Data were drawn from 473 college students within the California State University, Chico's Department of Psychology (n = 361) and Basic Needs program (provides disaster assistance to students; n = 112; see Table 1) by convenience sampling. Participants were recruited in Chico, CA as residents were among those most affected by the 2018 Camp Fire (the center of the fire was 10 to 15 miles from Chico).

Table 1
Participant Demographic Characteristics (N = 473)

Variable		%
Sex		
	Female	78.8
	Male	21.2
Race		
	White/Caucasian	72.1
	Black/African American	4.1
	Native Hawaiian/Other Pacific Islander	1.6
	Asian	6.5
	American Indian/Alaska Native	0.8
	Biracial or Multiracial	15.0
Socio-Economic Status		
	Low Affluence	2.1
	Lower-Middle Affluence	22.4
	Upper-Middle Affluence	48.6
	High Affluence	26.8
		M(SD)
Age		23.11(6.22)

Procedure

Six months following the 2018 Camp Fire (Spring 2019), California State University, Chico students within the Department of Psychology and/or students enrolled in the Basic Needs program were invited to participate in the present study. Online surveys exploring retrospective childhood trauma, current psychological distress (i.e., depression and anxiety symptoms), and resource use during and after the Camp Fire

were administered to participants once written informed consent was obtained. The study was approved by the institutional review boards of the University of California, San Diego (IRB#180140) and California State University, Chico (IRB#22838).

Measures

Demographics. Participant age, sex, race, and SES were obtained. Dichotomous codes were created to indicate participants' sex (i.e., 0 = female; 1 = male), if respondents identified as White (i.e., 0 = no; 1 = yes), and if respondents were in the California State University, Chico's Department of Psychology or Basic Needs program (i.e., site; 0 = basic needs; 1 = psychology). SES composite scores (0 = low affluence to 3 = high affluence) were created with an adapted version of the family affluence scale (Boudreau & Poulin, 2008), which measures family wealth by ownership of objects of value (e.g., car, computer)—items were chosen with brevity in mind, given the large sample size and contextual constraints of data collection after a serious climate change-induced disaster.

Childhood Trauma. Childhood trauma during the first 18 years of life was assessed using the 28-item brief screening version of the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003). Participants responded on a 5-point Likert scale (1 = never true; 5 = very often true), and a mean score was calculated—higher scores indicated greater trauma (Cronbach's α = .92).

Psychological Distress. To assess depressive symptomatology, the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) was administered. On this scale, participants responded on a 4-point Likert scale (0 = not at all; 3 = nearly every day) to assess the frequency of depression symptoms during the past two weeks. A total sum score was calculated, and higher scores indicated greater depressive symptomatology (Cronbach's α = .90). The 7-item Generalized Anxiety Disorder (GAD-7; Spitzer et al., 2006) scale was used to assess GAD symptom severity. Respondents rated the frequency of the anxiety symptoms on a 4-point Likert scale (0 = not at all; 3 = nearly every day), and a total sum score was calculated—higher scores indicated greater anxiety symptomatology (Cronbach's α = .91).

Resource Use. To determine which resources participants used during and/or following the Camp Fire, participants checked all that applied from an 8-item resource list; this list was generated through soliciting feedback from university staff and community members. Dichotomous codes were created to indicate resource use for the eight resource categories (i.e., 0 = no; 1 = yes). The list of resources included: Counseling and Wellness Center (on-campus; 19.9% yes), Wildcat Food Pantry (provides food and food benefit application assistance to students; 22.6% yes), Wildcat Rise Fire Recovery Fund Grants Application (grant that supports students impacted by the Camp Fire; 13.7% yes), University Housing Office (4.4% yes), Disaster CalFresh Relief (federal assistance program that provides food benefits to disaster victims; 4.2% yes), the Federal Emergency Management Agency (FEMA) Disaster Assistance (6.8% yes), Other Mental Health Services (off-campus; 6.6% yes), and Other Community Agencies (5.1% yes).

Statistical Analyses

Multiple regression analyses examined the effects of childhood trauma on depression and anxiety symptoms, while co-varying for age, race, SES, sex, and site. All covariates were selected a priori. To investigate the moderation effects of resource use on the

association between childhood trauma and depression and anxiety symptoms, eight moderation analyses were performed for each symptom by resource use category. Data were analyzed using IBM Statistical Package for the Social Sciences (SPSS) Statistics (Version 28) predictive analytics software and the macro Process version 4.0 (https://www.processmacro.org/index.html).

Results

Multiple regression analyses revealed, when co-varying for age, race, SES, sex, and site, greater exposure to childhood trauma was associated with increased depression (b = 3.40, SE = .58, p<.001) and anxiety (b = 2.04, SE = .55, p<.001; see Table 2) symptoms. The model equations were also significant (depression: $F(6,305) = 9.57$, p<.001, R^2 = .16; anxiety: $F(6,306) = 4.88$, p<.001, R^2 = .09). Moderation analyses were assessed using a Bonferroni (family-wise error rate) adjusted alpha value of .006 per test (.05/8). Moderation analyses indicated that the use of other (i.e., off-campus) mental health services buffered the effects of childhood trauma on depression (b = -3.81, SE = 1.32, p<.001; see Figure 1) and anxiety symptoms (b = -4.57, SE = 1.26, p<.001; see Figure 2), when co-varying for age, race, SES, sex, and site. These model equations were also significant (depression: $F(8,303) = 10.79$, p<.001, R^2 = .22; anxiety: $F(8,304) = 6.86$, p<.001, R^2 = .15). Furthermore, both models showed that use of other mental health services predicted greater depression (b = 13.47; SE = 3.18, p<.0001) and anxiety symptoms (b = 13.94; SE = 3.03, p<.0001), indicating that individuals who use other mental health services appear to have greater depression and anxiety symptoms compared to individuals who do not use these services. All other resources did not significantly moderate the relationship between childhood trauma and depression and anxiety symptoms (all p's >.05).

Table 2
Summary of Regression Analyses

	Depression Symptoms			Anxiety Symptoms		
Variable	*b*	*SE*	*p*	*b*	*SE*	*p*
Overall Intercept	5.55	2.41	.02	6.63	2.30	.004
Age	-.02	.06	.80	.01	.06	.89
Race[a]	.23	.80	.78	.03	.76	.97
Socio-Economic Status	-.65	.47	.17	-.57	.45	.20
Sex[b]	.03	.81	.98	1.08	.77	.16
Site[c]	-.97	.91	.29	-.81	.87	.35
Childhood Trauma	3.40	.58	<.001	2.04	.55	<.001

Note. [a] 0 = non-White, 1 = White. [b] 0 = female, 1 = male. [c] 0 = basic needs, 1 = psychology.

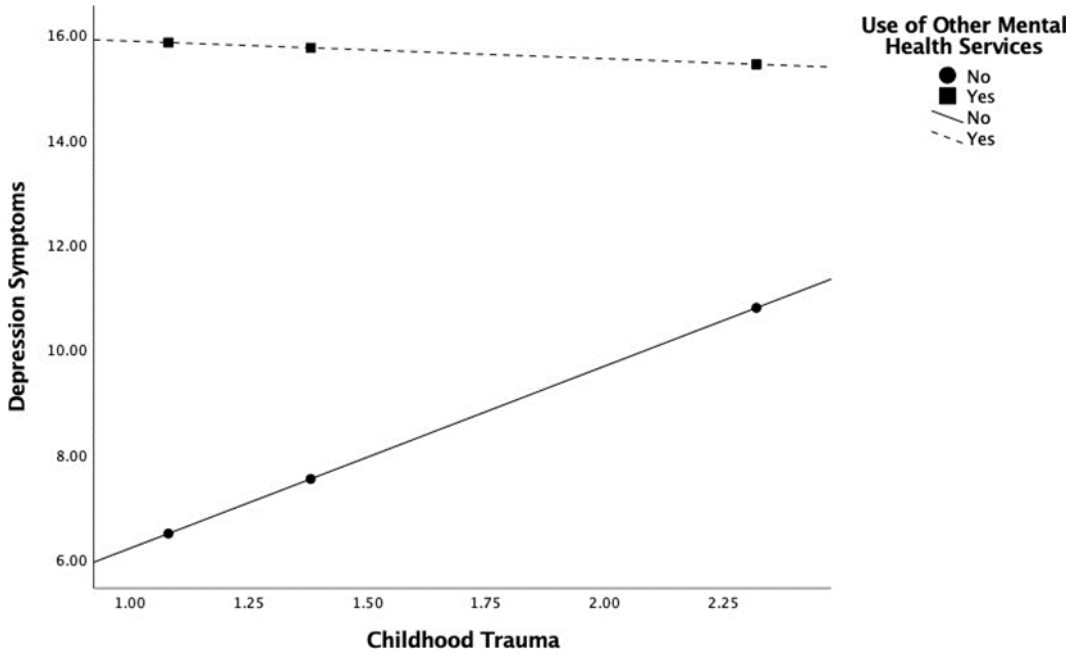

Figure 1. Moderation by use of other (i.e., off-campus) mental health services on the association between childhood trauma and depression symptoms

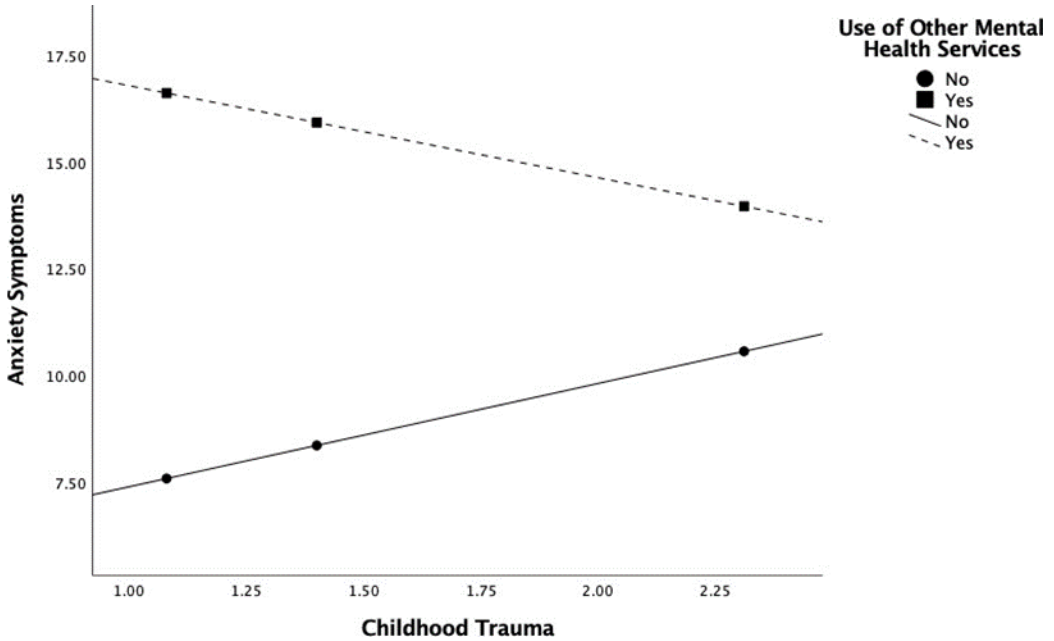

Figure 2. Moderation by use of other (i.e., off-campus) mental health services on the association between childhood trauma and anxiety symptoms

Discussion

The current study examined the associations between exposure to childhood trauma and psychological distress (i.e., depression and anxiety symptoms) as well as the moderating role of resource use during and after the 2018 Camp Fire. Findings suggested that college youth who have experienced childhood trauma may be particularly vulnerable to experiencing depression and anxiety symptoms following a climate change-induced disaster. However, using community-based (off-campus) mental health services shows potential for protecting against further exacerbation of symptoms. Notably, individuals who accessed off-campus mental health services exhibited higher levels of depression and anxiety symptoms compared to those who did not access these services. This suggests that off-campus mental health services may contribute to the well-being of college youth by offering protection against symptom exacerbation, especially for individuals with high anxiety and depression symptoms and a history of childhood trauma. These findings are consistent with previous research showing that individuals with pre-existing vulnerabilities are at an increased risk for psychological distress following a serious climate change-induced disaster (Berry et al., 2010; Taylor, 2020).

Our findings also align with prior research conducted outside the context of climate change-induced disasters, which shows that college students with a history of childhood trauma exhibit significantly higher levels of depression and anxiety symptoms compared to those without such exposure (Bahar, 2023; Chang et al., 2021; Watt et al., 2020). College students often experience significant emotional and intellectual demands, which can create a range of physical, social, and emotional challenges (Hubbard et al., 2018). As a result, college youth, particularly those with trauma histories, may be more susceptible to developing mental health issues during this period (Sheldon et al., 2021). Interestingly, while Artime and colleagues (2019) observed that college students were more likely to use off-campus mental health services compared to on-campus mental health services, we observed the opposite trend, with greater use of on-campus mental health services. Despite this, we found that off-campus mental health services showed a stronger protective effect against the worsening of depression and anxiety symptoms. This may be due to university counseling centers often being overburdened with a high volume of students seeking services, leading to short-term care (Gallagher, 2015; Ghetie, 2007). Whereas off-campus providers may have more capacity to offer longer-term and more individualized treatment. Future studies should continue to explore how community-level factors influence students' mental health service use and outcomes, particularly following a climate change-induced disaster. Research should also investigate how service accessibility and quality influence mental health outcomes to better inform the development of targeted, trauma-informed support systems both on- and off-campus, in the context of such disasters.

Furthermore, this study builds upon previous findings by examining a less studied sample (i.e., college youth) and pre-existing vulnerability (i.e., childhood trauma) in the climate change-induced disaster literature, while co-varying for key demographic characteristics, and investigating the moderating role of resource use. The current study is also noteworthy as it was conducted shortly after a catastrophic climate change-induced disaster and few studies like this exist. The findings emphasize the need for targeted interventions that prioritize the psychological well-being of college students.

Recognizing and addressing the specific needs and vulnerabilities of this demographic is crucial in developing effective strategies to mitigate the impact of climate change-induced disasters on students' mental health; addressing these needs in an evidence-based manner is becoming ever more critical for our society.

Overall, our study offers valuable insights into the associations between childhood trauma, psychological distress, and resource use in the aftermath of a climate change-induced disaster among a sample of college youth. By integrating these findings with the broader framework of community psychology and global climate change, we can gain a better understanding of the complexities that youth face after disasters and the potential for community-based interventions to support individuals during and after such events (Riemer & Reich, 2011). Recognizing the inherent values of well-being and social justice within community psychology, future research must continue to explore approaches to address the consequences of climate change-induced disasters, with a simultaneous focus on fostering youth resilience and expanding equitable support systems (Riemer & Reich, 2011). These efforts will ultimately contribute to promoting a more sustainable and just future, recognizing the importance of employing college student samples as future generations who have the potential to impact climate change policy by exercising their electoral vote and collective climate action (Mishra & Ramanathan, 2023).

Limitations

It is important to be cautious when generalizing our findings, given study limitations. First, our sample consisted of college students (the majority within the Department of Psychology), which indicates our findings are not representative of the larger population. However, it is important to recognize that emerging adulthood is a pivotal phase in the life course (Wood et al., 2018), and this unique population should continue to be studied to better understand how climate change-induced disasters affect students' well-being, while also acknowledging their resilience (Kornbluh et al., 2022). Future work with college student samples will need to consider not only access to post-disaster resources but also address issues of inequity to help inform institutions of higher education on the development of effective strategies for supporting *all* students, particularly those who may face additional barriers after disasters.

Second, most of our sample consisted of White college students, and we faced limitations when conducting analyses with each racial/ethnic group individually. Small numbers of certain races/ethnicities hindered our ability to effectively analyze within-group differences using quantitative analyses in the present sample. Nevertheless, we acknowledge that grouping unique races into one category obscures key differences and is an unideal method to recode race. To enhance the generalizability of this study's findings, it is imperative that future research include carefully designed sampling methods and analytic approaches to encompass a broad spectrum of diverse and intersecting identities (e.g., race, ethnicity, gender, age, education level, SES). This will allow for further development and expansion of the current findings.

Third, the current study employed a cross-sectional design, which inherently limits the ability to establish causality or assess changes over time (Mann, 2012). Although students' experiences with childhood trauma and their current depression and anxiety symptoms were assessed with well-validated measures,

the findings are constrained to associations within this sample at a single time point. Future research should prioritize longitudinal designs to help elucidate the temporal relationship between childhood trauma, mental health symptoms, and the buffering effects of resource use, especially in the context of disasters. Such designs would allow for a clearer understanding of whether mental health symptoms emerge or worsen following a disaster or reflect pre-existing vulnerabilities. Future studies should also use a mixed methods approach to increase the validity of the findings by combining quantitative results with the deeper insights gleaned from qualitative research (McKim, 2017). For example, a qualitative approach may shed light on why using community-based (off-campus) mental health services significantly buffered the negative effects of childhood trauma on psychological distress compared to using the other seven resources (e.g., Were off-campus mental health services more accessible and/or effective than on-campus mental health services?). Qualitative research can also provide a platform for students to share potential challenges and barriers encountered in accessing post-disaster resources, uncovering the ways in which inequities can manifest for certain groups of students. Additionally, due to the unexpected nature of the wildfire, we were unable to collect data on students' mental health and/or resource use prior to the disaster. It is important for future studies to collect data on participants' pre-disaster mental health vulnerabilities as well as resource use to mitigate the influence of these potential confounding variables and even to gain better insights on the importance of the continuum of care from pre- to post-disaster. Often, climate change-induced disasters occur suddenly with little warning; therefore, collecting pre-disaster data can be challenging. However, having participants retrospectively report about their mental health prior to the disaster may be the first step in working to address this concern. Notably, in this regard, our prior work has shown that mental health, cognitive health, and brain health are impacted in a graded manner based on wildfire exposure, with greatest impact on directly exposed individuals relative to non-exposed controls, and indirectly exposed individuals showing impacts in the middle of those two samples (Silveira et al., 2021, Grennan et al., 2023). These graded impacts based on severity of fire exposure suggest that the effects may be indeed disaster-related and not due to potential pre-disaster mental health. Lastly, future research should use a longitudinal design to elucidate the long-term mental health impacts of climate change-induced disasters on college students.

Conclusion

Despite study limitations, our findings highlight the importance of supporting college youth mental health following disasters, particularly for students with pre-existing vulnerabilities, specifically childhood trauma experiences. For this, universities may want to include concrete strategies for supporting students' mental health in their emergency preparedness plans (e.g., psychological screening, documentation of vulnerabilities, issuance of resources) and speedily disseminate mental health resources to those who may be at heightened risk for mental health challenges following a disaster. Future studies should continue to investigate the relationship between specific pre-existing vulnerabilities, like exposure to childhood trauma, and mental health outcomes after climate change-induced disasters. It is also crucial for future research to consider the use and impact of disaster assistance and emergency relief services for those affected by disasters. Such research could inform university, state, and federal budgets on the

allocation of mental health emergency relief services to ensure universities can effectively serve students' needs in times of crisis.

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