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How Adverse Childhood Trauma Affects Coping Behaviors and Anxiety in College Students
During COVID-19: A Neurobiological Perspective

by

Harshita Yepuri

Under the Direction of Amanda Gilmore, PhD

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Science

in the College of Arts and Sciences

Georgia State University

2022

ABSTRACT

The Coronavirus disease (COVID-19) pandemic has uprooted college students out of the traditional college environment and placed additional stressors on them, yet its effects are still emerging. In the present study, 329 college students ($M_{age}=19.74$, $SD_{age}= 1.96$) completed measures of generalized anxiety, behavioral coping, and adverse childhood experiences between July 2020 and March 2021 of the COVID-19 pandemic. It is hypothesized that more adverse childhood experiences would be associated with more maladaptive behavioral coping strategies. In addition, less adaptive coping strategies would be positively associated with more anxiety among college students. Results indicated that negative coping behaviors were associated with more adverse childhood experiences and anxiety symptoms. These findings highlight the impact of the COVID-19 pandemic on college student mental health and the need for targeted interventions for this population.

INDEX WORDS: Behavioral Coping, Anxiety, College Students, Adverse Childhood Experiences, COVID-19, Mental Health, Neuroscience

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During COVID-19: A Neurobiological Perspective

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May 2022

DEDICATION

To the younger version of myself who doubted her ability to succeed – you did it! In addition, this thesis was only possible by the support of my family, friends, and mentors.

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1 INTRODUCTION

1.1 Coronavirus Epidemic

The Coronavirus epidemic (COVID-19) has impacted the lifestyles of college students in the United States. College students are generally stressed by several persistent stressors, such as lack of leisure time, competition, or establishing new personal relationships (Ramon et al., 2020). In addition to such everyday stresses, COVID-19 has placed additional stressors college students are expected to cope with, such as transitioning to online schooling, managing time, struggling with the lack of motivation or schedule, and social isolation (Ramon et al., 2020). It is well known from previous studies that epidemics can increase or create new stressors due to quarantine (Son et al., 2020). These lifestyle changes include anxiety for oneself or a loved one's safety and the limits on movement and social gatherings (Son et al., 2020). The present study reports a preliminary understanding of how adverse childhood experiences impact college students' anxiety and behavioral coping strategies.

1.2 College Student Mental Health

College students are increasingly becoming stressed, and more students report mental health problems (Hurst et al., 2012). These stressors can negatively impact a student's physical and emotional health in the short and long term. Therefore, it is essential to understand the stressors induced by COVID-19.

At least 12-50% of college students experience a mental disorder (Ramon et al., 2020). Studies with undergraduate student populations found a high prevalence of anxiety, stress, and depression (Ramon et al., 2020). Between 2009 and 2015, the rate of anxiety increased by almost 6% (Ramon et al., 2020). Three nationwide surveys conducted in the US amid COVID-19 concluded a gradual increase in the proportion of students feeling anxious and stressed (Lee et

al., 2021). Recent studies that observed the effects of COVID-19 on anxiety amongst college students found that a majority of students showed an increase in their anxiety and stress levels (Son et al., 2020, Cao et al., 2020). These studies indicate that COVID-19 has adversely affected college students' mental health and requires attention.

1.3 Neurobiological Perspective on Stress, Anxiety, and Coping

Stress is the physical reaction to an aversive or threatening stimulus. Anything that disrupts the balance of homeostasis of the threatening event is considered a stressor, and the resulting action towards stressors to reestablish homeostasis is deemed the stress response (Agorastos et al., 2019). While small amounts of stress (eustress) can be beneficial or productive, a toxically high amount of stress has significant negative impacts on the developing brain and nervous system (Agorastos et al., 2019).

Chronic stress can have pathological implications, including impaired disease resistance, hypertension, and myopathy. Chronic stress has also been shown to impact memory by directly retracting and simplifying dendrites, impacting neurogenesis in the hippocampus. This effect is also seen in the medial prefrontal cortex, the part of the brain responsible for making decisions and retrieving long-term memories (Euston et al., 2012).

Chronic stress can also impact the suprachiasmatic nucleus of the hypothalamus. The circadian clock operates on an internal synchronization and impacts one's moods, quality of sleep, and the formation and consolidation of memories. A loss of the critical timing and synchronization of the circadian clock may cause disharmony in other biological systems, such as neuroendocrine or autoimmune functions (Agorastos et al., 2019). In addition, chronic stress is related to a decrease in sleep, whose downstream effects include altering appetite, weight,

cortisol and insulin levels, and cytokines. Decreases in these systems are associated with an anxious or depressive mood (Tahara et al., 2017).

Adverse childhood experiences may be associated with later abnormalities or deficits in the development and plasticity of the central nervous system (Berken et al., 2021). Increased brain plasticity, such as synaptogenesis, myelination, and neuronal pruning, occurs from birth through an individual's twenties (Berken et al., 2021). COVID-19 may further exacerbate the adverse conditions a child is undergoing and negatively impact the stability of their nervous system (Berken et al., 2021). Previous research also indicates that ACEs may result in the hypothalamic-pituitary-adrenal axis (HPA axis)

dysfunctions (Karcher et al., 2020). The functioning of the HPA axis is crucial for healthy brain development. Impairments in its functioning are associated with increased anxiety disorders, depression, or other psychiatric illnesses (Karcher et al., 2020). Since adversity in childhood is a good predictor of poor health outcomes in adulthood, HPA axis dysfunction may be a potential mechanism. However, little is known about childhood adversity's influence on the adult HPA axis over time as it becomes habituated to stress with decreased cortisol output in response to a continued stressor (Applemann et al., 2021). Childhood adversity has also been shown to alter the trajectories of brain development to affect brain circuits involved in detecting threats, regulating emotions, and anticipating rewards (Teicher et al., 2016). These regions, the limbic system and frontal lobe, have also been shown to be significantly reduced volume in children who have experienced ACEs (Berken et al., 2021).

Healthy brain development is dependent on a host of developmental and environmental processes that must happen at a specific time in specific concentrations (Perry and Polard 1998).

However, chronic stress can negatively impact this developmental process, especially when it is extreme or repeated (Anda et al., 2006).

The ages of 0-5 and early childhood represent a vulnerable time for brain development as the HPA-axis, amygdala, and hippocampus develop nonlinearly. Longitudinal studies of stress during this developmental period found a decreased sensitivity to stress as age increases (Agorastos et al., 2019), supporting the stress-sensitization hypothesis that states early life stressors can lower the threshold for reactivity to later stress and increase the risk for onset of disorders when faced with an equal or greater stressful experience later on in life (Benjet et al., 2010).

1.4 Stress and Coping

Coping is an action-oriented cognitive and behavioral effort aimed at managing a person's internal and external demands. These demands usually exceed the resources someone has and are considered stressful (Guszkowska et al., 2022). Coping strategies are integral for preventing future stresses and resilience and have a positive impact on mental and physical outcomes (Taylor et al., 2007). There are two predominant theories of how stress relates to the development of mental disorders: (1) the diathesis-stress model is a psychological theory that explains mental disorders develop from an interaction between predisposition factors (i.e., genes) and stressful life experiences; and (2) Stress sensitization model that explains how early life stressors can lower the threshold for reactivity to later stress and increases the risk for onset of disorders when faced with an equal or greater stressful experience later on in life (Benjet et al., 2010). Since this study does not have data on the participants' genetics, only the stress sensitization model will be used in this thesis to understand the impact of stressful experiences on college students.

To cope with increased anxiety and stress levels induced by COVID-19, college students sought help from others and used positive and negative self-management methods (Son et al., 2020). Negative self-management methods consisted of sleeping longer, distracting oneself, or drinking alcohol and smoking. Positive self-management methods involved exercise, meditation and breathing exercising, and seeking support from others. Previous research has shown that maladaptive coping behaviors are predictors of anxiety and depression, while adaptive coping methods can improve a student's mental health and wellness (Son et al., 2020). Previous studies have also concluded that college students struggle with coping with their stress (Son et al., 2020). Therefore, the strong, positive relationship between anxiety and coping behaviors can be assessed (Nurrunabi et al., 2020). The Brief COPE (Coping Measures to Problems Experienced) measure is a widely used scale to assess coping and is a shortened version of the COPE inventory (Carver, 1998). The Brief COPE is categorized into adaptive and maladaptive coping responses based on whether they are predictors of positive or negative mental health outcomes. Previous research has found that higher levels of maladaptive coping strategies are associated with higher perceived stress and anxiety (Moeller et al., 2020). It is unclear what coping strategies were used during COVID-19 and how adaptive or maladaptive they were. These findings could shed light on how college students cope during unprecedented and uncontrollable stressful situations.

1.5 Adverse Childhood Experiences and Coping

Adverse childhood experiences (ACEs) are experiences that occur in childhood (0-17) and can have long-lasting negative outcomes on mental, physical, and emotional health (CDC, 2022). These adversities can consist of abuse, neglect, or household dysfunction, such as growing up in a household with a parent who abuses alcohol. Childhood adversities are common

and account for almost 30% of all disorders across countries. In addition, about 61% of adults across 25 states said they had at least one type of adverse childhood experience. ACEs are correlated with maladaptive behaviors and poor health. College students with ACEs are prone to poor health (Krinner et al., 2020). Moreover, in surveys of self-rated physical health (SRPH) among college students, poor-SRPH was negatively associated with overall academic achievement and numerical grades (Krinner et al., 2020). These outcomes may impact a student's ability to succeed in college.

ACEs can serve as an important measure and predictor of developing mental disorders. When assessing the associations between childhood adversity and psychopathology, research shows strong associations in later teen years and early twenties, which is the age group of most college students (Clark et al., 2010). Moreover, those with more than one childhood adversity had a higher chance of developing a mental disorder (Kessler et al., 2010). In addition, the more stressed students have, the worse their mental health becomes as the semester continues (Canan, 2017). Mental disorders related to ACEs exist in adolescence, early adulthood, and mid-life. Some ACEs can predict the onset of certain psychopathologies in early adolescence (Clark et al., 2010). For example, family dysfunction in early childhood is a strong predictor of mood, anxiety, substance use, and externalizing mental disorders (Benjet et al., 2010). Understanding ACEs can help understand the mental disorders impacting college students.

Previous research shows that children exposed to adverse childhood experiences have increased stress, anxiety, and depression and are associated with higher morbidity and mortality in adulthood (Ortiz & Sibinga, 2017). All categories of the ACEs are correlated with multiple health risk factors in adulthood (Felitti et al., 1998), including age-related disorders, increased allostatic load, and hyperactive hypothalamic-pituitary-axis function (Ortiz & Sibinga, 2017).

Continuing research supports that adverse childhood experiences and coping ability impact one another, such that more adverse childhood experiences is associated with a decrease in coping ability (Jenzer et al., 2019). It is unknown how adverse childhood experiences impacts coping behaviors during COVID-19.

1.6 COVID-19 and its Impact on College Student Coping, Anxiety, and Stress

It is imperative that research focuses on the impacts COVID-19 has had on their mental health and wellness. Little research focuses on the association between various coping mechanisms and common stressors, especially during pandemics. In addition, since COVID-19 negatively impacts higher education, interventions for students to cope with current stressors (Freyhofer et al., 2021). The increased levels of anxiety and stress during COVID-19 can have long-lasting impacts on the mental health of college students and can impact their academic success (Freyhofer et al., 2021; Zimmerman et al., 2021). An important next step in the research is understanding the association between coping and GAD among college students. However, it is unknown how adverse childhood experiences can predict the coping behavior college students are more or less likely to use. Although this study does not measure any neurobiological markers, it is critical to understand the implications of anxiety, stress, and traumatic experiences on the developing brain and how that might predict one's ability to use healthy coping strategies.

1.7 Hypotheses, Aims and Experimental Design

This thesis aimed to examine the association between behavioral coping strategies and adverse childhood experiences among college students during the COVID-19 pandemic. A secondary aim was to understand the association between coping behavioral strategies and anxiety among college students during the COVID-19 pandemic.

Hypothesis 1: More maladaptive behavioral coping strategies and less adaptive ones will be associated with more adverse childhood among college students.

Hypothesis 2: Less adaptive behavioral strategies and more maladaptive behavioral coping strategies will be associated with more anxiety among college students.

Design: Cross-sectional surveys in Qualtrics using Generalized Anxiety Disorder (GAD), Brief Behavioral Coping (COPE), and Adverse Childhood Trauma Experiences (ACES) measures among college students (N=329) during COVID-19. Regression analyses were used to answer hypotheses. We will control related demographic variables.

2 MATERIALS AND METHODS

2.1 Participants and Procedures

A total of 329 undergraduate college students ($M_{\text{age}}=19.74$, $SD_{\text{age}}=1.96$) recruited from a university through a psychology subject pool in a large metropolitan city in the Southeastern United States between July 2020 and March 2021 during the COVID-19 pandemic. Participants received course credit for completing the study. Participants mostly identified a woman ($n=197$, 60.2%) and heterosexual ($n=229$, 69.8%). Over one-third identified as Black ($n=107$, 33.6%), followed by White ($n=91$, 28.6%), Asian ($n=91$, 28.6%), or multiracial/another racial identity ($n=28$, 8.8%). Of all the participants, 49.8% ($n=164$) were freshman, 29.2% ($n=96$) were sophomores, 13.1% ($n=43$) were juniors and 7.3% ($n=24$) seniors. In addition, 56.8% ($n=187$) of students lived with their parents during COVID-19, while 26.1% lived off-campus ($n=86$) and 15.5% ($n=51$) lived in dorms or residence halls. Furthermore, the vast majority of individuals (53.2%) were single and not dating while 22.2% ($n=73$) were single and dating 21.3% ($n=70$) were in a serious monogamous relationship.

2.2 Measures

2.2.1 Sociodemographic Characteristics

Demographic characteristics included age, gender identity (woman vs. man; other gender identity options were available but not selected), racial identity (Non-Hispanic/Latino White vs. Black, Asian, Multiracial/Other), sexual orientation (sexual minority vs. heterosexual), and living situation during the pandemic (living with parents vs. not living with parents).

2.2.2 Generalized Anxiety

Generalized anxiety was assessed using the Generalized Anxiety Disorder 7-item (GAD-7; Spitzer et al., 2006) scale. This questionnaire assesses how often individuals are bothered by

seven symptoms of generalized anxiety ranging from not at all (0) to nearly every day (3). Answers from all items are summed for a total score, with higher scores indicating more generalized anxiety. Cut off scores are 5 for mild, 10 for moderate, and 15 for severe anxiety (Spitzer et al., 2006).

2.2.3 Behavioral Coping

The Brief-COPE is an abbreviated version of the Coping Orientation to Problems Experienced (COPE; Carver et al., 1989) and assesses the ways one deals with the stress, isolation and uncertainty induced by COVID-19. It is validated on a community sample that had been impacted by a hurricane (Carver, 1997). Participants rate 28 items on a scale from I haven't been doing this at all (1) to I've been doing this a lot (4). The items are grouped into specific scales. These scales consist of two items each and are categorized as self-distraction (e.g., I've been turning to work or other activities to take my mind off things), active coping (e.g., I've been concentrating my efforts on doing something about the situation I'm in) denial (e.g., I've been saying to myself, "this isn't real"), substance abuse (e.g., I've been using alcohol or other drugs to make myself feel better), use of emotional support (e.g., I've been getting emotional support from others), use of instrumental support (e.g., I've been getting help and advice from other people, behavioral disengagement (I've been giving up trying to deal with it), venting (e.g., I've been saying things to let my unpleasant feelings escape), positive reframing (e.g., I've been trying to see it in a different light, to make it seem more positive), planning (e.g., I've been trying to come up with a strategy about what to do), humor (e.g., I've been making jokes about it), acceptance (e.g., I've been accepting the reality of the fact that it has happened), religion (e.g., I've been trying to find comfort in my religion or spiritual beliefs), and self-blame (e.g., I've been blaming myself for things that happened) and then summed. The items were then

categorized as adaptive (i.e., active coping, use of emotional and instrumental support, venting, positive reframing, planning, humor, acceptance, religion) and maladaptive (i.e., self-distraction, denial, substance use, behavioral disengagement, self-blame) composites (Carver, 1997).

2.2.4 Adverse Childhood Experiences

Ten items assess common adverse childhood experiences (Felitti et al., 1998). Five items assess personal abuse (e.g., *Did you often or very often feel that you didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?*) while five assess adverse experiences caused by other family members (e.g., *Was a household member depressed or mentally ill?*). A “Yes” for each category of adverse childhood experience gives one point, with higher scores indicating severe childhood adverse experiences (Felitti et al., 1998). The ACEs instrument is validated among adult samples (Ford et al., 2014; Murphy et al., 2014).

3 RESULTS

3.1 Descriptive Analyses

Among all students, those with adverse childhood experiences ($M=1.18$; $SD=1.62$) commonly reported having parents that were separated or divorced (27.7%; $n=91$). Other common experiences included parents or other adults in their household often acting in ways that made them afraid they might get hurt (16.4%; $n=54$) and feeling that no one in their family loved them (17%; $n=56$). Adapting coping ($M=2.43$; $SD=.730$), involved students accepting the reality of COVID-19 (37.1%, $n=122$), turning to other activities to take their mind off of things (31.7%; $n=88$), and learning to live with it (33.7%; $n=111$). The most common types of negative coping ($M=1.63$; $SD=.675$) were blaming themselves for what happened (6.1%; $n=20$), criticizing themselves (10.3%; $n=34$), giving up trying to deal with it (5.8%; $n=19$) and using alcohol or drugs to help them feel better (3.6%; $n=12$). Many students reported feeling anxious ($M=6.71$; $SD=6.52$), nervous or on edge several days after March 11, 2020, when the World Health Organization announced COVID-19 as a pandemic (33.1%; $n=109$). A great number of students also reported worrying too much about different things over half of the days (15.5%; $n=51$) and had trouble relaxing nearly every day (12.8%; $n=42$).

Table 1 Descriptives of Sample Characteristics

Table 1. Descriptives of Sample Characteristics				
	N	%	Mean	SD
Age			19.74	1.959
Gender Identity				
Female	197	59.9		
Male	123	37.4		
Transmale/Transman/FTM	1	.3		
Transfemale/Transwoman/MTF	0	0		
Genderqueer/Gender-non-conforming	4	1.2		
Other	2	.6		
Sexual Identity				

Lesbian	8	2.4		
Gay	8	2.4		
Bisexual	61	18.5		
Queer	2	.6		
Straight/Heterosexual	229	69.6		
Questioning	7	2.1		
Other	13	4.0		
Racial Identity				
Black/African American	107	32.5		
White	91	27.7		
Native American	0	0		
Asian	91	27.7		
Pacific Islander	1	.3		
Multiracial	21	6.4		
Other	7	2.1		
Ethnicity				
Hispanic/Latinx	47	14.3		
	273	83		
	164	49.8		
Sophomore	96	29.2		
Junior	43	13.1		
Senior	24	7.3		
Years in College				
Less than 1	153	48.5		
1	42	12.8		
2	74	22.5		
3	31	9.4		
4	18	5.5		
5 or more	10	3.0		
Living Situation				
Fraternity/Sorority House	1	.3		
Off-Campus Housing/Apartment/House	86	26.1		
Residence Hall/Dorm Rooms	51	15.5		
With Parents	187	56.8		
Relationship Status				
Single, not dating	175	53.2		
Single, dating	73	22.2		
In a serious monogamous relationship	70	21.3		
Engaged	2	.6		
Married	3	.9		
First-Generation				
Yes	109	33.1		
No	215	65.3		

First-Generation US Citizen				
Yes	121	36.8		
No	202	61.4		
Sorority or Fraternity Affiliation				
Yes	38	11.6		
No	264	80.2		
English as Native Language				
Yes	257	78.1		
No	69	21.0		
International Student				
Yes	14	4.3		
No	311	94.5		
Outcome Variables				
Positive COPE			2.43	.730
Negative COPE			1.62	.675
ACES			1.18	1.62
GAD			6.70	6.52

3.2 Regression Analyses

To examine the association between coping and ACEs, a regression model was run in SPSS 28. This model was run with the COPE measure as the independent variable, ACEs score as the dependent variable, and age was controlled for in the model (see **Table 2**). Similarly, to examine the association between coping and anxiety, a regression analysis was run in SPSS 28. This model was run with the COPE measure as independent variable, the GAD measure as the dependent variable, and age was controlled for in the model (see **Table 3**).

3.2.1 Behavioral Coping and Adverse Childhood Experiences

In regards to the first hypothesis assessing the association between behavioral coping and adverse childhood experiences, adaptive coping behaviors was not associated with ACEs, $p = .755$; $\beta = .022$. On the other hand, maladaptive coping behaviors were positively associated with ACEs, $p = .043$; $\beta = .142$. Findings demonstrated that students with more adverse childhood experiences were more likely to engage in negative coping behaviors (see Table 2).

Table 2 Association Between Coping Behavior and ACES score

	<i>p</i>	<i>b</i>	β	<i>t</i>	SE
Age	.057	.094	.119	1.910	.049
Positive Coping	.755	.046	.022	.312	.148
Negative Coping	.043*	.328	.142	2.035	.161

Note. * $p < .05$. SE = standard error

3.2.1 Behavioral Coping and Anxiety

In assessing the association between behavioral coping and anxiety, positive coping behaviors did not predict anxiety scores, $p = .561$; $\beta = .251$. However, negative coping positively predicted anxiety scores, $p < .001$; $\beta = .323$. Findings demonstrated that students with more anxiety were more likely to engage in maladaptive coping behaviors (see Table 3).

Table 3 Association Between Coping Behavior and Anxiety

	<i>p</i>	<i>b</i>	β	<i>t</i>	SE
Age	<.001	.842	.251	4.396	.191
Positive Coping	.561	.338	.038	.583	.580
Negative Coping	<.001*	3.101	.323	5.011	.619

Note. * $p < .05$. SE = standard error

4 DISCUSSION

Colleges and universities are seeing an increasingly large number of students who struggle to manage their mental health and find resources to cope (Son et al., 2020; Wang et al., 2020). Students already struggle with a lack of free time, cut-throat competition, and making new friends. With COVID-19 in the picture, additional stressors include transitioning to online schooling, managing the rising stack of assignments, and struggling with the lack of motivation. For many students, these stressors cause lots of anxiety. Some students cope positively by asking for help, venting to friends, or using humor. Others, unfortunately, cope negatively by disconnecting from their surroundings, blaming themselves for what's happened, or abusing drugs and alcohol. These negative coping behaviors can have long-lasting effects on one's mental, physical, and emotional health; therefore, it is crucial to understand how COVID-19 has impacted the mental health and wellness of college students and the lasting impacts it has already had.

Previous research shows that both positive and negative childhood experiences can influence one's coping behaviors because the ages of 0-5 and early childhood represent a vulnerable time for brain development, and the parts of the brain that deal with these emotions could be developmentally impacted if a child had traumatic experiences in his or her childhood (Agorastos et al., 2019).

As expected, students with more adverse childhood experiences had more maladaptive coping behaviors. In addition, those same students who had high anxiety levels were engaging in maladaptive coping behaviors. This finding is consistent with the stress sensitization theory, which states how an individual's susceptibility to mental health issues is impacted by early life stressors (Koss & Gunnar, 2018). Stressful life events, such as COVID-19 may be aggravated by

the vulnerabilities and traumas that occurred in childhood. In addition, the lack of control over one's environment impacts students during a time of critical development, furthering their stressful circumstances (Berken et al., 2021). Therefore, college students with maladaptive coping behaviors may have reported higher anxiety levels because their early life adversity impacts later exposure to stress and can trigger mental disturbances (Wade et al., 2019).

Interestingly, positive coping behaviors were not associated with ACEs scores. This result seems counterintuitive because one would expect those who experienced less adversity in childhood would have more positive coping behaviors. Perhaps these students may have enjoyed the freedom COVID-19 granted them. Students could go home and have more free time with the transition to online schooling and the closing of schools and businesses. One study found that adults engaged in "simple" coping behaviors, such as following a healthy diet, spending time outdoors, and using free time to pursue hobbies and other interests within the first two weeks of lockdown (Fullana et al., 2020). However, this study surveyed adult and adolescent populations and did not consider the specific lifestyle changes that impact college students. In another study assessing the impact of COVID-19 on the mental health of college students, in particular, researchers found students reported lower anxiety and stress levels related to academic pressures even though many students were worried about their grades. The lower stress levels could be attributed to professors and universities allowing open-note exams, extended deadlines, or reduced course loads (Son et al., 2020). However, they only reported lower stress and anxiety levels for academic pressures, and over 70% of students reported increased levels of stress overall (Son et al., 2020).

The findings supported the hypothesis that negative coping behaviors were associated with higher ACEs scores. Perhaps students who did not have high ACEs score were not coping

adaptively because positive coping is active and learning. Therefore, a student with little or functioning anxiety may not be motivated to learn positive coping behaviors. In addition, perceived coping efficacy, defined as one's view of how they cope, influences adaptive and maladaptive coping behaviors; when a person has a strong feeling that their coping method works, they are more likely to engage in adaptive coping behaviors, like seeking help, but ineffectiveness and emotional arousal are negatively associated with maladaptive coping behaviors (Chen et al., 2022).

There are a few limitations of this study. Firstly, the survey data were collected during the first year of COVID-19 (June 2020 – March 2021) and did not assess how anxiety or coping behaviors changed over time as students adjusted to their lifestyles. Secondly, the survey data is self-reported, so students could have reported experiences considered socially acceptable rather than being truthful. Despite these limitations, this study reports a valuable understanding of how adverse childhood experiences influence coping behaviors and their impacts on anxiety levels in college students during the first year of the COVID-19 pandemic.

5 IMPLICATIONS AND FUTURE DIRECTIONS

This study has broad and specific implications for colleges and their students. It may be impractical for colleges to assess ACEs for all incoming students each year; however, they can promote and teach adaptive coping strategies through workshops, panels, and other student-oriented events. Colleges must also continue to increase the amount of mental health and wellness resources available on their campus and ensure it is accessible for every group, especially during unexpected and uncontrollable events like COVID-19.

Students can use the ACEs questionnaire to assess adverse childhood experiences to understand how they influence current stressors and stress responses. Outside of the university, all students must learn positive coping behaviors since anxiety does not only discriminate against those with ACEs. In addition, students can work with their universities to ensure mental health events and resources are accessible and available through research, student clubs, and partnerships.

Future studies should assess how coping behaviors and anxiety levels changed as COVID-19 progressed, especially since many schools and workplaces transitioned from virtual learning to in-person learning. It may also be helpful to determine which adaptive coping method was most effective for reducing students' anxiety.

Psychophysiological markers, such as cortisol, alpha-amylase, or DNA methylation, could be used to support the findings in this study. fMRI studies assessing the effectiveness of adaptive coping behaviors in reducing anxiety would also be beneficial. These studies would highlight the best adaptive coping behaviors for college students and assist with creating targeted interventions to combat anxiety.

6 CONCLUSION

In conclusion, much time is spent assessing childhood to explain adult behaviors. However, this study shows that one is not entirely protected from maladaptive coping mechanisms regardless of having adverse childhood experiences. Additionally, college students with maladaptive coping behaviors are more likely to have high anxiety levels during COVID-19. Future studies should assess the coping behaviors and anxiety levels throughout COVID-19 and use fMRI and physiological markers to support findings.

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