

COPING STRATEGIES, MENTAL HEALTH SYMPTOMS, & ACES

COPING STRATEGIES ASSOCIATED WITH MENTAL HEALTH SYMPTOMS AMONG
COLLEGE STUDENTS WHO EXPERIENCED ADVERSE CHILDHOOD EXPERIENCES

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Abstract

Adverse childhood experiences (ACEs) are associated with poor mental health outcomes, particularly in college students. For example, college students who experienced three or more ACEs are more likely to report depressive symptoms and abuse alcohol (Merians et al., 2019). Individuals who adopt adaptive coping such as positive reappraisal, seeking social support, acceptance, and planning suffer less emotional distress. Unfortunately, little is known about the different coping strategies used among college students when they have experienced ACEs. This study aimed to examine the impact ACEs have on college student's mental health and drug use and whether the type of coping strategy used mediates the relationship between ACEs and overall distress level captured by the Global Severity Index (GSI). Undergraduate students ($N = 123$) who were primarily female ($N = 96$) and Latinx ($N = 41$) from a public university in the United States completed the online study. Being a child of separation or divorce was the most endorsed ACE (43.1%) and having a family member in prison and physical neglect was the least endorsed (8.9%). The results showed cumulative ACEs were significantly related to the GSI scale ($R^2 = .25$, $F(1,116) = 38.93$, $p < .001$) and drug use ($R^2 = .14$, $F(1,116) = 19.01$, $p < .001$). Furthermore, avoidance coping strategy was found to significantly mediate the relationship between cumulative ACEs and GSI score, $\beta = .705$, 95% CI [0.331, 1.199], $p < .000$. Lastly, results showed individuals who endorsed four or more ACEs ($M = 42.08$, $SD = 7.79$) were more likely to utilize avoidance coping strategies than individuals who endorsed three or fewer ($M = 36.29$, $SD = 7.81$); $t(121)$, $p < .001$. Results suggest that experiencing ACEs leads to poorer mental health outcomes, increased drug use, and utilizing avoidance coping strategies. The results also highlight the need for continued research on coping strategies that may act as protective factors in the relationship between ACEs and mental health outcomes.

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Introduction

Adverse childhood experiences (ACEs) are known to have a long-term negative impact on an individual's physical and mental health, yet they are highly prevalent (Felitti et al., 1998). ACEs include physical, emotional, and sexual abuse as well as household dysfunction (e.g., divorce, domestic violence, parental substance abuse; Anda et al., 2006; Austin & Herrick, 2014; Karatekin, 2018). In a groundbreaking study, Felitti et al. (1998) found that over 50% of participants in a large community sample ($N = 9,508$) endorsed at least one ACE in their lifetime. The study also found when people experience four or more categories of ACEs, each adult's health risk behaviors and diseases increased, such as alcoholism, drug abuse, depression, and suicide attempt. Recent research has suggested that ACEs may be on the rise in the general population (Austin & Herrick, 2014; Karatekin, 2018). For example, in a study investigating prevalence rates of ACEs, over a third of adults in the general U.S. population have experienced at least two ACEs in their lifetime (Anda et al., 2006).

The rise of ACEs poses a considerable public health burden. For instance, in a systematic review identifying 96 articles that studied health outcomes associated with ACEs, Petrucci and colleagues (2019) found that mental illness (depression, anxiety, sleep disorder) and poor physical health (type 2 diabetes, asthma) in adulthood was correlated with ACEs. To further illustrate the detrimental impact of ACEs, found that people with six or more ACEs died nearly 20 years earlier on average than those without ACEs (Brown et al., 2009). Furthermore, studies demonstrate that the cumulative effect of ACEs (i.e., three more ACEs) negatively impacts numerous mental health disorders, particularly in the college population (Karatekin, 2018). For example, studies have demonstrated college students who experienced three or more ACEs were more likely to report depressive symptoms and abuse alcohol (Kim, 2017, Merians et al., 2019).

At present, research on the effect of ACEs on mental and physical health as well as coping strategies used has focused on the general adult population, and samples of children and adults determined to be at risk of developing mental disorders. Little is known about the different coping strategies utilized by among college students when they experience ACEs. This shortcoming in the research literature is critical because of the unique coping strategies and stressors associated with being a college student. For example, as college students leave their homes for the first time, many report changes in their sleep and eating habits, newly added responsibilities, and additional stressors associated with classwork (Karatekin, 2018). Students with a history of ACEs may be particularly vulnerable to emotional disorders because of this abrupt increase in life stress.

Due to the harmful effects ACEs has on college students and the transition to a university, college students must draw upon coping strategies to handle the stress. According to Lazarus and Folkman (1984), coping is defined as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resource of the person.” Other scholars have defined coping as the interplay of cognitive and behavioral strategies that are used in individuals to manage stressful situations (Babicka-Wirkus et al., 2021; LaCourse et al., 2019; Freire et al., 2020; Huang et al., 2021). Additionally, coping styles are seen as the pattern of behavior that individuals primarily employ when they face new or unusual situations that increase levels of anxiety or stress (Lacourse et al., 2019). Literature has attempted to identify the impact maladaptive versus adaptive coping strategies has on one’s mental health. Maladaptive coping, such as avoidance coping, is defined as unhealthy and unhelpful strategies a person uses to deal with emotional or physical consequences. Avoidance coping involves trying to avoid stressors by individuals changing their

behavior to avoid thinking about or feeling about the stressor. Studies have found that many students employ avoidance coping strategies, such as avoiding the issue, substance abuse, behavioral disengagement, and denial, which leads to poorer mental and physical health outcomes when compared to students who use adaptive (active and emotion-focused) coping strategies (Dyson & Renk, 2006; Sheffler et al., 2019). Adopting adaptive coping strategies could serve as a protective factor that decreases the adverse effects of life stressors and traumatic experiences. For instance, a growing body of research has shown the harmful effects that racial discrimination has on an individual's mental health may be mitigated by employing adaptive coping, specifically, active coping strategies (Polanco-Roman et al., 2016).

Active coping strategies include planning, suppression of competing activity, positive reinterpretation, and restraint. For example, individuals modify how they think or feel about a stressful situation (positive reinterpretation) to deal with a problem situation. Individuals who rely on active coping strategies, such as planning, and positive reinterpretation, were associated with greater competence and fewer mental health problems (Coulacoglou & Saklofske, 2018; Polanco-Roman et al., 2016). Emotion-focused coping strategies may include turning to religion, focus on and venting of emotions, seeking of instrumental and emotional social support. Using spiritual or religion practices and beliefs as an emotion-focused coping strategy has shown to reduce one's desire to engage in substance use and suicidality (Amadi et al., 2015). Religion is often characterized and practiced within a community that generally agree on beliefs, practices, and rituals that are sacred (Amadi et al., 2015; Koenig, 2009). Spirituality is more personal, and defined by individuals themselves which is typically free from rules and regulations that are associated with religion (Koenig, 2009). Several studies on religion and depression find that individuals who identify as religious or spiritual may experience lower prevalence of depression,

highlighting the importance of using religion as an adaptive coping strategy (Koeing, 2009).

Thus, it is essential to examine active and emotion-focused coping strategies employed by college students who have a history of ACEs to understand the relationship with student's mental health.

Despite a lack of research on coping strategies used by college students who experience ACEs, there has been a shift to understanding the impact of ACEs on college students. Several studies have used latent class analysis, a statistical procedure used to identify qualitatively different subgroups within the college population. In one study, a latent class analysis of ACEs in a large sample of college students investigated the relationship between ACE classes and life functioning (Merians et al., 2019). The class of "high ACEs" suggests that participants had endorsed child physical abuse, child emotional abuse, household mental illness, drug use, alcohol abuse, and witnessing family violence. Meanwhile, the "moderate risk of non-violent household dysfunction" features moderate endorsement of alcohol abuse and drug abuse, coupled with the low endorsement of child physical abuse and witnessing domestic violence. The "emotional and physical child abuse" class is characterized by high childhood emotional abuse, moderate physical abuse, absence of other ACEs, low endorsement of alcohol abuse, drug abuse, and household incarceration. Finally, "low ACEs" were described as little endorsement of any ACE (fewer than two). This study utilized self-report measures of mental health, physical health, alcohol use, and academic performance. Merians and colleagues (2019) found a significant difference in functioning between those in the "high" and "low" ACE classes. Notably, students characterized as "high ACEs" reported more than twice as many days with poor mental health in the past month as students with no ACEs or in the low ACEs class.

In a study examining the relationship between ACEs, student depression, and alcohol abuse in a non-western culture population (Kim, 2017), a large sample of Korean college students ($N = 939$) were surveyed to measure the relationship between ACEs, student depression, and alcohol abuse. About 50% of the participants reported experiencing at least one category of adverse childhood experience, and of those, 80% reported four or more ACEs. As participants' ACE scores increased, the probability of them reporting depression, alcohol abuse, or the comorbid condition increased up to six times. In addition, Kim (2017) found that comorbidity between depression and alcohol abuse increased four-fold when college students experienced four or more ACEs. Of note, college students who reported one or two ACEs showed no statistical difference in alcohol abuse, potentially demonstrating a difference between low and high exposure to ACEs and its impact on alcohol abuse. The results of this study are consistent with previous literature (Karatekin, 2018; Karatekin & Ahluwalia, 2020), revealing that college students who report three or four ACEs are at an increased risk of experiencing poor mental health-related outcomes as compared to students who report less than three ACEs. This study indicates that ACEs also appear to negatively impact college students cross-culturally, increasing the generalizability of this relationship.

In addition to these mental health outcomes, ACEs appear to even impact brain connectivity and cognitive functioning negatively. One study evaluated present mental disorders and neuro system factors (i.e., inflammation and neuroplasticity), comparing college students who experienced ACEs to those who did not experience ACEs (Watt et al., 2020). The findings demonstrated that college students who experienced four or more ACEs are more likely to report experiencing depressive (i.e., loss of appetite, sleep problems) and anxiety symptoms than college students who did not experience ACEs. Furthermore, the researchers found that

inflammation and neuronal health are associated with mental health disorders among students with four or more ACEs, but not college students without a childhood trauma history. This study emphasizes that mental disorders associated with four or more ACEs may be tied to physiological processes, indicating tailored treatment approaches. Physical treatments that improve inflammation and neuroplasticity, such as exercise, meditation, and aromatherapy massage, may need to be included in future trauma-focused therapies (Watt et al., 2020). Furthermore, the study demonstrated how ACEs could create a level of toxic stress, which affects the ability to regenerate and maintain neurons (Watt et al., 2020).

While studies have most often highlighted deleterious effects of maladaptive coping strategies on one's mental health, the availability to use active coping strategies when faced with stressful situations has been found to play an important protective role in the mental health of college students. One study aimed to examine the coping strategies contributing to different trajectories of mental health response during the COVID-19 pandemic (Akeman et al., 2022). The college students ($N = 183$) were predominately White, middle to an upper-middle class, and majority were female ($N = 123$). Results corroborate previous research that college students experienced worsening mental health symptoms as the pandemic progressed. However, students who reported using more active coping strategies (positive reinterpretation, religion) were less likely to exhibit a worsening in mental health symptoms. On the contrary, students who used avoidance coping strategies, such as substance use and behavioral disengagement were more likely to experience an increase in mental health symptoms (e.g., depression, anxiety). The results indicate that active coping strategies may directly lessen mental health symptoms among college students. However, the generalizability of this study may be limited considering most of the sample was White. In another study investigating the mediation effects coping strategies has

on distress, Merluzzi et al. (2021) found disengagement (avoidant coping strategy) was found to mediate the relationship between functional impairment and emotional distress among 483 participants diagnosed with cancer. Their study highlighted by engaging with an avoidant coping strategy, individuals are more likely to experience emotional distress, which can lead to an increase in mental health symptoms.

An intriguing relevant hypothesis is that individuals who endorse more childhood traumatic events may be more prone to use avoidant coping strategies (e.g., disengagement) instead of active coping strategies (Leitenberg et al., 2004). Previous studies have shown that adopting disengagement coping methods, such as denial and self-blame, are associated with poorer adjustment when adults face a stressful event (Leitenberg et al., 2004). Data collected from a sample of 828 undergraduate females who endorsed a history of childhood abuse revealed that the participants relied on disengagement coping methods as their extensive child abuse histories increased. This study emphasized that when individuals are victims of numerous exposures to adverse childhood experiences, there is a tendency to use maladaptive coping strategies, such as disengagement. As previous research has indicated, Leitenberg et al. (2004) demonstrated that the likelihood of using a maladaptive coping strategy increases as ACEs increase.

Researchers identified different coping strategies used among adults who experienced ACEs but recently have begun to focus on the direct link ACEs has on which coping strategy used and the impact it has on mental health. Sheffler and colleagues (2019) employed longitudinal design to examine whether various coping methods mediated the link between ACEs and adult psychiatric and physical health outcomes (i.e., Wave I = 7108; Wave II = 4962; Wave III = 3294). Wave I was collected between 1995 – 1996, Wave II between 2013 and 2014,

and Wave III between 2013 and 2014. The study utilized the COPE Inventory subscales focusing on problem-focused coping (positive reinterpretation and growth, active coping, and planning) and avoidant emotion focused (focus on venting of emotion, behavioral disengagement, and denial). Results showed that ACEs reported at Wave I were associated with greater use of avoidant emotion-focused coping and lower use of problem-focused strategies at Wave II. Also, results revealed that avoidant emotion-focused coping strategies contributed to harmful pathways between ACEs and physical health problems in adulthood. Importantly this study demonstrates the type of coping strategy used among college students who experienced ACEs may worsen psychiatric and physical health outcomes.

Throughout the lives of survivors of childhood trauma, the social, psychological, and biological consequences of the abuse interact in complex ways. A negative core schema determined by the familial relationships can affect an individual's ability to maintain significant attachments throughout their lives (Coates, 2010). Difficulties associated with childhood trauma interact with the child's biopsychosocial development. Accordingly, the biopsychosocial model offers an integrative view of childhood trauma. Research demonstrates that prolonged childhood abuse impacts the child's developing brain, leading them to view any situation as a threat (Coates, 2010). For example, ACEs can negatively impact executive functioning skills, such as inhibitory control, cognitive flexibility, decision-making, and working memory (Shanling & Huiping, 2018). Since the victims of ACEs are constantly vigilant of the world, they may employ maladaptive coping strategies to help with their stress levels. These high levels of stress compounded by maladaptive coping strategies negatively impact mental health outcomes.

How college students respond to the stressors associated with ACEs is expected to mediate the severity of the mental health problems they subsequently experience. Students who

use adaptive coping strategies such as positive reappraisal, seeking social support, acceptance, and planning suffer less emotional distress. On the other hand, those who use maladaptive coping strategies such as denial, emotional and behavioral avoidance, and substance use experience more emotional and mental health problems (Babicka – Wirkus et al., 2021; Huang et al., 2021).

Current Study

Overall, there is mounting evidence that ACEs affect mental and physical health outcomes among emerging adults (Kim et al., 2017; Watt et al., 2020). The proposed study examines the relationship between the coping strategies (i.e., active, emotion-focused, and avoidance) used and mental health outcomes among college students who experienced ACEs and mental health outcomes. Adaptive coping strategies are defined as “active and emotion-focused” while maladaptive coping strategies are defined as “forms of avoidance” (Halamova et al., 2022; Oginska-Bulik, Juczynski, & Denollet, 2012; Kazina et al., 2021). Specifically, the study will explore the relationship between these adverse events and the presence of current psychological symptoms and drug use. Much of the existing research on the ACEs have been conducted in samples from the general population or samples of at-risk children (i.e., living in poverty, poor academic grades) with less research on the relationship between ACEs and outcomes in diverse college populations. Examining the relationship between ACEs and mental health outcomes is of particular importance as students who have experienced multiple forms of child abuse are more likely to drop out than students who did not experience multiple forms of child abuse (Karatekin, 2018; Karatekin & Ahluwalia, 2020).

Based on previous research (Liverant et al., 2004; Pozzi et al., 2015), it is predicted cumulative ACE exposures will be significantly positively correlated to global severity of psychopathology, which would be tested by assessing the participants Global Severity Index

(GSI) score, replicating previous studies (*hypothesis 1*). The Global Severity Index helps quantify the participants severity of illness and is essentially the mean of all of the subscale's scores of the Brief Symptom Inventory – 53. Also, it is expected that cumulative ACE exposures leads to an increase in avoidant coping strategies, which in turn leads to higher scores on the GSI index and drug use, respectively (*hypothesis 2*). Lastly, it is predicted that individuals who endorse four or more ACE exposures (High ACE group) will utilize more avoidant coping strategies than individuals who endorsed three or lower ACE exposures (Low ACE group) (*hypothesis 3*).

Method

Procedure

The study was approved by the William Paterson University Institutional Review Board (Protocol # 2022 – 322). Participants were undergraduate students (over the age of 18 years) who were recruited from March 2022 – December 2022 from a public university in New Jersey. The recruitment occurred using an online system available through the participant's psychology research website. Each participant gave their web-based consent to complete all questionnaires using a secure survey website. Informed consent was obtained electronically by asking participants to agree to participate to the study. After providing consent electronically, the participants completed the ACEQ, BSI-53, COPE inventory and the DAST – 10. Upon completion of the study, participants were provided the contact information of the university's health and wellness center.

Participants

Sample demographics are displayed in Table 1. The final sample included 123 undergraduate students who completed more than 90% of the survey. Out of the 157 participants

who began the survey, $n= 29$ were excluded because they had missing values over 10% on one of the measures and $n= 5$ were excluded because they were graduate students. The sample consisted of mostly female ($n = 96, 78\%$), Juniors ($n = 41, 33.3\%$). Most of the participants reported that they were Hispanic or Latino (33.3%), and 18 – 24-year-old ($n = 81.3\%$).

Measures

Adverse Childhood Experiences

The present study employed the Adverse Childhood Experience Questionnaire (ACEQ; Felitti et al., 1998), a retrospective 10 item self-report measure of childhood trauma for people aged 18 years and older. The questionnaire assesses ten types of childhood traumatic experiences: child maltreatment (emotional abuse, physical abuse, sexual abuse), household dysfunction (substance abuse and mental illness of household members, domestic violence, perpetrated against the mother or stepmother), incarceration of a household member, and parental separation/divorce. The number of experiences reported by each participant will be summed for a total ACEs score from 0 to 10, where participants answer either yes or no to the question. In one study, the ACE questionnaire was administered six months apart and demonstrated values greater than .65, showing good test-retest reliability (Pinto et al., 2014). Internal consistency has been estimated at 0.67 (Folayan et al., 2020). For the present study, Cronbach's alpha for the ACE questionnaire was 0.71.

Brief Symptom Inventory

Mental health symptoms were assessed using the Brief Symptom Inventory (BSI-53; Derogatis, 1982). The BSI is a 53-item self-report survey assessing the current severity of a range of mental health symptoms on a Likert scale ranging from 0 (not at all) to 4 (extremely). The BSI-53 contains nine subscales: somatization, obsessive-compulsive, interpersonal

sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. It also contains three global indices of distress: Global Severity Index (GSI), Positive Symptom Distress Index, and Positive Symptom Total. Items were summed and averaged to create a GSI score, which reflects both the number of symptoms present and the severity of each symptom the participants experienced. The BSI-53 has demonstrated good internal consistency reliability for the nine dimensions ranging from 0.71 to 0.85 (Derogatis, 1993). In a recent study, the nine subscales exhibited acceptable-to-good Cronbach's alpha coefficients, varying from .073 for psychoticism to .088 for depression (Adawi et al., 2019). Overall, the reliability of the BSI-53 proved to be excellent ($\alpha = 0.97$). For the current study, the BSI – 53 was found to be highly reliable (53 items; $\alpha = 0.97$).

Drug Abuse Screening Test – 10

The Drug Abuse Screening Test – 10 (DAST-10; Skinner, 1982) is a 10-item measure of past-year drug use. All items assess drug use in general, without referring to the specific drug types (e.g., “Do you use more than one drug at a time?”). Response options on the DAST-10 are “Yes” and “No” and each item is worth one point. Possible scores range from 0 to 10, with each item scored 0 or 1. The DAST–10 is a shortened version of the original, 28-item DAST. Internal consistency reliability for the DAST – 10 is between 0.86 and 0.94 (Yudko et al., 2007).

Regarding criterion validity, the DAST score was significantly correlated with the Children of Alcoholics Screening Test in psychiatric patients ($r = .31$) and with the Alcohol Use Disorders Identification Test in 143 adults seeking evaluation for ADHD ($r = .41$) (McCann et al., 2000; Staley & El-Guebaly, 1990). The Cronbach's alpha for this study was 0.62.

COPE Inventory

The COPE inventory (Carver et al., 1989) was developed to assess a broad range of coping responses. It is a self-report that includes 60 statements referring to the use of specific strategies that are based on a four-point Likert scale (1 – I usually don't do this at all; 2 – I usually do this a little bit; 3 – I usually do this a medium amount; 4 – I usually do this a lot). The present study will use three clusters of coping strategies identified by Jurzynski and Oginska-Bulik (2021), as cited in Kasznia et al. 2021. Participants who endorse active coping strategies would have endorsed using: active coping, planning, suppression of competing activities, positive reinterpretation and growth, and restraint. Participants who endorsed utilizing emotion-focused coping would have used: seeking of emotional social support, seeking of instrumental social support, turning to religion, and focus on and venting of emotions. Participants deemed to have used avoidance coping strategies would endorse the following items: acceptance, denial, behavioral disengagement, mental disengagement, substance use, humor. Cronbach's alpha for the 15 scales of the COPE Inventory ranged from 0.37 to .093 (Carver et al., 1989). Furthermore, apart from mental disengagement, the remainder of the alphas were above 0.59, with the majority above 0.70; the average alpha for the COPE Inventory was 0.79. Cronbach's alpha for the active coping subscale, avoidance coping subscale, and the emotion-focused subscale items were .90, .82, and .86, respectively. Also, the overall COPE Inventory for this study was found to be highly reliable (60 items; $\alpha = .92$).

Data Analysis

All analyses were conducted in SPSS Version 29.0 and alpha level was set at $p < .05$. First, descriptive analyses were conducted to describe demographics and sample characteristics. To address the first hypothesis, two separate linear regressions were run with mental health symptoms T-Scores (GSI – score) and drug use scores as the outcome variable and cumulative

ACES as the predictor variable. Mediation analyses (hypothesis two) was performed using PROCESS Model 4 (Hayes, 2013). The mediation analyses regression model included cumulative ACEs scores and GSI scores as well as drug use as the total effect variables and avoidance coping strategies as an indirect variable. The total effect is the effect the independent variable has on the dependent variable in the absence of the mediator, while the direct effect is the effect the independent variable on the dependent variable when the mediator is added. The significance of the mediator was determined by using the 95% confidence interval (CI), with the CI that did not include zero considered to be statistically significant. To test the third hypothesis, an independent t-test was conducted to determine if individuals who endorsed four or more ACEs utilized avoidance coping strategies at rates that are significantly different than individuals who endorsed three or fewer ACEs. Of note, after conducting a t-test to determine if there was a significant difference between the High group vs Low group utilizing active coping strategies, Levene's Test for Equality of Variances determine that the equal variances among both groups were not assumed. This resulted in a Welch T-Test being run to determine the significance between the two groups.

The dataset was examined for missing values with a 10% limit allowed for each questionnaire. After a thorough review, a listwise deletion method was conducted to meet the exclusion criteria. Each assumption for a linear regression design (i.e., linearity, multicollinearity, homoscedasticity, independence, and normality) and independent measure t-test (no significant outliers in the two groups, normality, and homogeneity of variance) were performed through SPSS Version 29.0.

Results

Before examining each hypothesis, the data was cleaned, and assumptions of linear regression analyses were examined. For each linear regression analyses completed, four assumptions were used. The data was explored for normality. All variables were normally distributed, and no outliers were detected. Considering regression analyses, no multicollinearity was detected, and relationships were homoscedasticity. Also, the relationship between cumulative ACEs scores and the mean of GSI and drug use scores are linear. The variance in the linear regression model cannot be explained by any other variables in the study. Lastly, each observation error found was independent from each.

Figure 1 presents the prevalence of ACE scores in this sample. A little over three-fourths of the sample (78%) had at least one ACE, and 28.7% of the participants had ACE scores of 4+. Table 2 shows numbers of participants exposed to each category of ACEs. The overall sample endorsed experiencing an average of 1.90 of 10 ACEs ($SD = .280$), the most common of which were having experienced parental separation or divorce (43.1%), and the second common as emotional neglect (39.8%). Women had higher GSI – scores ($M = 108.27$; $SD = 37.12$) than men ($M = 91.04$; $SD = 37.71$), resulting in a significant difference between the two groups, $t(119) = -2.06$, $p = .02$. Another finding was men utilized active coping strategies at higher rates ($M = 53.96$; $SD = 9.71$) than women ($M = 48.14$; $SD = 10.84$), $t(119) = 2.44$, $p = .008$. A simple linear regression was run with cumulative ACEs as the predictor variable and GSI score as the outcome variable. The overall model predicting GSI score from cumulative ACE scores was significant, $R^2 = .25$, $F(1,116) = 38.93$, $p = <.001$. Higher ACE scores were associated with higher GSI scores, $b = 2.31$, 95% CI [1.58, 3.04], $t = 6.24$, $p = <.001$, indicating that an increase in ACE score corresponded, on average, to an increase in GSI score of 2.31. A simple regression was also run to predict the relationship between cumulative ACEs score and drug use. The overall

model predicting drug use from cumulative ACE scores was significant, $R^2 = .14$, $F(1,116) = 19.01$, $p < .001$. Higher ACE scores were associated with an increase in drug use, $b = .26$, 95% CI [0.14, 0.37], $t = 6.40$, $p < .001$, indicating that an increase in ACE score corresponded on average, to an increase in drug use score of .26.

This study assessed the mediating role of avoidance coping strategies on the relationship between ACE exposure and GSI score as well as drug use. The results revealed cumulative ACEs has a significant impact on drug use, $\beta = .219$, 95% CI [0.096, 0.343] $t = 3.523$, $p < .000$. However, using avoidance coping strategies was not a significant predictor of drug use ($\beta = .016$, CI 95% [-0.026, 0.061]). Therefore, the indirect effect of cumulative ACEs on drug use through avoidance coping strategies was not significant, indicating the overall model was not significant.

Regarding the mediating role of avoidant coping strategies on the relationship between cumulative ACEs and GSI score, results revealed a statistically significant total effect, $\beta = 2.28$, 95% CI [1.56, 3.00] $t = 6.302$, $p < .000$. Furthermore, avoidance coping strategy was found to significantly mediate this relationship, $\beta = .705$, 95% CI [0.331, 1.199], $p < .000$. It is estimated that avoidance coping strategies accounts for 30.8% of cumulative ACEs on GSI score. Overall, results showed that avoidance coping strategies partially mediated the relationship between cumulative ACEs and GSI score. Mediation analysis summary is presented in Figure 2a and 2b.

Lastly, an independent t-test concluded there was a significant difference in the rate of utilization of avoidant coping strategies for the High ACE group ($M = 42.08$, $SD = 7.79$) and the Low ACE group ($M = 36.29$, $SD = 7.81$); $t(121)$, $p < .001$. There was not a statistically significant difference in the rate of utilization of emotion-focused coping strategies for the High ACE group ($M = 35.79$, $SD = 10.04$ and the Low ACE group ($M = 36.14$, $SD = 8.65$); $t(121) = -0.182$, $p = .428$. Due to the equal variance not being assumed, a Welch t-test was used to determine a

significant difference in the rate of utilization of active coping strategies for the High ACE group ($M = 53.13$, $SD = 7.99$) and the Low ACE group ($M = 47.96$, $SD = 11.59$); $t(96.97) = -2.849$, $p = .005$. Independent t- test analysis is presented in Table 3.

Discussion

This study aimed to examine the relationship between cumulative ACES, psychopathology and drug use, as well as to determine if coping strategies may play a mediating role in drug use and psychopathology when an individual experiences childhood trauma. Overall, the results indicate a relationship between ACEs, psychopathology, and drug use. The results confirmed our first hypothesis and replicated other studies that found significant relationships between cumulative ACES and poorer mental health outcomes in college students (Rodriguez et al., 2021; Kim, 2017). The recruited sample of primarily White and Latino undergraduate students reported relatively high levels of childhood adversity. This study also adds to the growing body of literature on ACEs in undergraduate students by showing that almost two-thirds (63.3%) of the students reported two or more ACE exposures. This rate is higher than Karatekin's (2018) study, where one-third of students endorsed two or more ACEs.

Females outnumbered males in this study by almost 4:1. Prevalence of ACEs among participants differed by gender, as males were more likely than females to report 4+ (36% vs. 28%). Gender differences have been reported in previous studies, but it appears to be according to the cultural background of the participants (Bynum et al., 2010; Kim, 2007). For example, one study showed that men in Saudi Arabia endorsed ACEs at higher rates than females; however, in a Korean study and a United States study, females endorsed ACEs more than men (Almuneef et al., 2014; Bynum et al., 2010; Kim, 2007).

Avoidant coping strategies mediated the relationship between ACEs and psychopathology. These results fit with predictions from previous research that found treatments that target unhelpful maladaptive coping strategies, such as avoidance, were effective at reducing symptoms of depression. This finding also aligns with previous studies demonstrating that avoidant coping strategies mediate the relationship between trauma and psychopathology (Tipsword et al., 2022). In this sample, avoidance coping strategies partially influenced the participants' mental health outcomes, particularly when they have experienced ACEs. This study addressed a critical gap in literature by demonstrating avoidant coping strategies play a significant role in one's mental health after experiencing a traumatic event during childhood and adolescence.

Lastly, this study found that individuals who endorsed more than four ACEs used active coping strategies at higher rates than those who endorsed three or fewer. This finding is surprising given the numerous amounts of literature that show individuals who experience trauma tend to engage in more avoidance coping behaviors than active coping strategies (Held et al., 2015), which was also supported by the data. Now, there could be some explanations for such a finding. First, it is possible that individuals who experienced four or more ACEs utilize active coping strategies but may do so in ineffective ways, which may not reduce drug use or psychopathology. Also, individuals who have experienced more ACEs are more likely to use different types of coping strategies to help them cope with their trauma. For example, in one study, adults who had high rates of childhood trauma, utilized emotion-focused coping strategies at higher rates than avoidant coping strategies (Reed et al., 2009). Despite certain adults utilizing an adaptive coping strategy (emotion-focused), they continue to have difficulties regulating their emotions and appropriately managing stressors. Therefore, the High ACE group may utilize both active and avoidance coping strategies to help deal with their general distress, causing them significant distress.

Limitations

This study is not without limitations. The population in this study was a convenience sample that was recruited from a single Northeastern public university. The homogenous sample limits the generalizability of the research findings. College students can adjust to stressors associated with childhood adversity. Universities and colleges have college counseling centers, staff, faculty, clubs, and affiliations that can support college student's overall well-being. The participants in the study may have utilized these supports and not their own coping strategies to handle stressors associated with ACEs. Outcomes were collected via self-report measures that asked participants to retrospectively report on their childhood experiences. This data collection may be limited by recall bias as well as social desirability bias, in which participants may be reluctant to specify which traumatic event they experienced. There could have also been other traumatic events the participants may have experienced that was not captured by the ACEQ. Also, the data was based on self-report measures which increases the likelihood of source bias.

Another limitation with the study is the type of ACEs that were most prevalent in the sample. The most prevalent ACEs in the sample was being a child of divorce (43.1%), experiencing emotional neglect (39.8%), and experiencing emotional abuse (34.1%). These ACEs involve less perceived threat when compared to physical abuse and witnessing domestic violence (Rodriguez et al., 2021). Therefore, it is important future studies continue to assess the impact specific ACEs has on a college students mental health and if there were any specific coping strategies used to help alleviate and handle the childhood trauma.

Future Directions

As previous research and the current study demonstrated, ACEs play a significant role in the mental health of undergraduate students. Screening for ACEs at the beginning of enrollment

may identify college students at risk of developing mental health issues, abusing drugs, or dropping out of college. By increasing awareness, resources could be allocated to the students deemed at high risk. Also, when a student seeks help at college counseling centers, the counselors should screen them for ACEs, to provide the appropriate care to address the underlying concern. In general, college students are well adjusted, therefore, there may have been some coping strategies that were used that have helped them obtain higher education. Future research should focus on developing a qualitative study identifying those coping strategies used among students who experienced ACEs to acted as a protective factor. Of course, preventing ACEs would be the most effective strategy; however, that is unlikely to occur which is why researching more preventive measures are needed to decrease serious health and mortality risks posed by ACEs.

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Appendix

Table 1

Participant demographics

	<i>N (%)</i>
Gender	
Female	96 (78.0%)
Male	25 (20.4%)
Non-binary/third gender	2 (1.6%)
Age Range	
18 – 24	100 (81.3%)
25 – 34	13 (10.6%)
35 – 44	6 (4.9%)
45 – 54	2 (1.6%)
55 – 65	1 (.8%)
Above 65	1 (.8%)
Class Standing	
Freshman	25 (20.3%)
Sophomore	24 (19.5%)
Junior	41 (33.3%)
Senior	33 (26.8%)
Race/Ethnicity	
Caucasian	37 (30.1%)
African – American	13 (10.6%)
Latinx or Hispanic	41 (33.3%)
Asian	7 (5.7%)
Middle Eastern	2 (1.6%)
Two or More	12 (9.7%)
Other	9 (7.3%)
Prefer not to say	2 (1.6%)
Sexual Orientation	
Heterosexual	86 (69.9%)
Bisexual	16 (13.0%)
Other	12 (9.8%)
Prefer not to say	9 (7.3%)

Table 2*Number of participants exposed to ACEs*

Categories of ACES	<i>N</i>	Percentage
1. Emotional Abuse	49	39.8%
2. Physical Abuse	24	19.5%
3. Sexual Abuse	18	14.6%
4. Emotional Neglect	42	34.1%
5. Physical Neglect	11	8.9%
6. Divorce	53	43.1%
7. Domestic Violence	17	13.8%
8. Living with an alcohol or substance abuser	35	28.5%
9. Living with mentally ill family member	39	31.7%
10. Incarcerated relative	11	8.9%

M = 1.90, SD = .280

Table 3

Results of independent t-test examining the rate of coping strategies used in High group vs Low ACE group

	<u>High Group</u>		<u>Low Group</u>		<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Active Coping	53.13	7.99	47.96	11.59	.005	10.65
Emotion-Focused	35.79	10.04	36.14	8.65	.428	9.64
Avoidant Coping	42.08	7.79	36.29	7.81	<.001	7.81

Figure 1

Distribution of ACE scores among participants

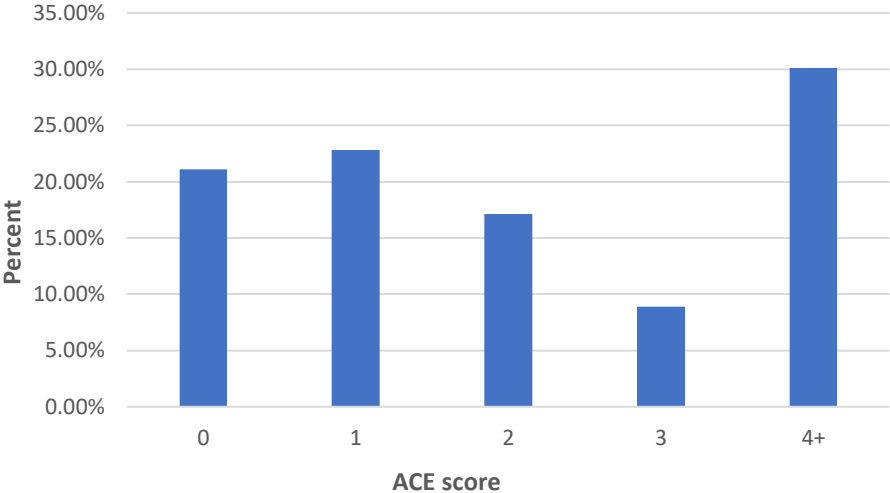
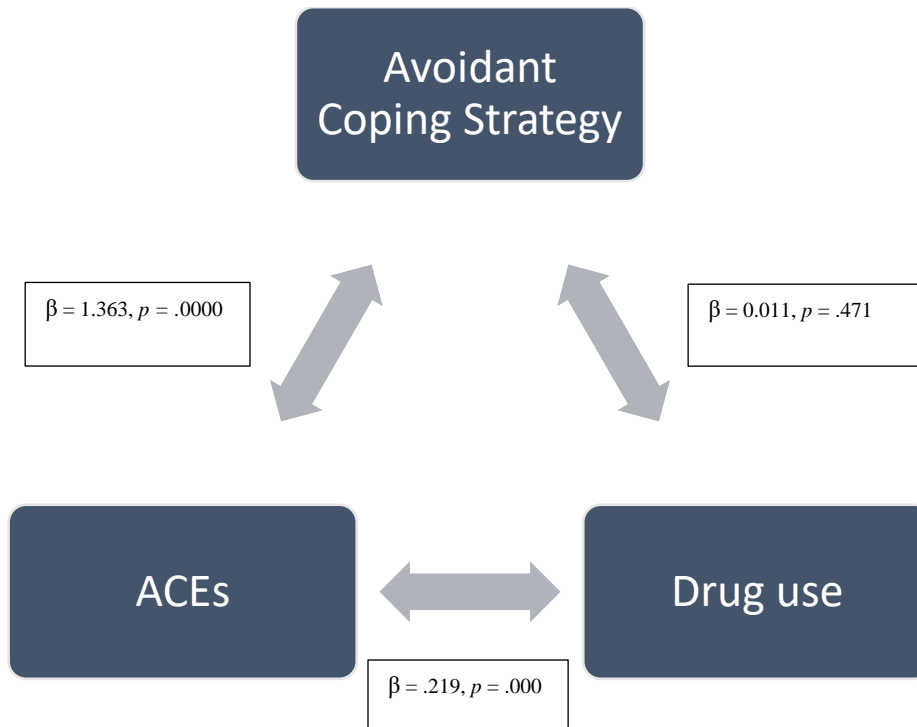


Fig. 1 Distrbution of ACE scores

Figure 2(a)

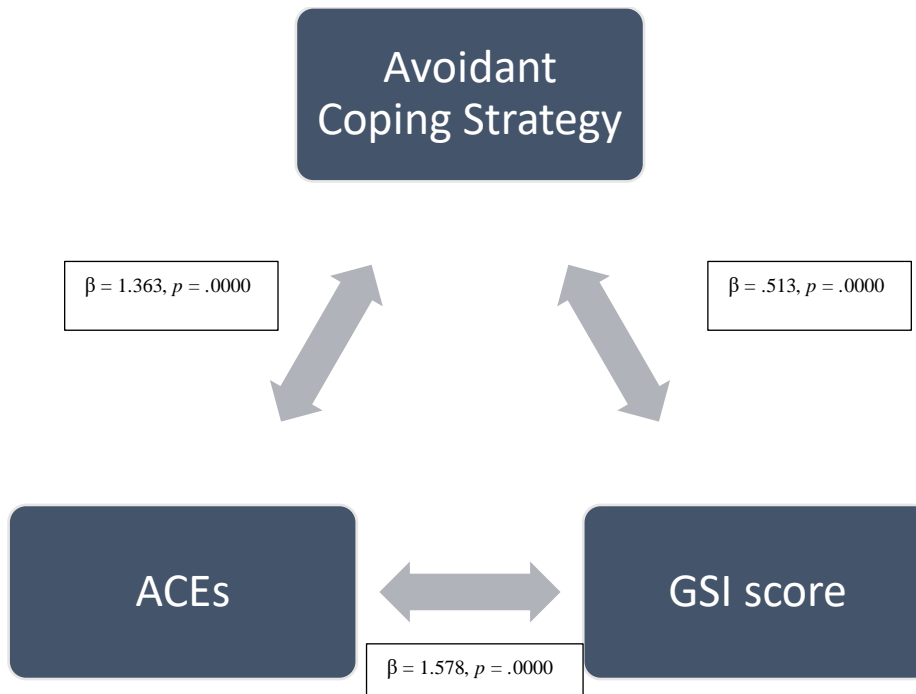
Mediation analysis ACE \Rightarrow Avoidant Coping Strategy \Rightarrow Drug Use



Direct effect: $\beta = .219, 95\% \text{ CI } [0.096, 0.343] t = 3.523, p < .000$
Indirect effect: $\beta = .203, \text{ CI } 95\% [-0.380, .0966]$.

Figure 2(b)

Mediation analysis ACE → *Avoidant Coping Strategy* → *GSI score*



Direct effect: $\beta = 1.578, 95\% \text{ CI } 95\% [0.891, 2.265] t = 4.548, p < .000$
Indirect effect: $\beta = .705, \text{ CI } 95\% [0.073, 0.254]$.