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CHILDHOOD MALTREATMENT AND
ACADEMIC OUTCOMES
IN COLLEGE

by

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Dedication

To my mother, who will always be with us. Your penchant for helping others continues to inspire. I love you ABAAP.

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ABSTRACT

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Individuals face numerous challenges throughout their lifetimes, and for many this may lead to problematic academic outcomes. More specifically, a history of childhood maltreatment impacts biological and cognitive processes, which can affect levels of academic engagement, perceived academic stress, school connectedness, and overall academic performance. This study investigates the relationship between college students' self-reported childhood maltreatment and GPA, and seeks to determine if academic engagement (AE), perceived academic stress (PAS), and school connectedness (SC) mediate the relationship between childhood maltreatment and GPA. It was hypothesized that there is a significant relationship between childhood maltreatment and GPA, and that separately, academic engagement, perceived academic stress, and school connectedness

will partially mediate the relationship. To test the hypotheses, data was collected from online self-report surveys completed by college students to assess childhood maltreatment, perceived academic stress, school connectedness, and academic engagement (N = 309). The results found that the relationship between childhood maltreatment and GPA was not significant but childhood maltreatment was related to SC, AE, and PAS. Additionally, in models that did not control for the variance explained by the other hypothesized mediators, childhood maltreatment had significant indirect effects on GPA through AE and PAS, but not SC; however, when accounting for other mediators in the model, the individual indirect effects through each specific mediator were not significant. Finally, AE, PAS, and SC together mediated the relationship between childhood maltreatment and GPA. This study establishes that experiences of maltreatment during childhood can negatively impact academic performance in college by decreasing academic engagement and increasing perceived academic stress.

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CHAPTER I: INTRODUCTION

Individuals face numerous challenges throughout their lifetime, and for many this may lead to problematic academic outcomes during grade school and into college. Numerous studies have been conducted on the adverse effects of childhood maltreatment and the effect those experiences have on life outcomes (Felitti & Anda, 1997; Brown et al., 2007; Chapman et al., 2007; Danese & McEwen, 2012; Segal & Collin-Vezina, 2019). However, research on the relationship between early childhood trauma and academic outcomes at a post-secondary level is limited. This study examines that relationship and potential mediating factors. To provide rationale for this study, the background section reviews definitions and prevalence rates of childhood maltreatment. In addition, the background section includes a review of how childhood maltreatment impacts biological and cognitive facilities that could influence college students' academic performance via school connectedness, academic engagement, and perceived academic stress.

Child Maltreatment

Complex trauma is defined as, “chronic, interpersonal traumas that begins early in life” (Cook et al., 2003, p. 7). It begins in childhood, occurs often, and within the primary caregiving system. It includes emotional, physical, and sexual abuse, neglect, and witnessing violence in the home and/or community (Cook et al., 2017). Research indicates that all types of physical, emotional, and/or sexual abuse, neglect, or exploitation of a child that may potentially cause, or actually causes harm to a child's well-being are considered child maltreatment (Norman et al., 2012).

Exposure to complex trauma may incite a developmental cascade that impacts biological and cognitive development, which has consequences for academic outcomes

(Aber et al., 1997). Individuals with a history of complex trauma often develop anxiousness, irritability, disassociation, and avoidant and aggressive behaviors that persist into adulthood (Cloitre et al., 2009). Moreover, these individuals are likely to encounter disrupted development (Farrow, 2015), which can lead to issues in home and school environments, relationships, and employment in adulthood (Metzler et al., 2017). There is limited research on the impact of trauma on post-secondary education outcomes. Understanding the relationship and mediating factors between complex trauma and post-secondary academic achievement could provide insight on how to best support individuals with a history of trauma as they navigate the stressors and challenges of higher education. Additionally, it may highlight resiliency factors that have benefited these students to overcome challenges during college.

Types of Trauma

Adverse childhood experiences include maltreatment, household and community violence, and parental maladaptive behaviors, substance use, separation, and imprisonment. There are multiple types of maltreatment which include physical, emotional, and/or sexual abuse, and neglect. Importantly, definitions often vary between and within systems and cultures. Physical abuse of a child is defined as “the intentional use of physical force against a child that results in—or has a high likelihood of resulting in—harm for the child’s health, survival, development, or dignity” (Norman et al., 2012, p.1). Physical abuse includes, but is not limited to: hitting, shaking, choking, burning, and poisoning. Sexual abuse is defined as “the involvement of a child in sexual activity that he or she does not fully comprehend, is unable to give informed consent to, or for which the child is not developmentally prepared, or else that violates the laws or social taboos of society” (Norman et al., 2012, p.1). Emotional abuse is defined as “a pattern of failure over time on the part of a parent or caregiver to provide a developmentally appropriate

and supportive environment” (Norman et al., 2012, p.1). The U.S. Department of Criminal Justice adds to this, that emotional abuse consists of behavior that deteriorates an individual’s self-esteem (U.S. Department of Justice (USDJ), n.d.). Physical, emotional, and educational neglect involves the caregiver’s failure to provide for a child’s needs in these areas, as well as safe living conditions (Stoltenborgh et al., 2015). These types of childhood maltreatment are considered adverse childhood experiences.

Prevalence

Previously reported prevalence rates of childhood maltreatment may vary due to several factors, including contrasts in the types of maltreatment, differences in defining it, and discrepancy of self-report depending on geographical location, as well as other cultural factors. With that said, it is imperative to gain some understanding of the prevalence of childhood maltreatment if there are plans to decrease its pervasiveness. In a meta-analysis that included 244 studies on self-reported abuse, researchers estimated global prevalence rates (maltreatment during childhood) of 12.7% for sexual abuse, 22.6% for physical abuse, 36.3% for emotional abuse, 16.3% for physical neglect, and 18.4% for emotional neglect (Stoltenborgh et al., 2015). Using the Juvenile Victimization Questionnaire (Hamby et al., 2004), researchers found that of 4000 children, ages 10-17, 38.3% witnessed violence at home and/or in the community (Finkelhor et al., 2015). Researchers collected self-reports from 1,420 individuals regarding any trauma that they experienced prior to 16 years old. Of these individuals, 10.3% reported prior physical abuse and 11% reported prior sexual abuse (Copeland et al., 2007). Mennen and colleagues reported that of a sample of ethnically diverse children (n = 303) identified as experiencing maltreatment during their childhood, 71% endorsed a history of neglect; of those children, 72.5% reported supervisory neglect, 61.6% reported environmental

neglect, and 95% reported other types of maltreatment in addition to the neglect (Mennen et al., 2011). The effects and prevalence of maltreatment is also seen college populations.

According to the U.S. Census, 59% of Americans had completed some college (Ryan & Bauman, 2016). According to Chen and colleagues, the average college dropout rate for the United States is approximately 55% (Chen et al., 2018). Researchers found that of 292 students attending their first semester of college, 53.7% had reportedly experienced at least one traumatic event during childhood including child sexual abuse, physical abuse, and/or emotional abuse; they found that this was comparable to that of the general population (Banyard & Cantor, 2004). Another study revealed that of 210 college students, 36% had reportedly experienced physical, psychological, and/or sexual abuse during childhood (Duncan, 2000). Unfortunately, students who have a history of childhood trauma may demonstrate a lack of academic engagement, perceive low levels of school connectedness, and high levels of academic stress.

Taken together, these prevalence rates are alarming, especially when considering that most individuals who experience trauma are more likely to experience several traumatic episodes over the course of their life (Kessler, 2000). Furthermore, these prevalence rates are likely underestimates, due to underreporting of trauma victims, as well as individuals and agencies mandated as reporters. Therefore, described in the next section is the most common, psychometrically sound, and nationally recognized assessment for measuring exposure to childhood trauma (Irwin, 1999).

Adverse Childhood Experiences (ACEs)

The ACEs questionnaire is nationally recognized and commonly used in research to assess individuals' experiences of childhood trauma (Felitti & Anda, 1997; Whitfield, 1998; Karatekin, 2018; Mackay-Neorr, 2019). The Center for Disease Control and Kaiser Permanente conceptualized the original ACE study (Felitti et al., 1998) to examine the

relationship between the exposure of childhood abuse, neglect, and household dysfunction, and adult health risk behavior and chronic disease (Dong et al., 2004). The self-report survey consists of 10 questions about psychological, physical, and sexual abuse, violence, divorced parents, household members who were substance abusers, mentally ill, suicidal, or a history of imprisonment prior to the child's age of 19 (Felitti et al., 1998). Over 9,500 individuals completed the survey and results revealed a relationship between the ACEs score and risk factors for multiple leading causes of death in adults and adult chronic disease (Felitti et al., 1998). According to Anda and colleagues, in the general population over one third of adults reported exposure to at least two ACEs (2006). Authors reported that approximately 46% of children under the age of 18 had experienced at least one ACE (Sacks et al., 2014). In 2016, the CDC reported that in a sample of 17,337 individuals, 63.9% of individuals had one or more ACE, and 12.5% had four or more (Felitti et al., 1998). These prevalence rates are concerning, especially considering that exposure to trauma can have detrimental effects on an individual's biological and cognitive development, which may ultimately impact important outcomes such as school performance. The next section provides an explanation as to how trauma impacts development and a hypothesis about how that could further impact academic outcomes in adulthood.

School Performance

Cognitive functioning is foundational to academic achievement, and academic achievement is predictive of educational and career success (Ammerman et al., 1986). The presence of cognitive deficits likely impacts academic achievement throughout childhood and into adulthood. Unfortunately, the consequences of early childhood maltreatment on academic performance is evident from a very young age. Research that examined children who had experienced neglect prior to age four and their adaptation to

kindergarten and first grade, suggests that neglected children obtain lower grades and exhibit less desirable classroom behavior than nonneglected children (Manly et al., 2013). Cognitive, academic, and social emotional difficulties are likely to result in poor school performance (Schoenfeld & Mathur, 2009).

To examine cognitive, academic, and social-emotional behavioral outcomes in school aged youth with a history of experiencing a traumatic event, researchers conducted a systematic literature review (Perfect et al., 2015). Participants of the reviewed studies consisted of children from pre-kindergarten to 12th grade, who had reportedly been exposed to a traumatic event defined as, “an acute or chronic life event that threatens one’s physical or emotional well-being” (National Child Traumatic Stress Network [NCTSN], 2003). Their review revealed that exposure to severe or chronic trauma during childhood was a risk factor for impaired cognitive functioning, academic difficulties, and social-emotional-behavioral problems (Perfect et al., 2015). Children with a history of maltreatment tend to have low self-esteem, poor academic performance, and are more likely to repeat a grade than their non-exposed peers (Gaudin, 1999; Hurt et al., 2001; Slade & Wissow, 2007).

These poor academic outcomes are likely related to cognitive and neurological changes, as well as social-emotional difficulties resulting from adverse childhood experiences. The connectivity of the frontal-limbic region, including the PFC, hippocampus, amygdala, basal ganglia, and hormonal processes involved within and around these regions is altered by childhood maltreatment (Jedd et al., 2015). Furthermore, these changes impact cognitive processes that are crucial for academic engagement and achievement and subsequent success, such as executive functioning, language, visual/spatial, attention/concentration, processing speed, and visual and verbal working memory. Also impacted are the cognitive systems that influence these processes

such as sensorimotor, inhibition, conflict monitoring, and emotional regulation (Mueller et al., 2010). These changes may result in altered perception of stress, school connectedness, and academic engagement, impacting future academic performance.

Social Emotional

Social emotional processes involved in academic engagement encompass cognitive, behavioral, and emotional patterns that vary between individuals and are reflected in their approach to learning (Alrashidi et al., 2016). Engagement dimensions include participation in academic activities, values for learning, sense of belonging, reaction styles to teachers and peers, willingness to face academic challenges, self-conceptualization, resilience, engrossment and dedication, self-regulated learning, and constructive contribution. Researchers discuss motivational, psychological, and affective factors involved in emotional engagement, such as an interest in learning activities, a sense of identification with school, and feeling supported by teachers and peers, which are important for academic success. Academic engagement may vary between students based on their social emotional dimensions, and studies have shown that increased academic engagement leads to improved tests scores and GPA (Alrashidi et al., 2016).

Social emotional development can be influenced by traumatic events during childhood (McLaughlin et al., 2020). Past experiences shape a child's knowledge structures, which is stored in memory, and in turn influences the way they processes information during future interactions. When presented with uncertain situations, maltreated children are more likely to perceive others' intentions as hostile, and this is referred to as the hostile attribution bias (McLaughlin et al., 2020). Some patterns of emotional processing in these individuals include decreased emotional awareness and issues with emotion learning and regulation. Maltreated children may experience changes in social emotional processing that impact the way they prioritize information related to a

threat. For instance, individuals may misclassify negative and neutral emotions and have attention biases related to threatening cues, which heightens their sensitivity to threat (McLaughlin et al., 2020). The impacts of trauma on a child's affect and interpersonal behaviors are important to consider because social emotional development plays an important role in learning and overall academic functioning (Perfect et al., 2016). Studies show that children who have a history of maltreatment endorsed higher levels of internalizing problems than non-maltreated children (McLeer et al., 1998). According to researchers, the earlier the occurrence of the maltreatment, the more pronounced the emotional stress reactivity resulting in more detrimental effects of trauma (Glaser et al., 2006). These neurobiological, cognitive, social emotional, and behavioral issues related to post traumatic stress can lead to learning difficulties, poor grades, special education needs, poor attendance, and disruptive behaviors (Perfect et al., 2016).

College

Though there is extensive research on academic outcomes for children and adolescents, very little is known about academic outcomes for college students with a history of childhood maltreatment. Research that focuses on the indirect effects of childhood maltreatment on academic achievement outcomes is of importance, due to the prevalence of academic failure. A culmination of previously mentioned findings leads to strong supporting evidence that exposure to adversity, stress, or trauma during childhood negatively impacts physical and mental health through childhood and into adulthood (Anda et al., 2006; Felitti et al., 1998, 2004; Karatekin, 2018). Therefore, it is important to understand the direct and indirect effects of childhood maltreatment on academic outcomes.

Children exposed to maltreatment exhibit decreased frustration tolerance and increased anger from an early age, which is likely to impact cognitive flexibility,

creativity, and self-control. In 2017 approximately 40% of college students endorsed symptoms of depression that impacted their functioning, and approximately 61% reported “overwhelming anxiety” (American College Health Association [ACHA], 2017). In a 2014 study, Franciscan University reported that between 2010 and 2014, there was a 173% increase in total annual clients and a 231% increase in annual visits to their counseling center, which is consistent with reports from other universities (Beiter et al., 2014). Negative and excessive stress experienced by college students is associated with a decline in health and academic performance (Shields, 2001; Svenson & Campbell, 1992). Further, ACHA (2013) suggests that stress is the most prevalent obstacle to academic achievement. A few variables that contribute to stress are coping abilities, which includes emotion coping strategies, time-management capabilities, low self-esteem, and overall mental health (Karatekin, 2018; Chapman et al., 2007). Individuals who have experienced childhood maltreatment are likely to endorse increased academic stress (Karatekin, 2018; Slade & Wissow, 2007), impacted academic engagement and school connectedness (Linnenbrink & Pintrich, 2004; Slade & Wissow, 2007; Linnenbrink-Garcia & Pekrun, 2011).

Increased rates of school drop-out are not limited to secondary school, as they are also seen at the college level. Duncan followed 210 college students from their first semester freshman year through their college career (Duncan, 2000). She found that, of those who reported multiple forms of child abuse (physical, sexual, and/or emotional), only 35% were still enrolled by their senior year; of those who reported only sexual abuse, 50% were still enrolled, and of those who denied a history of abuse, 60% were still enrolled. As of 2019, the college dropout rate in the United States on average, was approximately 44.8% (Alban & Mauricio, 2019). This indicates that college students who experienced maltreatment during childhood were more likely than non-maltreated

students to leave college prior to graduation (Duncan, 2000). These results suggest that the effects of child abuse, specifically sexual abuse and multiple events of child abuse are long lasting, and negatively impact individuals into adulthood.

GPA may also be impacted by a history of maltreatment exposure. Research on the association between child physical, sexual, and emotional abuse, and academic achievement in college revealed that histories of physical abuse and sexual abuse were associated with significantly lower GPA than those without a history of abuse (Gibby-Smith, 1995). Additionally, those with a history of occasional emotional abuse had lower GPAs than those with histories of frequent or no emotional abuse (Gibby-Smith, 1995). More specifically, students who endorsed a history of physical abuse had lower semester scores (mean GPA = 2.98, n= 36) than the no abuse group, (mean GPA = 3.18, n =98; $t=2.21$, $p= .01$). Students who endorsed a history of sexual abuse had lower semester scores (mean GPA of 2.90, n = 19) than those with no SA, (mean GPA = 3.16, n = 116; $t = 2.20$, $p = .01$). With regard to emotional abuse, post-hoc analysis revealed that individuals who reported occasional emotional abuse had lower semester scores (mean GPA = 2.79, $p = .01$) than those who reported frequent (mean GPA = 3.12, n = 74) or no emotional abuse (mean GPA of 3.14, n = 60) (Gibby-Smith, 1995). For those who plan to attend graduate school, a GPA of less than 3.0 could make all the difference.

Executive functioning may play a role in the relationship between maltreatment exposure and GPA (Welsh et al., 2017). Researchers screened 64 undergraduate students for a history of child maltreatment via the Childhood Treatment Questionnaire (CTQ), administered the WAIS-IV Vocabulary subtest, the Go-No-Go (GNG) EF assessment, Iowa Gambling task (IGT), a Student Adaptation to College Questionnaire (SACQ), and a demographics survey (Welsh et al., 2017). They were also asked to allow researchers access to their GPA at the end of each semester. Researchers hypothesized that the

disruption of emotion regulation due to early childhood maltreatment could disrupt executive functioning (EF) in academic context. Executive functioning in the form of heightened emotional arousal was used as a mediator to study its indirect effects. Their reasoning for using EF as a mediator was based on evidence that early life stressors have negative effects on the PFC. More specifically, they separated EF into “cool” EF (no emotional arousal) and “hot” EF (heightened emotional arousal). They found that EF mediated the relationship between past childhood abuse and college GPA (Welsh et al., 2017). Executive functioning deficits may lead to lack of motivation and off-task behaviors in academic settings, which can result in decreased academic engagement (Basch, 2011; Nakutin & Gutierrez, 2019).

Although ACEs are much broader a conceptualization of trauma than childhood maltreatment, examining studies of the relationship between ACEs and college outcomes may also shed light on how early traumatic experiences impact academic achievement. Recently, using archival data of 1197 college students, researchers found that ACE scores (3+) were higher for first-generation college students, students from diverse ethnic background (e.g., African American/Black and multiple races), and students with lower SES (Mackay-Neorr, 2019). Moreover, higher ACE (3+) scores predicted decreased academic performance (measured by cumulative GPA). Taken together, these studies demonstrate how the detrimental effects of early childhood trauma that persist into adulthood impact academic outcomes in college students.

To help support college students with a history of trauma, it is important to identify additional mediating factors between childhood trauma and academic outcomes. This study aims to examine the role of school connectedness, academic engagement, and perceived academic stress in mediating the relationship between childhood maltreatment and GPA. Students who have experienced childhood maltreatment may have difficulty

engaging in social and academic interactions with teachers and other students resulting in limited school connectedness (Mrug & Windle, 2009; Lemkin et al., 2018) and academic engagement, which then may decrease GPA (Lemkin et al., 2018). Further, past maltreatment may cause increased perceived academic stress (Cruz et al., 2013) and result in decreased GPA.

School Connectedness

School connectedness is described as “the relationship students have with other individuals at the learning institution, such as other students, faculty, and staff” (Gardner, 2016, p.5). Bonding with other individuals within the academic institution is crucial for academic achievement (Strayhorn, 2014), and when students perceive that they are cared for and supported by faculty and peers, their academic outcomes are improved (Whitlock et al., 2012). In one study, inapproachability of professors was correlated with college dropout rates (Agajanian et al., 2006). Hence, the environment in which an individual learns influences academic outcomes such as school connectedness. Experiencing family issues in the home environment, such as childhood maltreatment impedes the development of resilience in adolescents by negatively impacting their sense optimism and self-efficacy, which decreases school connectedness (Murphy & McKenzie, 2016; Clements-Nolle & Waddington, 2019). School connectedness is a protective factor for psychological distress (Clements-Nolle & Waddington, 2019), and a predictor of increased extra-curricular involvement and enhanced academic performance (GPA) (Bonny et al., 2000; Lemkin et al., 2018). Though most research on school connectedness and academic outcomes involves elementary, middle school, and high school students, it is important to consider the effect that perceived school connectedness has on academic performance at a higher level. It is likely that biological and cognitive factors are involved in the process of forming and maintaining these important school relationships,

and maltreatment may impact these processes resulting in decreased school connectedness.

Researchers found that maltreatment causes lowered self-esteem, emotional issues, behavioral difficulties, and peer relationship problems, which likely impacts relationship building and maintenance (Murphy & McKenzie, 2016). Further, as previously noted, EF is affected as a result of family dysfunction, suggesting that individuals who have experienced child maltreatment are likely to experience behavior problems, emotional issues, and interpersonal difficulties (Murphy & McKenzie, 2016). In addition, increased amygdala activation due to structural changes is seen in adults who reported emotional maltreatment during childhood, and individuals with structural changes to amygdala may have difficulty interpreting others' behaviors, which may interfere with them relating to others (van Harmelen et al., 2012). Moreover, children who have experienced childhood maltreatment may experience emotional memory impairment and enhanced threat response (Weniger et al., 2008), all of which could impact social relationships and decrease school connectedness.

Language is also an important cognitive process related to building and maintaining relationships. Early language delays can result in future substandard academic performance (Cho Lieu, 2004; Clegg et al., 2005; Sylvestre et al., 2016), and even school dropout (Ramey & Ramey, 2004). Unfortunately, researchers have found that maltreated children are often less capable of understanding instructions and questions asked of them when compared to developmental norms (receptive language), and they have poorer conversational skills due to the avoidance of social settings, as well as an insufficient range of functions (Sylvestre et al., 2016). An individual who experiences language delays may find it difficult to communicate with and relate to others, hindering their relationship with classmates and teachers. They may be less motivated than those

without language delays to engage in the learning environment. These delays and lack of understanding may negatively impact an individual's perceived school connectedness if they do not feel supported by or connected with others in their institution. Conversely, individuals who do progress to higher education, may have overcome these obstacles, and developed positive relationships and school connectedness (Clements-Nolle & Waddington, 2019). Taken together, school connectedness is an important factor contributing to academic achievement because students who feel connected are more likely to experience a sense of belonging, which may lead to improved academic outcomes (Libbey, 2004).

Academic Engagement

Academic engagement is described as a student's extent of cognitive, behavioral, and emotional interactions with faculty, curriculum, and class activities (Soria & Stebleton, 2012; Alrashidi et al., 2016). Specific ways in which students are engaged involve group study, faculty interaction, utilizing support services, on-task academic behavior, and taking part in extra-curricular activities (Landau et al., 2014; Nakutin & Gutierrez, 2019). Additionally, academic engagement involves the prioritization of, and amount of effort a student devotes to their academic endeavors, which includes taking advantage of academic resources such as tutoring, class attendance, and coursework completion (Landau et al., 2014). Researchers report that academic outcomes are influenced by the extent to which a student is academically engaged with their institution (Soria & Stebleton, 2012). The social aspects as well as exposure to information that increases knowledge and understanding contribute to academic success. The student engagement theory posits that, "students learn from what they do in college" (Gasiewski et al., 2012, p.229). Higher levels of engagement is often intrinsically motivated and influenced by one's opportunity for autonomy in their learning environment, confidence

in their abilities, understanding of the course content, behaviors of professors in the classroom, and an excitement for the course material (Gasiewski et al., 2012). The extent to which academic engagement impacts scholastic success is important to consider, as it is one of several mediating factors for academic outcomes that are explored in this study. Research shows that during primary and secondary education, as an individual's experiences of maltreatment increase, their academic engagement decreases (De Bellis et al., 2018; Robles et al., 2019), however, learning and exhibiting resilience buffers these outcomes (Bethell et al., 2014). ACEs have long-term negative impacts on health and development that affect an individual beyond childhood and into adulthood (De Bellis et al., 2018). Though there is limited research on the effect of maltreatment on college level academic engagement, the negative consequences of maltreatment related ACEs include opportunities for educational attainment and problems in education settings (De Bellis et al., 2018). Higher levels of academic engagement are correlated with higher GPAs (Barnett et al., 2020). Cognitive, emotional, and behavioral issues are associated with lower levels of academic engagement, and lead to early school drop-out rates, and lower GPAs (Alrashidi et al., 2016). Biological and cognitive factors involved in the evolution of an individual's desire and ability to engage academically are worthy of consideration. Learning and classroom engagement involves attentiveness, concentration, persistence, and effort (Alrashidi et al., 2016), which can be difficult for individuals who have experienced cognitive deficits due to childhood maltreatment.

Cognitive processes such as reasoning, problem-solving, attention, memory, visual processing, language, and emotional processing are necessary for academic engagement. Structural modifications to the cortical network due to early life trauma during the developmental period may lead to long term cognitive deficits (Gould et al., 2012). Researchers found that individuals with a history of early life trauma displayed

alterations in the prefrontal cortex (PFC), a brain area heavily involved in attention, goal settings, and other executive functioning skills. These changes last throughout adulthood, and researchers have identified related deficits in psychomotor and motor speed, reasoning and planning abilities, memory and attention, and frontal, temporal, hippocampal dysfunction, and emotional processing (Gould et al., 2012). These changes likely influence an individual's academic engagement (Slade & Wissow, 2007), as executive functioning is essential for learning and achievement (Romano et al., 2015). Changes in the PFC are compounded with other neurological changes that impact working memory (Tiecher et al., 2015) and sensory processing (Segal & Collin-Vézina, 2019). Deficits in one's ability to process and retain auditory and visual stimuli could impact engagement and understanding of information. Ultimately, it is likely that the biological and cognitive effects of chronic stress and maltreatment interfere with an individual's level of academic engagement. This information is important to know, in cases that accommodations are necessary to promote academic engagement.

Perceived Academic Stress

Individuals generally experience academic related stress during the course of their education; this includes the collegiate population (Cruz et al., 2013). When college students are stressed, they may experience increased anxiousness and difficulty concentrating and attending to tasks. Cruz and colleagues (2013) reported that students who experience heightened stress levels are more likely to have poor academic outcomes than those with lower levels of stress. Researchers found that perceived academic stress had a negative effect on college student performance (Khan, 2013). Students who have experienced ACEs are at risk for increased levels of stress and mental health problems (Karatekin, 2018), and this is partially due to the disruption of biological stress response systems and resulting emotional and behavioral responses (Nurius et al., 2016).

Specifically, the hypothalamic–pituitary–adrenal (HPA) axis is the central stress-response system, and functions to regulate stress reactions and other body processes including mood and emotions. When individuals encounter stressful situations, the sympathetic nervous system responds immediately, inciting the familiar physiological stress responses, such as release of cortisol which leads to increased heart rate and sweating (Dias-Ferreira et al., 2009; Lupien et al., 2009). If these processes occur repeatedly, biological and physiological “wear and tear” can occur (Dias-Ferreira et al., 2009). These changes may then impact brain functioning and future stress-responses leading to impaired emotion regulation. These changes are known as allostasis and refer to the organism adaptation to repeated challenges.

The *Adaptive Calibration Model* (ACM) theory emphasizes that immediate and developmental changes occurring from stress are evolutionary, adaptive, and responsive (Del Giudice et al., 2011). In explaining the ACM theory, researchers postulate that biologically driven adaptive mechanisms respond to chronic and dangerous environmental challenges to prepare the individual organism to survive (i.e., live and reproduce) in similar settings. However, this process becomes maladaptive when the individual is no longer in a dangerous or chronically stressful environment. For example, reduced cortisol response in adulthood as a result of chronic stress in childhood can be adaptive in the face of continued chronic stress (e.g., remaining calm while in the middle of violent event); however, it may lead to otherwise risky behaviors in safer environments (e.g., college; Del Giudice et al., 2011).

The patterns of stress responsivity in the ACM include sensitive (I), buffered (II), vigilant (III), and unemotional (IV), and they are considered to be complex, in that they develop through acquired knowledge about environmental stimuli, historical strategies, and stress responsivity levels. The sensitivity response pattern results from experiencing

low-stress environments, and is correlated with strengthened social learning and engagement (Ellis et al., 2017). The buffered response pattern is considered “average,” resulting from moderate-stress environments. Individuals that have developed this pattern of stress responsivity, likely experience low levels of anxiety and sensitivity to social learning and engagement. The vigilant response pattern results from stressful environments, and individuals with this response pattern generally experience high anxiety, and may exhibit antisocial behavior. The unemotional response pattern results from high stress environments, and may compromise social learning. Individuals with unemotional response patterns may be less sensitive to environmental threats, and may present as uncooperative, impulsive, unempathetic, and may engage in antisocial behaviors. Ultimately, these adaptive patterns have the potential to impact perceived stress in academic settings, and those with elevated or blunted stress responses systems may have poorer academic outcomes due to their heightened psychological, physiological, and behavioral responses (Cruz et al., 2013). However, individuals who have experienced maltreatment that have gone to college may have higher levels of resilience than those who did not, considering that the acquisition and exhibition of resilience is a buffer for factors that influence academic outcomes (Bethell et al., 2014). Taken together, early childhood maltreatment could potentially cause an increase or decrease in perceived academic stress, depending on whether the stress response is elevated or blunted. This study will test this relationship and its directionality. Further, both scenarios could negatively impact GPA (e.g., too little perceived stress could reduce academic motivation, too much stress could cause avoidance).

The Current Study

During childhood and adolescence, the human brain is exceptionally malleable and influenced by an interaction between genetic predisposition (nature) and exposure to

external stimuli (nurture). When these experiences are perceived by an individual as stressful, over time the structure and functioning of the brain may be altered (McEwen, 2007; McEwen et al., 2015), and the modification of brain structures as a result of chronic stress leads to changes in cognition (Putnam, 1998) and social emotional development (Jedd et al., 2015). Childhood maltreatment has the ability and the tendency to shape the course of development because of the plasticity of the human brain and other related biological functions, such as allostatic load (Blaustein, 2013), as well as environmental adaptations (Del Giudice et al., 2011). Social emotional development may be thwarted by experiences of childhood maltreatment; Individuals who experience abuse or neglect may have difficulty with social understanding, affect regulation, and perspective taking (Luke & Banerjee, 2013). Theoretically, these biological, cognitive, and social emotional changes may impact levels of academic engagement, school connectedness, and perceived academic stress, which may influence academic outcomes such as GPA.

The purpose of this study is to determine if there is a relationship between childhood maltreatment and college performance (GPA), and, if so, to examine potential mediators of this relationship, including school connectedness (SC), academic engagement (AE), and perceived academic stress (PAS). In doing this, this study answers the following research questions:

1. Is there a relationship between childhood maltreatment and GPA in college?
2. Is there a relationship between self-reported childhood maltreatment and perceived academic stress, school connectedness, or academic engagement?
3. What factors mediate the relationship between childhood maltreatment and GPA?

- a. Does school connectedness mediate the relationship between childhood maltreatment and GPA?
- b. Does academic engagement mediate the relationship between childhood maltreatment and GPA?
- c. Does perceived academic stress mediate the relationship between childhood maltreatment and GPA?
- d. What is the combined indirect effect of maltreatment on GPA through school connectedness, academic engagement, and perceived academic stress?
 - i. Which mediator accounts for the largest indirect effect of childhood maltreatment on GPA?

It's hypothesized that there is a significant inverse relationship between childhood maltreatment and GPA. Additionally, it's hypothesized that perceived academic stress, academic engagement, and school connectedness will mediate the relationship between childhood maltreatment and GPA. Specifically, it's expected that exposure to childhood maltreatment increases perceived academic stress, which results in decreased GPA. Exposure to childhood maltreatment is expected to decrease school connectedness and academic engagement, resulting in decreased GPA. Finally, it's hypothesized that childhood maltreatment has a significant total indirect effect on GPA through school connectedness, academic engagement, and perceived academic stress.

CHAPTER II:

METHODS

Participants

Participants were undergraduate and graduate students enrolled in psychology courses, and participation occurred between January 2020 through December 2020. Originally, 330 participants consented to the study; however, 21 of these participants completed the consent and survey twice. These participants' second attempts were removed to avoid any biases in the data. Therefore, this study includes a sample of 309 college students. Students from the UHCL SONA Participant Pool were provided one credit for their participation in the study.

Inclusionary Criteria

For participating in the study, inclusion criteria included: (1) current college student (2) ages 18 and up (age 17 acceptable if participating/signing up through SONA only, because SONA requires students to have parent consent for participation in experiments on file before signing up for experiments) (3) fluent in written and spoken English (4) normal or corrected-to-normal hearing and vision. Criteria 1-4 will be determined based on participant attestation at the beginning of the online questionnaires. In addition to collecting demographic information, the researcher used the Maltreatment and Abuse Exposure Scale to assess childhood trauma history. Additionally, the researcher used the Perceived Academic Stress Scale to assess perceived academic stress, the Psychological Sense of School Membership to assess school connectedness, and the Student Engagement Instrument - College to measure academic engagement.

Demographics

Participants answered questions regarding demographics including age, gender, race/ethnicity, academic, and background characteristics (see Table 1). The sample analyzed included 29 freshmen, 28 sophomores, 102 juniors, 84 seniors, and 60 graduate students. The age range of students was 17 years to 58 years old. Females represented 72.8% of the sample, males represented 22.7% of the sample, 1.9% identified as neither male nor female, and 1% preferred not to answer. Hispanic participants represented 32.70% of the sample, White participants represented 32% of the sample, and Black or African Americans represented 11.7% of the sample. The remaining 47% of the sample were Asian (7.8%), Middle Eastern/North African (1.60%), Hawaiian or Pacific Islander (0.30%), more than one ethnicity (11.3%), or prefer not to answer (1%). A new variable was created for ethnicity to represent participants who identified with more than one ethnicity.

Measures

Maltreatment Related ACEs

To measure exposure to childhood maltreatment, the researcher used the *Maltreatment and Abuse Exposure Scale* (MAES Teicher & Parigger, 2015). The MAES is a self-report questionnaire that includes the 52 items from the Maltreatment and Abuse Chronology of Exposure Scale (MACE). The MACE was established by Teicher and Parigger to assess the degree, frequency, and severity of exposure to ten types of maltreatment including, parental abuse and neglect, peer abuse and bullying, and witnessing violence in the home (Teicher & Parigger, 2015). This study collected data from the six scales on the MAES that assess maltreatment related ACEs: Emotional Neglect (5 items; e.g. “My mother/father was emotionally unavailable”); Non-verbal emotional abuse (6 items; e.g. “A parent locked you in a closet, basement, garage, etc.”);

Parental Physical Maltreatment (6 items; e.g. “A parent intentionally pushed, pinched, slapped, kicked you, etc.”); Parental Verbal Abuse (4 items; e.g., “Said hurtful things, made you feel humiliated”); Physical Neglect (5 items; e.g. “You did not have enough to eat.”); and Sexual Abuse (7 items, e.g., “Parents touched or fondled you in a sexual way”). These scales were selected because they assess the frequency and severity of the core components of maltreatment experienced in childhood (i.e., physical abuse and neglect, sexual abuse, verbal abuse, and emotional abuse and neglect). Upon completion of the MAES, two separate composite scores were created from these six subscales.

The MAES multiplicity composite score denotes the number of specific types of childhood maltreatment, ranging from 0 to 6 (Schalinski et al., 2016), with 0 indicating no exposure to maltreatment and 6 indicating exposure to all 6 different types of maltreatment (Teicher & Parigger, 2015). The multiplicity scores were adapted to include scores across only six subscales being assessed in this study (the MACE includes a total of 10 subscales and 0 to 10 range). The MAES severity score denotes the overall severity of exposure to maltreatment based on the number of items endorsed within each subscale (Schalinski, et al., 2016), with more frequent positive item endorsements on each scale indicating more severe maltreatment within that domain. A variable was created for multiplicity of childhood maltreatment by summing the total number of childhood maltreatment domains (MAES multiplicity = 0-6) for each participant, and a variable was created for severity of childhood maltreatment by summing the total number of items endorsed across all six childhood maltreatment domains for each participant (MAES Severity = 0-29).

The MACE has evidenced psychometric validity and high test-retest reliability among individuals across the lifespan ranging between $r = 0.5$ to 0.8 (Teicher & Parigger, 2015). The MACE has demonstrated more variance in psychiatric symptom ratings than

the Child Trauma Questionnaire (CTQ) or the Adverse Childhood Experience Scale, in addition to having high psychometric qualities (ACE; Fosse et al., 2020). Additionally, the MACE has demonstrated high convergent validity with CTQ, with coefficients falling between $r = 0.6$ to 0.9 (Schalinski, et al., 2016; Teicher & Parigger, 2015).

Perceived Academic Stress

To measure perceived academic stress, the *Perception of Academic Stress Scale* was used. The PASS an 18-item self-report measure of perceived academic stress administered among university students. Students are asked to rate on a 5-point Likert-type scale (from 1 = strongly disagree to 5 = strongly agree), their perceptions and experiences about each item in measuring sources of academic stress. Five factors are measured: Pressure to perform, Perceptions of workload and examinations, Self-Perceptions, and Time restraints. The overall internal consistency coefficient is 0.70. The total (sum of all factors) was used in the analysis.

School Connectedness

To measure school connectedness, the *Psychological Sense of School Membership* PSSM; Goodenow, 1993; Pittman & Richmond, 2008) was used. The PSSM is an 18-item self-report measure. The original PSSM has been modified slightly from a 5-point Likert scale from "not at all true" to "completely true," to a 3-point scale (never, sometimes, always), specifically for use with college students (Cronbach's $\alpha = .77 - .88$). The scale consists of questions on student perceived liking, personal acceptance, inclusion, respect, and participation in the school environment. Five of the eighteen items are reversed to avoid a set response pattern. The total (sum of all factors) was used in the analysis.

Academic Engagement

To measure academic engagement, the *Student Engagement Instrument – College Version* (SEI-C; Appleton et al., 2006; Reschly et al., 2014) was used. The SEI-C is a 33-item self-report measure comprised of the following four subtypes of student engagement: academic, behavioral, cognitive, and psychological/affective. The measure is validated from elementary to post-secondary level. SEI survey item response choices are based upon a 4-point Likert-like scale (from 1 = strongly disagree, 2 = agree, 3 = disagree, 4 = strongly agree). Coefficient alphas provided evidence of internal consistency across all five factors: Teacher-Student Relationships ($r\alpha = .88$), Control and Relevance of School Work ($r\alpha = .80$), Peer Support for Learning ($r\alpha = .82$), Future Aspirations and Goals ($r\alpha = .78$), Family Support for Learning ($r\alpha = .76$; Appleton et al., 2006). The total (sum of all factors) was used in the analysis.

Procedures

Participants were asked to access online Qualtrics surveys through a weblink. Informed consent was obtained for participation from all potential participants prior to enrollment in this study. Consent is included as the first text “item” in the online self-report questionnaire on Qualtrics, which was the first step in study participation. A statement in the online consent form was included that says, “If you do NOT wish to consent to participation in this study, please exit this webpage now.” Participants were asked to verify inclusion criteria 1-4. Once the participant consents, verifies that criteria 1-4 are met, and enters their email address, the participant was prompted to begin the survey. Participants were guided to complete the assessments in the survey in the following order: Maltreatment and Abuse Chronology of Exposure Scale, Perception of Academic Stress Scale, The Student Engagement Instrument – College Version, Psychological Sense of School Membership, and demographics. The survey process took

approximately one hour to complete. All data was accessed by the lead researcher, and cleaned and analyzed using excel, R, and SPSS.

CHAPTER III:
DATA ANALYSIS PLAN

Prior to answering the research questions, descriptive statistics were used to describe central tendency and distribution of each variable (e.g., standard deviation, skewness, kurtosis). Assumptions were tested for multiple and linear regression models. Specifically, residuals were plotted using a histogram to check the distribution. Pearson correlations were used to check for multicollinearity. The researcher used scatter plots to compare residuals to predictive values to test for heteroscedasticity. The following research questions were investigated:

Research Question 1: Is there a relationship between Childhood Maltreatment and GPA?

First, the researcher used multiple regression models that controlled for significant covariates to examine the direct effects of childhood maltreatment on GPA. Bootstrapping (1,000 resamples) was used to estimate standard error of the regression models coefficients. The following regression equation provides an example of the regression model testing the direct effects of childhood maltreatment on GPA.

$$Y_{\text{GPA}} = B_0 + B_1X_{\text{CM}} + B_2X_{\text{covariate}} + e$$

Research Question 2: Is there a relationship between Childhood Maltreatment and School Connectedness, Academic Engagement, and Perceived Academic Stress?

Second, the researcher used multiple regression models that controlled for significant covariates to examine the direct effects of childhood maltreatment on SC, AE, and PAS. Bootstrapping was again used to calculate to calculate standard error. The following regression equation provides an example of the regression model testing the direct effects of childhood maltreatment on School Connectedness.

$$Y_{\text{schoolconnectedness}} = B_0 + B_1X_{\text{CM}} + B_2X_{\text{covariates}} + e$$

Research Question 3: Does School Connectedness, Academic Engagement, and Perceived Academic Stress Mediate the Relationship between Childhood Maltreatment and GPA?

After examining the direct effects of childhood maltreatment on GPA, the researcher tested whether school connectedness, academic achievement, and perceived academic stress mediate the relationship between childhood maltreatment and GPA. The researcher estimated the indirect effect by calculating the product of coefficients from path a and b of the regression models. Relatedly, the researcher used bootstrapping methods to calculate the standard error and 95% confidence intervals around the estimated indirect effect. Analyses were computed in R using single-mediator models and multiple mediator models. The (a) path represents the direct effect of childhood maltreatment on the mediator (e.g., School Connectedness), and the (b) path represents the mediators' effect on the outcome after controlling for childhood maltreatment. The following equations provide an example of the single mediator model equations the researcher used to test whether school connectedness mediates the relationship between childhood maltreatment and GPA:

$$\text{a) } Y_{SC} = B_0 + B_1 X_{CM} + e$$

$$\text{b) } Y_{GPA} = B_0 + B_1 X_{CM} + B_2 X_{SC} + e$$

As mentioned earlier, the researcher tested a multiple mediator model that includes all three mediators in the same model. This was done by calculating the product of coefficients for each hypothesized mediator based on the following a and b path regression models:

$$\text{a) } Y_{SC} = B_0 + B_1 X_{CM} + e$$

$$\text{b) } Y_{GPA} = B_0 + B_1 X_{CM} + B_2 X_{SC} + B_3 X_{AE} + B_4 X_{PAS} + e$$

Bootstrapping was used to calculate 95% CI and test the significance of each indirect effect.

Estimated Sample Size

To observe a wide range of maltreatment exposure and academic outcomes and explore these variables from a dimensional rather than categorical perspective, a correlational design was used. An a priori power analysis in G*Power (Faul et al., 2007; Mayr et al., 2007) for multiple linear regression with 2 predictors, estimated approximately 244 participants ($\alpha = .05$) were needed to achieve 80% power to detect small effect sizes (i.e., $f^2 = .04$; based on typical effect sizes comparing maltreatment and GPA; Welsch et al., 2017). Target total recruitment was 250 participants to account for incomplete data. The actual sample of 309 participants should result in greater than 80% power to detect small effect sizes.

CHAPTER IV:

RESULTS

Descriptive Statistics

Descriptive statistics and percent of missing data was calculated for each variable included in the study. Table 2 provides the mean, median, standard deviation, kurtosis, skewness, and percent of missing data for these variables. Using the cutoff +/- 1 for skewness and +/-2 for kurtosis, all variables were observed to be normally distributed (see Table 2). The percent of missing data for the variables in this study ranged from 1.2% to 1.94% for demographic variables (see Table 1) and .32% to 1.94% for study variables (see Table 2). All regression models used Maximum Likelihood Estimation (MLE) to account for missing data and correlational and descriptive statistics used pairwise deletion. Quantitative researchers have demonstrated that MLE yields less biased estimates than other approaches such as pairwise deletion (Enders, 2001).

To identify potential covariates, a series of one-way ANOVAs were conducted to test the relationship between demographic variables (i.e., gender, ethnicity, classification) and Childhood Maltreatment Multiplicity and Severity, School Connectedness, Academic Engagement, Perceived Academic Stress, and GPA. Results of these ANOVAs indicated that gender was not significantly related to any predictor, mediator, or outcome variable of interest (see Table 3). However, classification in school (e.g., freshman, sophomore, junior, senior, graduate student) was related to Perceived Academic Stress [$F(4, 300) = 3.21, p = 0.01$] and GPA [$F(4, 300) = 3.87, p < 0.01$], but not Childhood Maltreatment, School Connectedness or Academic Engagement. In addition, ethnicity had a marginally significant relationship with Childhood Maltreatment Multiplicity [$F(8, 296) = 1.876, p = .06$], GPA [$F(8, 296) = 1.807, p = .075$], and Perceived Academic Stress [$F(8, 296) = 1.69, p = .10$]. Post hoc pairwise comparisons using the Tukey HSD test indicated that the

mean GPA for graduate students ($M = 3.55$, $SD = 0.71$) was significantly higher (i.e., $p < .05$) than undergraduate juniors ($M = 3.27$, $SD = 0.47$, $p = .01$) and seniors ($M = 3.30$, $SD = 0.42$, $p = .03$). Additionally, the mean of Perceived Academic Stress for undergraduate freshman ($M = 54.72$, $SD = 12.04$) was significantly higher than juniors ($M = 46.28$, $SD = 11.53$, $p = .01$), seniors ($M = 46.77$, $SD = 12.32$, $p = .02$), and graduate students ($M = 45.74$, $SD = 12.59$, $p = .01$). Regarding ethnicity, there were no significant differences (i.e., $p < .10$) in the pairwise comparisons for mean Maltreatment Multiplicity and mean Perceived Academic Stress. However, Asian students ($M = 3.59$, $SD = 0.39$) reported significantly higher GPAs in comparison to Black or African American students ($M = 3.19$, $SD = 0.69$, $p = .07$). Because classification and ethnicity were significant predictors of GPA, all regression models were originally tested with and without the covariates; However, including the covariates did not change significance of any relationships. Therefore, all regression results reported below do not include the covariates in the models.

Assumptions of Linear Regression

All regression models were run in the “lavaan” package in R, which is a structural equation modeling program that uses MLE to account for missing data and bootstrapping to calculate standard error. Models that employ bootstrapping do not need to meet the typical assumptions of multiple regression and, because of this, tests of regression assumptions are not available in the “lavaan” package. However, to further explore these models and in line with the original data analyses plan, the researcher tested the assumptions of each multiple regression model by also computing them in SPSS without bootstrapping and MLE. First, Pearson correlations indicated that the predictor variables of interest in this study were significantly correlated with each other (Table 3). Therefore, collinearity was tested in SPSS, using Variance Inflation Factors (VIF); results indicated

that the correlations between the predictor variables were not strong enough to require correction ($VIF < 3$). To test for residual independence, Durbin Watson statistics were calculated using SPSS for each model. The Durbin Watson statistics (Durbin Watson = 2.239 to 2.236) for each regression model indicated the assumption of residual independence was met. To test for homoscedasticity (i.e., equal variance), the researcher created scatterplots of each model's residuals compared to the predicted values of the dependent variable. Visual analyses of the scatterplots indicated the assumption of equal variance was met for each model. Normal distribution of the residuals was tested using a normal probability plot, which indicated that this assumption was met. Using Cook's Distance statistics in SPSS, influential cases (e.g., outliers) were tested for and no such instances were identified.

Research Question 1: Direct Effects of Maltreatment on GPA

The results of a linear regression model with bootstrapped standard error estimates indicated the relationship between childhood maltreatment multiplicity and GPA was not statistically significant, $\beta = -.019$, $z = -1.26$, $p = .209$. Similarly, the relationship between childhood maltreatment severity and GPA was not statistically significant, $\beta = -.007$, $z = -1.35$, $p = .18$.

Research Question 2: Direct Effects of Maltreatment on School Connectedness, Academic Engagement, and Perceived Academic Stress

The researcher used linear regression models to estimate the direct effects of maltreatment multiplicity and severity on school connectedness, academic engagement, and perceived academic stress. Bootstrapping was used to calculate the standard error of the direct effects. The results indicated that childhood maltreatment multiplicity was a statistically significant predictor of School Connectedness, $\beta = -0.86$, $z = -4.34$, $p < .01$, Academic Engagement, $\beta = -2.25$, $z = -4.94$, $p < .01$, and Perceived Academic Stress, $\beta =$

1.106, $z = 2.83$, $p = .005$. The results of the linear regression models indicated that childhood maltreatment severity was a statistically significant predictor of School Connectedness, $\beta = -0.19$, $z = -3.21$, $p = .001$, Academic Engagement, $\beta = -0.61$, $z = -5.160$, $p < .01$, and Perceived Academic Stress, $\beta = .400$, $z = 3.86$, $p < .01$.

Research Question 3: Single and Multiple Mediator Models

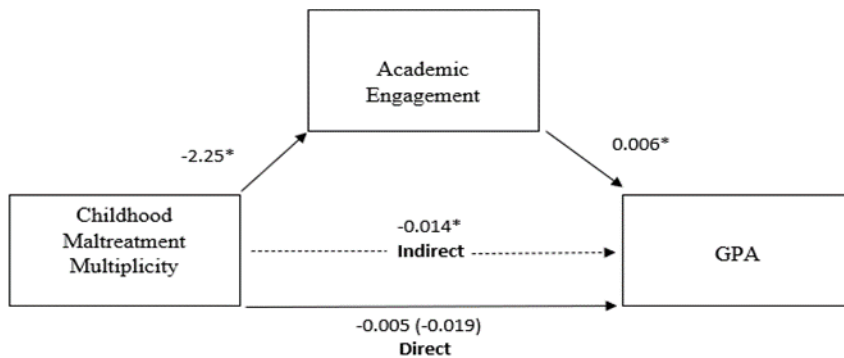
The product of coefficients and bootstrapped 95% confidence intervals were used to calculate and test the indirect effects of Childhood Maltreatment on GPA via School Connectedness, Academic Engagement, and Perceived Academic Stress. The product of the coefficients and confidence intervals were calculated from the coefficients and standard error of regression models that test paths *a* and *b* of the hypothesized mediated relationships. Path *a* represents the direct effect of childhood maltreatment (e.g., severity or multiplicity) on the hypothesized mediator (e.g., School Connectedness), and path *b* represents the hypothesized mediator's effect on the outcome after controlling for childhood maltreatment. In the single-mediator analyses, the path *b* regression equation only includes the hypothesized mediator and the maltreatment variable of interest (i.e., either severity or multiplicity). In the multiple mediator analyses, the path *b* regression model includes all the hypothesized mediators and the maltreatment variable of interest.

Single Mediation Models

School Connectedness. The path *a* standardized regression coefficient for childhood maltreatment multiplicity predicting school connectedness was statistically significant, $\beta = -0.86$, $z = -4.34$, $p < .01$. The path *b* standardized regression coefficient for school connectedness predicting GPA after controlling for childhood maltreatment multiplicity was not statistically significant, $\beta = -0.007$, $z = -2.20$, $p = .109$. The indirect effect (see Table 6) of childhood maltreatment multiplicity on GPA through school connectedness was not statistically significant, $a*b = -.006$, $z = -1.40$, $p = .161$, CI [-

0.017, 0.001]. The path *a* standardized regression coefficient for childhood maltreatment severity predicting school connectedness was statistically significant, $\beta = -0.19$, $z = -3.21$, $p = .001$. The path *b* standardized regression coefficient between school connectedness and GPA after controlling for childhood maltreatment was not statistically significant, $\beta = 0.007$, $z = 1.54$, $p = .124$. The indirect effect (see Table 7) of childhood maltreatment severity on GPA through school connectedness was not statistically significant, $a*b = -0.001$, $z = -1.26$, $p = .209$, CI [-0.004, 0.00].

Academic Engagement. The path *a* standardized regression coefficient for childhood maltreatment multiplicity predicting academic engagement was statistically significant $\beta = -2.25$, $z = -5.49$, $p < .01$. The path *b* standardized regression coefficient for academic engagement predicting GPA after controlling for childhood maltreatment multiplicity was statistically significant, $\beta = 0.006$, $z = 2.92$, $p = .003$. The indirect effect (see Table 6) of childhood maltreatment multiplicity on GPA through academic engagement was statistically significant, $a*b = -0.013$, $z = -2.35$, $p = .016$, CI [-0.027, 0.004]. Figure 1 illustrates this relationship.

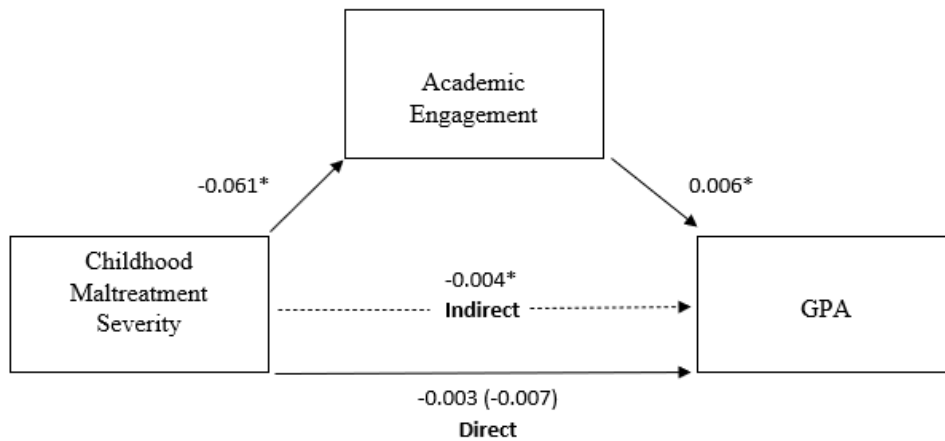


Notes. * $p < .05$; Direct effect after accounting for mediator (Direct effect without accounting for mediator)

Figure 1.

Indirect Effect of Maltreatment Multiplicity through Academic Engagement

Similarly, the path a standardized regression coefficient for childhood maltreatment severity predicting academic engagement was statistically significant, $\beta = -0.61$, $z = -5.16$, $p < .01$. The path b standardized regression coefficient for academic engagement predicting GPA after controlling for childhood maltreatment severity was statistically significant, $\beta = 0.006$, $z = 2.77$, $p = .006$. The indirect effect (see Table 7) of childhood maltreatment severity on GPA through academic engagement was also statistically significant, $a*b = -0.004$, $z = -2.36$, $p = .019$, CI [-0.007, 0.001]. Figure 2 illustrates this relationship.

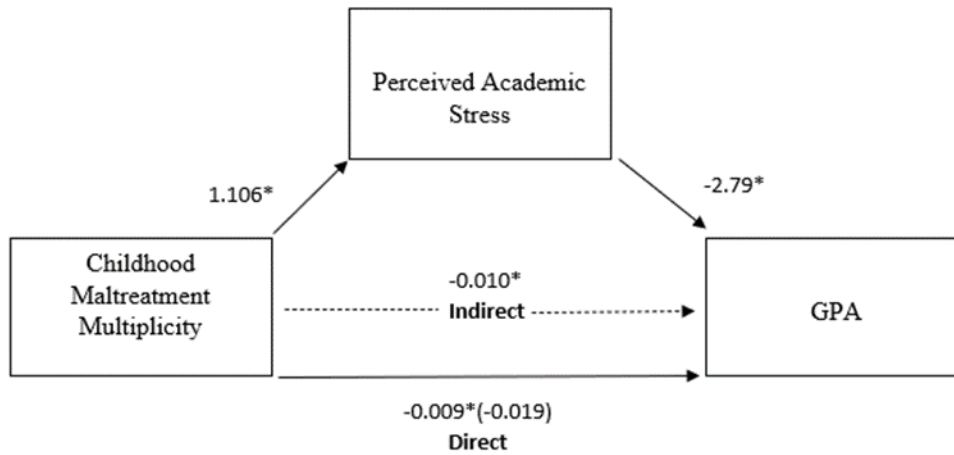


Notes. $*p < .05$; Direct effect after accounting for mediator (Direct effect without accounting for mediator)

Figure 2.

Indirect Effect of Maltreatment Severity through Academic Engagement

Perceived Academic Stress. The path *a* standardized regression coefficient for childhood maltreatment multiplicity predicting perceived academic stress was statistically significant, $\beta = 1.106$, $z = 2.83$, $p = .005$. The path *b* standardized regression coefficient for perceived academic stress predicting GPA after controlling for childhood maltreatment multiplicity was statistically significant, $\beta = -0.009$, $z = -2.79$, $p = .005$. The indirect effect (see Table 6) of childhood maltreatment multiplicity on GPA through perceived academic stress was statistically significant, $a*b = -0.010$, $z = -1.92$, $p = .055$, CI $[-0.02, 0.002]$. Figure 3 illustrates this relationship.

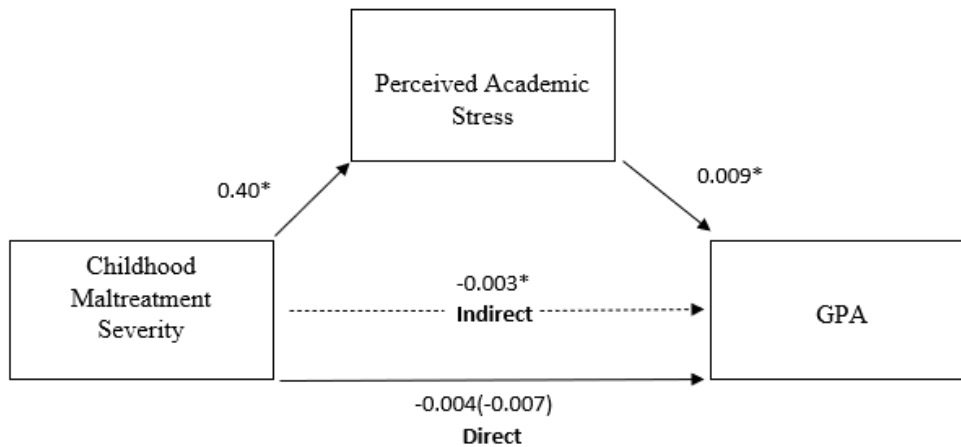


Notes. * $p < .05$; Direct effect after accounting for mediator (Direct effect without accounting for mediator)

Figure 3.

Indirect Effect of Maltreatment Multiplicity through Perceived Academic Stress

The path a standardized regression coefficient for childhood maltreatment severity predicting perceived academic stress was statistically significant, $\beta = .400$, $z = 3.86$, $p < .01$. The path b standardized regression coefficient for perceived academic stress predicting GPA after controlling for childhood maltreatment severity was statistically significant, $\beta = -0.009$, $z = -2.86$, $p = .004$. The indirect effect (see Table 7) of childhood maltreatment severity on GPA through perceived academic stress was statistically significant, $a*b = -0.003$, $z = -2.18$, $p = .029$, CI [-0.007, 0.001]. Figure 4 illustrates this relationship.



Notes. * $p < .05$; Direct effect after accounting for mediator (Direct effect without accounting for mediator)

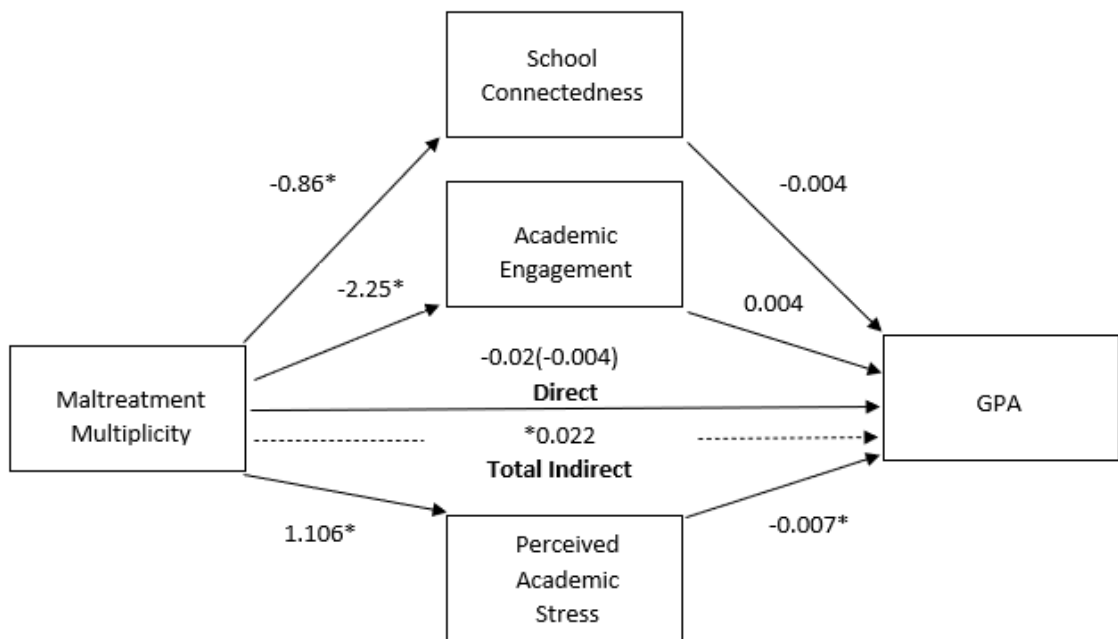
Figure 4.

Indirect Effect of Maltreatment Severity through Perceived Academic Stress

Multiple Mediation Models

Childhood Maltreatment Multiplicity. As previously reported in the single mediator model analyses, the path *a* standardized regression coefficients for childhood maltreatment multiplicity predicting school connectedness, academic engagement, and perceived academic stress were all statistically significant (see Table 8 and/or previous sections). After controlling for all hypothesized mediators and childhood maltreatment multiplicity, the only statistically significant predictor of GPA in the path *b* multiple regression model was perceived academic stress, $\beta = -0.007$, $z = -2.198$, $p = .028$. Table 9 provides estimates, standard error, *z*-values, and *p*-values for the predictors in the path *b* multiple regression model. After accounting for all hypothesized mediators, the individual indirect effects of childhood maltreatment severity on GPA were not significant for school connectedness, academic engagement, and perceived academic stress (see Table 8). However, the total indirect effect of childhood maltreatment multiplicity through school connectedness, academic engagement, and perceived

academic stress was significant, $a*b_{total} = 0.022$, $z = 2.24$, $p = 0.03$. Of note, though interpreted as not significant, the indirect effect through perceived academic stress approached significance, $a*b_{stress} = -0.008$, $z = -1.63$, $p = .104$. In addition, the indirect effect through perceived academic stress was significantly larger than the indirect effects through school connectedness, $\beta = 0.012$, $z = 1.685$, $p = .092$ and academic engagement, $\beta = -0.002$, $z = -0.197$, $p = .844$ (note: β represents the difference between the standardized indirect effect of perceived academic stress and the indirect effect of the other hypothesized mediator). Figure 5 depicts this model.

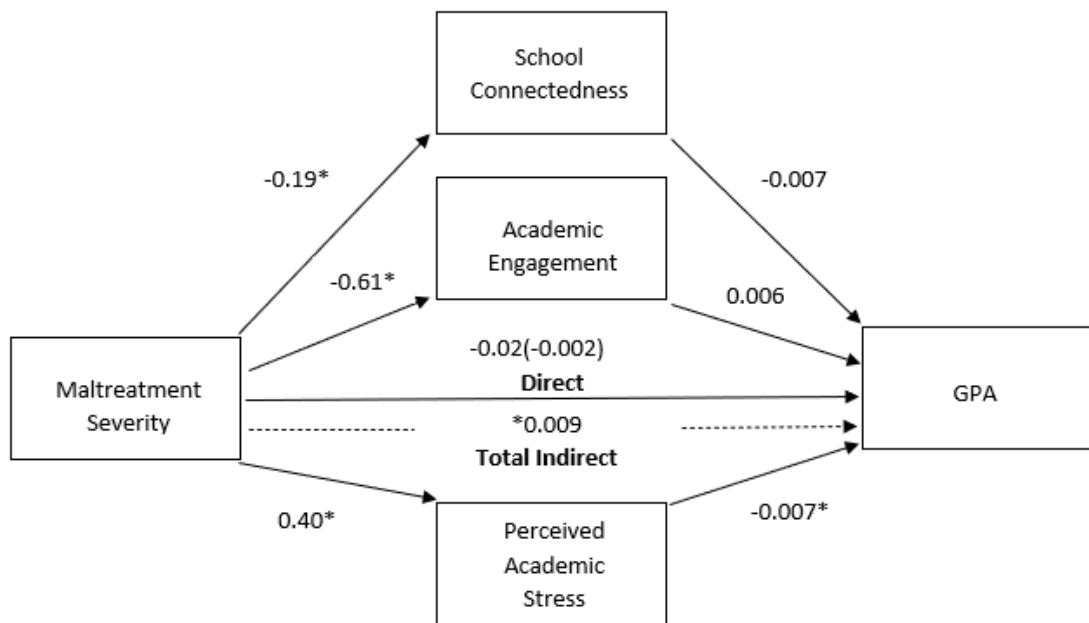


Notes. $*p < .05$; Direct effect after accounting for mediators (Direct effect without accounting for mediators)

Figure 5.

Indirect Effect of Maltreatment Multiplicity through Multiple Mediators

Childhood Maltreatment Severity. As previously reported in the single mediator model analyses, the path *a* standardized regression coefficients for childhood maltreatment severity predicting school connectedness, academic engagement, and perceived academic stress were all statistically significant (see Table 9 and/or previous sections). After controlling for all hypothesized mediators and childhood maltreatment severity, the only statistically significant predictor of GPA in the path *b* multiple regression model was perceived academic stress, $\beta = -0.007$, $z = -2.109$, $p = .035$. Table 11 provides estimates, standard error, z-values, and p-values for the predictors in the path *b* multiple regression model. After accounting for all hypothesized mediators, the individual indirect effects of childhood maltreatment severity on GPA were not significant (see Table 10) for school connectedness, academic engagement, or perceived academic stress. However, the total indirect effect of school connectedness, academic engagement, and perceived academic stress was significant, $a*b_{total} = 0.022$, $z = 2.24$, $p = .03$. Figure 6 depicts this model.



Notes. $*p < .05$; Direct effect after accounting for mediators (Direct effect without accounting for mediators)

Figure 6.

Indirect Effect of Maltreatment Severity through Multiple Mediators

CHAPTER IV:

DISCUSSION

The purpose of this study was to investigate the direct and indirect effects of past experiences of childhood maltreatment on academic outcomes in college students. In doing so, this study explored the effects of childhood maltreatment on college students' grade point averages (GPA), school connectedness (SC), academic engagement (AE), and perceived academic stress (PAS). Importantly, this study also tested the indirect effects of childhood maltreatment on GPA through school connectedness, academic engagement, and perceived academic stress. The following sections provide an in-depth discussion of these results, implications, and limitations.

Relationship Between Childhood Maltreatment and GPA

It was hypothesized that participants with greater experiences of maltreatment would report lower college GPA because childhood maltreatment has developmental biological, cognitive, behavioral, emotional, and psychiatric consequences such as decreased readiness to learn (Gaudin, 1999), low motivation for academic tasks (Gaudin, 1999), attention problems (Slade & Wissow, 2017), executive functioning delays (Welsch et al., 2017), and increased stress (MacKay-Neorr, 2019) which are likely to lead to impaired academic functioning. The results of the current study found that the relationship between childhood maltreatment and GPA was not significant, which was inconsistent with previous research that reported significant effects of childhood maltreatment on GPA (Gibby-Smith, 1995; Gaudin, 1999; Slade & Wissow, 2007; Welsch et al., 2017; Lemkin et al., 2018; MacKay-Neorr, 2019). This inconsistency may be due to differences in the current study. For example, there appeared to be some range restriction in GPA and this study also included graduate students in addition to undergraduates. Graduate students may have higher GPAs than undergraduate students

for many reasons; graduate coursework tends to be more course specific where undergraduate students make take courses unrelated to their majors. In addition, undergraduate students may experience more academic related stress than graduate students (Chapell et al., 2005). Importantly, though there were no significant direct effects of maltreatment on college students' GPAs, mediation can still occur without the presence of direct effects (Mackinnon et al., 2007); such chain relations can explain how mediating variables transmit effects between variables.

Relationship Between Childhood Maltreatment and School Connectedness

It was hypothesized that participants with greater experiences of maltreatment would experience lower school connectedness because the level at which individuals feel connected to others in an academic setting is influenced by their past experiences in relationships and resulting social constructs (Murphy & McKenzie, 2016; Clements-Nolle & Waddington, 2019). Individuals who have experienced maltreatment may be at a disadvantage when it comes to developing and maintaining relationships due to impaired sense of self, difficulty with emotion regulation, and subsequent interpersonal issues (Murphy & McKenzie, 2016). The results of this study indicated that experiences of childhood maltreatment were inversely related to school connectedness. These results are consistent with findings from previous research that suggest that individuals who experience abuse or neglect during childhood are likely to report low school connectedness (Murphy & McKenzie, 2016; Clements-Nolle & Waddington, 2019). To buffer against these effects, universities must create supportive social environments that nurture students' positive peer and faculty interactions (Johnson et al., 2007; Stein, et al., 2003; Cohen et al., 2005; Mahoney et al., 2020; Hong et al., 2013).

Relationship Between Childhood Maltreatment and Academic Engagement

It was hypothesized that participants with greater experiences of maltreatment would experience lower levels of academic engagement because maltreatment often cause internalizing (e.g., emotional, cognitive processes) and externalizing (e.g., behavior) difficulties and these difficulties may influence the way a person engages with academic curriculum in adulthood (McLaughlin et al., 2020; Gould et al., 2012). The results of this study supported this hypothesis in that severity and multiplicity of childhood maltreatment experiences had a significant inverse relationship with academic engagement. The findings of this research are consistent with past studies that suggest individuals who experience abuse or neglect during childhood are likely to have decreased levels of academic engagement compared with those who have not experienced maltreatment (De Bellis et al., 2018; Robles et al., 2019). Due to the impact of childhood maltreatment on academic engagement, it is important to identify interventions for college students whose academic engagement is impacted by experiences of childhood maltreatment. Such interventions should focus on the enhancement of academic skills that promote academic engagement such as the prioritization of academic goals, attending class, studying, completing coursework, and involvement in tutoring, and other academic resources (Landau et al., 2014). Additionally, universities should encourage engagement in group study, faculty interaction, and extra-curricular activities (Landau et al., 2014; Nakutin & Gutierrez, 2019) and provide academic resources that promote engagement (Landau et al., 2014).

Relationship Between Childhood Maltreatment and Perceived Academic Stress

It was hypothesized that participants with greater experiences of maltreatment would experience higher levels of perceived academic stress because individuals who have experienced maltreatment during childhood are more likely to respond to highly

stressful situations with avoidance, withdrawal, hypervigilance, impulsivity, and negative or exaggerated emotionality (Cruz et al., 2013), and these patterns may impact levels of perceived stress in academic settings (Cruz et al., 2013). The results of this study found a significant relationship between childhood maltreatment and perceived academic stress, which is consistent with past research (Karatekin, 2018; Slade & Wissow, 2007). In light of these findings, college counseling centers and mental health professionals should consider providing resources to students that include optional screening for maltreatment related stressors and contextual issues that could interfere with academic outcomes and well-being among college students (Baker et al., 2020). Affected students should be encouraged to seek individual and/or group skill-based interventions designed to reduce stressor exposure and stress-related symptoms. Such interventions should focus on psychoeducation that aims to normalize these difficulties for college students with a history of childhood maltreatment. Additionally, interventions that focus on problem-solving strategies and coping strategies may be beneficial (Baker et al., 2020).

School Connectedness, Academic Engagement, and Perceived Academic Stress as Mediators

It was hypothesized that School Connectedness, Academic Engagement, and Perceived Academic Stress would mediate the relationship between Childhood Maltreatment and GPA because individuals who have experienced childhood maltreatment are likely to endorse increased academic stress (Karatekin, 2018; Slade & Wissow, 2007) and decreased academic engagement and school connectedness (Linnenbrink & Pintrich, 2004; Slade & Wissow, 2007; Linnenbrink-Garcia & Pekrun, 2011), which may impact academic outcomes for college students. Results of this study provide some support for this hypothesis. Specifically, in single mediation models, which didn't control for the variance explained by the other hypothesized mediators, Childhood

Maltreatment Multiplicity and Severity had significant indirect effects on GPA through Academic Engagement and Perceived Academic Stress; however, the indirect effects through School Connectedness were not significant. These results indicate that colleges and universities should consider adopting supports that improve academic engagement and perceived academic stress amongst students with histories of childhood maltreatment. In doing so, universities and colleges may help these students improve their grade point averages, which could improve retention rates amongst this population of college students.

In addition to testing single mediator models, this study also tested multiple mediator models to measure the total indirect effect of maltreatment on GPA through school connectedness, academic engagement, and perceived academic stress. When including school connectedness, academic engagement, and academic stress in the same mediation model (see figures 5 and 6), the total indirect effect was significant but the individual indirect effects through each specific mediator were not significant. Ultimately, these results provide evidence that school connectedness, academic engagement, and perceived academic stress together can help explain a significant amount of variance in the relationship between childhood maltreatment and GPA. The lack of significant specific indirect effects in the multiple mediator models is likely due to possible limitations related to discriminant validity among the hypothesized mediators. Specifically, the operational definitions of academic engagement and school connectedness are similar and overlap (Libbey, 2004; Whitlock, 2006; Bond et al., 2007; Lohmeier & Lee, 2011). Both constructs include interactions with faculty, though academic engagement also includes interactions with the curriculum and class activities, whereas school connectedness includes interactions with others in the school systems (i.e., classmates, faculty). Including both variables in a regression model likely reduced

the unique variance explained by the individual variable. Relatedly, though not interpreted as statistically significant, the individual indirect effect through perceived academic stress, which has less overlap with academic engagement and school connectedness, approached significance (i.e., $p = .104$; there's an 89.6% chance of a true indirect effect). Taken together, it would behoove universities and colleges to provide additional and previously described supports for managing academic stress and improving academic engagement in students with childhood histories of maltreatment.

Implications

These findings suggest that educators should be aware of the impact that childhood maltreatment has on academic performance throughout primary and secondary school and into college. Additionally, this research highlights the need for prevention and treatment strategies for individuals vulnerable to and impacted by childhood maltreatment. In regards to prevention, a review of research indicates that primary, secondary, and tertiary prevention programs have been effective in multiple cases for preventing childhood maltreatment (Harden et al., 2016). Unfortunately, prevention programs have not eradicated all childhood maltreatment and many students will continue to carry the weight of these adverse experiences as they matriculate through school and transition into adulthood. Because students with experiences of childhood maltreatment are more likely to report difficulties with a host of social-emotional and academic outcomes, educators and professionals should adopt supports and evidence-based interventions that can buffer against the negative effects of maltreatment (Mohr & Rosen, 2017; Robling et al., 2016). Such interventions should occur as early as possible and target processes negatively impacted by childhood maltreatment (Mohr & Rosen, 2017). Moreover, this study demonstrates the importance of providing targeted interventions that support academic engagement and managing academic stress because

maltreatment's significant effect on these outcomes may lead to decreases in academic grades.

Importantly, colleges and universities should not assume their students have received support in the past. Instead, universities should make efforts to identify (e.g., optional screeners) at-risk students and provide accessible interventions and supports. Programs to consider are those designed to improve executive functioning difficulties caused by maltreatment, as executive functioning is integral to academic engagement and perceived academic stress. Such programs often teach and practice mindfulness (McCloskey, 2015), problem-solving strategies (Rivera et al., 2019), and metacognitive strategies (Schroeder & Kelley, 2008) to enhance self-awareness, self-management, social awareness, relationship skills, and responsible decision making (Dymnicki et al., 2013). Participation in these types of interventions can lead to improved learning strategies (e.g., academic engagement), sense of belonging (connectedness) interpersonal skills, social skills, emotional regulation (e.g., coping with academic stress), and overall academic performance (Savitz-Romer et al., 2015).

In addition, formal interventions that are action-based and goal orientated, such as the School-to-Jobs Program, have been successful in increasing academic engagement (Landau et al., 2014). The School-to-Jobs Program encourages individuals to identify career goals and act toward those goals. Further, interventions that teach college students skills for developing secure attachments to peers, educate parents about the stresses involved in the transition to college, and teach university faculty how to appear approachable and helpful to students have also been found to improve school connectedness and academic engagement in college students (Wilson & Gore, 2013). Relatedly, academic peer mentoring programs can function to increase school

connectedness and academic engagement by promoting peer support and connectedness, which leads to increased perceived belonging.

Stress management interventions that focus on time management, relaxation, study skills, coping skills, cognitive restructuring and reappraisal, social relations, problem solving, and dealing with failure are effective for reducing academic stress (Manjula, 2016). Relatedly, Cognitive Behavior Therapy (CBT) interventions such as Dialectical Behavior Therapy (DBT), and Cognitive Processing Therapy (CPT) are evidence-based treatment used to treat individuals who have experienced trauma. Acceptance and Commitment Therapy (ACT) can also address maladaptive beliefs and the involvement of language in the experience of shame and suffering (Hong et al., 2013). Importantly, researchers have found that these CBT based interventions can improve emotion regulation, interpersonal effectiveness, and distress tolerance skills (Linehan, 1987; Hayes & Hayes, 1992; Resick & Schnicke, 1992; Beck, 1993; Ashraf et al., 2020; Levin et al., 2020). To access many of these interventions, at-risk college students should be encouraged to seek support from campus counselors and mental health specialists. Further, to identify at-risk students, universities and colleges may consider using screeners and self-report measures to assess perceived academic stress (Schafer, 1987; Bedewy & Gabriel, 2013), academic engagement, executive functioning (Biederman et al., 2007), social emotional difficulties, and past experiences of maltreatment.

Lastly, colleges must address and prepare for barriers to treatment access. For example, high “no show” rates are often due to a lack of financial resources necessary for transportation, supplies, and if applicable, costs for copays (Nock & Ferriter, 2005; Smith et al., 2013). Additionally, some students may be less likely to seek out support, complete screeners, or actively engage in services due to low acceptability, heightened anxiety

related to seeking such services (Wilson & Gore, 2013), and misalignment with cultural values, beliefs, and needs (Peterson et al., 2017). To address some of these issues, colleges and universities should culturally adapt interventions to align services with the needs and values of diverse student populations (Peterson et al., 2017). Cultural adaptation includes refining interventions, measures, and service delivery approaches based on qualitative feedback from people representative of minoritized cultures or backgrounds. Taken together, prevention is the first line of defense against maltreatment, but, where prevention fails, school systems ranging from kindergarten to college can and should provide evidence-based treatments and supports that buffer against the negative effects of maltreatment

Limitations

Though this study has many strengths, there are limitations that future researchers should address. First, data for the current study showed range restrictions for GPA (Min.=1.6, Max.=4.0, $M=3.37$). This is likely because not many college students who took the survey for extra credit had a failing GPA. Second, childhood maltreatment history may have different impacts on academic performance at different stages in college (Moore et al., 2020) and the sample in this study included students ranging from freshmen in college to graduate students. Third, participation was limited to students from one university. Diversity with regard to geographical area and course study/degree programs may have provided varied results. Though basic demographic information was included in the questionnaire, this study did not collect a wealth of information specific to cultural factors that may contribute to more complex and diverse perceptions and behaviors. Specifically, individual and cultural factors may lead to varied perceptions of school connectedness, academic engagement, and academic stress. Fourth, significantly more females than males participated in this study (Female:73.8%, Male: 22.9%). The

gender distribution of our sample did not mirror that of the university (Female: 62%, Male: 38%; Univstats, 2021), and caution is warranted when generalizing these results to other populations. Additionally, differing styles of self-reporting should be considered between females and males, in that males are less likely to report a history of child sexual abuse than females (Tonmyr & Shields 2017).

Fifth, self-reporting presents potential issues, including recall biases (Prescot et al., 2020), stigma or embarrassment, and ex-post rationalization. Any of these factors could have led to underreporting or overreporting. The possibility that any style of misreporting should be considered, as well as the effect it would have on the results. Additionally, responses were gathered at one point in time, and specific to the participants' experience at their current university, which does not account for fluctuations in perceptions of academic engagement, school connectedness, and academic stress from one term to another, or for other institutions.

Another limitation relates to the constructs measured in this study. Specifically, though academic engagement and perceived academic stress helped to explain the relationship between childhood maltreatment and GPA to some extent, it is reasonable to believe that there are other variables that can provide an explanation for the relationships that were not included in this study. For example, data was not collected about the participants' past or current involvement in intervention programs such as those mentioned in the discussion section or other support systems that may buffer the relationship between childhood maltreatment and GPA. Though this study tested a causal relationship, true causation cannot be established without the use of randomized experimental methods. Importantly, using an RCT to evaluate these causal relationships is unethical and unfeasible as it would require researcher to randomly assign people to different maltreatment experiences. Lastly, a limitation that was considered during the

analysis step is the role of the mediators as moderators. Though it would have been feasible to test the mediating variables as moderators, researchers were concerned with investigating the relationship between variables as it was not initially assumed or determined that a relationship existed. Due to the lack of a-priori justification for moderation analyses, it goes beyond the scope of this study and should be considered in future research.

Future Directions for Research

There is a host of research on the effects of childhood maltreatment on academic performance in primary and secondary schools. Research on evidenced based intervention programs for individuals currently struggling in elementary, intermediate, and high school is plentiful, and appears to be gaining traction. However, less research exists on the effect of childhood maltreatment on college performance. To further assess these impacts, as well as the potential effectiveness of formal interventions on academic performance in college, future research should focus on studies that examine the relationship between childhood maltreatment and academic performance and identify interventions with a potential for improving academic outcomes for affected college students. The latter studies should use randomized control trials to test intervention efficacy. Additionally, it would be beneficial to invest in longitudinal studies wherein researchers collect data on childhood maltreatment during childhood, interventions accessed during childhood, high school graduation, college acceptance and entrance, and academic performance in college. Future research should involve diversifying the sample population by collecting data from participants enrolled in various college programs in broader geographic areas. Also, studies should examine the relationship between increased stress response system (SRS) and resiliency, and any related improved academic performance outcomes. The findings of this study highlight the impact of

childhood maltreatment on academic outcomes and are consistent with the need to continue research on the developmental impacts of maltreatment through adolescence and into adulthood.

Conclusion

In conclusion, this study establishes that experiences of maltreatment during childhood can negatively impact academic performance in college by decreasing academic engagement and increasing perceived academic stress. As such, universities and colleges should consider the impact of childhood maltreatment on their students' academic functioning and provide interventions and accommodations that support and promote academic engagement and stress management. In doing so, universities and colleges may help students improve their academic grades, and ultimately increase retention rates amongst student with past experiences of childhood maltreatment.

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APPENDIX A:

TABLES

Table 1. Demographic Characteristics

Demographic	N	% Sample (n= 309)	Missing %
Gender	305		1.29%
Male	70	22.70%	
Female	225	72.80%	
Other	1	0.30%	
Neither	6	1.90%	
Prefer not to answer	3	1.00%	
Ethnicity	305		1.30%
American Indian/Alaskan	0	0	
Asian	24	7.80%	
Black or African American	36	11.70%	
Hispanic	101	32.70%	
Middle Eastern/North African	5	1.60%	
Hawaiian or Pacific Islander	1	.30%	
White	99	32.00%	
Prefer Not to Answer	3	1%	
Other	1	1.30%	
2+	35	11.30%	
Classification	303		1.94%
Freshman	29	9.40%	
Sophomore	28	9.10%	
Junior	102	33.00%	
Senior	84	27.20%	
Graduate	60	19.40%	

Table 2. Descriptive Statistics for Study Variables

Variables	\bar{X}	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Percent Missing</i>	<i>Skew</i>	<i>Kurtosis</i>
1. CM - Multiplicity	3.55	1.75	0.00	6.00	.32%	-.346	-.846
2. CM - Severity	9.21	6.27	0.00	29.00	.32%	.541	-.378
3. School Connectedness	42.26	6.57	24.00	54.00	.97%	-.357	-.591
4. Academic Engagement	104.75	13.47	66.00	132.00	.65%	.027	-.472
5. Perceived Academic Stress	47.29	12.30	18.00	83.00	.32%	.166	-.362
6. GPA	3.37	0.45	1.60	4.00	1.94%	-.703	.358

Table 3. Covariates for Outcome Variables

Outcome Variables	Covariates	df	Sum of Squares	Mean Square	F	<i>p</i> -value
Childhood	Gender	4	20.7	5.18	1.69	0.15
Maltreatment-Multiplicity	Ethnicity*	8	45.4	5.68	1.88	0.06
	Classification	4	12.2	3.05	0.98	0.42
Childhood	Gender	4	101	25.36	0.64	0.63
Maltreatment-Severity	Ethnicity	8	394	49.19	1.26	0.27
	Classification	4	116	28.97	0.73	0.57
School Connectedness	Gender	4	121	30.21	0.70	0.59
	Ethnicity	8	178	22.24	0.51	0.85
	Classification	4	300	75.00	1.77	0.13
Academic Engagement	Gender	4	924	231.0	1.27	0.28
	Ethnicity	8	990	123.8	0.67	0.72
	Classification	4	951	237.7	1.31	0.27
Perceived Academic Stress	Gender	4	367	91.66	0.61	0.66
	Ethnicity*	8	1998	249.8	1.69	0.10
	Classification**	4	1877	469.3	3.21	0.01
GPA	Gender	4	0.44	0.11	0.39	0.87
	Ethnicity*	8	3.95	0.50	1.81	0.075
	Classification**	4	4.16	1.04	3.87	0.00

***p* < 0.05 level (2-tailed), **p* < .10
 Significance codes: 0.001 '**' 0.01 '*'

Table 4. Correlations for Study Variables

		CMs	CMm	PAS	SC	AE	GPA
CM Severity	Pearson Correlation	1	.88	.21	-.19	-.29	-.05
	Sig. (2-tailed)		<.001	<.001	.001	<.001	.40
CM Multiplicity	Pearson Correlation		1	.16	-.23	-.29	-.05
	Sig. (2-tailed)	.88					
Perceived Academic Stress	Pearson Correlation	<.001		.006	<.001	<.001	.42
	Sig. (2-tailed)	.21	.16	1	-.40	-.46	-.19
School Connectedness	Pearson Correlation	<.001	.006		<.001	<.001	.001
	Sig. (2-tailed)	-.19	-.23	-.40	1	.69	.10
Academic Engagement	Pearson Correlation	.002	<.001	<.001		<.001	.06
	Sig. (2-tailed)	-.29	-.29	-.46	.69	1	.18
GPA	Pearson Correlation	<.001	<.001	<.001	<.001		.001
	Sig. (2-tailed)	-.05	-.05	-.19	.10	.18	1
		.40	.42	.001	.08	.001	

Table 5. Direct Effects of Childhood Maltreatment on GPA

Independent Variable	Estimate	SE	Z-value	95% Confidence Intervals		P-Value
				Lower	Upper	
CMm	-0.02	0.02	-1.3	-.16	.03	.21
CMs	-0.007	0.005	-1.4	-.20	.04	.18

Table 6. Childhood Maltreatment – Multiplicity Indirect Effects through Single Mediators

Mediator	Path A		Path B		Indirect Effect A*B	95% Confidence Intervals		P- Value
	<i>Estimate</i>	<i>SE</i>	<i>Estimate</i>	<i>SE</i>		Lower	Upper	
SC	-0.86	0.20	0.007	0.005	-0.006	-.017	.001	.161
AE	-2.25	0.41	0.006	0.002	-0.01	-.027	-.004	.016
PAS	1.11	0.39	-0.009	0.003	-0.01	-.020	-.002	.055

Table 7. Childhood Maltreatment – Severity Indirect Effect through Single Mediators

Mediator	Path A		Path B		Indirect Effect A*B	95% Confidence Intervals		P-Value
	Estimate	SE	Estimate	SE		Lower	Upper	
SC	-0.19	0.06	0.007	0.005	-0.001	-.004	0.00	.209
AE	-0.61	0.12	0.006	0.002	-0.004	-.007	-.001	.019
PAS	0.40	0.10	-0.009	0.003	-0.003	-.007	-.001	.029

Table 8. Childhood Maltreatment Multiplicity Indirect Effects on GPA through Multiple Mediators

Mediator	Path A		Path B		Indirect Effect A*B	95% Confidence Intervals		P-Value
	Estimate	SE	Estimate	SE		Lower	Upper	
SC	-0.86	0.20	-0.004	.005	0.003	.006	.01	.47
AE	-2.25	0.41	0.004	.003	-0.01	-.03	.002	.15
PAS	1.11	0.38	-0.007	.003	-0.003	-.01	-.001	.10
Total	-	-	-	-	0.02	.01	.07	.03

Table 9. Multiplicity on GPA controlling for School Connectedness, Academic Engagement, and Perceived Academic Stress

Variable	Estimate	SE	Z value	95% Confidence Intervals		P-Value
				Lower	Upper	
CMm	-0.004	0.02	-0.27	-0.03	0.03	0.79
SC	-0.004	0.005	-0.74	-0.02	0.006	0.46
AE	0.004	0.003	1.53	-0.001	0.01	0.13
PAS	-0.007	0.003	-2.20	-0.01	-0.001	0.03

Table 10. Childhood Maltreatment – Severity Indirect Effects on GPA through Multiple Mediator

Mediator	Path A		Path B		Indirect Effect A*B	95% Confidence Intervals		P-Value
	Estimate	SE	Estimate	SE		Lower	Upper	
SC	-0.19	0.06	-0.004	0.006	0.001	-.002	.003	.51
AE	-0.61	0.12	0.004	0.003	-0.003	-.007	.001	.20
PAS	0.40	.011	-0.007	0.003	-0.003	-.007	-.000	.10
Total	-	-	-	-	0.009	.004	.02	.04

Table 11. Childhood Maltreatment – Severity on GPA controlling for School Connectedness, Academic Engagement, and Perceived Academic Stress

Variable	Estimate	SE	Z value	95% Confidence Intervals		P-Value
				Lower	Upper	
CMs	-0.002	0.005	-0.46	-0.01	0.008	0.65
SC	-0.004	0.006	0.71	-0.02	-0.008	0.48
AE	0.004	0.003	1.42	-0.002	0.01	0.16
PAS	-0.007	0.003	-2.11	-0.02	-0.001	0.04

APPENDIX B:

MEASURES

Maltreatment and Abuse Exposure Scale (MAES)

<p>Sometimes parents, stepparents or other adults living in the house do hurtful things.</p> <p>If this happened during your childhood (first 18 years of your life), please check ‘Yes’. If this did not happen in your childhood, please check ‘No.’</p>		
1.	Swore at you, called you names, said insulting things like your “fat”, “ugly”, “stupid”, etc. more than a few times a year.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
2.	Said hurtful things that made you feel bad, embarrassed or humiliated more than a few times a year.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
3.	Acted in a way that made you afraid that you might be physically hurt.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
4.	Threatened to leave or abandon you.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
5.	Locked you in a closet, attic, basement or garage.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
6.	Intentionally pushed, grabbed, shoved, slapped, pinched, punched or kicked you.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
7.	Hit you so hard that it left marks for more than a few minutes.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
8.	Hit you so hard, or intentionally harmed you in some way, that you received or should have received medical attention.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
9.	Spanked you on your buttocks, arms or legs.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
10.	Spanked you on your bare (unclothed) buttocks.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
11.	Spanked you with an object such as a strap, belt, brush, paddle, rod, etc.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
12.	Made inappropriate sexual comments or suggestions to you.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
13.	Touched or fondled your body in a sexual way.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
14.	Had you touch their body in a sexual way.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀

**Please continue
(page 1 of 4)**

Sometimes parents, stepparents or other adults living in the house do hurtful things to your siblings (brother, sister, stepsiblings). If this happened during your childhood (first 18 years of your life), please check 'Yes'. If this did not happen in your childhood, please check 'No.'

- | | | | |
|-----|--|--|---------------------------------------|
| 15. | Hit your sibling (stepsibling) so hard that it left marks for more than a few minutes. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 16. | Hit your sibling (stepsibling) so hard, or intentionally harmed him/her in some way, that he/she received or should have received medical attention. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 17. | Made inappropriate sexual comments or suggestions to your sibling (stepsibling). | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 18. | Touched or fondled your sibling (stepsibling) in a sexual way. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |

Sometimes adults or older individuals NOT living in the house do hurtful things to you. If this happened during your childhood (first 18 years of your life), please check 'Yes'. If this did not happen in your childhood, please check 'No.'

- | | | | |
|-----|---|--|---------------------------------------|
| 19. | Had you touch their body in a sexual way. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 20. | Actually had sexual intercourse (oral, anal or vaginal) with you. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |

Sometimes intense arguments or physical fights occur between parents, stepparents or other adults (boyfriends, girlfriends, grandparents) living in the household. If this happened during your childhood (first 18 years of your life), please check 'Yes'. If this did not happen in your childhood, please check 'No.'

- | | | | |
|-----|---|--|---------------------------------------|
| 21. | Saw adults living in the household push, grab, slap or throw something at your mother (stepmother, grandmother). | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 22. | Saw adults living in the household hit your mother (stepmother, grandmother) so hard that it left marks for more than a few minutes. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 23. | Saw adults living in the household hit your mother (stepmother, grandmother) so hard, or intentionally harm her in some way, that she received or should have received medical attention. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 24. | Saw adults living in the household push, grab, slap or throw something at your father (stepfather, grandfather). | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |
| 25. | Saw adults living in the household hit your father (stepfather, grandfather) so hard that it left marks for more than a few minutes. | <input type="radio"/> Yes ₁ | <input type="radio"/> No ₀ |

<p>Sometimes children your own age or older do hurtful things like bully or harass you.</p> <p>If this happened during your childhood (first 18 years of your life), please check ‘Yes’. If this did not happen in your childhood, please check ‘No.’</p>		
26.	Swore at you, called you names, said insulting things like your “fat”, “ugly”, “stupid”, etc. more than a few times a year.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
27.	Said hurtful things that made you feel bad, embarrassed or humiliated more than a few times a year.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
28.	Said things behind your back, posted derogatory messages about you, or spread rumors about you.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
29.	Intentionally excluded you from activities or groups.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
30.	Acted in a way that made you afraid that you might be physically hurt.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
31.	Threatened you in order to take your money or possessions.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
32.	Forced or threatened you to do things that you did not want to do.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
33.	Intentionally pushed, grabbed, shoved, slapped, pinched, punched, or kicked you.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
33.	Hit you so hard that it left marks for more than a few minutes.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
35.	Hit you so hard, or intentionally harmed you in some way, that you received or should have received medical attention.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
36.	Forced you to engage in sexual activity against your will.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
37.	Forced you to do things sexually that you did not want to do.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
<p>Please indicate if the following happened during your childhood (first 18 years of your life).</p> <p>If this happened during your childhood (first 18 years of your life), please check ‘Yes’. If this did not happen in your childhood, please check ‘No.’</p>		
38.	You felt that your mother or other important maternal figure was present in the household but emotionally unavailable to you for a variety of reasons like drugs, alcohol, workaholic, having an affair, heedlessly pursuing their own goals.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
39.	You felt that your father or other important paternal figure was present in the household but emotionally unavailable to you for a variety of reasons like drugs, alcohol, workaholic, having an affair, heedlessly pursuing their own goals.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀
40.	A parent or other important parental figure was very difficult to please.	<input type="radio"/> Yes ₁ <input type="radio"/> No ₀

41.	A parent or other important parental figure did not have the time or interest to talk to you.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
42.	One or more individuals in your family made you feel loved.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
43.	One or more individuals in your family helped you feel important or special.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
44.	One or more individuals in your family were there to take care of you and protect you.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
45.	One or more individuals in your family were there to take you to the doctor or Emergency Room if the need ever arose, or would have if needed.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
<p>Please indicate if the following statements were true about you and your family during your childhood.</p> <p>If this happened during your childhood (first 18 years of your life), please check 'Yes'. If this did not happen in your childhood, please check 'No.'</p>			
46.	You didn't have enough to eat.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
47.	You had to wear dirty clothes.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
48.	You felt that you had to shoulder adult responsibilities.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
49.	You felt that your family was under severe financial pressure.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
50.	One or more individuals kept important secrets or facts from you.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
51.	People in your family looked out for each other.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀
52.	Your family was a source of strength and support.	<input type="radio"/> Yes ₁	<input type="radio"/> No ₀

Martin H. Teicher & Angelika Parigger

Psychological Sense of School Membership Scale (PSSM)

The evaluator at University of North Carolina Greensboro's Beyond Academics program has created an adapted version of the Psychological Sense of School Membership scale for use with its students, as part of the program evaluation. The original version was developed for use at the secondary level. In regards to how it has been adapted, wording was changed to not only reflect the university setting, but a specific campus (e.g., "at UNCG," instead of "at this university") to add concreteness. In addition, instead of a 5-point Likert scale from "not at all true" to "completely true," a 3 point scale (never, sometimes, always) has been utilized.

Original Version

Table 1
The Psychological Sense of School Membership (PSSM) Scale

-
1. I feel like a real part of (name of school).
 2. People here notice when I'm good at something.
 3. It is hard for people like me to be accepted here. (*reversed*)
 4. Other students in this school take my opinions seriously.
 5. Most teachers at (name of school) are interested in me.
 6. Sometimes I feel as if I don't belong here. (*reversed*)
 7. There's at least one teacher or other adult in this school I can talk to if I have a problem.
 8. People at this school are friendly to me.
 9. Teachers here are not interested in people like me. (*reversed*)
 10. I am included in lots of activities at (name of school).
 11. I am treated with as much respect as other students.
 12. I feel very different from most other students here. (*reversed*)
 13. I can really be myself at this school.
 14. The teachers here respect me.
 15. People here know I can do good work.
 16. I wish I were in a different school. (*reversed*)
 17. I feel proud of belonging to (name of school).
 18. Other students here like me the way I am.
-

University of North Carolina Greensboro Adapted version

Sense of School Membership Scale

For each of the following statements, circle whether you feel like this is “Never,” “Sometimes,” or “Always” true for you.

1. I feel like a real part of UNCG.	Never	Sometimes	Always
2. People at UNCG notice when I’m good at something.	Never	Sometimes	Always
3. It is hard for people like me to be accepted at UNCG.	Never	Sometimes	Always
4. Other students at UNCG take my opinions seriously.	Never	Sometimes	Always
5. Most instructors at UNCG are interested in me.	Never	Sometimes	Always
6. Sometimes I feel as if I don’t belong at UNCG.	Never	Sometimes	Always
7. There’s at least one instructor or staff member at UNCG I can talk to if I have a problem.	Never	Sometimes	Always
8. People at UNCG are friendly to me.	Never	Sometimes	Always
9. Instructors at UNCG are not interested in people like me.	Never	Sometimes	Always
10. I am included in lots of activities at UNCG.	Never	Sometimes	Always
11. I am treated with as much respect as other students.	Never	Sometimes	Always
12. I feel very different from most other students at UNCG.	Never	Sometimes	Always

13. I can really be myself at UNCG.	Never	Sometimes	Always
14. The instructors at UNCG respect me.	Never	Sometimes	Always
15. People at UNCG know I can do good work.	Never	Sometimes	Always
16. I wish I were at a different school.	Never	Sometimes	Always
17. I feel proud of belonging to UNCG.	Never	Sometimes	Always
18. Other students here at UNCG like the way I am.	Never	Sometimes	Always

Citation for Original Scale: Goodenow, C. (1993). The psychological sense of school membership among adolescents: Scale development and educational correlates. *Psychology in the Schools, 30*, 79-90.

Citation for the scale's adaptation for use with university students: Pittman, L. D., & Richmond, A. (2008). University belonging, friendship quality, and psychological adjustment during the transition to college. *The Journal of Experimental Education, 76*(4), 343-361.

Perception of Academic Stress Scale (PAS)

The following questions ask about your thoughts and feelings towards the classes you are currently taking. Please choose from the following options to indicate how much you agree with each statement:

1 = Strongly Agree 2 = Slightly Agree 3 = Neutral 4 = Slightly Disagree 5 = Strongly Disagree

- | | | | | | |
|---|---|---|---|---|---|
| 1. Competition with my peers for grades is quite intense. | 1 | 2 | 3 | 4 | 5 |
| 2. My teachers are critical of my academic performance. | 1 | 2 | 3 | 4 | 5 |
| 3. Teachers have unrealistic expectations of me. | 1 | 2 | 3 | 4 | 5 |
| 4. The unrealistic expectations of my parents stress me out. | 1 | 2 | 3 | 4 | 5 |
| 5. The time allocated to classes and academic work is enough. | 1 | 2 | 3 | 4 | 5 |
| 6. The size of the curriculum (workload) is excessive. | 1 | 2 | 3 | 4 | 5 |
| 7. I believe that the amount of work assignments is too much. | 1 | 2 | 3 | 4 | 5 |
| 8. I am unable to catch up if I get behind on my work. | 1 | 2 | 3 | 4 | 5 |
| 9. I have enough time to relax after work. | 1 | 2 | 3 | 4 | 5 |
| 10. Exam questions are usually difficult. | 1 | 2 | 3 | 4 | 5 |
| 11. Exam times are too short to complete the answers. | 1 | 2 | 3 | 4 | 5 |
| 12. Exam times are very stressful to me. | 1 | 2 | 3 | 4 | 5 |
| 13. I am confident that I will be a successful student. | 1 | 2 | 3 | 4 | 5 |
| 14. I am confident that I will be successful in my future career. | 1 | 2 | 3 | 4 | 5 |
| 15. I can make academic decisions easily. | 1 | 2 | 3 | 4 | 5 |
| 16. I fear of failing classes this year. | 1 | 2 | 3 | 4 | 5 |
| 17. I think that my worry about exams is a weakness of mine. | 1 | 2 | 3 | 4 | 5 |
| 18. Even if I pass my exams, I am worried about getting a job. | 1 | 2 | 3 | 4 | 5 |

Scoring: Reverse score items 1-5 in which 1 = Strongly Disagree and 5 = Strongly Agree. The lower the score, the higher the level of perceived academic stress.

Student Engagement Instrument – College (SEI-C)

Please rate your perception about the following statements regarding your experiences while attending this school.

1 = Strongly Disagree 2 = Disagree 3 = Agree 4 = Strongly Agree

My family are there for me when I need them.

After finishing my schoolwork, I check over it to see if it's correct.

My professors are there for me when I need them.

Other students here like me the way I am.

Adults at my university listen to the students.

Other students at school care about me.

Students at my university are there for me when I need them.

My education will create many future opportunities for me.

Most of what is important to know, you learn in school.

The university rules are fair. Going to school after high school is important.

When something good happens at school, my family wants to know about it.

Most professors at the university are interested in me as a person, not just as a student.

Students here respect what I have to say.

When I do schoolwork I check to see whether I understand what I am doing.

Overall, my professors are open and honest with me. I plan to graduate from college.

The grades in my classes do a good job of measuring what I'm able to do.

College is important for achieving my future goals.

When I have problems at school my family is willing to help me.

Overall, adults at my university treat students fairly.

I enjoy talking to the professors here. I enjoy talking to the students here.

I have some friends at the university.

When I do well in school, it's because I work hard.

The tests in my classes do a good job of measuring what I am able to do.

I feel safe at school.

I feel like I have a say about what happens to me at school.

My family wants me to keep trying when things are tough at school.

I am hopeful about my future. At my university, professors care about students.

Learning is fun because I get better at something.

What I'm learning in my classes will be important in my future.