ASSOCIATION BETWEEN ADVERSE CHILDHOOD EXPERIENCES (ACES) AND
DEPRESSION AND SUBSTANCE USE IN ADOLESCENTS USING A SELF-REPORTED
AND CAREGIVER-REPORTED EXTENDED ACES MEASURE

by

Rugeen Rose Soliemannjad

A thesis submitted to the faculty of
The University of North Carolina at Charlotte
in partial fulfillment of the requirements
for the degree of Master of Arts in
Psychology

Charlotte

2024

Approved by:

_____
Dr. Ryan P. Kilmer (Co-Chair)

_____
Dr. Amy Canevello (Co-Chair)

_____
Dr. Laura M. Armstrong

_____
Dr. Sonyia Richardson

ABSTRACT

RUGEEN ROSE SOLIEMANNJAD. Association between Adverse Childhood Experiences (ACEs) and Depression and Substance Use in Adolescents Using a Self-Reported and Caregiver-Reported Extended ACEs Measure.
(Under the direction of DR. RYAN P. KILMER & DR. AMY CANEVELLO)

Adverse childhood experiences (ACEs) can negatively impact adolescents' academic, affective, behavioral, biological, cognitive, and social development. Disruptions to these domains are shown to increase the risk for significant behavioral and emotional difficulties, including depressive symptoms and problematic substance use. Despite efforts to expand the conceptualization of ACEs, minimal research has evaluated the cumulative impact of the 10 conventional ACEs (Felitti et al., 1998) and nine expanded ACEs (i.e., additional adversities and life stressors such as bullying, racism, neighborhood violence, living in foster care, separation from caregivers due to deportation; Burke Harris & Renschler, 2015) – referred to as *extended* ACEs here – on youth depression and substance use. Of the few efforts assessing extended ACEs, most rely on caregiver reports of adolescents' ACE exposure.

The present effort uses data from an adolescent-focused primary and behavioral health care practice and a sample of 1,183 youths between the ages of 12 and 17 years. The study aimed to (a) measure adolescents' self-reported and caregiver-reported extended ACEs; (b) examine the association between extended ACEs and youth depressive symptoms and problematic substance use; and (c) evaluate whether caregiver-youth discrepancy in adolescents' extended ACE exposure related to a difference in adolescent-reported depression and substance use.

Results indicated that adolescents reported more extended ACEs than their caregivers reported for them. Both adolescent- and caregiver-reported extended ACEs were associated with depressive symptoms and substance use. Adolescent self-reports were a stronger predictor of

depressive symptoms, though not of substance use, than caregiver reports. Although the direction of the caregiver-youth discrepancy significantly related to higher levels of depression and substance use (i.e., when adolescents reported more extended ACEs than their caregivers reported), the degree of the caregiver-youth discrepancy did not (i.e., the difference between reported extended ACEs). Youths endorsed a higher level of depression when dyads were in agreement at midrange levels of extended ACE exposure.

Findings underscore the value of assessing extended ACEs and using multiple informants to understand the impact of ACEs on youth depressive symptoms and problematic substance use. Understanding these relationships may inform early detection, prevention, and treatment efforts, in addition to safeguarding adolescents' developmental trajectories by reducing their risk for short- and long-term health consequences. Policymakers should consider ways to decrease youths' extended ACE exposure across different levels of their ecologies, along with implementing policies that better support families.

ACKNOWLEDGEMENTS

I would like to express my wholehearted gratitude to my advisor and co-chair of my thesis committee, Dr. Ryan Kilmer, who gave me the opportunity to pursue my doctoral studies. His expertise and unwavering support and confidence in me at every stage of this project (including the many obstacles that stood in my way) were instrumental in my ability to survive this milestone. Your mentorship and dedication to youth, their families, and community partners motivate me to continue "fighting the good fight" and asking the hard questions. I am also immensely grateful for my thesis committee co-chair Dr. Amy Canevello, who has been making me a better researcher since the start of my PhD journey. Your contributions to my growth and development are immeasurable; thank you for always believing in me and for standing in my corner. To my thesis committee members, Dr. Laura Armstrong and Dr. Sonyia Richardson, thank you for challenging me to think outside the box and for meaningfully shaping my identity as a researcher. Your insights and feedback have allowed me to gain new perspectives not only in terms of how I approach my research, but how I approach my clinical work as well.

I would also like to extend my sincere appreciation to Dr. Linda Shanock, who provided her invaluable expertise and took the time to ensure my understanding of polynomial regression with response surface analysis. In addition, I am indebted to Cat Runden, who has been a ray of sunshine throughout the process of obtaining and updating this study's IRB reliance agreement.

Finally, this project would not have been possible without two truly wonderful humans from Teen Health Connection: Casey Simon Kaplan and Dr. Katherine Hogan. Thank you for allowing me to support Teen Health's commitment to providing adolescent-focused integrated care to the greater Charlotte community and for trusting me with the many years of hard work you both have put into this effort.

DEDICATION

First and foremost, to the youth whose real-world experiences are represented in this study. Their stories, as captured by the data, fuel my commitment to advocate for children and adolescents because their voices tend to be the ones silenced or forgotten.

To my parents for their unconditional love and support (and for the countless late-night phone calls that pushed me to keep going every time I wanted to give up). To Nikki and The D who never failed to remind me that dropping out and going back home was always an option. To Alessi for believing in me when the thought of completing this feat felt impossible (and for always feeding me). And finally, to Brian and Jeter because I run into them every day down Memory Lane.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AAP	American Academy of Pediatrics
ACEs	adverse childhood experiences
APA	American Psychiatric Association
CRAFFT	Car, Relax, Alone, Forget, Friends, and Trouble
CYW ACE-Q	Center for Youth Wellness Adverse Childhood Experiences Questionnaire
CYW ACE-Q Teen	Center for Youth Wellness Adverse Childhood Experiences Questionnaire for Adolescents
CYW ACE-Q Teen SR	Center for Youth Wellness Adverse Childhood Experiences Questionnaire for Adolescents: Self-Report
DoS	date of service
DSM-5-TR	Diagnostic and Statistical Manual, Fifth Edition, Text Revision
DSS	Department of Social Services
MRN	medical record number
NSDUH	National Survey of Drug Use and Health
PHQ	Patient Health Questionnaire
PHQ-2	Patient Health Questionnaire-2
PHQ-9	Patient Health Questionnaire-9
PTSD	post-traumatic stress disorder
SAMHSA	Substance Abuse and Mental Health Services Administration
SBIRT	Screening, Brief Intervention and Referral to Treatment

CHAPTER 1: INTRODUCTION

The impact of adverse childhood experiences (ACEs) has garnered increasing attention in recent years. Research has documented the association between ACEs and later psychological distress, health-risk behaviors, and premature death (Anda et al., 1999; Edwards et al., 2003; Felitti et al., 1998). A recent adaptation of the original ACEs measure, which assesses 10 childhood stressors that largely focus on adversities occurring within the family of origin (e.g., domestic/intimate partner violence, child maltreatment, parental mental health condition; Felitti et al., 1998), has incorporated additional adversities (Burke Harris & Renschler, 2015), resulting in an "extended ACEs" measure that appears to augment the conventional ACEs meaningfully. The goal of the current study was to examine whether the association between extended ACEs and symptoms of depression and substance use in adolescents varies, when measuring extended ACEs using adolescents' self-reports versus using caregiver reports of adolescents' extended ACEs. This study also evaluated whether caregiver-youth discrepancies in adolescents' extended ACE exposure relate to a difference in

1.1.   Developmental Characteristics of Adolescence

Within the life course, adolescence represents a significant developmental period (Broderick & Blewitt, 2014) that bridges the transition from childhood to adulthood (Cicchetti & Rogosch, 2002). While pubertal changes – such as growth spurts, changes in body shape and facial features, and reproductive maturation (Rudolph, 2014; Susman & Dorn, 2012) – characterize this time, individuals also experience increasing academic, occupational, and social responsibilities (Holmbeck & Kendall, 2002; Weisz & Hawley, 2002). In addition to increased responsibilities, a defining component of adolescence is an evolving sense of self and set of self-perceptions (Cicchetti & Rogosch, 2002; Shortt & Spence, 2006), which not only impact the

individual but also influence how adolescents interact with peers and family (Bornstein et al., 2012; Weisz & Hawley, 2022). For instance, as adolescents develop autonomy and individuate, their interpersonal relationships with family change, and they evidence an increase in establishing and maintaining relationships with peers (Bornstein et al., 2012; Broderick & Blewitt, 2014; Cicchetti & Rogosch, 2002). In light of these changes and transitions, adolescence also represents a vulnerable time when individuals become at increased risk for developing mental health problems (Cicchetti & Toth, 1998; Kessler et al., 2005), especially when faced with adversity (Browne & Finkelhor, 1986; Cohen et al., 2001; De Bellis, 2005; Fairbank & Fairbank, 2009; McLaughlin, 2016; McLaughlin et al., 2012; Shaw, 2000). Exposure to adversity, whether a single or recurring incident (Bomysoad & Francis, 2020) or multiple types of experiences (Adams et al., 2016; Gilbert et al., 2009), poses serious threats to adolescents' academic, affective, behavioral, biological, cognitive, and social development (Bounds et al., 2021; Finkelhor, 1995; Turner et al., 2006). Disruptions to these domains due to adversity exposure increase the risk for developing significant behavioral and emotional difficulties during adolescence (Cicchetti & Toth, 1998) and across the lifespan (Felitti et al., 1998).

1.2.   Adverse Childhood Experiences

One means of conceptualizing and measuring childhood adversities is adverse childhood experiences (ACEs), which refer to negative, stressful, and potentially traumatic events occurring before the age of 18 (Felitti et al., 1998). Specifically, ACEs encompass a variety of experiences in the family of origin, including multiple forms of maltreatment (physical, psychological, and sexual abuse), household dysfunction (exposure to substance abuse, mental illness, violence, and criminal behavior), and neglect (Cronholm et al., 2015; Fagan & Novak, 2018; Felitti et al., 1998). Although occurring in childhood, ACEs have been linked to subsequent social, cognitive,

and emotional impairment; health-risk behaviors; disease, disability, and social problems; and premature death in adulthood (Anda et al., 1999; Edwards et al., 2003; Felitti et al., 1998).

While adult physical and mental health outcomes associated with ACEs are well-documented (Hughes et al., 2017; Larkin et al., 2012), this research has important limitations. For instance, considerable research has evaluated the effects of ACEs in adult populations not representative of the U.S. population as a whole. Participant samples predominately include individuals who are White, have education levels higher than the national average, and have middle- and upper-income levels (Cronholm et al., 2015). Moreover, the use of adults' retrospective reports of ACEs represents a limitation within the extant literature due to recall bias (Hardt & Rutter, 2004; Reuben et al., 2016). For example, Naicker and colleagues (2017) found minimal agreement between ACEs scores when comparing prospective and retrospective data in a sample of 1,595 young adults. In their study, self-reported and caregiver-reported ACEs scores were prospectively collected at six different time points across childhood and adolescence, as well as once retrospectively when participants reached young adulthood. Findings indicated that participants prospectively acknowledged higher rates of ACEs as adolescents than retrospectively as young adults (Naicker et al., 2017).

In order to address these limitations, research has more recently assessed adverse childhood experiences prospectively in youth populations, including nationally representative (Bomysoad & Francis, 2020; Mersky et al., 2021) and community-based (Meeker et al., 2021; Negriff, 2020) samples, diverse ethnic and racial groups (Brockie et al., 2015; de Vasconcelos et al., 2020; Hicks et al., 2021; Villamil Grest et al., 2021; Wang et al., 2021), youth in residential (Schauss et al., 2020) and psychiatric inpatient (Penttinen et al., 2020) treatment centers, youth involved in the justice system and those perpetrating violence (Baglivio & Epps, 2016; Barra et

al., 2022; Blum et al., 2019; Craig et al., 2019; Fagan & Novak, 2018; Folk et al., 2021; Weber & Lynch, 2021), and youth receiving social services (Lee & Markey, 2022; McCrae et al., 2019; Mishra et al., 2020; Villodas et al., 2016). Notably, these efforts have documented that adolescents such as those involved in the justice system and those receiving social services experience three or more ACEs on average, come from low-resourced communities and neighborhoods, belong to ethnic minority groups, and represent backgrounds characterized by low socioeconomic status (Lee & Markey, 2022; McCrae et al., 2019). These youth populations also experience additional adversity by being removed from their homes (Villodas et al., 2016).

Of particular salience given the long-term consequences of ACEs, an estimated 56% of adolescents between the ages of 12 and 17 years have experienced at least one ACE, while 10% of the adolescent population have experienced three or more ACEs in the U.S. (Bethell, Davis, et al., 2017; Sacks & Murphey, 2018). Even though the body of evidence prospectively examining ACEs in adolescents continues to grow, research has more recently acknowledged that the conventional ACEs originally identified by Felitti and colleagues (1998) do not fully capture the experiences of youth in today's society (Wade et al., 2014), since they are limited to adolescents' experiences in the home. As a result, there is increasing support for using expanded ACEs measures that better capture adolescents' adverse experiences both within the family of origin and those occurring outside of the home.

CHAPTER 2: LITERATURE REVIEW

2.1.   Exploring Expanded Adverse Childhood Experiences

Building upon the ACEs research with youth, studies have highlighted the importance of expanding the original conceptualization of adverse childhood experiences to include additional adversities and life stressors beyond the conventional 10 ACEs. For example, Finkelhor and colleagues (2013) suggested that several unmeasured adverse experiences are associated with mental health symptoms similar to conventional ACEs. Specifically, they evaluated whether expanding the conventional ACEs measure to include additional adversities would better predict psychological distress in a sample of 2,030 youths between the ages of 10 and 17 years. To examine this relationship, the investigators constructed an expanded ACEs scale by regressing distress scores first on the original 10 ACE items and, subsequently, on the additional adversity items in conjunction with the original 10 items. Results indicated that the conventional ACE items of parental separation or divorce and incarcerated family member did not significantly predict distress, while several of the additional adversity items (i.e., exposure to community violence, peer rejection and victimization, parental conflict, and the serious injury or illness of a close contact or loved one) were strongly associated with distress. Comparing the final expanded ACEs measure, which only included statistically significant items from the analyses, to the original 10-item scale revealed that the expanded measure was a stronger predictor of psychological distress than the conventional ACEs alone (Finkelhor et al., 2013).

In order to compare the prevalence of conventional ACEs and additional adversities occurring at the community level, Cronholm and colleagues (2015) included items such as experiencing bullying and discrimination, exposure to community and neighborhood violence, and having lived in foster care on their expanded ACEs measure. Although their study involved

adult participants ($N = 1,784$), results indicated that 63.4% of individuals had experienced at least one expanded ACE during childhood, while 49.3% had experienced both conventional and expanded ACEs. Notably, 13.9% of participants had only experienced a form of adversity captured by the expanded ACE items (Cronholm et al., 2015). Taken together, these studies underscore the importance of expanding the conventional ACEs measure to incorporate developmentally-salient research and experiences affecting ethnically, racially, and socioeconomically diverse groups (Cronholm et al., 2015; Finkelhor et al., 2013).

Even though the inclusion of additional adverse experiences, such as bullying, racism, neighborhood violence, living in foster care, and separation from caregivers due to deportation (Burke Harris & Renschler, 2015), appears to augment the conventional ACEs meaningfully, minimal research has evaluated the cumulative impact of the conventional and expanded ACEs on adolescents. Due to adolescents' susceptibility to experiencing negative mental health outcomes during this developmental period (McLaughlin, 2016), the current study examined the cumulative effect of conventional and expanded ACEs, referred to as *extended* ACEs, in understanding the relationship between ACEs and symptoms of depression and problematic substance use in adolescents.

2.2.   ACEs and Adolescent Mental Health

Although limited research has prospectively examined the impact of adverse childhood experiences in non-adult samples, the extant literature indicates that adolescents experience many of the same mental health concerns seen in adult populations with histories of ACEs. To that end, in a systematic review conducted by Scully and colleagues (2020), exposure to ACEs was found to be significantly and positively associated with adolescents' externalizing and internalizing mental health problems, in addition to deliberate self-harm, posttraumatic stress

disorder (PTSD), and overall psychological maladjustment. Findings also revealed that

adolescents who had experienced multiple ACEs presented with more severe mental health

outcomes, such as suicidal ideation and attempted suicide (Scully et al., 2020). Adding to this

growing body of evidence, studies have investigated whether adolescents who report ACEs also

experience concurrent symptoms of depression and substance use, which represent two of the

health risks increasingly affecting youth populations between the ages of 12 and 17 years

(Substance Abuse and Mental Health Services Administration [SAMHSA], 2023).

2.2.1. ACEs and Symptoms of Depression

In the U.S., depression is the leading health concern for adolescents (SAMHSA, 2023).

Based on the results of the 2022 National Survey of Drug Use and Health (NSDUH), roughly 4.8

million adolescents (19.5% of the population for this age group) experienced depression within

the 12 months prior to the survey (SAMHSA, 2023). Of particular concern, 3.6 million

adolescents (14.6% of the population for this age group, or 75.1% of the above adolescent

population reporting depression) experienced depression with severe impairment within the 12

months prior to the survey (SAMHSA, 2023). Notably, the COVID-19 Pandemic has

exacerbated youths' stress, anxiety, suicidality, and depressive symptoms, leading the American

Academy of Pediatrics (AAP) and the U.S. Surgeon General to declare a national emergency

related to the child and adolescent mental health crisis (AAP, 2021; Murthy, 2021).

Symptoms of depression primarily include depressed mood and/or loss of interest or

pleasure in daily activities, and are accompanied by additional cognitive and somatic symptoms

(American Psychiatric Association [APA], 2022). Evidence suggests that experiencing

symptoms of depression during adolescence disrupts developmental domains and places

adolescents at risk for academic and occupational failure (Cairns et al., 2014; Lewinsohn, Rohde,

et al., 2000), comorbid mental health diagnoses and substance use and misuse (Rohde et al., 1991; Thapar et al., 2012), poor interpersonal relationships with family and peers (Garber & Rao, 2014; Shortt & Spence, 2006; Zhang et al., 2018), and increased risk for suicide (Avenevoli et al., 2015; Johnson et al., 2018; Thapar et al., 2012), the second leading cause of death for this age group (Hedgegaard et al., 2021). Furthermore, subclinical levels of depression during adolescence contribute to functional impairment and distress (Garber & Rao, 2014; Lewinsohn, Solomon, et al., 2000), in addition to increasing the likelihood of adulthood major depressive disorder (Fergusson et al., 2005; Klein et al., 2009; Kovacs & Lopez-Duran, 2010).

Of salience, research assessing the conventional ACEs and two expanded ACEs (i.e., neighborhood violence and discrimination) demonstrates that adolescents who experience one or more adverse childhood experience(s) are at increased risk for experiencing depressive symptoms (Kim et al., 2021; Lee et al., 2020; Lew & Xiang, 2019). Specifically, adolescents who experience one ACE are two times more likely to present with symptoms of depression than adolescents reporting no ACE(s); those reporting four or more ACEs are 10 times as likely to experience depressive symptoms than their counterparts (Bomysoad & Francis, 2020). Due to the respective effects of ACEs and symptoms of depression on adolescents, their cumulative impact is especially concerning. Moreover, both ACEs (Sheffler et al., 2020) and symptoms of depression (Bai et al., 2018; Lewinsohn et al., 1993) are shown to be associated with adolescent substance use, which contributes additional risks to adolescent health and well-being.

2.2.2. ACEs and Substance Use

During adolescence, some individuals begin experimenting with and using substances (Afifi et al., 2020), which often include alcohol, marijuana, nicotine and tobacco, and cocaine (Johnston et al., 2023; Miech et al., 2023). Beyond experimenting, some adolescents engage in

significant levels of use. For instance, according to the 2022 NSDUH, 8.7% of adolescents reported a substance use disorder, 7.0% reported an illicit drug use disorder, and 2.9% reported alcohol use disorder (SAMHSA, 2023). Adolescents who use substances are at increased risk for poor academic engagement and achievement (Bugbee et al., 2019), negative health and mental health outcomes (Brownlie et al., 2019; Schulte & Hser, 2014), legal problems (Belcher & Shinitzky, 1998), and poor interpersonal relationships with family and peers (Johnson et al., 2002; Russell et al., 2017). Additionally, research indicates that early initiation of using substances, such as in adolescence, relates to substance misuse and use disorders in adulthood (Hawkins et al., 1997; Schulte & Hser, 2014).

Notably, adverse childhood experiences increase adolescents' risk for using substances (Afifi et al., 2020; Anda et al., 1999; Beal et al., 2019; Chatterjee et al., 2018; Duke, 2018; Penttinen et al., 2020; Villamil Grest et al., 2021). Based on research using the conventional ACEs and the two expanded ACEs of neighborhood violence and discrimination, adolescents are five times more likely to use substances when exposed to one ACE than adolescents reporting no ACE exposure; those reporting four or more ACEs are 15 times more likely to use substances than adolescents without any exposure to ACEs (Bomysoad & Francis, 2020). Moreover, due to the dose-response relationship between the number of ACEs experienced and use initiation, 20%-70% of individuals who begin using alcohol during adolescence have experienced ACEs (Dube et al., 2006). Furthermore, Forster and colleagues (2017) found that adolescents' nonmedical use of prescription medication increased by 47%-56% for every additional conventional ACE exposure. Their results also revealed that, with every additional conventional ACE experienced, the rate of polydrug use increased by 62% (Forster et al., 2017). Although Dube et al. (2006) and Forster et al. (2017) investigated these relationships using solely

conventional ACEs, it is reasonable to postulate that these findings carry over to extended adverse childhood experiences as well. Even though the literature has yet to establish a causal relationship between ACEs and symptoms of depression and substance use in adolescents, several studies suggest that ACEs may represent one of the possible etiological factors for adolescent depression (Elmore & Crouch, 2020; Lee et al., 2020) and substance use (Chatterjee et al., 2018; Dube et al., 2006; Duke, 2018; Hicks et al., 2021). For instance, it is plausible that youth engage in substance use as a means of self-medicating, suggesting maladaptive coping mechanisms. Additionally, the stress and distress stemming from the ACEs may play a role in exacerbating adolescents' depressive symptoms.

2.3.   Extended ACEs and Symptoms of Depression and Substance Use

Although advances in the area of extended ACEs and youth mental health are promising, there are additional gaps within the literature that have yet to be addressed. For example, because most research investigates the association between adolescents' extended ACEs and symptoms of depression and substance use separately, there is a dearth of research examining these negative mental health outcomes concurrently. Of the few efforts examining both depression symptoms and substance use, most rely on caregiver reports of adolescents' ACEs, especially in large, nationally-representative studies (e.g., Bomysoad & Francis, 2020), as opposed to adolescents' self-reported ACEs. While caregiver-reported scores can serve as a proxy for adolescent self-reported scores (Oh et al., 2018), evidence shows that caregivers underestimate adolescents' exposure to adverse experiences (Lewis et al., 2013; Stover et al., 2010).

For instance, Oransky and colleagues (2013) explored the discrepancies between caregiver and youth reports of youths' exposure to potentially traumatic events in a sample of 114 youths between the ages of 7 and 16 years and their caregivers. Findings revealed poor

agreement between youths' self-reported exposure and caregivers' reports of youths' exposure, with the most significant difference occurring for exposure to a serious accident (Oransky et al., 2013). In another study, Zimmerman and Farrell (2013) investigated the difference between adolescents' self-reported exposure to community violence and caregiver reports of adolescents' exposure in a sample of 1,517 youths ages 12 to 15 years. They also evaluated whether the difference between scores varied across youths' biological sex. Results indicated that caregivers typically reported fewer incidents of adolescents' exposure to community violence than adolescents' self-reported exposure, with overall difference scores ranging from -10 to 13. While male participants acknowledged higher levels of exposure ($M = 5.2$, $SD = 3.0$) than female participants ($M = 4.9$, $SD = 3.2$), caregivers underestimated adolescents' exposure to community violence similarly for both sexes ($M = 3.3$, $SD_m = 2.6$, $SD_f = 2.7$; Zimmerman & Farrell, 2013). Furthermore, disagreement between adolescents' and caregivers' reports was shown to positively and significantly relate to adolescents' poorer mental health outcomes in both studies, including higher levels of internalizing symptoms, externalizing problems, PTSD symptoms, functional impairment, and offending behavior (Oransky et al., 2013; Zimmerman & Farrell, 2013). Based on these findings, caregiver-youth disagreement in reports about adolescents' exposure to community violence may serve as a proxy for negative caregiver-youth relationships, which in turn may contribute to worse outcomes for youth (Goodman et al., 2010).

The present review identified only two studies that measured adolescents' self-reported extended ACEs as well as symptoms of depression and substance use, among other outcomes. In a reservation-based sample of 288 Indigenous adolescents and young adults (aged 15-24 years), Brockie and colleagues (2015) found the cumulative impact of eight extended ACEs (i.e., six conventional ACEs and two expanded ACEs specific to the experiences of Indigenous Peoples)

to significantly relate to symptoms of depression, PTSD, polydrug use, and suicide attempt. Of salience, every additional extended ACE exposure increased the risk of depressive symptoms by 57%, PTSD symptoms by 55%, polydrug use by 51%, and suicide attempt by 37% (Brockie et al., 2015). In a larger study conducted by Meeker and colleagues (2021), 11 extended ACEs (consisting of the 10 conventional ACEs and one expanded ACE) and health risk indicators were measured in a community sample of 1,532 public high school students. Findings showed that youths who had experienced one extended ACE were significantly more likely to report the health risk indicators of depressed mood, nonsuicidal self-injury, suicidal ideation, being a victim of school violence, fighting, and carrying a gun or other weapon than their peers without ACEs. For youths reporting two or more extended ACEs, results indicated significantly higher rates of suicide attempt, alcohol use, marijuana use, other substance use, and intoxication at school compared to youths who did not report exposure to an extended ACE (Meeker et al., 2021).

Moreover, research using multiple informants when prospectively measuring adolescents' extended ACEs and concurrent symptoms of depression and substance use is scant. As evidenced by the broader extant literature (i.e., not solely focused on ACE reports), caregivers also tend to underreport their adolescents' exposure to adverse experiences (e.g., Lewis et al., 2012; Oransky et al., 2013; Stover et al., 2010; Zimmerman & Farrell, 2013). One explanation for differences between adolescent and caregiver reports could be that caregivers are unaware of youths' experiences outside of the home (Oh et al., 2018). Given that several of the adverse childhood experiences assessed on extended ACEs measures occur when caregivers are not present (e.g., peer rejection and victimization, discrimination, and exposure to community and neighborhood violence), collecting information about adolescents' experiences from

multiple informants (i.e., adolescents, caregivers, teachers, school-based therapists, social workers, etc.) may better elucidate the negative mental health outcomes associated with adolescent extended ACEs.

This study aimed to address these gaps by measuring adolescents' self-reported extended ACEs and caregiver reports of their adolescent's extended ACE exposure, in order to evaluate the association between extended ACEs and symptoms of depression and substance use in adolescents. Enhancing understanding of this relationship can inform early detection, prevention, and treatment efforts encompassing extended ACEs, depression, and substance use, in addition to safeguarding adolescents' developmental trajectories by reducing their risk for short- and long-term health consequences.

CHAPTER 3: THEORETICAL FRAMEWORK

While the extant literature proposes a variety of mechanisms linking conventional adverse childhood experiences to youth mental health, evaluating the impact of extended ACEs requires a more inclusive understanding of the wide range of individual, relational, and contextual factors affecting development. As such, an integrative transactional model of development (Cicchetti & Toth, 1997; García Coll et al., 1996), viewed within the broader ecological systems framework (Bronfenbrenner, 1977, 1979), guided the present study.

The integrative transactional model conceptualizes development as a complex and dynamic process influenced by the bidirectional interactions between a child and the environment (Cicchetti & Toth, 1997; García Coll et al., 1996). Specifically, in this model, the child is viewed as a system consisting of the individual's developmental domains (i.e., biological, emotional, cognitive, linguistic, representational, and interpersonal; Cicchetti & Toth, 1997) and the unique factors contributing to their social position (i.e., race, social class, ethnicity, and gender; García Coll et al., 1996), while the environment is framed as a system composed of contextual factors (i.e., intrafamilial, societal, community, and cultural; Cicchetti & Toth, 1997) and social stratification mechanisms (i.e., racism, prejudice, discrimination, and oppression; García Coll et al., 1996). Transactions within and between these systems not only impact the child's biological and psychological development, they also contribute to the child's sociocultural experiences within the environment (Cicchetti & Toth, 1997; García Coll et al., 1996).

Considering this model within a socioecological framework further demonstrates the significant influence of these interrelated systems over time, especially on the development of diverse youth populations. Supporting the notion that adolescents do not passively exist within

their environment (i.e., they are engaging with various levels of their ecologies; García Coll et al., 1996), the ecological systems framework (Bronfenbrenner, 1977, 1979) indicates that the processes of development and adaptation do not occur in isolation. This framework distinguishes between proximal and distal levels of the environment, which create the larger ecological system, and addresses their role with respect to the individual. The proximal level includes direct relational influences on the individual, such as the family of origin, peers, and school personnel (Kilmer & Gil-Rivas, 2010). The distal level contains the conditions or characteristics of a setting or the broader society that indirectly influence the individual's day-to-day experiences, including the overarching culture, values, neighborhood qualities, and governing laws (Kilmer & Gil-Rivas, 2010). Of salience here, adverse childhood experiences are rooted in – and can occur at – both proximal and distal levels of an individual's environment, suggesting the need for evaluating extended ACEs and their impact on adolescents.

Notably, the dynamic interactions as proposed in the integrative transactional model of development further illustrate the developmental trajectory of diverse youth based on their ecological circumstances (García Coll et al., 1996). That is, rather than emphasizing deficiencies within the individual and the family of origin, the model shifts the focus to the contextual factors that directly or indirectly influence adolescent development. For example, an adolescent exposed to peer victimization or bullying (proximal factor) may not receive the necessary mental health care that promotes their emotional and psychological well-being, due to the lack of funding allocated for school-based mental health resources or restrictive funding streams that limit access to behavioral health prevention or intervention services (distal factors). As another example, laws targeting undocumented immigrants (distal factor) may result in an adolescent's separation from

their primary caregiver (proximal factor) through deportation, contributing to uncertainty about the adolescent's immediate and future circumstances.

In addition to emphasizing contextual factors, the integrative transactional model aims to more comprehensively account for the intragroup variability of adolescents' lived experiences in the current sociocultural climate. While noteworthy contributions have been made to the conventional ACE literature, conceptualizing extended ACEs requires a multidimensional approach guided by developmental science. Therefore, embedding an integrative transactional model of development within an ecological systems framework serves as an appropriate theoretical foundation for understanding the relationship between extended ACEs and adolescents' mental health outcomes.

CHAPTER 4: RESEARCH AIMS AND HYPOTHESES

4.1.   Context of the Present Study

This study used data from an adolescent-focused medical and behavioral health practice, which has been tracking patients' extended adverse childhood experiences, depressive symptoms, and substance use as part of the standardized assessments of routine care. Due to the behavioral and emotional risks experienced by adolescent populations, the integrated medical and behavioral health practice began measuring substance use as part of its initial routine assessment and ongoing care beginning in 2016. In order to better understand the potential risk factors further affecting this population, the practice began assessing patients' depressive symptoms and their exposure to extended ACEs in 2018. Towards the end of 2018, new and returning patients completed the substance use, symptoms of depression, and extended ACEs measures as part of the routine paperwork. To maintain comprehensive patient charts, providers reassess returning patients in these three domains at Physical Exam visits.

4.2.   The Present Study

The present study sought to contribute to the growing body of research examining extended adverse childhood experiences (ACEs) and symptoms of depression and substance use in adolescents between the ages of 12 and 17 years. To evaluate these relationships, this study examined the following research questions and hypotheses:

1) Is there a significant difference between adolescents' self-reported extended ACE scores compared to adolescents' extended ACE scores reported by their caregivers?
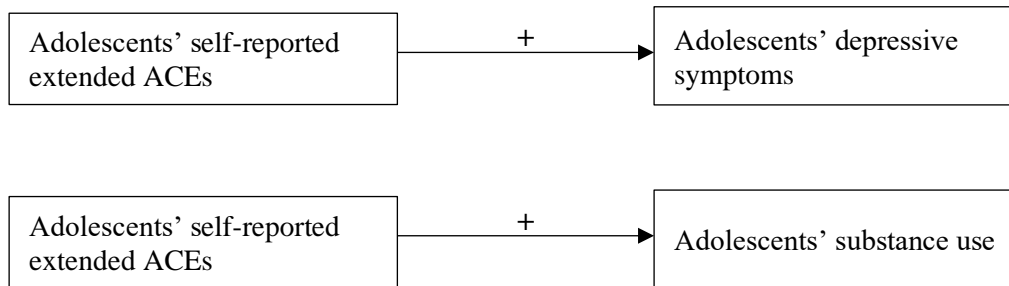
   H_1: The number of extended ACEs reported by adolescents will exceed the number reported by caregivers about their adolescents' experiences.

2) Do extended ACEs predict symptoms of depression and substance use in adolescents?

H$_{2.1}$: Adolescents who self-report a greater number of extended ACEs will tend to report

higher levels of depressive symptoms.

H$_{2.2}$: Adolescents who self-report a greater number of extended ACEs will tend to report
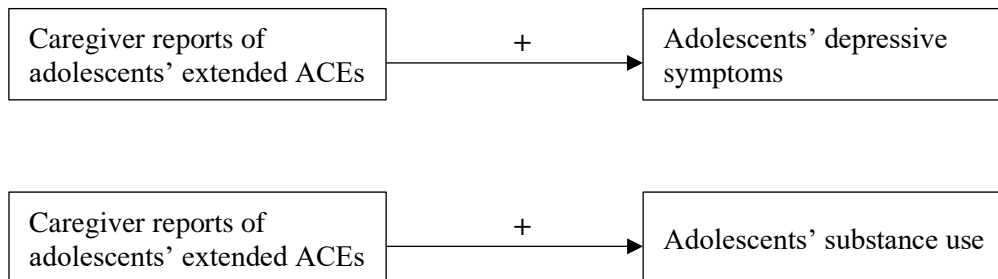
higher levels of substance use.

Figure 1. *Hypothesized, Positive Association between Adolescents' Self-Reported Extended ACEs and Symptoms of Depression and Substance Use*

```
┌─────────────────────────┐       +        ┌─────────────────────────┐
│ Adolescents' self-reported │ ──────────→  │ Adolescents' depressive │
│ extended ACEs            │                │ symptoms                │
└─────────────────────────┘                └─────────────────────────┘


┌─────────────────────────┐       +        ┌─────────────────────────┐
│ Adolescents' self-reported │ ──────────→  │ Adolescents' substance use │
│ extended ACEs            │                │                         │
└─────────────────────────┘                └─────────────────────────┘
```

H$_{2.3}$: When caregivers report a greater number of extended ACEs for their adolescent,

these youth will tend to endorse higher levels of depressive symptoms.

H$_{2.4}$: When caregivers report a greater number of extended ACEs for their adolescent,

these youth will tend to endorse higher levels of substance use.

Figure 2. *Hypothesized, Positive Association between Caregiver Reports of Adolescents' Extended ACEs and Adolescents' Symptoms of Depression and Substance Use*

```
┌─────────────────────────┐       +        ┌─────────────────────────┐
│ Caregiver reports of    │ ──────────→  │ Adolescents' depressive │
│ adolescents' extended ACEs │             │ symptoms                │
└─────────────────────────┘                └─────────────────────────┘


┌─────────────────────────┐       +        ┌─────────────────────────┐
│ Caregiver reports of    │ ──────────→  │ Adolescents' substance use │
│ adolescents' extended ACEs │             │                         │
└─────────────────────────┘                └─────────────────────────┘
```

H$_{2.5}$: Adolescents' self-reported extended ACEs will be a stronger predictor of

adolescents' depressive symptoms than caregiver reports of adolescents' extended

ACEs.

H$_{2.6}$: Adolescents' self-reported extended ACEs will be a stronger predictor of

adolescents' substance use than caregiver reports of adolescents' extended ACEs.

Figure 3. *Hypothesized, Positive Associations between Predictor and Outcome Variables, with Adolescents' Self-Reported Extended ACEs as a Stronger Predictor (indicated by boldface arrow)*
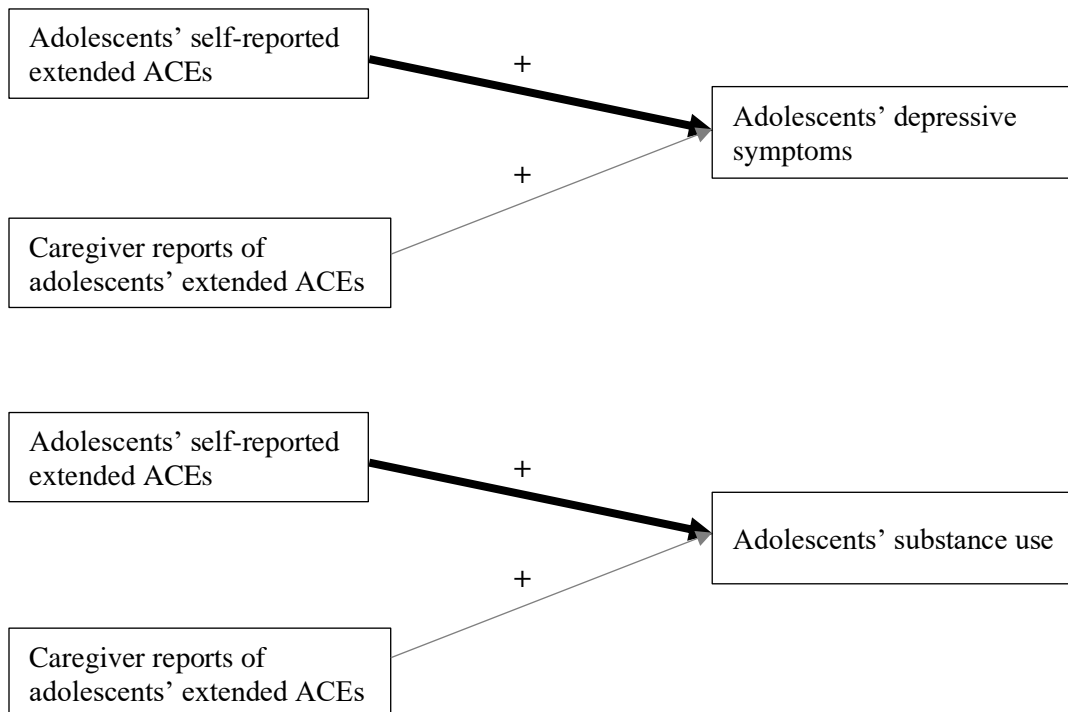
3) Do caregiver-youth discrepancies in adolescents' extended ACE exposure have an effect

on adolescents' depressive symptoms and substance use?

H$_{3.1}$: Levels of adolescents' depressive symptoms will increase as the caregiver-youth

discrepancy in adolescents' extended ACE exposure increases, such that when

adolescents self-report a greater number of extended ACEs than their caregivers

report for them, the impact of this discrepancy on adolescents' depressive symptoms will be higher than for the discrepancy created when caregiver reports are higher than adolescent reports.

H3.2: Levels of adolescents' substance use will increase as the caregiver-youth discrepancy in adolescents' extended ACE exposure increases, such that when adolescents self-report a greater number of extended ACEs than their caregivers report for them, the impact of this discrepancy on adolescents' substance use will be higher than for the discrepancy created when caregiver reports are higher than adolescent reports.

Figure 4. *Hypothesized Polynomial Regression with Response Surface Model*
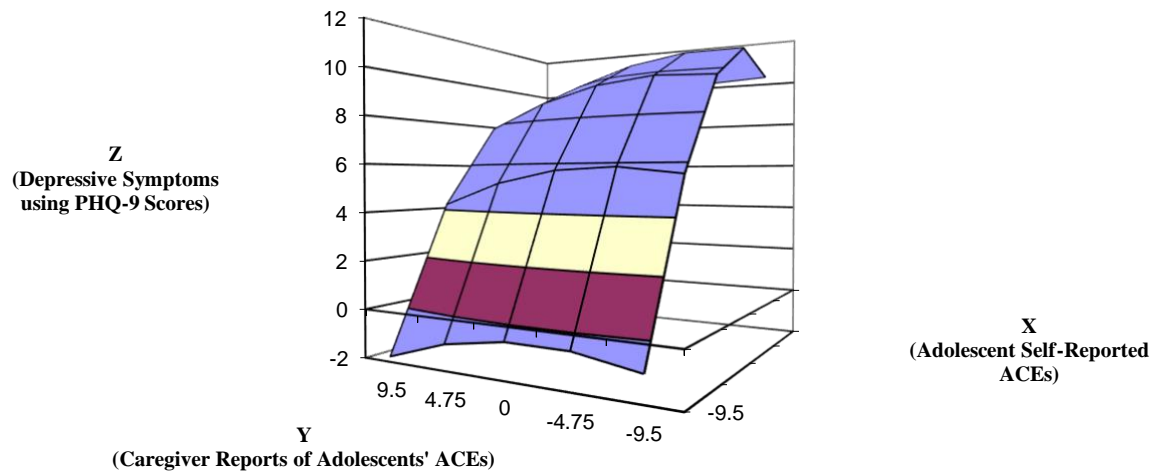
CHAPTER 5: METHODOLOGY

5.1.   Sample

Study participants presented for services at an adolescent-focused, integrated medical and behavioral health practice in a metropolitan city in the southeastern United States. Typical characteristics of the population seen by this practice include being female, 16 to 19 years old (range: 10-26 years old), Black/African American (roughly 65%), low-income, and Medicaid-insured (70%). Roughly 15% of those served are Latinx/Hispanic.

Data were available for a total of 3,137 participant entries. For the purpose of this study, participant data from September 1, 2018 to April 25, 2022 were included for individuals aged 12 to 17 years ($n = 1,780$), resulting in the removal of 1,357 cases that did not meet these criteria. This time period represents the starting point of when the integrated medical and behavioral health practice began assessing adolescents for all variables of interest (i.e., adolescent- and caregiver-reported extended ACEs, symptoms of depression, and substance use) to when datasets were made available for the present study. Participants were included if they had been assessed for ACEs (as reported by the adolescent or as reported by their caregiver) and symptoms of depression or substance use. Participants were excluded if they had not been assessed for ACEs (as reported by either the adolescent or their caregiver) or for symptoms of depression or substance use. That is, participants needed at least one ACEs score and one mental health outcome score. Multiple entries for individual participants ($n = 377$ entries) were assessed based on completeness (i.e., entries with more complete data on the study's key variables) and date of service (i.e., while preference was given to the most recent visit, each variable was examined across service dates in order to include participants' most complete entry), so that the final sample reflected unique cases only ($n = 1,403$). Moreover, due to the present study's focus on

examining caregiver-youth discrepancy in reports of adolescents' extended ACE exposure, participants were also excluded if they were categorized as being in the custody of the Department of Social Services (DSS; $n = 220$) in the provided database. The final sample included data from 1,183 adolescents. This study received approval from the Institutional Review Boards at Wake Forest University School of Medicine (IRB00088416) and the University of North Carolina at Charlotte (IRB-23-0637).

<div align="center">5.2. Procedure</div>

When presenting for services at the integrated healthcare practice, patients completed self-reported measures assessing their symptoms of depression, substance use, and exposure to extended ACEs. Caregivers also reported on their adolescents' exposure to extended ACEs in a separate measure. All study measures were collected at New Patient visits and Physical Exam visits; if caregivers were not present for appointments, then only adolescent measures were administered. In addition, relevant information from participants' medical charts (patients' medical record number, date of service, age, race, gender, visit type, reason for medical visit, and outcome of visit) were deidentified and compiled into two password-protected spreadsheets, one for extended ACEs and one for depressive symptoms and substance use, which were provided to the investigator by a research team member at the integrated care practice.

Because participant data were split across two spreadsheets, data from both spreadsheets were cross-matched based on 1) medical record number (MRN) and then 2) the date of service, resulting in a matched-pair for each participant. Figure 5 illustrates the number of entries per spreadsheet before merging data, the number of matched-pairs after merging data, the sample size prior to removing duplicate participants, and then the final sample size. In addition, the number of entries that were removed based on eligibility criteria are denoted in red. Furthermore,

Figure 6 delineates the decision-making process for duplicate cases (i.e., participants who received services more than once during the study's time period), in order for participants to have one entry for use in analyses.

Figure 5. *Flowchart of Adolescent Data Represented in the Present Study*
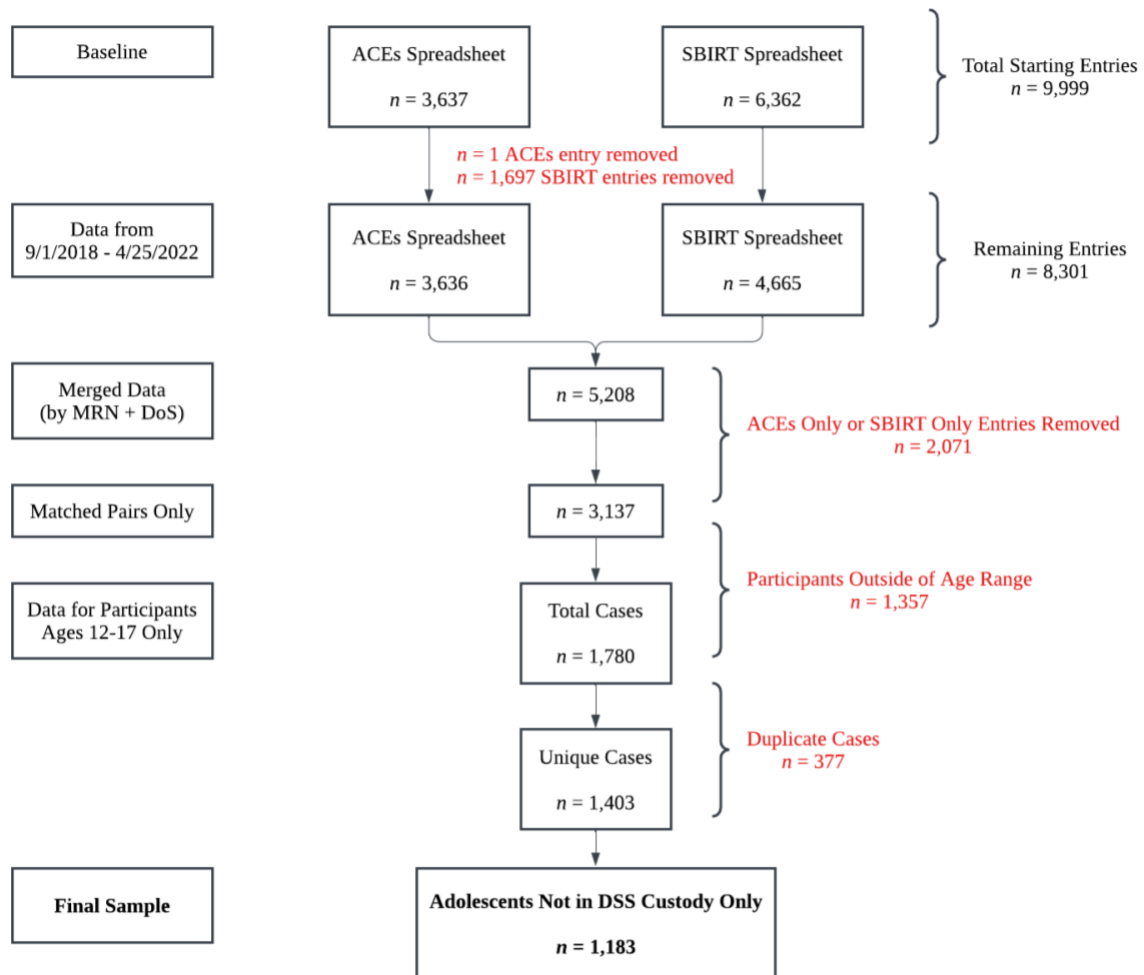
Note. ACEs = Adverse Childhood Experiences; SBIRT = Screening, Brief Intervention and Referral to Treatment (refers to the depressive symptom and substance use spreadsheet); MRN = Medical Record Number; DoS = Date of Service; DSS = Department of Social Services.

Figure 6. *Decision-Making Process for Duplicate Cases*

Decision Tree for Duplicate Entries

<div align="center">
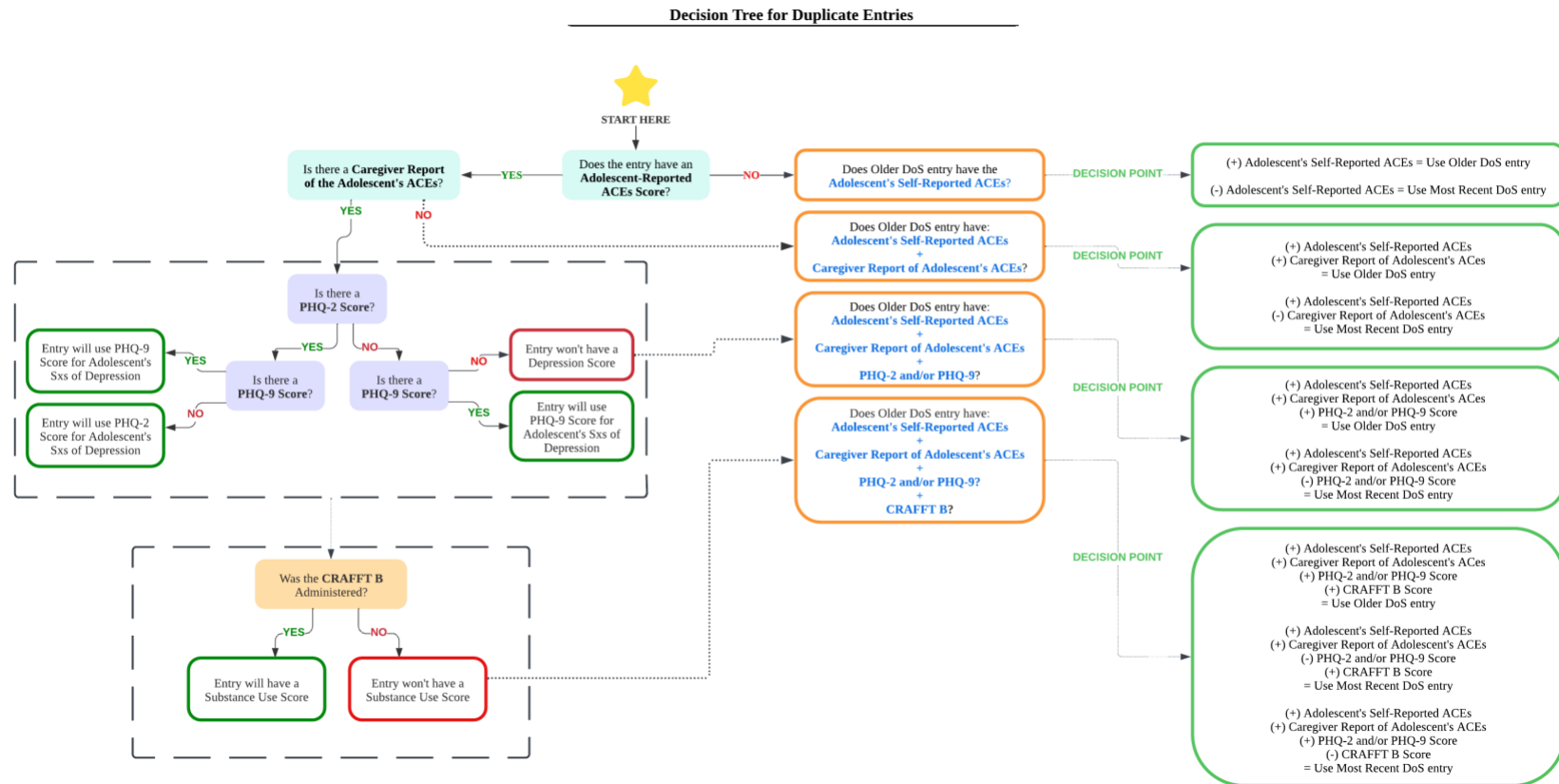
5.3.   Measures

</div>

5.3.1. Demographics

Participants reported their age, gender, and race. A member of the medical team recorded the reason for each adolescent's visit and if they were in the custody of the Department of Social Services (DSS).

5.3.2. Extended Adverse Childhood Experiences

The 19-item Center for Youth Wellness Adverse Childhood Experiences Questionnaire (CYW ACE-Q; Burke Harris & Renschler, 2015) is a self-report (CYW ACE-Q Teen SR) or caregiver-report (CYW ACE-Q Teen) clinical screening tool measuring the cumulative exposure to ACEs for adolescents ages 13 to 19 years. The adolescent self- and caregiver-report measures each consist of two sections. The first section includes 10 items assessing exposure to the conventional 10 ACEs (e.g., "child lived with a household member who served time in jail or prison;" "child lived with a household member who was depressed, mentally ill, or attempted suicide;" "someone touched your child's private parts;" and "child often felt unsupported, unloved and/or unprotected"). The second section includes nine items assessing exposure to additional early life stressors, or expanded ACEs, such as experiencing "harassment or bullying at school," "been in foster care," "often seen or heard violence in the neighborhood/school neighborhood," "been detained, arrested, or incarcerated," "had a serious medical procedure or life-threatening illness," and "lived with a parent or guardian who died." Items that align with their (or their youth's) experiences are tallied by respondents, and scores are summed for each section. Scores for both sections are combined to generate a two-number score (e.g., 3+2, three items endorsed in Section 1 and two items endorsed in Section 2). The integrated care clinic keeps scores for each section separate for research purposes (i.e., to evaluate whether the

integrated care model contributes to a decrease in youths' exposure to conventional ACEs), but they can be summed to receive a total score when used in clinical settings (Bucci et al., 2015). For the present study, summed scores were used for both adolescent reports and caregiver reports in order to capture an extended ACE score (i.e., the sum of conventional and expanded ACEs). Of note, as a checklist regarding youths' potential adversity experiences, all items have obvious face validity but the CYW ACE-Q is not a validated diagnostic tool (Bucci et al., 2015). In addition, research validating the scale and evaluating its use is not currently available (Lipscomb et al., 2021).

5.3.3. Depression

Patient Health Questionnaire-2. The Patient Health Questionnaire-2 (PHQ-2; Kroenke et al., 2003) is a 2-item self-report measure consisting of the first two items on the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001; Spitzer et al., 1999). The measure assesses the frequency of individuals' experience of a depressed mood or loss of interest or pleasure within a 2-week timeframe. The questionnaire begins with the stem, "Over the last two weeks, how often have you been bothered by any of the following problems?", followed by the two items ("little interest or pleasure in doing things" and "feeling down, depressed, or hopeless"). Items are scored on a 4-point Likert scale (0 = *not at all* to 3 = *nearly every day*) and summed. With scores ranging from 0 to 6, a total score of 3 or greater indicates the likelihood of major depressive disorder and requires further evaluation. The PHQ-2 has been validated in adolescent populations and demonstrates good sensitivity (.74) and specificity (.75; Richardson, Rockhill, et al., 2010). See Appendix A.

Patient Health Questionnaire-9. The Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001; Spitzer et al., 1999) is a 9-item self-report scale measuring the symptoms of depression

based on the diagnostic criteria for major depressive disorder of the *DSM-5-TR* (APA, 2022). In clinical settings, the PHQ-9 is administered when patients score a 3 or higher on the PHQ-2; thus, PHQ-9 data are available for the subset of youth in the present patient sample who scored at or above this threshold. Symptoms are assessed within a 2-week timeframe and include "little interest or pleasure in doing things;" "feeling down, depressed, or hopeless;" "feeling tired or having little energy;" "trouble falling or staying asleep, or sleeping too much;" and "poor appetite or overeating." Items are scored on a 4-point Likert scale (0 = *not at all* to 3 = *nearly every day*) and summed. Higher scores indicate greater levels of depression severity with scores ranging from 0 to 27. This measure has excellent internal reliability (Cronbach's α = .89) and excellent test-retest reliability after 48 hours (r = .84; Kroenke et al., 2001). Additionally, the PHQ-9 has been validated in adolescent populations and demonstrates good sensitivity (.90) and specificity (.76; Richardson, McCauley, et al., 2010). See Appendix B.

Importantly, not all adolescents needed to be further assessed for symptoms of depression with the PHQ-9. Depression scores from the PHQ-2 were used for adolescents without PHQ-9 scores (n = 502), while depression scores from the PHQ-9 were used for those with both PHQ-2 and PHQ-9 scores (n = 618), in order to represent adolescents' symptoms of depression as a single "PHQ" variable. Given that the PHQ-2 represents the first two questions on the PHQ-9 (and one approach is to administer the PHQ-9 and stop after the first two items if respondents do not endorse scores of 3 or higher), combining scores from these measures into a single variable creates a more representative distribution of depressive symptoms in the current study's sample.

5.3.4. Substance Use

CRAFFT Questionnaire: Part B. Part B of the CRAFFT Questionnaire (Car, Relax, Alone, Forget, Friends, and Trouble; Knight et al., 1999) was used to measure participants'

substance use. This section of the measure consists of six questions regarding different actions or outcomes related to substance use (e.g., "Have you ever ridden in a CAR driven by someone (including yourself) who was 'high' or had been using alcohol or drugs?" and "Have you ever gotten into TROUBLE while you were using alcohol or drugs?"). Items are scored (*yes* = 1 or *no* = 0) and summed. A total score of 2 or greater on Part B indicates problematic substance use (sensitivity = .76, specificity = .94) and the potential of substance use disorder (sensitivity = .80, specificity = .86.) and substance use dependence (sensitivity = .92, specificity = .80; Knight et al., 2002). This measure has good internal consistency (Cronbach's α = .79; Knight et al., 1999). See Appendix C.

Number of Substances. Providers at the integrated care practice asked adolescents the number of substances they used in the last 12 months and responses were scored from 0 to 3 (0 = *zero substances*, 1 = *one substance*, 2 = *two substances*, 3 = *three or more substances*). The present study used the number of substances adolescents reported using for descriptive purposes.

5.4.   Analytic Approach

After participant data were assessed for inclusion and exclusion criteria, the remaining sample of 1,183 participants were included in the analyses. Using G*Power Version 3.1.9.6 (Faul et al., 2009), post hoc power analyses revealed that the statistical power achieved in the paired samples *t*-test (Hypothesis 1), bivariate correlation (Hypotheses 2.5-2.6), and polynomial regression (Hypotheses 3.1-3.2) models was 1.00, in addition to a power of 0.999 in the simple linear regression models (Hypotheses 2.1-2.4), indicating that the study had sufficient power to detect a medium-sized effect at a significance criterion of α = .05, if one existed.

Using IBM SPSS Statistics (Version 28.0.1.1), descriptive statistics for patient characteristics and study variables (means, standard deviations, and frequencies), in addition to

bivariate correlations of the main study variables, were computed. Missing data were examined for the variables of interest (i.e., extended ACEs, depressive symptoms, and substance use) using Little's missing completely at random (MCAR) test (Little, 1998). The Little's MCAR test indicated that the pattern of missingness was not completely at random, $\chi^2(26, N = 1183) = 50.89$, $p = .002$, which can be attributed to the setting in which the data were collected. While the integrated medical and behavioral health practice implemented the CRAFFT in 2016 to assess adolescents' substance use, it did not incorporate the PHQ-2, PHQ-9, and CYW ACE-Q (Teen and Teen SR) until 2018. Notably, the data missing not at random may also be attributed to data collection partially occurring during the COVID-19 Pandemic. Although data were missing not at random, imputation strategies were not used in the present study to avoid introducing biases in the dataset (Graham et al., 2012) and inaccurately representing the relationships between study variables (Tabachnick & Fidell, 2013). With the goal of promoting transparency in reporting, pairwise deletion was utilized to manage this pattern of missingness in order to best capture the real-world experiences of this adolescent population.

Prior to conducting the primary analyses (i.e., paired samples *t*-test, simple linear regression, bivariate correlation, and polynomial regression with response surface analysis), data were assessed using diagnostic plots and statistics to ensure the assumptions were met for each statistical test. The assumption of linearity between independent and dependent variables was assessed by visual inspection of scatterplots, which showed the assumption held true. The Variance Inflation Factor (VIF) and tolerance scores resulted in values well below 10 and above 0.2, respectively, indicating the assumption of collinearity had also been met. Homoscedasticity held true based on visual assessment of scatterplots of standardized results against predicted values. Examination of histograms and normal P-P plots indicated the assumption of normality

of the residuals was also met. The independence of residuals assumption held true if the Durbin-Watson statistic obtained a value close to 2 (Durbin-Watson$_{PHQ}$ = 1.12, Durbin-Watson$_{CRAFFT}$ = 2.06). Although the Durbin-Watson statistic in the depression model was closer to 1 than the desired 2 value, this assumption was still met since the value did not fall below 1 (Wesolowsky, 1976, p. 141). Outliers were first identified by examining the values of the standardized residuals (i.e., those greater than |3.3|; Tabachnick & Fidell, 2013, p. 128). Further inspection of the data using Cook's Distance statistic indicated all values were less than 1, suggesting data that fell far from the central tendency of the distribution did not substantially or inappropriately affect the outcomes of the regression analyses. Additional assumptions for polynomial regression with response surface analysis (i.e., the two predictor variables must be commensurate and the predictor variables must be measured on the same numeric scale to facilitate determining their degree of correspondence) were also met.

I assessed the distribution of caregiver-youth discrepancy in adolescents' exposure to extended ACEs following the steps outlined by Shanock and colleagues (2010), in order to determine whether there was practical value in exploring associations between discrepancies and the outcomes of interest (i.e., about 10% or more discrepant ratings between the two predictor variables; Edwards & Parry, 1993; Shanock et al., 2010). First, adolescents' self-reported extended ACE scores and caregiver reports of adolescents' extended ACE scores were standardized. Then, the standardized caregiver scores were subtracted from the standardized adolescent scores. A discrepancy between scores existed when the standardized score on one predictor variable (i.e., adolescent-reported scores or caregiver-reported scores) was half a standard deviation above or below the standardized score on the other predictor variable (i.e., caregiver-reported scores or adolescent-reported scores). Next, the percentages of discrepant

values and values in agreement were determined. Results showed 31.5% of the sample was considered to have a discrepancy (adolescent-reported scores < caregiver-reported scores = 14.6%, adolescent-reported scores > caregiver-reported scores = 16.9%), indicating that the prevalence of discrepancies in the present sample was sufficient to move forward with the polynomial regression with response surface analyses.

5.5.   Primary Analyses

A paired samples *t*-test was conducted to compare the mean difference between adolescents' self-reported extended ACEs scores and caregiver reports of adolescents' extended ACEs scores (Hypothesis 1). Simple linear regression models were performed to assess whether adolescents' self-reported extended ACEs positively predicted symptoms of depression (Hypothesis 2.1) or substance use (Hypothesis 2.2) in adolescents. Simple linear regression models were also conducted to determine whether caregiver reports of adolescents' extended ACEs positively predicted symptoms of depression (Hypothesis 2.3) or substance use (Hypothesis 2.4) in adolescents. Support for each hypothesis was determined by evaluating the values and significance of each slope coefficient.

Zero-order correlation coefficients were calculated to assess whether adolescents' self-reported extended ACEs more strongly predicted symptoms of depression (Hypothesis 2.5) or substance use (Hypothesis 2.6) in adolescents compared to caregiver reports of adolescents' extended ACEs. Support for each hypothesis was determined by testing the significance of the difference between the two correlation coefficients using Lee and Preacher's (2013) web utility, which applies Steiger's (1980) statistical test for assessing correlation coefficients obtained from the same sample. Steiger's (1980) test controls for the correlation between two coefficients

generated by two dependent associations (i.e., adolescent-reported extended ACEs and

caregiver-reported extended ACEs).

A polynomial regression with response surface analysis (Edwards & Parry, 1993;

Shanock et al., 2010) was conducted to assess the relationship of the caregiver-youth discrepancy

in reports of adolescents' exposure to extended ACEs with adolescents' depressive symptoms

(Hypothesis 3.1). Polynomial regression provided the opportunity to determine the unique

relationship of each predictor variable (adolescent-reported extended ACEs and caregiver-

reported extended ACEs) simultaneously, and whether the discrepancy between these predictors

related to the outcome of interest (symptoms of depression). Response surface analysis provided

a three-dimensional figure, illustrating how the degree and direction of discrepancy between the

two predictors related to the outcome. The polynomial regression was conducted using the

following equation:

$$Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + e$$

In the present study, Z represented adolescents' symptoms of depression (outcome variable), X

was adolescents' self-reported extended ACEs (Predictor 1), and Y was caregiver reports of

adolescents' extended ACEs (Predictor 2). To aid with interpretation (Aiken & West, 1991), and

as recommended by Edwards (1994), each predictor variable (i.e., the extended ACE scores) was

first centered around the midpoint of their respective scales (i.e., CYW ACE-Q Teen SR or

Teen). The midpoint for both predictor variables was 9.5 (range from 0 to 19). Then, three new

variables were created: The square of the centered adolescent-reported extended ACEs score

(X^2), the square of the centered caregiver-reported extended ACEs score (Y^2), and the cross-

product of the centered adolescent-reported score and caregiver-reported score (XY). Next, the

polynomial regression analysis was executed by regressing the outcome variable on each

predictor variable (X and Y), the interaction between the two predictor variables (XY), and the squared value for each predictor (X^2 and Y^2).

Unlike a common regression analysis that evaluates R^2, the results of a polynomial regression with response surface analysis are examined with respect to a response surface pattern (Shanock et al., 2010). A response surface pattern includes four surface test values (a_1, a_2, a_3, and a_4) – which were calculated by entering the unstandardized coefficients (b_1, b_2, b_3, b_4, and b_5)[1] into Shanock et al.'s (2010) Excel spreadsheet – that illustrate the slope and curvature of the line of perfect agreement ($X = Y$) and the line of incongruence ($X = -Y$). As related to adolescents' depressive symptoms (Z), the slope of the line of perfect agreement (i.e., adolescent-reported scores = caregiver-reported scores) was calculated by $a_1 = (b_1 + b_2)$ and indicated whether the outcome was different for scores that were in agreement at high levels than for those in agreement at low levels. The curvature along the line of perfect agreement as related Z was determined by $a_2 = (b_3 + b_4 + b_5)$ and illustrated whether scores that were in agreement at extreme levels had different outcomes than those in agreement at less extreme levels. The slope of the line of incongruence ($X > Y$ or $X < Y$) as related to Z was calculated by $a_3 = (b_1 - b_2)$ and indicated whether discrepancy in one direction was better or worse than discrepancy in the other direction. The curvature of the line of incongruence as related to Z was determined by $a_4 = (b_3 - b_4 + b_5)$ and illustrated whether the outcome was better or worse for scores in agreement than for discrepant scores.

---

[1] b_1 is beta coefficient for adolescent-reported extended ACEs (X)
b_2 is beta coefficient for caregiver-reported extended ACEs (Y)
b_3 is beta coefficient for X squared
b_4 is beta coefficient for the product of XY
b_5 is beta coefficient for Y squared

Following the strategy employed to examine Hypothesis 3.1, a structurally similar approach was used to assess the relationship of the caregiver-youth discrepancy in reports of adolescents' exposure to extended ACEs with adolescents' substance use (Hypothesis 3.2).

CHAPTER 6: RESULTS

Out of 1,183 participants, adolescents were on average 15 years old ($M = 15.37$, $SD =$ 1.52). Sixty-four percent identified as female, 35.7% identified as male, and .6% identified as transgender. Roughly half of adolescents identified as Black or African American (52.6%). As shown in Table 1, the next largest racial/ethnic groups represented in the sample were adolescents who identified as Hispanic or Latino (18.8%) and then those who identified as White (15.3%).

Table 1

Participant Adolescents' Self-Reported Characteristics

Variable	n	%
Gender		
Female	754	63.7
Male	422	35.7
Transgender	7	0.6
Age [a]		
12 years	66	5.6
13 years	110	9.3
14 years	145	12.3
15 years	216	18.3
16 years	287	24.3
17 years	359	30.3
Race/Ethnicity [b]		
American Indian/Alaskan Native	14	1.2
Asian/Asian American	11	0.9
Black/African American	622	52.6
Hispanic/Latino	222	18.8
White	181	15.3
Biracial	23	1.9
Multiracial	1	0.1

Note. $N = 1,183$.
[a] Adolescents were on average 15.37 years old ($SD = 1.52$).
[b] Race/Ethnicity information was not reported for 109 participants (9.2%).

Table 2 summarizes the nature of caregivers' relationships with adolescents (this information is available for 75.7% of caregivers). Mothers represented the largest group of

caregivers (56.0%), followed by fathers (7.8%), parents (not specified; 2.5%), grandmothers

(2.2%), guardians (not specified; 2.1%), and sisters (1.0%). Notably, although adolescents in this

subsample were not listed as being in the custody of DSS, 17 of the caregiver respondents (1.6%)

had descriptions pertaining to youth in DSS custody (e.g., foster mother, DSS social worker,

residential staff, etc.).[2] Moreover, 24.3% of caregiver respondents did not have descriptions

identifying their relationship to their adolescent.

Table 2

Description of Caregiver Respondents' Relationship to Adolescents

Variable	*n*	%
Relationship Descriptor Provided	895	75.7
Family Member		
Mother	663	56.0
Father	92	7.8
Parent (not specified)	29	2.5
Stepmother	8	0.7
Stepfather	1	0.1
Sister	12	1.0
Brother	1	0.1
Sibling (not specified)	1	0.1
Great Grandmother	3	0.3
Grandmother	26	2.2
Grandfather	2	0.2
Aunt	7	0.6
Cousin	1	0.1
Father's Partner	1	0.1
Caregivers & Guardians		
Foster Mother	1	0.1
Foster Parent (not specified)	3	0.3
DSS Guardian	2	0.2
DSS Social Worker	6	0.5
Residential Staff	5	0.5
Caregiver (not specified)	6	0.5
Guardian (not specified)	25	2.1

Note. $n = 288$ participants (24.3%) did not have descriptions for caregiver respondents. The extrafamilial caregivers and guardians were specified in the database, even though youth characterized as in the custody of the Department of Social Services (DSS) were removed from the study dataset.

[2] Since the present study excluded participants who were labelled in the data set as being in DSS custody, it is unclear why these adolescents were brought to the integrated care practice by caregiver respondents whose relationship descriptors imply the youths were in the custody of DSS.

Table 3 delineates the descriptive statistics and frequencies for each study variable. Of the participants with available data, adolescents (96.7%) self-reported experiencing an average of 3 extended ACEs (*M* = 2.82, *SD* = 3.09, range = 0-19), while caregivers (87.3%) reported that their adolescents had experienced an average of 2 extended ACEs (*M* = 2.20, *SD* = 2.80, range = 0-18). Adolescents also endorsed an average of approximately 4 symptoms of depression (*M* = 3.98, *SD* = 5.59, range = 0-26, 94.7%), average substance use scores lower than 1 (*M* = 0.23, *SD* = 0.84, range = 0-6, 79.2%), and, on average, using less than 1 substance in the last 12 months (*M* = 0.26, *SD* = 0.54, range = 0-3, 98.3%).

Table 3

Descriptive Statistics and Frequencies of Study Variables

Variable	*n*	%	*M*	*SD*	Possible Score Range
Adolescent-Reported Extended ACEs	1,144	96.7	2.82	3.09	0-19
Conventional ACEs only	1,146	96.9	1.83	2.20	0-10
Expanded ACEs only	1,142	96.5	0.99	1.25	0-9
Caregiver-Reported Extended ACEs	1,033	87.3	2.20	2.80	0-19
Conventional ACEs only	1,038	87.7	1.50	2.04	0-10
Expanded ACEs only	1,034	87.4	0.71	1.10	0-9
Adolescent-Reported Symptoms of Depression	1,120	94.7	3.98	5.59	0-27
PHQ-2 Score	1,119	94.6	1.12	1.54	0-6
PHQ-9 Score	618	52.2	6.90	6.07	0-27
Adolescent-Reported Substance Use					
CRAFFT Score	937	79.2	0.23	0.84	0-6
n Substances	1,163	98.3	0.26	0.54	0-3
0	918	77.6			
1	194	16.4			
2	48	4.1			
3 or more	3	0.3			

Note. *N* = 1,183. ACEs = Adverse Childhood Experiences; PHQ-2 = Patient Health Questionnaire-2; PHQ-9 = Patient Health Questionnaire-9; CRAFFT = Car, Relax, Alone, Forget, Friends, and Trouble Questionnaire.

Results from the bivariate correlation analysis (Table 4) revealed weak to strong positive correlations between study variables. The strongest relationship existed between adolescent-

reported extended ACEs and caregiver-reported extended ACEs ($r = .70$, $p < .001$), while the

weakest relationships existed between caregiver-reported extended ACEs and adolescent

substance use ($r = .11$, $p = .001$) and adolescents' depressive symptoms and substance use ($r = .11$, $p = .001$). Given the sample size and resulting statistical power, the significance of these

findings was not surprising.

Table 4

Bivariate Correlations for Key Study Variables

Variable	1	2	3	4
1. Adolescent-Reported Extended ACEs	-			
2. Caregiver-Reported Extended ACEs	.70 ***	-		
3. Symptoms of Depression	.33 ***	.26 ***	-	
4. Substance Use	.15 ***	.11 ***	.11 ***	-

Note. Sample sizes vary for each correlation due to pairwise deletion. For adolescent-reported extended ACEs and caregiver-reported extended ACEs, $n = 1,006$. For adolescent-reported extended ACEs and symptoms of depression, $n = 1,082$. For caregiver-reported extended ACEs and adolescent-reported symptoms of depression, $n = 982$. For adolescent-reported extended ACEs and substance use, $n = 912$. For caregiver-reported extended ACEs and adolescent-reported substance use, $n = 825$. For adolescent-reported symptoms of depression and substance use, $n = 892$.
*** $p < .001$.

Research Question 1: Is there a significant difference between adolescents' self-reported extended ACE scores compared to adolescents' extended ACE scores reported by their caregivers?

Hypothesis 1: The number of extended ACEs reported by adolescents will exceed the number reported by caregivers about their adolescents' experiences.

In support of Hypothesis 1, results from a paired samples *t*-test suggested that adolescents

self-reported a greater number of extended ACEs ($M = 2.77$, $SD = 3.05$) compared to the number

of adolescents' extended ACEs reported by caregivers ($M = 2.19$, $SD = 2.80$), $t(1005) = 8.12$, $p <$

.001, *d* = 0.26. Thus, on average, adolescents self-reported exposure to roughly half an additional extended ACE (*M* = 0.58, *SD* = 2.29) than their caregivers reported for them.

Research Question 2: Do extended ACEs predict symptoms of depression and substance use in adolescents?

Two simple linear regression models tested whether the adolescents' self-reported extended ACE scores were associated with depressive symptoms in one model (Hypothesis 2.1) and with substance use in another model (Hypothesis 2.2). Two additional simple linear regression models tested whether caregiver reports of adolescents' extended ACE scores were associated with adolescents' symptoms of depression in the first model (Hypothesis 2.3) and with substance use in the second model (Hypothesis 2.4). I also tested whether adolescent-reported extended ACEs or caregiver-reported extended ACEs more strongly predicted adolescents' symptoms of depression (Hypothesis 2.5) and substance use (Hypothesis 2.6) by testing the differences between correlation coefficients (Lee & Preacher, 2013).

Hypothesis 2.1: Adolescents who self-report a greater number of extended ACEs will tend to report higher levels of symptoms of depression.

Results indicated a moderate linear relationship between adolescent-reported extended ACEs and depression symptoms (*r* = .33). Adolescent-reported extended ACEs predicted statistically significant variance in depression symptoms, *b* = 0.60, *t*(1080) = 11.55, β = 0.33, R^2 = .11, *p* < .001, 95% CI [.50, .70], accounting for 11% of the variance in symptoms of depression. Consistent with expectations, adolescents who self-reported a greater number of extended ACEs tended to reported higher levels of depression symptoms. A one-unit increase in adolescent-reported extended ACEs was associated with an increase of 0.60 units of depression symptoms.

Hypothesis 2.2: Adolescents who self-report a greater number of extended ACEs will tend to report higher levels of substance use.

Results indicated a relatively weak linear relationship between adolescent-reported extended ACEs and substance use ($r = .15$). Adolescent-reported extended ACEs predicted statistically significant variance in substance use, $b = 0.04$, $t(910) = 4.44$, $\beta = 0.15$, $R^2 = .02$, $p < .001$, 95% CI [.02, .06], accounting for 2% of the variance in adolescents' substance use. In support of Hypothesis 2.2, adolescents who self-reported a greater number of extended ACEs tended to report higher levels of substance use. A one-unit increase in extended ACEs was associated with an increase of 0.04 units of substance use.

Hypothesis 2.3: When caregivers report a greater number of extended ACEs for their adolescent, these youth will tend to endorse higher levels of depressive symptoms.

Results indicated a moderate linear relationship between caregiver reports of adolescents' extended ACEs and adolescents' symptoms of depression ($r = .26$). Caregiver-reported extended ACEs predicted statistically significant variance in depression symptoms, $b = 0.51$, $t(980) = 8.32$, $\beta = 0.26$, $R^2 = .07$, $p < .001$, 95% CI [.39, .63], accounting for 7% of the variance in adolescents' symptoms of depression. Consistent with expectations, when caregivers reported a greater number of extended ACEs for their adolescents, these youth tended to endorse higher levels of depression symptoms. A one-unit increase in caregiver-reported extended ACEs was associated with an increase of 0.51 units in adolescents' depression symptoms.

Hypothesis 2.4: When caregivers report a greater number of extended ACEs for their adolescent, these youth will tend to endorse higher levels of substance use.

Results indicated a weak linear relationship between caregiver reports of adolescents' extended ACEs and adolescents' substance use ($r = .11$). Although caregiver-reported extended ACEs predicted statistically significant variance in substance use, $b = 0.03$, $t(823) = 3.30$, $\beta = 0.11$, $R^2 = .01$, $p = .001$, 95% CI [.01, .06]; however, these reports accounted for 1% of the

variance in adolescents' self-reported use of substances. In support of Hypothesis 2.4, when caregivers reported a greater number of extended ACEs for their adolescents, these youth tended to endorse higher levels of substance use. A one-unit increase in caregiver-reported extended ACEs was associated with an increase of 0.03 units in adolescents' substance use.

Hypothesis 2.5: Adolescents' self-reported extended ACEs will be a stronger predictor of adolescents' depressive symptoms than caregiver reports of adolescents' extended ACEs.

Adolescents' depressive symptoms positively correlated with both adolescents' self-reported extended ACEs, $r(982) = .33$, $p < .001$, and caregiver reports of adolescents' extended ACEs, $r(982) = .26$, $p < .001$. The difference between these correlation coefficients was significant, $z = 3.14$, $p = .001$. Consistent with Hypothesis 2.5, adolescents' self-reported extended ACEs were a stronger predictor of adolescents' depressive symptoms than caregiver reports of adolescents' extended ACEs.

Hypothesis 2.6: Adolescents' self-reported extended ACEs will be a stronger predictor of adolescents' substance use than caregiver reports of adolescents' extended ACEs.

Adolescents' substance use positively correlated with both adolescents' self-reported extended ACEs, $r(825) = .15$, $p < .001$, and caregiver reports of adolescents' extended ACEs, $r(825) = .11$, $p < .001$. The difference between these correlation coefficients was not significant, $z = 1.19$, $p = .117$. In contrast to expectations, adolescents' self-reported extended ACEs were not a stronger predictor of adolescents' use of substances than caregiver reports of adolescents' extended ACEs, failing to support Hypothesis 2.6.

Research Question 3: Do caregiver-youth discrepancies in adolescents' extended ACE exposure have an effect on adolescents' depressive symptoms and substance use?

Hypothesis 3.1: Levels of adolescents' depressive symptoms will increase as the caregiver-youth discrepancy in adolescents' extended ACE exposure increases, such that when adolescents self-report a greater number of extended ACEs than their caregivers report for them, the impact of this discrepancy on adolescents' depressive symptoms will be higher than for the discrepancy created when caregiver reports are higher than adolescent reports.

A polynomial regression with response surface analysis was conducted to examine the relationship of the caregiver-youth discrepancy in reports of adolescents' exposure to extended ACEs with adolescents' depressive symptoms. The middle column of Table 5 shows the results of the polynomial regression with response surface analysis model, while Figure 7 illustrates the three-dimensional plot of this relationship.

When adolescent-reported extended ACEs were in perfect agreement with caregiver-reported extended ACEs ($X = Y$), the reported level of extended ACEs (i.e., the number of extended ACEs to which adolescents were exposed, according to both adolescent and caregiver reports) did not significantly predict a change in adolescents' depression symptoms ($a_1 = -0.09$, $p = .615$). However, the curvature along the line of perfect agreement was negative and statistically significant ($a_2 = -0.08$, $SE = 0.02$, $p = .000$), indicating a non-linear slope along the line of perfect agreement (i.e., agreement in adolescent-reported extended ACEs and caregiver-reported extended ACEs related to adolescents' symptoms of depression in a non-linear way). As illustrated by Figure 7, a negative a_2 represents a concave – or downward – surface, suggesting that adolescents' depressive symptoms were higher when adolescent-reported and caregiver-reported extended ACE scores matched at midrange levels (i.e., less extreme levels) than when they matched at more extreme levels (i.e., represented in the figure by the front corner where X and Y are both -9.5 and the back corner where X and Y are both +9.5).

When adolescent-reported extended ACEs were incongruent with caregiver-reported extended ACEs, the slope along the line of incongruence was positive and statistically significant ($a_3 = 0.66$, $SE = 0.29$, $p = .025$). When adolescent-reported extended ACEs were higher than caregiver-reported extended ACEs ($X > Y$), adolescents endorsed more symptoms of depression than when caregiver-reported extended ACEs were higher than adolescents' self-reports.

However, the negative curvature along the line of incongruence was not statistically significant (a_4 = -0.03, p = .568), suggesting that adolescents' symptoms of depression did not significantly increase or decrease as the degree of the discrepancy between adolescent-reported and caregiver-reported extended ACEs increased. That is, the divergence between adolescents and their caregivers in reports of adolescents' exposure to extended ACEs did not predict a change in these youths' depressive symptoms. Therefore, these findings only partially supported Hypothesis 3.1; specifically, when adolescents reported a greater number of extended ACEs than their caregivers reported for them, the impact of this discrepancy on adolescents' depressive symptoms was higher than for the discrepancy created when caregiver reports were higher than adolescent reports.

Hypothesis 3.2: Levels of adolescents' substance use will increase as the caregiver-youth discrepancy in adolescents' extended ACE exposure increases, such that when adolescents self-report a greater number of extended ACEs than their caregivers report for them, the impact of this discrepancy on adolescents' substance use will be higher than for the discrepancy created when caregiver reports are higher than adolescent reports.

A polynomial regression with response surface analysis was also conducted to examine the relationship of the caregiver-youth discrepancy in reports of adolescents' exposure to extended ACEs with adolescents' substance use. The right column of Table 5 shows the results of the polynomial regression with response surface analysis model, while Figure 8 illustrates the three-dimensional plot of this relationship.

When adolescent-reported extended ACEs were in perfect agreement with caregiver-reported extended ACEs ($X = Y$), the reported level of extended ACEs (i.e., the number of extended ACEs to which adolescents were exposed, according to both adolescent and caregiver reports) did not significantly predict a change in adolescents' substance use (a_1 = 0.03, p = .277).

In addition, the curvature along the line of perfect agreement was not statistically significant (a_2 = 0.00, p = .686).

When adolescent-reported extended ACEs were incongruent with caregiver-reported extended ACEs, the slope along the line of incongruence was positive and statistically significant (a_3 = 0.13, SE = 0.05, p = .016). When adolescent-reported extended ACEs were higher than caregiver-reported extended ACEs ($X > Y$), adolescents endorsed higher levels of substance use than when caregiver-reported extended ACEs were higher than adolescents' self-reports. As illustrated by Figure 8, the slope along the line of incongruence slants upward towards the right corner of the figure (i.e., when X is +9.5, and Y is -4.5 or lower). However, the positive curvature along the line of incongruence was not statistically significant (a_4 = 0.01, p = .314), suggesting that adolescents' use of substances did not significantly increase or decrease as the degree of the discrepancy between adolescent-reported and caregiver-reported extended ACEs increased. That is, the divergence between adolescents and their caregivers in reports of adolescents' exposure to extended ACEs did not significantly predict a change in these youths' substance use. As a result, these findings only partially supported Hypothesis 3.2; specifically, when adolescents reported a greater number of extended ACEs than their caregivers reported for them, the impact of this discrepancy on adolescents' use of substances was higher than for the discrepancy created when caregiver reports were higher than adolescent reports.

Table 5

Caregiver-Youth Extended ACE Discrepancy as Predictors of Adolescents' Mental Health Outcomes

Variable	Symptoms of Depression			Substance Use		
	Adjusted R^2 = .14 ***			Adjusted R^2 = .03 ***		
	B (SE)	β	*p*	*B* (SE)	β	*p*
Constant	7.73		< .001	0.49		< .001
X: Adolescent-Reported Extended ACEs (b_1)	0.28 (0.17)	0.15	.087	**0.08 (0.03)**	0.28	**.007**
Y: Caregiver-Reported Extended ACEs (b_2)	**-0.38 (0.18)**	-0.18	**.034**	-0.05 (0.03)	-0.16	.113
X^2: Adolescent-Reported Extended ACEs Squared (b_3)	-0.02 (0.02)	-0.08	.480	0.006 (0.004)	0.22	.092
XY: Adolescent-Reported Extended ACEs x Caregiver-Reported Extended ACEs (b_4)	-0.03 (0.02)	-0.14	.284	-0.005 (0.004)	-0.17	.256
Y^2: Caregiver-Reported Extended ACEs Squared (b_5)	**-0.04 (0.02)**	-0.19	**.035**	-0.003 (0.003)	-0.09	.367
Response Surface Tests						
$a_1 = (b_1 + b_2)$ – Slope along line of congruence	-0.09 (0.18)		.615	0.03 (0.03)		.277
$a_2 = (b_3 + b_4 + b_5)$ – Curvature along line of congruence	**-0.08 (0.02)**		**.000**	0.00 (0.00)		.686
$a_3 = (b_1 - b_2)$ – Slope along line of incongruence	**0.66 (0.29)**		**.025**	**0.13 (0.05)**		**.016**
$a_4 = (b_3 - b_4 + b_5)$ – Curvature along line of incongruence	-0.03 (0.05)		.568	0.01 (0.01)		.314

Note. The symptoms of depression analysis n = 956 and the substance use analysis n = 807.
*** $p < .001$.

Figure 7. *Symptoms of Depression as Predicted by Caregiver-Youth Discrepancy in Reports of Adolescents' Exposure to Extended ACEs*
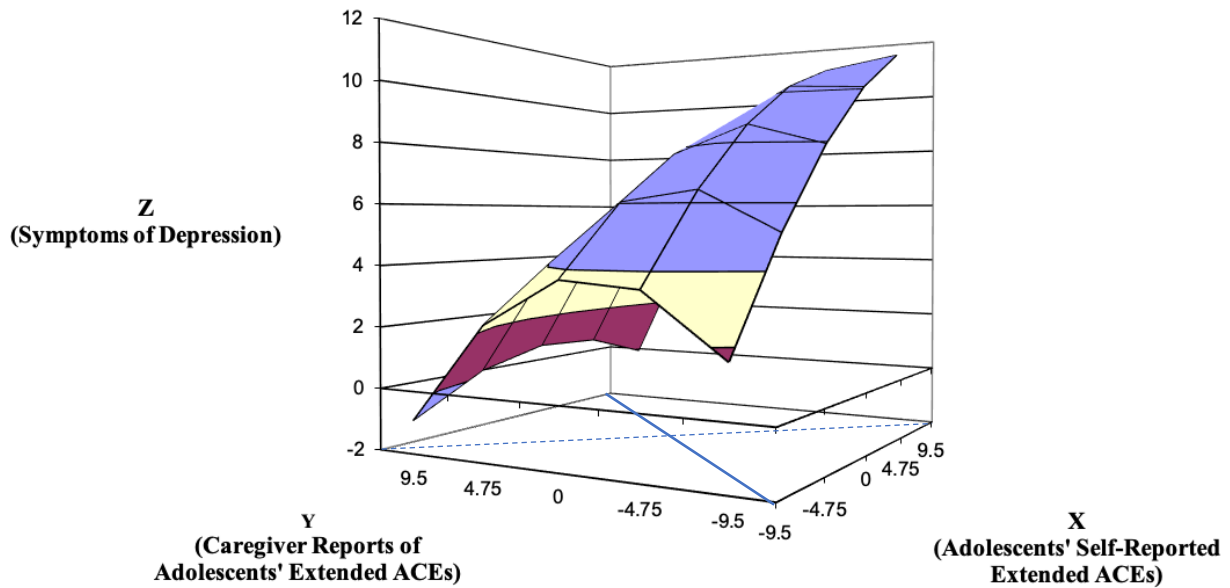
Note. Polynomial regression with response surface analysis results showing the relationship between the discrepancy of adolescent-reported (*X*) and caregiver-reported (*Y*) extended ACEs scores and adolescents' depression symptoms (*Z*). The solid line along the horizontal plane at the bottom of the figure represents the line of perfect agreement, while the dotted line represents the line of incongruence.

Figure 8. *Substance Use as Predicted by Caregiver-Youth Discrepancy in Reports of Adolescents' Exposure to Extended ACEs*
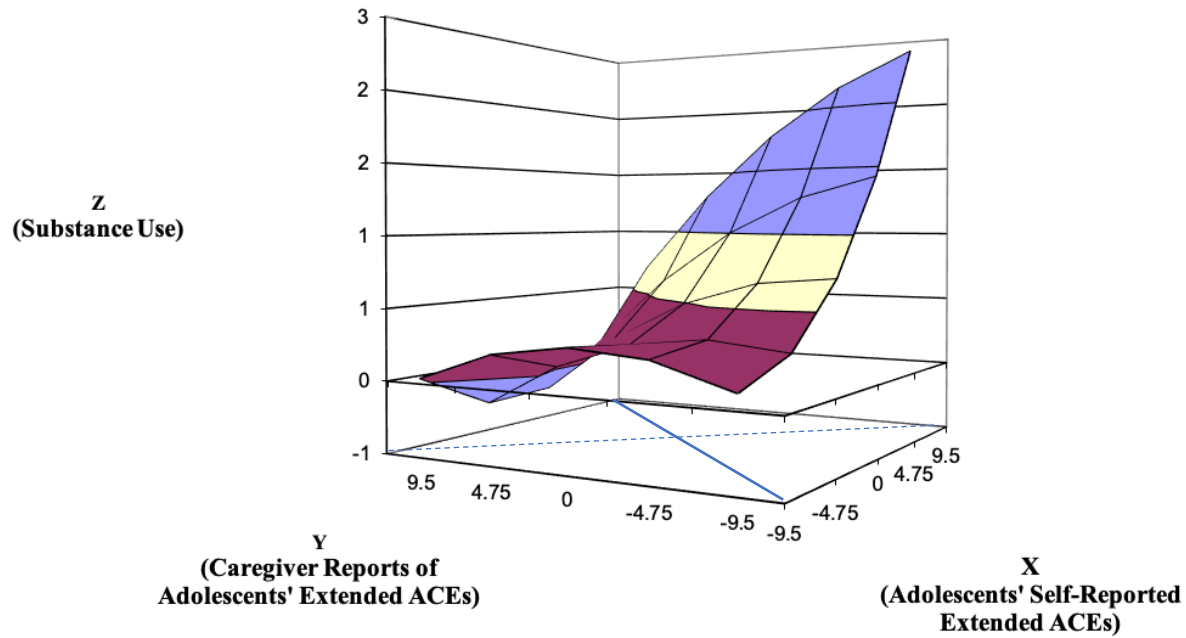
Note. Polynomial regression with response surface analysis results showing the relationship between the discrepancy of adolescent-reported (*X*) and caregiver-reported (*Y*) extended ACEs scores and adolescents' use of substances (*Z*). The solid line along the horizontal plane at the bottom of the figure represents the line of perfect agreement, while the dotted line represents the line of incongruence.

CHAPTER 7: DISCUSSION

Despite increasing support for expanding the conceptualization of adverse childhood experiences (ACEs), few studies have explored the concurrent impact of extended ACEs on adolescent mental health. In order to address several gaps within the extant literature and contribute to the knowledge base from ACEs research with youth, the current study aimed to 1) measure adolescents' self-reported and caregiver-reported exposure to extended ACEs; 2) examine whether the association between extended ACEs and adolescents' symptoms of depression and substance use varied depending on who reported adolescents' extended ACE exposure; and 3) evaluate whether caregiver-youth discrepancy in adolescents' exposure to extended ACEs related to a difference in adolescent-reported symptoms of depression and substance use.

As predicted, the number of extended ACEs adolescents self-reported exceeded the number of extended ACEs caregivers reported for their adolescent. While not surprising, this finding suggests that adolescents may not always disclose their experiences – specifically those occurring outside of the home – to their caregivers. Consistent with the broader literature evaluating the use of multiple informants when assessing adolescents' adverse experiences (e.g., Lewis et al., 2012; Oransky et al., 2013; Stover et al., 2010; Zimmerman & Farrell, 2013), this finding also underscores the clinical and empirical limitation of relying on caregiver reports alone. That is, when developmentally and contextually appropriate, efforts should be made to collect information from both adolescents and their caregivers in order to obtain a more comprehensive understanding of youths' experiences (Oh et al., 2018), especially as they relate to extended ACEs and to how adolescents may internalize these experiences (including symptoms related to anxiety and depression).

In support of the study's hypotheses, both adolescent-reported (Hypothesis 2.1) and caregiver-reported (Hypothesis 2.3) extended ACEs were moderately associated with adolescents' symptoms of depression. Similarly, adolescent-reported (Hypothesis 2.2) and caregiver-reported (Hypothesis 2.4) extended ACEs were associated with adolescents' substance use. When adolescents experienced a greater number of extended ACEs, they tended to endorse higher levels of depressive symptoms and substance use. Notably, even though caregivers reported fewer extended ACEs than adolescents self-reported, these findings align with previous research suggesting that exposure to adversity during this developmental period further heightens individuals' susceptibility to psychopathology (Kim et al., 2021; Lee et al., 2020; Lew & Xiang, 2019), using substances (Dube et al., 2006; Duke et al., 2018; Forster et al., 2017), or both (Bomysoad & Francis, 2020; Brockie et al., 2015; Meeker et al., 2021).

Of particular salience, adolescent-reported extended ACE scores were a stronger predictor of adolescents' depressive symptoms than caregiver reports. While contributing to the growing body of evidence emphasizing the clinical and empirical utility of collecting reports from multiple informants, these findings highlight a key limitation of the extant literature: Reliance on caregiver reports of adolescents' ACE exposure to serve as a proxy for adolescents' self-reported exposure. Although relying solely on caregiver reports is more developmentally appropriate for younger children (Bethell, Carle, et al., 2017), failing to measure adolescents' extended ACEs directly from adolescents potentially limits our understanding of the unique experiences and the important nuances contributing to these youths' mental health outcomes. This concern is especially relevant for the adolescent sample in the present study, given that these youth predominately come from ethnic and racial minority groups and backgrounds characterized by low socioeconomic status. That is, their sociocultural positions within the larger

ecological system may relate meaningfully to diverse adversities and present additional disruptions to their developmental trajectories (Duncan et al., 2017; García Coll et al., 1996; Luthar, 1999; National Academies of Sciences, Engineering, and Medicine, 2019), further exacerbating these youths' risk for negative mental health outcomes. Therefore, particularly in regard to internalizing symptoms which may not be readily observable to caregivers (e.g., some symptoms of depression and anxiety), it appears that collecting self-reports of extended ACEs, in addition to caregiver reports, may better identify the adolescents who could benefit from receiving preventive or therapeutic interventions, in turn mitigating their risk for developing psychopathology (Mills et al., 2020).

Contrary to expectations, adolescent-reported extended ACE scores were not a stronger predictor of adolescents' substance use than caregiver reports. One possible explanation for this finding is the age of adolescents in the current sample. Given that adolescents were on average 15 years old, it is possible that these youths did not have the means to obtain or engage with substances. Because some substance use may be more easily observable to caregivers than some internalizing symptoms (e.g., depressive symptoms), it is possible that caregivers were more aware of their adolescents' substance use behavior and as a result intervened (e.g., eliminated youths' access to substances in the home). Another possible explanation for this finding is the role that protective factors play in the associations between ACEs and youth mental health outcomes. This is, it may be that adolescents in the current sample had strong relationships with an adult figure, such as a coach, mentor, or teacher. For example, prior research findings indicate that the prevalence of youth substance use decreased when adolescents had supportive relationships with a trusted adult (Bellis et al., 2017; Shin et al., 2019). Moreover, youth involved in the child welfare system also showed less engagement with substances when more

positive adult relationships were present (Brown & Shillington, 2017). Although examining the role of potential protective factors (such as a strong connection with a warm, caring, supportive adult) was beyond the scope of the present study, supportive adult relationships appear to buffer the relationship between adolescents' exposure to adversity and their use of substances, having a prosocial impact on these youths (Brown & Shillington, 2017).

Furthermore, findings only partially supported the hypothesized relationships between caregiver-youth discrepancy and adolescents' symptoms of depression and substance use. Consistent with research examining the impact of caregiver-youth discrepancy in reports of youths' exposure to trauma (Oransky et al., 2013) and community violence (Zimmerman & Farrell, 2013), when adolescents reported more extended ACEs than their caregivers, they endorsed higher levels of depression and substance use. However, contrary to expectations, the degree of the caregiver-youth discrepancy did not significantly predict a change in either outcome of interest. Put another way, adolescents did not acknowledge higher levels of depression or substance use, even as the difference between reported extended ACEs increased. Although the direction of the discrepancy mattered, the magnitude of the discrepancy did not. While not explicitly examined by the current effort, these findings may be attributed to various protective factors present within these youths' ecology. Though not exhaustive, examples of relevant protective factors that may be buffering the impact of extended ACEs on adolescents' depressive symptoms and problematic substance use include the following: internal assets and resources, such as a sense of belonging, positive self-esteem, strong beliefs, motivation, cognitive control, and healthy coping strategies; supportive relationships, such as those with family members, mentors, peers, and teachers; and community assets and resources, such as neighborhood social networks, access to quality pediatric health and mental health services, and

high quality education (Narayan, 2023). With respect to the contextual parameters of extended ACEs, it is also possible that additional protective factors relevant to the current sample include predictability within the home and positive parenting from a safe and involved caregiver (Narayan, 2023).

Relatedly, given that adolescents in the sample may have experienced adversity outside of the home, another explanation for these findings is that these experiences were unknown to caregivers, as supported by Hypothesis 1 findings. Among ethnic and racial minority youth, certain extended ACEs are more prevalent than others (Giovanelli & Reynolds, 2021; Kirsch & Lippard, 2022) and are shown to exacerbate these youths' overall health and well-being (Martin-Gutierrez et al., 2021; Pearlin et al., 2005). Experiences of discrimination and racism are shown to associate with adolescents' depression (Brody et al., 2006; Lewis et al., 2015; Williams, 2018), while bullying, peer victimization (Hicks et al., 2022), and race-specific adversity (e.g., historical loss; Brockie et al., 2015) are shown to relate with both depressive symptoms and substance use. Taken together, these findings suggest that the impact of extended ACEs on depressive symptoms and substance use in adolescents may be affected by protective factors or influenced by factors outside of the caregiver-youth relationship.

Findings also revealed that adolescents endorsed higher levels of depression symptoms when adolescent-reported and caregiver-reported extended ACEs matched at midrange levels, but not when scores were in agreement at more extreme levels. That is, when dyads agreed that adolescents had experienced a moderate level of extended ACEs, adolescents presented with more depressive symptoms than when dyads agreed at extreme levels of exposure. Although this was unexpected, this finding may reflect the developmental timing of exposure and to the quality of the caregiver-adolescent relationship.

With respect to developmental timing, Turner and colleagues (2020) found that certain extended ACE exposures were stronger predictors of trauma symptoms for older children and youth (10-17 years old) than for younger children (2-9 years old), and vice versa. For example, exposure to community violence and experiencing peer victimization and interpersonal loss (e.g., someone close to the child was seriously ill or attempted suicide) had a stronger impact on older children. For younger children, stronger predictors of trauma symptoms consisted of extended ACEs relating to the family, such as removal from the home, economic stressors, and parent mental health. Of salience, several extended ACEs strongly affected both groups of children, including physical abuse, emotional abuse, sexual assault, and witnessing domestic violence (Turner et al., 2020). Therefore, given that adolescents in the present study endorsed more depressive symptoms at a moderate level of extended ACE exposure, it is possible that the developmental timing of these youths' exposure affected this relationship.

Another possible explanation for the current finding is the quality of the caregiver-adolescent relationship. Despite shifts in family relationships during adolescence, having a close bond with caregivers – one characterized by warmth, comfort, and availability of caregivers when needed (Chen et al., 2017) – may serve as a protective factor, buffering adolescents from the negative mental health outcomes associated with adversity and supporting more positive developmental trajectories (Olson et al., 2023; Webster, 2022). As such, it is reasonable to postulate that caregiver-youth agreement in adolescents' exposure to extended ACEs serves as a proxy for the quality of the caregiver-adolescent relationship (Gribble et al., 1993). While beyond the scope of the present study, this may be a meaningful area for future investigation. Furthermore, even though results demonstrated support for most study hypotheses, several limitations should be noted.

7.1.   Limitations of the Study

The present study is not without limitations. First, the cross-sectional design of the study does not allow for testing or determining causality. As such, the causal nature between the present associations is unknown. In order to accurately evaluate the degree to which adolescent-reported and caregiver-reported extended ACEs predicted adolescent depressive symptoms or substance use, a prospective longitudinal study would have to assess adolescents' self-reported and caregiver reports of adolescents' extended ACEs at an earlier timepoint, followed by measuring adolescents' symptoms of depression and substance use at a later timepoint.

Second, this study used secondary data collected via a community-based, integrated care clinic, as opposed to via a large funded research study. Therefore, the study's overall design included a fairly circumscribed set of variables. While I was able to explore the extended ACEs–symptom relationships, I was unable to explore the role of a host of potentially relevant individual, family, and contextual variables that may be influencing the relationships or outcomes of interest.

Third, although the expanded items on the CYW ACE-Q (Burke Harris & Renschler, 2015) appear to meaningfully augment the conventional items, this was not statistically evaluated. Instead, because scores from each section of the measure (i.e., conventional ACEs and expanded ACEs) are reported, these were combined to create a single *extended* ACE score for the present effort. This approach assumes that the conventional ACE items and the expanded ACE items are measuring the same underlying construct, which may not necessarily be the case. Furthermore, it is important to note that, as stated by Bucci and colleagues (2015), this questionnaire is not a validated diagnostic measure, but rather a clinical screener for assessing youths' cumulative exposure to adverse childhood experiences. As indicated in the user manual,

the questionnaire was designed to help pediatric and family practice settings identify individuals at increased risk for negative health outcomes (e.g., developmental, behavioral, mental, and physical), resulting from prolonged exposure to extreme stress (Bucci et al., 2015, p. 9). In addition, the CYW ACE-Q does not collect item-level responses; respondents are asked to only report the total number of ACE exposures for each section. Given this scoring approach, it was not possible to examine the relationship between individual extended ACEs and adolescents' symptoms of depression and substance use. To evaluate whether the expanded items on this measure enhance our understanding of youths' adversity experiences (both within and outside of the home), it would be necessary for future research efforts to have participants provide item-level responses on the CYW ACE-Q.

Fourth, the CRAFFT, PHQ-2, and PHQ-9 were administered primarily for clinical purposes in a real-world setting and not for a controlled research study. Consequently, the CRAFFT questionnaire was not administered as originally intended or validated. Providers at the integrated care practice did not assess the number of days within the previous 12 months that adolescents used different substances, as instructed in Part A of the CRAFFT (see Appendix C). Instead, providers used this section to record the number of substances used by adolescents in the sample. Moreover, even though responses from Part B of the CRAFFT are used to assess adolescents' substance use behaviors, routine administration of this section was not consistent across providers. As a result, roughly 21% of the sample did not have substance use scores. Of salience, missing data were not unique to the substance use variable. All variables of interest experienced instances of missing data, including: 3.3% for adolescent-reported extended ACEs (as measured by the CYW ACE-Q Teen SR), 12.7% for caregiver-reported extended ACEs (as measured by the CYW ACE-Q Teen), and 5.3% for adolescents' symptoms of depression (as

captured by the PHQ-2 and PHQ-9). Therefore, because the nonstandard administration and the associated missing data may contribute to inaccurate conclusions about the current adolescent sample, findings should be interpreted with caution. In that vein, it is also important to note that the measures in the current study use summed scores; thus, skipping questions would artificially change these sums. Even though I did not have access to the raw data to be able to assess for such issues with precision, missing data across study variables, and potentially at the item level, introduce bias in the results and limit the generalizability of findings.

Finally, although I made a concerted effort to include data from all youth meeting the inclusion criteria, adolescents in DSS custody were removed from the final sample for two main reasons. First, this subpopulation had experienced substantially more extended ACEs ($M = 7.21$, $SD = 4.38$) than their non-DSS counterparts ($M = 2.82$, $SD = 3.05$), significantly skewing the distribution of adolescents' extended ACE exposure such that findings were not representative of the broader sample's adversity experiences. Second, the caregiver respondents for these youth did not parallel the relationships of caregiver respondents in the non-DSS subgroup. While these adolescents were excluded in the present study, they will be included in future investigations. Even though the current findings should be interpreted cautiously given these limitations, the present study highlights several areas needing further consideration and evaluation.

7.2. Implications for Research, Policy, and Practice

While the present analyses necessarily yield an incomplete picture, they underscore the need for comprehensive approaches to understanding and addressing the impact of adverse childhood experiences on adolescent mental health. Supporting the developmental trajectories of ethnically, racially, and socioeconomically diverse youth populations requires collaborative efforts across research, policy, and practice. To advance the ACEs literature, researchers in this

area should consider expanding the definition of ACEs to include experiences beyond the family

of origin, with the objective of capturing the range of significant contextual adversities

experienced by children and youth in their broader ecologies (e.g., an active shooter at school;

experiences of police brutality; an epidemic or pandemic; forced displacement;

cybervictimization; limited or no access to necessary healthcare, such as mental health services,

abortion, or gender-affirming care). Future researchers may also consider reconceptualizing the

approach to measuring ACE exposure (i.e., the presence or absence of certain experiences; Lacey

& Minnis, 2020) to encompass the nature of the ACE (i.e., type, severity, frequency,

developmental timing, relationship to perpetrator, and direct/indirect exposure; Matjasko et al.,

2022; Smith & Pollak, 2021).

Furthermore, given that conditions across all levels of the ecological system may

contribute to adolescents' exposure to ACEs, there may be value in examining ACEs and their

potential effects from an integrative transactional model of development. That is, it is reasonable

to postulate that the associations between adolescents' exposure to extended ACEs and negative

mental health outcomes, such as symptoms of depression and substance use, are contingent upon

transactions between the following: the nature of the ACE (i.e., type, severity, frequency,

developmental timing, relationship to perpetrator, direct/indirect exposure); individual-level

factors of the adolescent (e.g., developmental domains; Cicchetti & Toth, 1993; the unique

factors contributing to social position; García Coll et al., 1996); and aspects of the social and

physical environment (e.g., contextual factors; Cicchetti & Toth, 1993; social stratification

mechanisms; García Coll et al., 1996). As such, researchers may also consider developing

measures designed to capture the unique circumstances and experiences of adolescents with

marginalized identities as one method of supporting the developmental trajectories of ethnically,

racially, and socioeconomically diverse youth populations. Such efforts have the opportunity to amplify marginalized voices by allowing these youths' stories to be incorporated into the broader social narrative and, in turn, highlighting the individual, relational, and contextual factors that place these youths at even greater risk for developing negative mental health outcomes. In addition, viewing the ecological system from an integrative and transactional lens of development may facilitate the development of targeted policies and guide implementation of practical intervention and prevention efforts, geared towards decreasing the prevalence of extended ACEs and their impact on youth mental health.

Since extended ACEs occur across multiple levels of youths' ecologies, solutions that address these multiple levels are needed. Consistent with the study's guiding theory, efforts to reduce adolescents' exposure to ACEs across ecological levels and steps to strengthen and stabilize youth and their families are crucial. For instance, a focus on youths' broader ecologies may improve and increase accessible resources in the environment that better support the needs of youth and their families (McLaughlin, 2016), such as implementing policies that reduce some of the major stressors in adolescents' key settings (e.g., schools, neighborhoods, communities) as well as financial stressors for their families. The present study underscores how contextual adversities affecting families can carry negative consequences for adolescent mental health outcomes, further emphasizing the importance of addressing systemic factors in intervention and prevention efforts. Potential opportunities targeting the proximal level include strengthening economic supports for families, such as financial security and family-friendly work policies (Centers for Disease Control and Prevention [CDC], 2019; Metzler et al., 2017). Affording families – especially those belonging to ethnic and racial minority groups similar to the majority of the present sample – the resources to secure financial stability, while simultaneously

supporting caregivers' work-life balance, may safeguard adolescents' developmental trajectories (Klevens et al., 2016, 2017). That is, considering exposure to ACEs is more prevalent for ethnic and racial minority groups (Mersky et al., 2021), bolstering a caregiver's ability to provide life's basic necessities, afford safe and consistent childcare, and balance responsibilities at home and at work may reduce the caregiver and family's financially-related stressors, and otherwise stress exposure, and significantly reduce an adolescent's risk for short- and long-term health consequences (Merrick et al., 2020). This is of particular salience given that individuals living under conditions of poverty or in low-income households experience more stressful life events and circumstances (Luthar, 1999).

Consistent with the extended ACEs measure employed by the current study, expanded ACEs typically occur outside of youths' families and at more distal levels. In order to target this level of youths' ecologies, attention should be given to improving the conditions of lower-resourced neighborhoods and communities (Klevens et al., 2015; Merrick et al., 2020) and to promoting and increasing access to trauma-informed, culturally responsive integrated care (Bellis et al., 2019; Piotrowski, 2020). In addition, policymakers should consider developing policies that allocate funding for school-based programs that build children and youths' social-emotional and prosocial skills (Durlak et al., 2022; Greenberg, 2023; Mahoney et al., 2021) and school-based mentorship programs that connect adolescents with caring, supportive adults (Durlak et al., 2010; Herrera et al., 2011; Raposa et al., 2019). Given that ACEs are linked with mental health and other problems, there could be benefit in helping build the resources for children and adolescents to cope and respond to adversity effectively (Cowen, 1994). Similar to those in the current study, adolescents with high exposure to extended ACEs have been shown to

evidence better health outcomes when more distal-level resources (e.g., within schools, neighborhoods, and communities) are available to them (Liu et al., 2020; McCoy et al., 2020).

Furthermore, the present study highlights the benefit of routinely screening adolescents for extended ACEs. Due to an individual's susceptibility to experiencing negative mental health outcomes during this developmental period – and the present work's findings regarding the association between extended ACEs and both depressive symptoms and problematic substance use – administering an extended ACE measure as part of a clinic's regular practice may yield data that can inform preventive strategies or intervention approaches. Healthcare providers working with adolescents, especially ethnic and racial minority youth from lower socioeconomic backgrounds, should be equipped with the necessary tools and resources to effectively recognize and respond to these experiences. For example, implementing trauma-informed practices (Bargemen et al., 2021) within integrated care settings may offer youth who have been exposed to extended ACEs with a safe, supportive, and empathic environment. Rather than decontextualizing youths' extended ACE exposures, trauma-informed practices acknowledge adolescents' unique cultural, racial, and socioeconomic contexts within the broader ecological system (Grummitt et al., 2022). By doing so, this inclusive approach may help providers tailor interventions to the specific needs of different youth and their families, while also aiming to prevent further exposure to extended ACEs.

7.3.   Contributions

A primary strength of the current study was that it examined extended ACEs and their potential linkages with depressive symptoms and problematic substance use in a large, diverse sample of adolescents, which addressed a pertinent gap in the extant literature on extended ACEs. Given the amount of data collected across four years, the number of adolescents included

in the sample yielded sufficient power to test all of the proposed models. This was particularly salient when conducting the polynomial regression with response surface analyses, due to the percentage of discrepant values required to warrant further examination using this technique (i.e., roughly 10% or more of the sample; Shanock et al., 2010). In addition, the scientific rigor of this analytic approach and its use to explore the postulated hypotheses identified a possible proxy for the quality of the caregiver-adolescent relationship (i.e., caregiver-youth agreement in adolescents' extended ACE exposure), which future researchers may wish to investigate. Evidenced by the extant literature, previous studies assessing similar questions employed a variety of analytic approaches, including: paired *t*-tests and multiple regression analyses (Oransky et al., 2013); McNemar's test, Ordinary Least Sequences (OLS) regression, and logistic regression analyses (Lewis et al., 2012); Cohen's kappa (κ), Prevalence-Adjusted Bias-Adjusted Kappa (PABAK), and Pearson correlations (Stover et al., 2010); and two-level hierarchical linear regression and two-level Poisson models with overdispersion analyses (Zimmerman & Farrell, 2013). To the best of my knowledge, this study represents the first ACEs study to use polynomial regression with response surface analysis to examine caregiver-youth discrepancy in the association between adolescents' extended ACEs and symptoms of depression and substance use, providing valuable insight into the interactions and non-linear relationships of these associations.

Another strength of this work was that the majority of adolescents in the sample attended their integrated care appointments with caregivers who could reasonably report on the adolescent's exposure to extended ACEs (87.3%). As such, the current effort was able to use multiple informants in the measure of adolescents' exposure to extended ACEs and their symptoms of depression and substance use. Furthermore, the present study employed an ACEs

measure – albeit a non-validated one – that assesses conventional and expanded ACEs (CYW ACE-Q; Burke Harris & Renschler, 2015), adding to the growing body of literature examining adversities beyond those originally identified by Felitti and colleagues (1998).

Taken together, findings from the present study suggest that not every adolescent exposed to extended adverse childhood experiences will endorse symptoms of depression and substance use. Given the sociocultural positions of these youth within the broader ecological system, it is imperative for future researchers to reconceptualize the approach to measuring extended ACEs in order to encompass the adverse experiences of adolescents belonging to ethnic and racial minority groups and representing backgrounds characterized by low socioeconomic status. Only then can studies yield findings that adequately inform 1) culturally and developmentally appropriate interventions across all levels of the socioecological system and 2) multifaceted approaches to prevention.

REFERENCES

Adams, Z. W., Moreland, A., Cohen, J. R., Lee, R. C., Hanson, R. F., Danielson, C. K., Self-Brown, S., & Briggs, E. C. (2016). Polyvictimization: Latent profiles and mental health outcomes in a clinical sample of adolescents. *Psychology of Violence*, *6*(1), 145-155. https://doi.org/10.1037/a0039713

Afifi, T. O., Taillieu, T., Salmon, S., Davila, I. G., Stewart-Tufescu, A., Fortier, J., Struck, S., Asmundson, G. J. G., Sareen, J., & MacMillan, H. L. (2020). Adverse childhood experiences (ACES), peer victimization, and substance use among adolescents. *Child Abuse & Neglect*, *106*, 104504. https://doi.org/10.1016/j.chiabu.2020.104504

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage Publications.

American Academy of Pediatrics. (2021, October 19). *AAP-AACAP-CHA declaration of a national emergency in child and adolescent mental health.* https://www.aap.org/en/advocacy/child-and-adolescent-healthy-mental-development/aap-aacap-cha-declaration-of-a-national-emergency-in-child-and-adolescent-mental-health/

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). https://doi.org/10.1176/appi.books.9780890425787

Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. G., Williamson, D. F., & Giovino, G. A. (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *Journal of the American Medical Association, 282*(17), 1652-1658. https://doi.org/10.1001/jama.282.17.1652

Avenevoli, S., Swendsen, J., He, J.-P., Burstein, M., & Merikangas, K. R. (2015). Major depression in the National Comorbidity Survey–Adolescent Supplement: Prevalence,

correlates, and treatment. *Journal of the American Academy of Child & Adolescent Psychiatry*, *54*(1), 37-44. https://doi.org/10.1016/j.jaac.2014.10.010

Bai, S., Zeledon, L. R., D'Amico, E. J., Shoptaw, S., Avina, C., LaBorde, A. P., Anderson, M., Fitzpatrick, O. M., & Asarnow, J. R. (2018). Reducing health risk behaviors and improving depression in adolescents: A randomized controlled trial in primary care clinic. *Journal of Pediatric Psychology, 43*(9), 1004-1016. https://doi.org/10.1093/jpepsy/jsy048

Baglivio, M. T., & Epps, N. (2016). The interrelatedness of adverse childhood experiences among high-risk juvenile offenders. *Youth Violence and Juvenile Justice*, *14*(3), 179-198. https://doi.org/10.1177/1541204014566286

Bargeman, M., Smith, S., & Wekerle, C. (2021). Trauma-informed care as a rights-based "Standard of care": A critical review. *Child Abuse & Neglect*, *119*, 104762. https://doi.org/10.1016/j.chiabu.2020.104762

Barra, S., Turner, D., Müller, M., Hertz, P. G., Retz-Junginger, P., Tüscher, O., Huss, M., & Retz, W. (2022). ADHD symptom profiles, intermittent explosive disorder, adverse childhood experiences, and internalizing/externalizing problems in young offenders. *European Archives of Psychiatry and Clinical Neuroscience*, *272*(2), 257-269. https://doi.org/10.1007/s00406-020-01181-4

Barranti, M., Carlson, E. N., & Côté, S. (2017). How to test questions about similarity in personality and social psychology research. *Social Psychological and Personality Science*, *8*(4), 465-475. https://doi.org/10.1177/1948550617698204

Beal, S. J., Wingrove, T., Mara, C. A., Lutz, N., Noll, J. G., & Greiner, M. V. (2019). Childhood adversity and associated psychosocial function in adolescents with complex

trauma. *Child & Youth Care Forum*, *48*(3), 305-322. https://doi.org/10.1007/s10566-018-9479-5

Belcher, H. M., & Shinitzky, H. E. (1998). Substance abuse in children. *Archives of Pediatrics & Adolescent Medicine*, *152*(10), 952-960. https://doi.org/10.1001/archpedi.152.10.952

Bellis, M. A., Hardcastle, K., Ford, K., Hughes, K., Ashton, K., Quigg, Z., & Butler, N. (2017). Does continuous trusted adult support in childhood impart life-course resilience against adverse childhood experiences - A retrospective study on adult health-harming behaviours and mental well-being. *BMC Psychiatry*, *17*(1). https://doi.org/10.1186/s12888-017-1260-z

Bellis, M. A., Hughes, K., Ford, K., Ramos Rodriguez, G., Sethi, D., & Passmore, J. (2019). Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: A systematic review and meta-analysis. *The Lancet Public Health*, *4*(10), e517-e528. https://doi.org/10.1016/s2468-2667(19)30145-8

Bethell, C. D., Carle, A., Hudziak, J., Gombojav, N., Powers, K., Wade, R., & Braveman, P. (2017). Methods to assess adverse childhood experiences of children and families: Toward approaches to promote child well-being in policy and practice. *Academic Pediatrics*, *17*(7), S51-S69. https://doi.org/10.1016/j.acap.2017.04.161

Bethell, C. D., Davis, M. B., Gombojav, N., Stumbo, S., & Powers, K. (2017). *A national and across-state profile on adverse childhood experiences among U.S. children and possibilities to heal and thrive* [Issue Brief]. Child and Adolescent Health Measurement Initiative. https://www.cahmi.org/docs/default-source/resources/issue-brief-a-national-and-across-state-profile-on-adverse-childhood-experiences-among-children-and-possibilities-to-heal-and-thrive-(2017).pdf?sfvrsn=18ba657f_0

Blum, R. W., Li, M., & Naranjo-Rivera, G. (2019). Measuring adverse child experiences among young adolescents globally: Relationships with depressive symptoms and violence perpetration. *Journal of Adolescent Health, 65*, 86-93. https://doi.org/10.1016/j.jadohealth.2019.01.020

Bomysoad, R. N., & Francis, L. A. (2020). Adverse childhood experiences and mental health conditions among adolescents. *Journal of Adolescent Health, 67*(6), 868-870. https://doi.org/10.1016/j.jadohealth.2020.04.013

Bornstein, M. H., Jager, J., & Steinberg, L. D. (2012). Adolescents, parents, friends/peers: A relationships model. In R. M. Lerner, M. A. Easterbrooks, J. Mistry, & I. B. Weiner (Eds.), *Handbook of psychology: Volume 6. Developmental psychology* (2nd ed., pp. 393-433). John Wiley & Sons.

Bounds, D., Leland, N., & Amar, A. F. (2021). Child and adolescent victims of trauma. In E. L. Yearwood, G. S. Pearson, & J. A. Newland (Eds.), *Child and adolescent behavioral health: A resource for advanced practice psychiatric and primary care practitioners in nursing* (pp. 425-443). John Wiley & Sons. http://dx.doi.org/10.1002/9781119487593.ch24

Brockie, T. N., Sacco-Dana, G., Wallen, G. R., Wilcox, H. C., & Campbell, J. C. (2015). The relationship of adverse childhood experiences to PTSD, depression, poly-drug use and suicide attempt in reservation-based Native American adolescents and young adults. *American Journal of Community Psychology, 55*(3-4), 411-421. https://doi.org/10.1007/s10464-015-9721-3

Broderick, P. C., & Blewitt, P. (2014). *The life span: Human development for helping professionals* (4th ed.). Pearson.

Brody, G. H., Chen, Y., Murry, V. M., Ge, X., Simons, R. L., Gibbons, F. X., Gerrard, M., & Cutrona, C. E. (2006). Perceived discrimination and the adjustment of African American youths: A five-year longitudinal analysis with contextual moderation effects. *Child Development*, *77*(5), 1170-1189. https://doi.org/10.1111/j.1467-8624.2006.00927.x

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513-531. https://doi.org/10.1037/0003-066x.32.7.513

Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard University Press.

Brown, S. M., & Shillington, A. M. (2017). Childhood adversity and the risk of substance use and delinquency: The role of protective adult relationships. *Child Abuse & Neglect*, *63*, 211-221. https://doi.org/10.1016/j.chiabu.2016.11.006

Browne, A., & Finkelhor, D. (1986). Impact of child sexual abuse: A review of the research. *Psychological Bulletin*, *99*(1), 66-77. https://doi.org/10.1037/0033-2909.99.1.66

Brownlie, E., Beitchman, J. H., Chaim, G., Wolfe, D. A., Rush, B., & Henderson, J. (2019). Early adolescent substance use and mental health problems and service utilization in a school-based sample. *The Canadian Journal of Psychiatry*, *64*(2), 116-125. https://doi.org/10.1177/0706743718784935

Bucci, M., Gutiérrez Wang, L., Koita, K., Purewal, S., Silvério Marques, S., & Burke Harris, N. (2015). *Center for Youth Wellness ACE-Questionnaire user guide for health professionals*. Center for Youth Wellness.

Bugbee, B. A., Beck, K. H., Fryer, C. S., & Arria, A. M. (2019). Substance use, academic performance, and academic engagement among high school seniors. *Journal of School Health*, *89*(2), 145-156. https://doi.org/10.1111/josh.12723

Burke Harris, N., & Renschler, T. (2015). *Center for Youth Wellness ACE-Questionnaire (CYW ACE-Q Teen, Teen SR)*. Center for Youth Wellness.

Cairns, K. E., Yap, M. B. H., Pilkington, P. D., & Jorm, A. F. (2014). Risk and protective factors for depression that adolescents can modify: A systematic review and meta-analysis of longitudinal studies. *Journal of Affective Disorders, 169*, 61-75. https://doi.org/10.1016/j.jad.2014.08.006

Centers for Disease Control and Prevention. (2019). *Adverse childhood experiences (ACEs) prevention resource for action: A compilation of the best available evidence*. Division of Violence Prevention, National Center for Injury Prevention and Control. https://www.cdc.gov/violenceprevention/pdf/ACEs-Prevention-Resource_508.pdf

Chatterjee, D., McMorris, B., Gower, A. L., Forster, M., Borowsky, I. W., & Eisenberg, M. E. (2018). Adverse childhood experiences and early initiation of marijuana and alcohol use: The potential moderating effects of internal assets. *Substance Use & Misuse*, *53*(10), 1624-1632. https://doi.org/10.1080/10826084.2017.1421224

Chen, E., Brody, G. H., & Miller, G. E. (2017). Childhood close family relationships and health. *American Psychologist*, *72*(6), 555-566. https://doi.org/10.1037/amp0000067

Cicchetti, D., & Rogosch, F. A. (2002). A developmental psychopathology perspective on adolescence. *Journal of Consulting and Clinical Psychology*, *70*(1), 6-20. https://doi.org/10.1037/0022-006x.70.1.6

Cicchetti, D., & Toth, S. L. (1997). Transactional ecological systems in developmental psychopathology. In S. S. Luthar, J. A. Burack, D. Cicchetti, & J. R. Weisz (Eds.), *Developmental psychopathology: Perspectives on adjustment, risk, and disorder* (pp. 317-349). Cambridge University Press.

Cicchetti, D., & Toth, S. L. (1998). The development of depression in children and

    adolescents. *American Psychologist*, *53*(2), 221-241. https://doi.org/10.1037/0003-

    066x.53.2.221

Cohen, P., Brown, J., & Smailes, E. (2001). Child abuse and neglect and the development of

    mental disorders in the general population. *Development and Psychopathology*, *13*(4),

    981-999. https://doi.org/10.1017/s0954579401004126

Cowen, E. L. (1994). The enhancement of psychological wellness: Challenges and

    opportunities. *American Journal of Community Psychology*, *22*(2), 149-179.

    https://doi.org/10.1007/bf02506861

Craig, J. M., Zettler, H. R., Wolff, K. T., & Baglivio, M. T. (2019). Considering the mediating

    effects of drug and alcohol use, mental health, and their co-occurrence on the adverse

    childhood experiences–recidivism relationship. *Youth Violence and Juvenile*

    Justice, *17*(3), 219-240. https://doi.org/10.1177/1541204018796910

Cronholm, P. F., Forke, C. M., Wade, R., Bair-Merritt, M. H., Davis, M., Harkins-Schwartz, M.,

    & Pachter, L. M. (2015). Adverse childhood experiences: Expanding the concept of

    adversity. *American Journal of Preventive Medicine, 49*(3), 354-361.

    https://doi.org/10.1016/j.amepre.2015.02.001

De Bellis, M. D. (2005). The psychobiology of neglect. *Child Maltreatment*, *10*(2), 150-172.

    https://doi.org/10.1177/1077559505275116

de Vasconcelos, N. M., Ribeiro, M., Reis, D., Couto, I., Sena, C., Botelho, A. C., Bonavides, D.,

    Hemanny, C., Seixas, C., Zeni, C. P., & de Oliveira, I. R. (2020). Life satisfaction

    mediates the association between childhood maltreatment and depressive symptoms: A

study in a sample of Brazilian adolescents. *Brazilian Journal of Psychiatry, 42*(3), 250-257. https://doi.org/10.1590/1516-4446-2019-0535

Dube, S. R., Miller, J. W., Brown, D. W., Giles, W. H., Felitti, V. J., Dong, M., & Anda, R. F. (2006). Adverse childhood experiences and the association with ever using alcohol and initiating alcohol use during adolescence. *Journal of Adolescent Health*, *38*(4), 444.e1-444.e10. https://doi.org/10.1016/j.jadohealth.2005.06.006

Duke, N. N. (2018). Adolescent adversity and concurrent tobacco, alcohol, and marijuana use. *American Journal of Health Behavior*, *42*(5), 85-99. https://doi.org/10.5993/ajhb.42.5.8

Duncan, G. J., Magnuson, K., & Votruba-Drzal, E. (2017). Moving beyond correlations in assessing the consequences of poverty. *Annual Review of Psychology*, *68*(1), 413-434. https://doi.org/10.1146/annurev-psych-010416-044224

Durlak, J. A., Mahoney, J. L., & Boyle, A. E. (2022). What we know, and what we need to find out about universal, school-based social and emotional learning programs for children and adolescents: A review of meta-analyses and directions for future research. *Psychological Bulletin*, *148*(11-12), 765-782. https://doi.org/10.1037/bul0000383

Durlak, J. A., Weissberg, R. P., & Pachan, M. (2010). A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. *American Journal of Community Psychology*, *45*(3-4), 294-309. https://doi.org/10.1007/s10464-010-9300-6

Edwards, J. R. (1994). The study of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Processes*, *58*(1), 51-100. https://doi.org/10.1006/obhd.1994.1029

Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: Results from the adverse childhood experiences study. *American Journal of Psychiatry,* *160*(8), 1453-1460. https://doi.org/10.1176/appi.ajp.160.8.1453

Edwards, J. R., & Parry, M. E. (1993). On the use of polynomial regression equations as an alternative to difference scores in organizational research. *Academy of Management Journal*, *36*(6), 1577-1613. https://doi.org/10.5465/256822

Elmore, A. L., & Crouch, E. (2020). The association of adverse childhood experiences with anxiety and depression for children and youth, 8 to 17 years of age. *Academic Pediatrics*, *20*(5), 600-608. https://doi.org/10.1016/j.acap.2020.02.012

Fagan, A. A., & Novak, A. (2018). Adverse childhood experiences and adolescent delinquency in a high-risk sample: A comparison of white and black youth. *Youth Violence and Juvenile Justice, 16*(4), 395-417. https://doi.org/10.1177%2F1541204017735568

Fairbank, J. A., & Fairbank, D. W. (2009). Epidemiology of child traumatic stress. *Current Psychiatry Reports*, *11*(4), 289-295. https://doi.org/10.1007/s11920-009-0042-9

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical Power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149-1160. https://doi.org/10.3758/brm.41.4.1149

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction

to many of the leading causes of death in adults. *American Journal of Preventive*

    Medicine, *14*(4), 245-258. https://doi.org/10.1016/s0749-3797(98)00017-8

Fergusson, D. M., Horwood, L. J., Ridder, E. M., & Beautrais, A. L. (2005). Subthreshold

    depression in adolescence and mental health outcomes in adulthood. *Archives of General*

    Psychiatry, *62*(1), 66-72. https://doi.org/10.1001/archpsyc.62.1.66

Finkelhor, D. (1995). The victimization of children: A developmental perspective. *American*

    Journal of Orthopsychiatry, *65*(2), 177-193. https://doi.org/10.1037/h0079618

Finkelhor, D., Shattuck, A., Turner, H., & Hamby, S. (2013). Improving the adverse childhood

    experiences study scale. *JAMA Pediatrics*, *167*(1), 70-75.

    https://doi.org/10.1001/jamapediatrics.2013.420

Folk, J. B., Ramos, L. M. C., Bath, E. P., Rosen, B., Marshall, B. D. L., Kemp, K., Brown, L.,

    Conrad, S., & Tolou-Shams, M. (2021). The prospective impact of adverse childhood

    experiences on justice-involved youth's psychiatric symptoms and substance use. *Journal*

    of Consulting and Clinical Psychology, 89(6), 483-498.

    https://doi.apa.org/doi/10.1037/ccp0000655

Forster, M., Gower, A. L., Borowsky, I. W., & McMorris, B. J. (2017). Associations between

    adverse childhood experiences, student-teacher relationships, and non-medical use of

    prescription medications among adolescents. *Addictive Behaviors*, *68*, 30-34.

    https://doi.org/10.1016/j.addbeh.2017.01.004

Garber, J., & Rao, U. (2014). Depression in children and adolescents. In M. Lewis & K. D.

    Rudolph (Eds.), *Handbook of developmental psychopathology* (pp. 489-520). Springer.

    https://psycnet.apa.org/doi/10.1007/978-1-4614-9608-3_25

García Coll, C., Crnic, K., Lamberty, G., Wasik, B. H., Jenkins, R., García, H. V., & McAdoo, H. P. (1996). An integrative model for the study of developmental competencies in minority children. *Child Development*, *67*(5), 1891-1914. https://doi.org/10.1111/j.1467-8624.1996.tb01834.x

Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, *373*(9657), 68-81. https://doi.org/10.1016/s0140-6736(08)61706-7

Giovanelli, A., & Reynolds, A. J. (2021). Adverse childhood experiences in a low-income black cohort: The importance of context. *Preventive Medicine*, *148*, 106557. https://doi.org/10.1016/j.ypmed.2021.106557

Goodman, K. L., De Los Reyes, A., & Bradshaw, C. P. (2010). Understanding and using informants' reporting discrepancies of youth victimization: A conceptual model and recommendations for research. *Clinical Child and Family Psychology Review*, *13*(4), 366-383. https://doi.org/10.1007/s10567-010-0076-x

Graham, J. W., Cumsille, P. E., & Shevock, A. E. (2012). Methods for handling missing data. In J. A. Schinka, W. F. Velicer, & I. B. Weiner (Eds.), *Handbook of psychology: Volume 2. Research methods in psychology* (2nd ed., pp. 109-141). John Wiley & Sons.

Greenberg, M. T. (2023). *Evidence for social and emotional learning in schools*. Learning Policy Institute. https://doi.org/10.54300/928.269

Gribble, P. A., Cowen, E. L., Wyman, P. A., Work, W. C., Wannon, M., & Raoof, A. (1993). Parent and child views of parent-child relationship qualities and resilient outcomes among urban children. *Journal of Child Psychology and Psychiatry*, *34*(4), 507-519. https://doi.org/10.1111/j.1469-7610.1993.tb01032.x

Grummitt, L., Barrett, E., Kelly, E., & Newton, N. (2022). An umbrella review of the links

    between adverse childhood experiences and substance misuse: What, why, and where do

    we go from here? *Substance Abuse and Rehabilitation*, *13*, 83-100.

    https://doi.org/10.2147/sar.s341818

Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood

    experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry*, *45*(2),

    260-273. https://doi.org/10.1111/j.1469-7610.2004.00218.x

Hawkins, J. D., Graham, J. W., Maguin, E., Abbott, R., Hill, K. G., & Catalano, R. F. (1997).

    Exploring the effects of age of alcohol use initiation and psychosocial risk factors on

    subsequent alcohol misuse. *Journal of Studies on Alcohol*, *58*(3), 280-290.

    https://doi.org/10.15288/jsa.1997.58.280

Hedgegaard, H., Curtin, S. C., & Warner, M. (2021). *Suicide mortality in the United States,*

    1999-2019 (NCHS Data Brief No. 398). Centers for Disease Control and Prevention.

    https://www.cdc.gov/nchs/data/databriefs/db398-H.pdf

Herrera, C., Grossman, J. B., Kauh, T. J., & McMaken, J. (2011). Mentoring in schools: An

    impact study of big brothers big sisters school-based mentoring. *Child*

    Development, *82*(1), 346-361. https://doi.org/10.1111/j.1467-8624.2010.01559.x

Hicks, M. R., Kernsmith, P., & Smith-Darden, J. (2021). The effects of adverse childhood

    experiences on internalizing and externalizing behaviors among Black children and

    youth. *Journal of Child & Adolescent Trauma*, *14*(1), 115-122.

    https://doi.org/10.1007/s40653-020-00316-y

Holmbeck, G. N., & Kendall, P. C. (2002). Introduction to the special section on clinical

    adolescent psychology: Developmental psychopathology and treatment. *Journal of*

    Consulting and Clinical Psychology, *70*(1), 3-5. https://doi.org/10.1037/0022-006x.70.1.3

Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., &

    Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A

    systematic review and meta-analysis. *The Lancet Public Health*, *2*(8), e356-366.

    https://doi.org/10.1016/s2468-2667(17)30118-4

Johnson, J. G., Cohen, P., Gould, M. S., Kasen, S., Brown, J., & Brook, J. S. (2002). Childhood

    adversities, interpersonal difficulties, and risk for suicide attempts during late

    adolescence and early adulthood. *Archives of General Psychiatry*, *59*(8), 741-749.

    https://doi.org/10.1001/archpsyc.59.8.741

Johnson, D., Dupuis, G., Piche, J., Clayborne, Z., & Colman, I. (2018). Adult mental health

    outcomes of adolescent depression: A systematic review. *Depression and Anxiety*, *35*(8),

    700-716. https://doi.org/10.1002/da.22777

Johnston, L. D., Miech, R. A., Patrick, M. E., O'Malley, P. M., Schulenberg, J. E., & Bachman,

    J. G. (2023). *Monitoring the Future national survey results on drug use, 1975-2022:*

    Overview, key findings on adolescent drug use. Institute for Social Research, The

    University of Michigan. https://monitoringthefuture.org/wp-

    content/uploads/2023/01/mtfoverview2022.pdf

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005).

    Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National

    Comorbidity Survey replication. *Archives of General Psychiatry*, *62*(6), 593-602.

    https://doi.org/10.1001/archpsyc.62.6.593

Kilmer, R. P., & Gil-Rivas, V. (2010). Introduction: Attending to ecology. In R. P. Kilmer, V. Gil-Rivas, R. G. Tedeschi, & L. G. Calhoun (Eds.), *Helping families and communities recover from disaster: Lessons learned from Hurricane Katrina and its aftermath* (pp. 3-24). American Psychological Association. https://psycnet.apa.org/doi/10.1037/12054-000

Kim, I., Galván, A., & Kim, N. (2021). Independent and cumulative impacts of adverse childhood experiences on adolescent subgroups of anxiety and depression. *Children and Youth Services Review*, *122*, 105885. https://doi.org/10.1016/j.childyouth.2020.105885

Kirsch, D. E., & Lippard, E. T. C. (2022). Early life stress and substance use disorders: The critical role of adolescent substance use. *Pharmacology Biochemistry and Behavior*, *215*, 173360. https://doi.org/10.1016/j.pbb.2022.173360

Klein, D. N., Shankman, S. A., Lewinsohn, P. M., & Seeley, J. R. (2009). Subthreshold depressive disorder in adolescents: Predictors of escalation to full-syndrome depressive disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *48*(7), 703-710. https://doi.org/10.1097/chi.0b013e3181a56606

Klevens, J., Barnett, S. B., Florence, C., & Moore, D. (2015). Exploring policies for the reduction of child physical abuse and neglect. *Child Abuse & Neglect*, *40*, 1-11. https://doi.org/10.1016/j.chiabu.2014.07.013

Klevens, J., Luo, F., Xu, L., Peterson, C., & Latzman, N. E. (2016). Paid family leave's effect on hospital admissions for pediatric abusive head trauma. *Injury Prevention*, *22*(6), 442-445. https://doi.org/10.1136/injuryprev-2015-041702

Klevens, J., Schmidt, B., Luo, F., Xu, L., Ports, K. A., & Lee, R. D. (2017). Effect of the earned income tax credit on hospital admissions for pediatric abusive head trauma, 1995-

2013. *Public Health Reports*, *132*(4), 505-511.

https://doi.org/10.1177/0033354917710905

Knight, J. R., Sherritt, L., Shrier, L. A., Harris, S. K., & Chang, G. (2002). Validity of the

CRAFFT substance abuse screening test among adolescent clinic patients. *Archives of*

Pediatrics & Adolescent Medicine, *156*(6), 607-614.

https://doi.org/10.1001/archpedi.156.6.607

Knight, J. R., Shrier, L. A., Bravender, T. D., Farrell, M., Vander Bilt, J., & Shaffer, H. J. (1999).

A new brief screen for adolescent substance abuse. *Archives of Pediatrics & Adolescent*

Medicine, *153*(6), 591-596. https://doi.org/10.1001/archpedi.153.6.591

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression

severity measure. *Journal of General Internal Medicine*, *16*(9), 606-613.

https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2003). The Patient Health Questionnaire-2:

Validity of a two-item depression screener. *Medical Care*, *41*(11), 1284-1292.

https://doi.org/10.1097/01.mlr.0000093487.78664.3c

Kovacs, M., & Lopez-Duran, N. (2010). Prodromal symptoms and atypical affectivity as

predictors of major depression in juveniles: Implications for prevention. *Journal of Child*

Psychology and Psychiatry, *51*(4), 472-496. https://doi.org/10.1111/j.1469-

7610.2010.02230.x

Lacey, R. E., & Minnis, H. (2020). Practitioner review: Twenty years of research with adverse

childhood experience scores – Advantages, disadvantages and applications to

practice. *Journal of Child Psychology and Psychiatry*, *61*(2), 116-130.

https://doi.org/10.1111/jcpp.13135

Larkin, H., Shields, J. J., & Anda, R. F. (2012). The health and social consequences of adverse childhood experiences (ACE) across the lifespan: An introduction to prevention and intervention in the community. *Journal of Prevention & Intervention in the Community*, *40*(4), 263-270. https://doi.org/10.1080/10852352.2012.707439

Lee, H., Kim, I., Nam, S., & Jeong, J. (2020). Adverse childhood experience and the associations with depression and anxiety in adolescents. *Children and Youth Services Review, 111*, 104850. https://doi.org/10.1016/j.childyouth.2020.104850

Lee, K., & Markey, J. (2022). Effects of adverse childhood experiences on developmental outcomes for head start eligible low-income children. *Journal of Social Services Research, 48*(1), 45-62. https://doi.org/10.1080/01488376.2021.1951925

Lee, I. A., & Preacher, K. J. (2013, September). Calculation for the test of the difference between two dependent correlations with one variable in common [Computer software]. http://quantpsy.org/corrtest/corrtest2.htm

Lew, D., & Xian, H. (2019). Identifying distinct latent classes of adverse childhood experiences among US children and their relationship with childhood internalizing disorders. *Child Psychiatry & Human Development*, *50*(4), 668-680. https://doi.org/10.1007/s10578-019-00871-y

Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology, 102*(1), 133-144. https://doi.org/10.1037//0021-843x.102.1.133

Lewinsohn, P. M., Rohde, P., Seeley, J. R., Klein, D. N., & Gotlib, I. H. (2000). Natural course of adolescent major depressive disorder in a community sample: Predictors of recurrence

in young adults. *American Journal of Psychiatry*, *157*(10), 1584-1591.

https://doi.org/10.1176/appi.ajp.157.10.1584

Lewinsohn, P. M., Solomon, A., Seeley, J. R., & Zeiss, A. (2000). Clinical implications of

"subthreshold" depressive symptoms. *Journal of Abnormal Psychology, 109*(2), 345-351.

https://content.apa.org/doi/10.1037/0021-843X.109.2.345

Lewis, T. T., Cogburn, C. D., & Williams, D. R. (2015). Self-reported experiences of

discrimination and health: Scientific advances, ongoing controversies, and emerging

issues. *Annual Review of Clinical Psychology*, *11*(1), 407-440.

https://doi.org/10.1146/annurev-clinpsy-032814-112728

Lewis, T., Thompson, R., Kotch, J. B., Proctor, L. J., Litrownik, A. J., English, D. J., Runyan, D.

K., Wiley, T. R. A., & Dubowitz, H. (2012). Parent–youth discordance about youth-

witnessed violence: Associations with trauma symptoms and service use in an at-risk

sample. *Child Abuse & Neglect*, *36*(11-12), 790-797.

https://doi.org/10.1016/j.chiabu.2012.09.009

Lipscomb, S. T., Hatfield, B., Lewis, H., Goka-Dubose, E., & Abshire, C. (2021). Adverse

childhood experiences and children's development in early care and education

programs. *Journal of Applied Developmental Psychology*, *72*, 101218.

https://doi.org/10.1016/j.appdev.2020.101218

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing

values. *Journal of the American Statistical Association*, *83*(404), 1198-1202.

https://doi.org/10.1080/01621459.1988.10478722

Liu, S. R., Kia-Keating, M., Nylund-Gibson, K., & Barnett, M. L. (2020). Co-occurring youth

profiles of adverse childhood experiences and protective factors: Associations with

health, resilience, and racial disparities. *American Journal of Community Psychology*, *65*(1-2), 173-186. https://doi.org/10.1002/ajcp.12387

Lombardi, B. M., Thyberg, C. T., & Bledsoe, S. E. (2022). Concordance of children's adverse childhood experiences amongst child, caregiver, and caseworker. *Journal of Aggression, Maltreatment & Trauma*, *31*(2), 204-218. https://doi.org/10.1080/10926771.2021.1960453

Luthar, S. (1999). Poverty and the family: Psychological processes. In *Poverty and children's adjustment* (Vol. 41, pp. 40-58). Sage Publications. https://doi.org/10.4135/9781452233758

Mahoney, J. L., Weissberg, R. P., Greenberg, M. T., Dusenbury, L., Jagers, R. J., Niemi, K., Schlinger, M., Schlund, J., Shriver, T. P., VanAusdal, K., & Yoder, N. (2021). Systemic social and emotional learning: Promoting educational success for all preschool to high school students. *American Psychologist*, *76*(7), 1128-1142. https://doi.org/10.1037/amp0000701

Martin-Gutierrez, G., Wallander, J. L., Yang, Y. (June), Depaoli, S., Elliott, M. N., Coker, T. R., & Schuster, M. A. (2021). Racial/ethnic differences in the relationship between stressful life events and quality of life in adolescents. *Journal of Adolescent Health*, *68*(2), 292-299. https://doi.org/10.1016/j.jadohealth.2020.05.055

Matjasko, J. L., Herbst, J. H., & Estefan, L. F. (2022). Preventing adverse childhood experiences: The role of etiological, evaluation, and implementation research. *American Journal of Preventive Medicine*, *62*(6S1), S6-S15. https://doi.org/10.1016/j.amepre.2021.10.024

McCoy, K., Tibbs, J. J., DeKraai, M., & Hansen, D. J. (2020). Household dysfunction and adolescent substance use: Moderating effects of family, community, and school

support. *Journal of Child & Adolescent Substance Abuse*, *29*(1), 68-79.

https://doi.org/10.1080/1067828x.2020.1837320

McCrae, J. S., Bender, K., Brown, S. M., Phillips, J. D., & Rienks, S. (2019). Adverse childhood

experiences and complex health concerns among child welfare-involved children.

Children's Health Care, 48(1), 38-58. https://doi.org/10.1080/02739615.2018.1446140

McLaughlin, K. A. (2016). Future directions in childhood adversity and youth

psychopathology. *Journal of Clinical Child & Adolescent Psychology*, *45*(3), 361-382.

https://doi.org/10.1080/15374416.2015.1110823

McLaughlin, K. A., Greif Green, J., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler,

R. C. (2012). Childhood adversities and first onset of psychiatric disorders in a national

sample of US adolescents. *Archives of General Psychiatry*, *69*(11), 1151-1160.

https://doi.org/10.1001/archgenpsychiatry.2011.2277

Meeker, E. C., O'Connor, B. C., Kelly, M. L., Hodgeman, D. D., Scheel-Jones, A. H., &

Berbary, C. (2021). The impact of adverse childhood experiences on adolescent health

risk indicators in a community sample. *Psychological Trauma: Theory, Research,

Practice, and Policy, 13*(3), 302-312. https://doi.apa.org/doi/10.1037/tra0001004

Merrick, M. T., Ports, K. A., Guinn, A. S., & Ford, D. C. (2020). Safe, stable, nurturing

environments for children. In G. J. G. Asmundson & T. O. Afifi (Eds.), *Adverse

childhood experiences: Using evidence to advance research, practice, policy, and

prevention* (pp. 329-347). Academic Press. https://doi.org/10.1016/B978-0-12-816065-

7.00016-1

Mersky, J. P., Choi, C., Plummer Lee, C. T., & Janczewski, C. E. (2021). Disparities in adverse

childhood experiences by race/ethnicity, gender, and economic status: Intersectional

analysis of a nationally representative sample. *Child Abuse & Neglect*, *117*, 105066. https://doi.org/10.1016/j.chiabu.2021.105066

Metzler, M., Merrick, M. T., Klevens, J., Ports, K. A., & Ford, D. C. (2017). Adverse childhood experiences and life opportunities: Shifting the narrative. *Children and Youth Services Review*, *72*, 141-149. https://doi.org/10.1016/j.childyouth.2016.10.021

Miech, R. A., Johnston, L. D., Patrick, M. E., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2023). *Monitoring the Future national survey results on drug use, 1975-2022: Secondary school students*. Institute for Social Research, The University of Michigan. https://monitoringthefuture.org/wp-content/uploads/2022/12/mtf2022.pdf

Mills, M. S., Embury, C. M., Klanecky, A. K., Khanna, M. M., Calhoun, V. D., Stephen, J. M., Wang, Y.-P., Wilson, T. W., & Badura-Brack, A. S. (2020). Traumatic events are associated with diverse psychological symptoms in typically-developing children. *Journal of Child & Adolescent Trauma*, *13*(4), 381-388. https://doi.org/10.1007/s40653-019-00284-y

Mishra, A. A., Schwab-Reese, L. M., & Murfree, L. V. (2020). Adverse childhood experiences associated with children's patterns of out of home placement over time and subsequent negative outcomes during adolescence. *Child & Youth Care Forum*, *49*(2), 247-263. https://doi.org/10.1007/s10566-019-09526-4

Murthy, V. H. (2021). *Protecting youth mental health: The U.S. Surgeon General's advisory, 2021*. Office of the Surgeon General. https://www.hhs.gov/sites/default/files/surgeon-general-youth-mental-health-advisory.pdf

Naicker, S. N., Norris, S. A., Mabaso, M., & Richter, L. M. (2017). An analysis of retrospective and repeat prospective reports of adverse childhood experiences from the South African

birth to twenty plus cohort. *PLOS ONE*, *12*(7), e0181522.

https://doi.org/10.1371/journal.pone.0181522

Narayan, A. J. (2023). Intergenerational resilience in the context of adverse childhood

experiences (ACEs). In S. G. Portwood, M. J. Lawler, & M. C. Roberts (Eds.), *Handbook*

of adverse childhood experiences: A framework for collaborative health promotion (pp.

13-27). Springer. https://doi.org/10.1007/978-3-031-32597-7

National Academies of Sciences, Engineering, and Medicine. (2019). *A roadmap to reducing*

child poverty. The National Academies Press. https://doi.org/10.17226/25246

Negriff, S. (2020). Aces are not equal: Examining the relative impact of household dysfunction

versus childhood maltreatment on mental health in adolescence. *Social Science &*

Medicine, *245*, 112696. https://doi.org/10.1016/j.socscimed.2019.112696

Oh, D. L., Jerman, P., Purewal Boparai, S. K., Koita, K., Briner, S., Bucci, M., & Harris, N. B.

(2018). Review of tools for measuring exposure to adversity in children and

adolescents. *Journal of Pediatric Health Care*, *32*(6), 564-583.

https://doi.org/10.1016/j.pedhc.2018.04.021

Olson, A. E., Chow, S.-M., Jones, D. E., & Shenk, C. E. (2023). Child maltreatment, parent-child

relationship quality, and parental monitoring in relation to adolescent behavior problems:

Disaggregating between and within person effects. *Child Abuse & Neglect*, *136*, 106003.

https://doi.org/10.1016/j.chiabu.2022.106003

Oransky, M., Hahn, H., & Stover, C. S. (2013). Caregiver and youth agreement regarding

youths' trauma histories: Implications for youths' functioning after exposure to

trauma. *Journal of Youth and Adolescence*, *42*(10), 1528-1542.

https://doi.org/10.1007/s10964-013-9947-z

Penttinen, R., Hakko, H., Riipinen, P., Isohookana, R., & Riala, K. (2020). Associations of adverse childhood experiences to smoking and nicotine dependence among adolescent psychiatric inpatients. *Community Mental Health Journal*, *56*(2), 333-337. https://doi.org/10.1007/s10597-019-00476-8

Pearlin, L. I., Schieman, S., Fazio, E. M., & Meersman, S. C. (2005). Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*, *46*(2), 205-219. https://doi.org/10.1177/002214650504600206

Piotrowski, C. C. (2020). ACEs and trauma-informed care. In G. J. G. Asmundson & T. O. Afifi (Eds.), *Adverse childhood experiences: Using evidence to advance research, practice, policy, and prevention* (pp. 307-328). Academic Press. https://doi.org/10.1016/B978-0-12-816065-7.00015-X

Raposa, E. B., Rhodes, J., Stams, G. J., Card, N., Burton, S., Schwartz, S., Sykes, L. A., Kanchewa, S., Kupersmidt, J., & Hussain, S. (2019). The effects of youth mentoring programs: A meta-analysis of outcome studies. *Journal of Youth and Adolescence*, *48*(3), 423-443. https://doi.org/10.1007/s10964-019-00982-8

Reuben, A., Moffitt, T. E., Caspi, A., Belsky, D. W., Harrington, H., Schroeder, F., Hogan, S., Ramrakha, S., Poulton, R., & Danese, A. (2016). Lest we forget: Comparing retrospective and prospective assessments of adverse childhood experiences in the prediction of adult health. *Journal of Child Psychology and Psychiatry*, *57*(10), 1103-1112. https://doi.org/10.1111/jcpp.12621

Richardson, L. P., McCauley, E., Grossman, D. C., McCarty, C. A., Richards, J., Russo, J. E., Rockhill, C., & Katon, W. (2010). Evaluation of the Patient Health Questionnaire-9 item

for detecting major depression among adolescents. *Pediatrics*, *126*(6), 1117-1123.

https://doi.org/10.1542/peds.2010-0852

Richardson, L. P., Rockhill, C., Russo, J. E., Grossman, D. C., Richards, J., McCarty, C.,

McCauley, E., & Katon, W. (2010). Evaluation of the PHQ-2 as a brief screen for

detecting major depression among adolescents. *Pediatrics*, *125*(5), e1097-e1103.

https://doi.org/10.1542/peds.2009-2712

Rohde, P., Lewinsohn, P. M., & Seeley, J. R. (1991). Comorbidity of unipolar depression: II.

Comorbidity with other mental disorders in adolescents and adults. *Journal of Abnormal

Psychology*, *100*(2), 214-222. https://doi.org/10.1037/0021-843x.100.2.214

Rudolph, K. D. (2014). Puberty as a developmental context of risk for psychopathology. In M.

Lewis & K. D. Rudolph (Eds.), *Handbook of developmental psychopathology* (pp. 331-

354). Springer. https://doi.org/10.1007/978-1-4614-9608-3_17

Russell, B. S., Simpson, E., Flannery, K. M., & Ohannessian, C. M. (2017). The impact of

adolescent substance use on family functioning. *Youth & Society*, *51*(4), 504-528.

https://doi.org/10.1177/0044118x16688708

Sacks, V., & Murphey, D. (2018). *The prevalence of adverse childhood experiences, nationally,

by state, and by race/ethnicity* (Research Brief Publication No. 2018-03). Child Trends.

https://www.childtrends.org/wp-

content/uploads/2018/02/ACESBriefUpdatedFinal_ChildTrends_February2018.pdf

Schauss, E., Zettler, H., Naik, S., Ellmo, F., Hawes, K., Dixon, P., Bartelli, D., Cogdal, P., &

West, S. (2020). Adolescents in residential treatment: The prevalence of ACEs, substance

use and justice involvement. *Journal of Family Trauma, Child Custody & Child

Development*, *17*(3), 249-267. https://doi.org/10.1080/26904586.2020.1781018

Schulte, M. T., & Hser, Y.-I. (2014). Substance use and associated health conditions throughout the lifespan. *Public Health Reviews*, *35*(2). https://doi.org/10.1007/bf03391702

Scully, C., McLaughlin, J., & Fitzgerald, A. (2019). The relationship between adverse childhood experiences, family functioning, and mental health problems among children and adolescents: A systematic review. *Journal of Family Therapy*, *42*(2), 291-316. https://doi.org/10.1111/1467-6427.12263

Shanock, L. R., Baran, B. E., Gentry, W. A., Pattison, S. C., & Heggestad, E. D. (2010). Polynomial regression with response surface analysis: A powerful approach for examining moderation and overcoming limitations of difference scores. *Journal of Business and Psychology*, *25*(4), 543-554. https://doi.org/10.1007/s10869-010-9183-4

Shaw, J. A. (2000). Children, adolescents, and trauma. *Psychiatric Quarterly*, *71*(3), 227-243. https://doi.org/10.1023/a:1004630127000

Sheffler, J. L., Stanley, I., & Sachs-Ericsson, N. (2020). ACEs and mental health outcomes. In G. J. G. Asmundson & T. O. Afifi (Eds.), *Adverse childhood experiences: Using evidence to advance research, practice, policy, and prevention* (pp. 47-69). Academic Press. https://doi.org/10.1016/B978-0-12-816065-7.00004-5

Shin, S. H., Wang, X., Yoon, S. H., Cage, J. L., Kobulsky, J. M., & Montemayor, B. N. (2019). Childhood maltreatment and alcohol-related problems in young adulthood: The protective role of parental warmth. *Child Abuse & Neglect*, *98*, 104238. https://doi.org/10.1016/j.chiabu.2019.104238

Shortt, A. L., & Spence, S. H. (2006). Risk and protective factors for depression in youth. *Behaviour Change, 23*(1), 1-30. https://doi.org/10.1375/bech.23.1.1

Smith, K. E., & Pollak, S. D. (2021). Rethinking concepts and categories for understanding the neurodevelopmental effects of childhood adversity. *Perspectives on Psychological Science*, *16*(1), 67-93. https://doi.org/10.1177/1745691620920725

Spitzer, R. L., Kroenke, K., & Williams, J. B. W. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *Journal of the American Medical Association, 282*(18), 1737-1744. https://doi.org/10.1001/jama.282.18.1737

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, *87*(2), 245-251. https://doi.org/10.1037/0033-2909.87.2.245

Stover, C. S., Hahn, H., Im, J. J., & Berkowitz, S. (2010). Agreement of parent and child reports of trauma exposure and symptoms in the early aftermath of a traumatic event. *Psychological Trauma: Theory, Research, Practice, and Policy, 2*(3), 159-168. https://doi.org/10.1037/a0019156

Substance Abuse and Mental Health Services Administration. (2023). *Key substance use and mental health indicators in the United States: Results from the 2022 National Survey on Drug Use and Health* (HHS Publication No. PEP23-07-01-006, NSDUH Series H-58). U.S. Department of Health and Human Services, Center for Behavioral Health Statistics and Quality. https://www.samhsa.gov/data/sites/default/files/reports/rpt42731/2022-nsduh-nnr.pdf

Susman, E. J., & Dorn, L. D. (2012). Puberty: Its role in development. In R. M. Lerner, M. A. Easterbrooks, J. Mistry, & I. B. Weiner (Eds.), *Handbook of psychology: Volume 6. Developmental psychology* (2nd ed., pp. 289-320). John Wiley & Sons.

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.

Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *The Lancet*, *379*(9820), 1056-1067. https://doi.org/10.1016/s0140-6736(11)60871-4

Turner, H. A., Finkelhor, D., Mitchell, K. J., Jones, L. M., & Henly, M. (2020). Strengthening the predictive power of screening for adverse childhood experiences (ACEs) in younger and older children. *Child Abuse & Neglect*, *107*, 104522. https://doi.org/10.1016/j.chiabu.2020.104522

Turner, H. A., Finkelhor, D., & Ormrod, R. (2006). The effect of lifetime victimization on the mental health of children and adolescents. *Social Science & Medicine*, *62*(1), 13-27. https://doi.org/10.1016/j.socscimed.2005.05.030

Villamil Grest, C., Cederbaum, J. A., Lee, J. O., & Unger, J. B. (2021). Adverse childhood experiences and the substance use behaviors of Latinx youth. *Drug and Alcohol Dependence, 227*, 108936. https://doi.org/10.1016/j.drugalcdep.2021.108936

Villodas, M. T., Cromer, K. D., Moses, J. O., Litrownik, A. J., Newton, R. R., & Davis, I. P. (2016). Unstable child welfare permanent placements and early adolescent physical and mental health: The roles of adverse childhood experiences and post-traumatic stress. *Child Abuse & Neglect*, *62*, 76-88. https://doi.org/10.1016/j.chiabu.2016.10.014

Wade, R., Shea, J. A., Rubin, D., & Wood, J. (2014). Adverse childhood experiences of low-income urban youth. *Pediatrics*, *134*(1), e13-e20. https://doi.org/10.1542/peds.2013-2475

Wang, D., Jiang, Q., Yang, Z., & Choi, J.-K. (2021). The longitudinal influences of adverse childhood experiences and positive childhood experiences at family, school, and neighborhood on adolescent depression and anxiety. *Journal of Affective Disorders, 292*, 542-551. https://doi.org/10.1016/j.jad.2021.05.108

Weber, S., & Lynch, S. (2021). Understanding the relations among adverse childhood

    experiences (ACE), substance use, and reoffending among detained youth. *Child Abuse*

    & Neglect, *120*, 105211. https://doi.org/10.1016/j.chiabu.2021.105211

Webster, E. M. (2022). The impact of adverse childhood experiences on health and development

    in young children. *Global Pediatric Health*, *9*, 1-11.

    https://doi.org/10.1177/2333794x221078708

Weisz, J. R., & Hawley, K. M. (2002). Developmental factors in the treatment on

    adolescents. *Journal of Consulting and Clinical Psychology*, *70*(1), 21-43.

    https://doi.org/10.1037/0022-006x.70.1.21

Wesolowsky, G. O. (1976). *Multiple regression and analysis of variance: An introduction for*

    computer users in management and economics. John Wiley & Sons.

Williams, D. R. (2018). Stress and the mental health of populations of color: Advancing our

    understanding of race-related stressors. *Journal of Health and Social Behavior*, *59*(4),

    466-485. https://doi.org/10.1177/0022146518814251

Zhang, S., Smith, D. C., & Tabb, K. M. (2018). Adolescent depression and the use of services

    and psychotropic medications in relation to family structure and race/ethnicity. *Children*

    and Youth Services Review, 94, 636-643.

    https://doi.org/10.1016/j.childyouth.2018.09.004

Zimmerman, G. M., & Farrell, A. S. (2013). Gender differences in the effects of parental

    underestimation of youths' secondary exposure to community violence. *Journal of Youth*

    and Adolescence, *42*(10), 1512-1527. https://doi.org/10.1007/s10964-012-9897-x

APPENDIX A: THE PATIENT HEALTH QUESTIONNAIRE-2 (PHQ-2)

TOOL 1. The Patient Health Questionnaire-2 (PHQ-2)

Instructions: Print out the short form below and ask patients to complete it while sitting in the waiting or exam room.

Use: The purpose of the PHQ-2 is not to establish a final diagnosis or to monitor depression severity, but rather to screen for depression as a "first-step" approach.

Scoring: A PHQ-2 score ranges from 0 to 6; patients with scores of 3 or more should be further evaluated with the PHQ-9, other diagnostic instrument(s), or a direct interview to determine whether they meet criteria for a depressive disorder.

Patient Name: _____ Date of Visit: _____

Over the past 2 weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than one-half of the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3

Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care*. 2003;41:1284-1292. ©2007CQAIMH. All rights reserved. Used with permission.

APPENDIX B: THE PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

TOOL 2. The Patient Health Questionnaire-9 (PHQ-9) Instructions

Instructions: To further evaluate patients with PHQ-2 scores of 3 or more, administer or have them complete the questionnaire on the next page.

USE OF THE PHQ-9 TO MAKE A TENTATIVE DEPRESSION DIAGNOSIS

The clinician should rule out physical causes of depression, normal bereavement, and a history of a manic/hypomanic episode.

Step 1: Questions 1 and 2
Need one or both of the first two questions endorsed as a "2" or "3"

Step 2: Questions 1 through 9
Need a total of five or more boxes endorsed within the shaded area of the form to arrive at the total symptom count

Step 3: Question 10
This question must be endorsed as "Somewhat difficult," "Very difficult," or "Extremely difficult"

PHQ-9 scores of 5, 10, 15, and 20 represent mild, moderate, moderately severe, and severe depression, respectively.

USE OF THE PHQ-9 FOR TREATMENT SELECTION AND MONITORING

Step 1: A depression diagnosis that warrants initiating or changing treatment requires that at least one of the first two questions was endorsed as positive ("more than one-half of the days" or "nearly every day") in the past 2 weeks. In addition, the tenth question about difficulty at work or home or getting along with others should be answered at least "somewhat difficult."

Step 2: Add the total points for each of the columns 2-4 separately. Add the totals for each of the three columns; this is the total score or the severity score.

Step 3: Review the severity score using the following table

PHQ-9 SCORE	PROVISIONAL DIAGNOSIS	TREATMENT RECOMMENDATION (Patient preference should be considered)
0-4	None – minimal	None
5-9	Minimal symptoms[a]	Support, educate to call if worse, return in 1 month
10-14	• Minor depression[b]	Support, watchful waiting
	• Dysthmia[a]	Antidepressant or psychotherapy
	• Major depression, mild	Antidepressant or psychotherapy
15-19	Major depression, moderately severe	Antidepressant or psychotherapy
> 20	Major depression, severe	Antidepressant AND psychotherapy (especially if not improved on monotherapy)

[a]If symptoms are present for at least 2 years, then chronic depression is probable, which warrants antidepressants or psychotherapy
[b]If symptoms are present for at least 1 month or patient is experiencing severe functional impairment, consider active treatment

Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16:606-613. ©2007CQAIMH. All rights reserved. Used with permission.

TOOL 2. The Patient Health Questionnaire-9 (PHQ-9)

Patient Name: _____ Date of Visit: _____

Over the past 2 weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than one-half of the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling asleep, staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you're a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed; or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

10. If you checked off any problems listed above, how difficult have those problems made it for you to do your work, take care of things at home, or get along with other people? ❏ Not difficult at all ❏ Somewhat difficult ❏ Very difficult ❏ Extremely difficult

APPENDIX C: THE CRAFFT QUESTIONNAIRE

The CRAFFT Questionnaire (version 2.1)
To be completed by patient

Please answer all questions **honestly**; your answers will be kept **confidential**.

During the PAST 12 MONTHS, on how many days did you:

1. Drink more than a few sips of beer, wine, or any drink containing **alcohol**? Put "0" if none.	# of days
2. Use any **marijuana** (weed, oil, or hash, by smoking, vaping, or in food) or "**synthetic marijuana**" (like "K2," "Spice") or "vaping" **THC oil**? Put "0" if none.	# of days
3. Use **anything else to get high** (like other illegal drugs, prescription or over-the-counter medications, and things that you sniff, huff, or vape)? Put "0" if none.	# of days

---

READ THESE INSTRUCTIONS BEFORE CONTINUING:
- If you put "0" in ALL of the boxes above, ANSWER QUESTION 4, THEN STOP.
- If you put "1" or higher in ANY of the boxes above, ANSWER QUESTIONS 4-9.

	No	Yes
4. Have you ever ridden in a **CAR** driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	☐	☐
5. Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?	☐	☐
6. Do you ever use alcohol or drugs while you are by yourself, or **ALONE**?	☐	☐
7. Do you ever **FORGET** things you did while using alcohol or drugs?	☐	☐
8. Do your **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?	☐	☐
9. Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?	☐	☐

The CRAFFT Interview (version 2.1)

To be orally administered by the clinician

Begin: "*I'm going to ask you a few questions that I ask all my patients. Please be honest. I will keep your answers confidential.*"

Part A

During the PAST 12 MONTHS, on how many days did you:

1. Drink more than a few sips of beer, wine, or any drink containing **alcohol**? Say "0" if none.

    # of days

2. Use any **marijuana** (weed, oil, or hash, by smoking, vaping, or in food) or "**synthetic marijuana**" (like "K2," "Spice") or "vaping" **THC oil**? Put "0" if none.

    # of days

3. Use **anything else to get high** (like other illegal drugs, prescription or over-the-counter medications, and things that you sniff, huff, or vape)? Say "0" if none.

    # of days

Did the patient answer "0" for all questions in Part A?

Yes ☐   **No** ☐

↓   ↓

Ask CAR question only, then stop   **Ask all six CRAFFT* questions below**

| *Part B*	No	Yes
C Have you ever ridden in a **CAR** driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	☐	☐
R Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?	☐	☐
A Do you ever use alcohol or drugs while you are by yourself, or **ALONE**?	☐	☐
F Do you ever **FORGET** things you did while using alcohol or drugs?	☐	☐
F Do your **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?	☐	☐
T Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?	☐	☐

*Two or more YES answers suggest a serious problem and need for further assessment. See back for further instructions ➡

1. **Show your patient his/her score on this graph and discuss level of risk for a substance use disorder.**

Percent with a DSM-5 Substance Use Disorder by CRAFFT score*
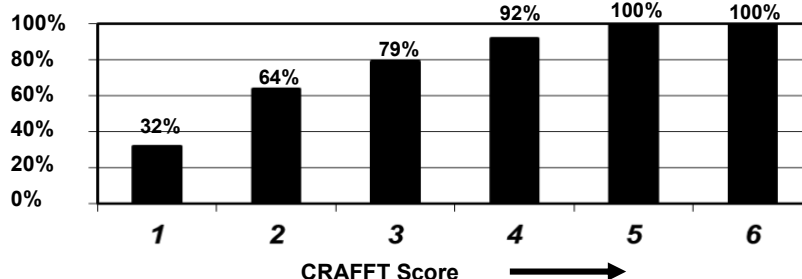
*Data source: Mitchell SG, Kelly SM, Gryczynski J, Myers CP, O'Grady KE, Kirk AS, & Schwartz RP. (2014). The CRAFFT cut-points and DSM-5 criteria for alcohol and other drugs: a reevaluation and reexamination. Substance Abuse, 35(4), 376–80.

2. **Use these talking points for brief counseling.**

1. **REVIEW** screening results
   For each "yes" response: *"Can you tell me more about that?"*

2. **RECOMMEND** not to use
   "As your doctor (nurse/health care provider), my recommendation is not to use any alcohol, marijuana or other drug because they can: 1) Harm your developing brain; 2) Interfere with learning and memory, and 3) Put you in embarrassing or dangerous situations."

3. **RIDING/DRIVING** risk counseling
   "Motor vehicle crashes are the leading cause of death for young people. I give all my patients the Contract for Life. Please take it home and discuss it with your parents/guardians to create a plan for safe rides home."

4. **RESPONSE** elicit self-motivational statements
   Non-users: *"If someone asked you why you don't drink or use drugs, what would you say?"* Users: *"What would be some of the benefits of not using?"*

5. **REINFORCE** self-efficacy
   "I believe you have what it takes to keep alcohol and drugs from getting in the way of achieving your goals."

3. **Give patient Contract for Life.** Available at www.crafft.org/contract

---