

The Association Between Adverse Childhood Experiences, Social Support, and Adolescent Mental Health Outcomes

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ABSTRACT

ABSTRACT: Adverse childhood experiences (ACEs), preventable traumatic events that occur before a person reaches 18 years of age, have long lasting implications for an individual's health, educational attainment, and socioeconomic status. In my thesis, I examine the relationship between adverse childhood experiences when the child is 9 years old and his or her mental health outcomes when he or she reaches 15 years old. In addition, I examine whether having access to social support at the time of adverse experiences moderates the association between ACEs and adolescent mental health outcomes. Using longitudinal data from the Future of Families and Child Wellbeing Study (FFCWS; N=2,509), I find a strong association between adverse childhood experiences and adolescent depression. However, for adolescent anxiety, there is only an association when the adolescent experienced multiple categories of adverse childhood experiences. I do not find evidence that having access to social support at the time of experiencing ACEs moderates the association between ACEs and adolescent mental health outcomes. The results emphasize the importance of protecting children from toxic environments, and the results further understandings of the social determinants of mental health outcomes. In particular, mental health outcomes like depression or anxiety, which are commonly attributed to biological factors, such as genetics or physical health, are also linked to social conditions during childhood.

The Association Between Adverse Childhood Experiences, Social Support, and Adolescent
Mental Health Outcomes

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INTRODUCTION

Adverse Childhood Experiences (ACEs) are preventable traumatic events that occur before a person reaches 18 years of age. ACEs are unfortunately common: roughly two-thirds (64%) of U.S. adults report they experienced one or more ACEs, while nearly 1 in 6 adults (17%) report they experienced four or more ACEs (CDC 2024). ACEs are associated with negative emotional and physical outcomes (CDC 2024). These negative outcomes have long lasting consequences and have been linked to high-risk behaviors, chronic health issues, and socioeconomic hardship later in life (Gilbert et al. 2009). Given the prevalence and far-reaching consequences of ACEs, it is important to understand the impact of ACEs across the life course and possible mechanisms that may reduce the effects of ACEs.

While many existing works on ACEs have focused on links to adult health outcomes (Felitti et al. 1998; Font and McGuire-Jack 2015; Wade Jr. et al. 2016), research that examines the transitional period from childhood to adulthood, known as adolescence, is less common. Adolescence is associated with physical, emotional, social, and environmental changes and is also the period when individuals gain elevated levels of autonomy (Pollmann 2023). Adolescence is a particularly sensitive and important developmental period, and understandings of how ACEs might influence adolescent outcomes need to be further developed.

Similarly, the many negative outcomes, both physical and mental, associated with ACEs, lead to questions about potential interventions that may lessen the impacts of ACEs. A large body of research in sociology shows that social support is positively associated with mental and physical health (Thoits 2011; House, Umberson, and Landis 1988; Kessler and Mcleod 1985). These studies argue that many mechanisms of social support, such as emotional, instrumental, informational, and appraisal support, can create a positive causal effect on health. These

mechanisms have been applied to ACEs research, finding that social support can create a buffer between ACEs and depression or even mortality, such as suicidal ideations (Lensch et al. 2021). However, while there is existing research (Gómez-Tabares et al. 2022) that shows social support in adulthood can lessen the impact of ACEs, no research has focused on how social support at the time of trauma may lessen the impacts of ACEs in the future. This study fills that gap in research.

Drawing on data from the Future of Families and Child Wellbeing Study (FFCWS), my thesis examines three research questions. First, is there an association between adverse childhood experiences (ACEs) and adolescent mental health outcomes, such as depression and anxiety? Second, to what extent is the association between ACEs and adolescent mental health conditional on the number of hardships experienced? Third, does having access to social support moderate the association between ACEs and adolescent mental health outcomes? In doing so, this research helps improve understandings of how exposure to childhood adversities relates to adolescent mental health, offers insights into how social support may moderate the impacts of ACEs, and contributes to understandings of the social determinants of mental health outcomes.

BACKGROUND

Categories of Adverse Childhood Experiences (ACEs)

The concept of adverse childhood experiences is a fairly recent development. Vincent Felitti and his colleagues conducted the first clinical study of ACEs at Kaiser Permanente's San Diego Health Appraisal Clinic from 1995 to 1997, and the results of their study were published in 1998. They developed seven categories of childhood adversities in the first wave of their study: psychological abuse, physical abuse, sexual abuse, substance abuse, mental illness, mother treated violently, and criminal behavior in household (Felitti et al. 1998). By examining multiple categories of ACEs, including both abuse and household dysfunctions, retrospectively and prospectively, they found a strong and cumulative impact on health and mortality risk outcomes in adulthood (Felitti et al. 1998)

Since this initial research, the concept of ACEs has continued to evolve with researchers recognizing more actions, events, or environments experienced as damaging to children's physical, mental, and emotional health. For example, researchers added emotional neglect, physical neglect, and parental separation and divorce in the second wave of the original ACEs study (Dube et al. 2001; Dube et al. 2003). In 2011 and 2012, the National Survey of Children's Health (NSCH) developed a version of ACEs categories that added new categories for "financial hardship", "parental death", "victim or witness of neighborhood violence", and "treated unfairly because of race/ethnicity", while the other categories were similar to the original concept but contained more detailed descriptions, such as the category "lived with someone with an alcohol or drug problem" opposed to "substance abuse" (Halfon et al. 2017: S77). Measures of ACEs have also evolved across geographies. Notably, the Adverse Childhood Experiences International Questionnaire (ACE-IQ) includes experiences such as "peer violence, exposure to war, marriage,

and parental death” in order to reflect childhood experiences in different countries (Struck et al. 2021).

In many ways, the continued evolution of what events are captured in measures of ACEs reflect changes in societal norms and how researchers have come to understand child development; however, categories of ACEs can be contested. For instance, the concept of physical child abuse is surprisingly new. In the United States, the concept of physical abuse, did not exist until the middle of the twentieth century due to the belief that disciplining a child, by beating, was legitimate in order to achieve disciplinary, educational, or religious obedience (Pfohl 1977). This belief was prevalent for about two hundred years in the United States. Thus, some of the parental actions that are associated with child discipline, such as spanking, beating, or yelling, that may not be considered abusive behaviors by parents are abusive in nature.

As ACEs measures have evolved, capturing all aspects of ACEs has proven to be difficult. For example, neglect of a child is hard to define and measure considering there are many different aspects of omission or lack of care by the parents that could harm the child or put the child in risky situations (Gilbert et al. 2009). The concept of neglect itself is challenging to define considering the heterogeneity of circumstances and the omission of unmet needs are innately difficult to specify and differentiate compared to abusive situations (Straus and Kantor 2005). This is further confounded by the fact that behaviors which are considered neglectful are culturally constructed phenomena (aside from extreme apparent situations where the child is severely injured or dies); therefore, what is considered as culturally acceptable in one society may be considered neglectful behavior in another (Finkelhor and Korbin 1998; Straus and Kantor 2005). Along with other cultural events or norms that are constantly shifting with time and new discoveries, circumstances or characterizations that are deemed neglectful experience

shift as well; for instance, in modern day society, children are expected to be taught how to read and write as their developmental need, but this was not always the case in previous centuries as it was considered a privilege that only some children may receive (Straus and Kantor 2005). Both abuse and neglect as core categories of ACEs are tied with societal values, which makes it hard to delineate all the indications of ACEs.

In my thesis, I focus on 6 dimensions of ACEs: physical neglect, emotional neglect, physical abuse, emotional abuse, parental incarceration, and parental depression. These categories and how they are measured are discussed in the Methods section. Due to the sensitive nature of ACEs in relation to societal norms and the reliance on FFCWS survey data along with self-reports from the parents, there may be underreporting of abusive or neglectful behaviors from the mother stemming from either social desirability bias or uncertainty of own behavior. In addition, there may be underreporting from the children in the self-reports due to recall bias from simply not remembering or suppressed memories from being abused, and desirability bias by protecting his or her parents. I will further elaborate on this in the conclusion.

The Potential Impact of ACEs on Adolescent Mental Health

Adversities experienced during childhood influence a person's health beginning in childhood and continues into adolescence (Flaherty et al. 2013) and adulthood if there are no preventative efforts to ameliorate the negative experiences (Merrick et al. 2017). Symptoms of ACEs, such as depression, anxiety, drug use, and antisocial behaviors, are not limited to only adolescence as they could continue to influence mental state onto adulthood (Schilling, Aseltine, and Gore 2007). In the context of ACEs affecting physical health, Felitti et al.'s (1998) first study

on ACEs found a strong graded relationship between the exposure to abuse or household dysfunction in childhood and detrimental disease conditions in adulthood, such as ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease (Felitti et al. 1998). They estimate that such negative health outcomes could have stemmed from chronic unhealthy coping mechanisms, such as alcohol or drug abuse, smoking, overeating, or sexual behaviors, either during the stressful times of the abuse and household dysfunction or when the anger, depression, and anxiety feelings overwhelmed the individual from the experiences of abuse in childhood (Felitti et al. 1998).

The impact from ACEs can also be emotionally damaging and leaves the people who have suffered ACEs developmentally impaired. Many categories of ACEs, such as witnessing violence or a lack of parental figure due to parental incarceration or divorce, can have a long-lasting effect on a child's interpersonal and psychological development that carries over to later years (Moore and Ramirez 2016). The link between ACEs and an individual's physical and mental health highlights a key finding from sociology of health literature: while biology and genetics are important aspects of health, the social situations and contexts that an individual is born in or moves in can be just as powerful in the influence of health outcomes (Horwitz 2002; Timmermans and Haas 2008). The exposure to abusive behaviors from parents, the accidental or intentional lack of physical and emotional care from parents, the consistent hunger or lack of safe housing from exposure to poverty all could be connected to developing unhealthy coping mechanisms, mental struggles, and ultimately chronic diseases in adulthood.

Prior to the formalization of the concept of ACEs, a Hungarian psychoanalyst, Sándor Ferenczi, studied trauma in clinical studies in the early twentieth century. Ferenczi emphasized that trauma could not only originate in the actions or events of the parents, but also in the lack of

parental investment in the child (Boschan 2008). Ferenczi also found that children who had witnessed or experienced aversion or impatience, whether conscious or subconscious, from the mother were more likely to become somatically ill and were more likely to have feelings of inferiority, emptiness, and low self-esteem because of trauma (Boschan 2008). More recent findings have shown that maltreatment experienced during childhood can have permanent effects on the children's future mental health and leads to an increased risk of substance use (drugs and alcohol) and abuse problems, high risk sexual behaviors, obesity, and criminal behaviors in adulthood (Gilbert et al. 2009).

These findings are similar to sociology of health findings related to stress. Sociologist Leonard Pearlin argued that stressful experiences typically originate from an individual's status in his or her social structure (Pearlin 1989). Multiple levels of social structure – social institutions (arrangement of statuses and roles), social stratification, interpersonal relationships (complementary roles of parent and child) – can intersect and interact with each other to potentially create experiences that are consequentially negative or stressful events, and these experiences can impact an individual's health (Pearlin 1989).

My thesis is focused on two mental health outcomes: adolescent depression and anxiety. Adolescence is a critical period of development where individuals go through tremendous physical, emotional, cognitive, and psychological changes (Edmunds and Alcaraz 2021). Poor mental health or mental disorders during this critical developmental stage could disrupt proper educational attainment and disrupt learning best strategies to manage stressors of daily life that could impede their future adult life and mental health status along with other negative health conditions.

Depression is most common among young adults (18-25), but it typically first occurs during adolescence, which spans from as early as 11 years old to as late as 18 years old (Zorrilla et al. 2019). Depression is characterized by persistent sad and negative feelings that the youth feel they may not be able to shake off (Edmunds and Alcaraz 2021). Depression by itself is a major risk factor for future outcomes as it can lead to other health problems, such as substance abuse, and in some severe cases, suicide (Zorrilla et al. 2019). Adolescents who do experience symptoms of depression may experience trouble in school with engagement and relationships due to troublesome feelings of sadness, indifference, aggression, or feelings of low self-esteem (Lee et al. 2020).

Anxiety, on the other hand, is characterized by constant fear and worry (CDC 2023). Anxiety disorder during adolescence also has a significant impact on physical health and social functioning (Lee et al. 2020). These two disorders, depression and anxiety, commonly persist into adulthood and are associated with the risk of co-occurring mental and physical conditions and early mortality (Bitsko et al. 2018).

Why might ACEs increase the risk of adolescent depression and mental health? First, exposure to ACEs can negatively impact relationships and social network building since it is being increasingly recognized as a predictor of interpersonal difficulties not only during the time of exposure, but across a person's lifespan (Poole, Dobson, and Pusch 2018). Previous research has shown that people who have experienced ACEs are more likely to have issues developing healthy relationships due to the abuse and neglect, and that experiencing ACEs is associated with an increased risk of having negative self-perceptions compared to peers (Poole, Dobson, and Pusch 2018). As a result, ACEs are associated with an increased chance of loneliness and social isolation (Tzouvara et al. 2023). Not only is experiencing greater loneliness connected to more

severe symptoms of depression and anxiety, but also, both loneliness and social isolation can hinder remission from depression and anxiety (Wang et al. 2018).

Second, ACEs can have indirect effects that impact experiences and behaviors. For example, financial hardship is often considered an adverse child experience. Financial hardship could create educational achievement gaps (Reardon 2011) and prevent youths from engaging in outdoor activities, participating in organized sports, or taking lessons for an instrument, all of which are associated with building social competence and self-esteem. Compared to a few decades ago, parents are investing more monetarily to improve their children's circumstance, but an inequality persists between low- and high-income households as the household spending on children varies greatly between the rich and the poor (Kornrich and Furstenberg 2013). As a result, financial hardship could lead to missed academic or life opportunities, which could lead to lower self-esteem and further exacerbated feelings of depression or anxiety. Similarly, having only one parent in the household because of divorce or incarceration is also routinely considered an adverse childhood experience. Having only one parent in the home can create time constraints that may limit the youth's ability to participate in extracurricular activities. In fact, research finds that children in single-parent households or lower income families are less likely to be involved in extracurricular activities than children in married two-parent households or wealthier families (An and Western 2019). Additionally, children from single-parent households usually have a higher risk of experiencing cognitive, academic, and socioemotional difficulties due to the diminished economic and parental resources available and children have to adapt to these stressful circumstances (Amato 2005).

Another potential pathway is that stressful, toxic experiences during childhood can result in using alcohol and drugs as a coping mechanism (Merrick et al. 2017). Research by Merrick et

al. (2017) found three categories of ACEs, emotional abuse, household substance abuse, and household mental illness, were the strong risk factors for moderate to heavy drinking and drug use in adulthood. Since the years of adolescence is the passageway between childhood and adulthood, substance use could start early in the adolescent years to use as a potential unhealthy coping mechanism for feelings of depression or anxiety.

Role of Social Support

Social support has been broadly defined as the exchange of resources, specifically assistance and functions, between two individuals that are intended to enhance the wellbeing of the recipient (Shumaker and Brownell 1984). It is considered a coping resource, which is something people draw from when dealing with stressors (Thoits 1995). There are four major defining attributes of social support based on seminal work by House (1981) in which supportive behaviors or acts can be categorized under: 1) emotional support (provision of trust, caring, love, and empathy); 2) informational support (information and advice to help an individual to address issues during stressful times); 3) instrumental support (provision of tangible goods and services for direct assistance); and 4) appraisal support (communication of information for self-evaluation or constructive feedback and affirmation) (House 1981; Heaney and Isreal 2008).

Research shows that having social support can help those later in life who have previously experienced ACEs. For example, family communication and social support could buffer the association between ACEs and suicidal behaviors (Lensch et al. 2021), and social support itself is negatively correlated with suicidal ideation and behavior (Gómez-Tabares et al. 2022). People with depression who have low levels of perceived social support have worse

depression symptoms, recovery, and problems with social functioning (Wang et al. 2018).

However, what is missing from research is an understanding of how social support at the time of experiencing ACEs might protect against future depression and/or anxiety.

Research in the sociology of health suggests that having access to social support at the time of experiencing ACEs has the potential to be impactful. Social relationships can have a causal impact on health, especially if an individual's social networks can regulate behaviors and emotions in ways that promote health (House, Umberson, and Landis 1988). For children experiencing ACEs, having support from their social network could affect their emotional development in a more regulatory or even positive trajectory. In addition, direct social control from their social network could mitigate health damaging behaviors, such as early substance abuse, and facilitate positive coping mechanisms (House, Umberson, and Landis 1988).

Moreover, the experience of ACEs could be highly stressful for an adolescent's mental health and be detrimental to an adolescent's sense of worth and personal development. A lack of social support may create a sense of vulnerability (Chi et al. 2022), but a tangible social support system can be beneficial and necessary for those that experienced or are experiencing ACEs. Having social support systems at the time of experiencing ACEs might be beneficial in a few ways. One of which is their stress levels may be lower by knowing there is someone there for the adolescent. People who are under psychological distress and having depression or anxiety disorders are commonly accompanied by unhealthy lifestyle behaviors, such as over- or under-indulgence of food, sleep, drinking or smoking; social support system of the children may be concerned if they see them exhibiting such behaviors and could try to comment or intervene leading to potential success, which can avert or decrease symptoms of stress, depression, and anxiety (Thoits 2011).

Another potential mechanism is the child could have an increased sense of self-esteem or self-worth because of the demonstration of care and encouragement from support systems. Individuals with low self-esteem are prone to depression regardless of good or stressful circumstances and they are more prone to believe that they are not in control of events (Baumeister et al. 2003). Lastly, assistance by offering instrumental support, such as behavioral or material assistance, can help with practical problems especially for families that may struggle with food or materials for school (Thoits 2011).

Social support are usually actions performed by intimate others (i.e. family members, relative, friends) or people with less personal relationships (Thoits 2011), but it is a very important coping resource with previous evidence of buffering effects (Kessler and McLeod 1985). The actions provided include emotional, informational, instrumental, and appraisal assistance, which can all have positive impact on both physical and mental health. The demonstration of care, love, encouragement, and sympathy from emotional support could give an elevated self-esteem, thereby having a better sense of belonging; informational assistance can help problem solving or seeking relevant, helpful resources for issues; instrumental assistance can be very useful in times of dire financial situations or help with practical tasks; and advice or information from appraisal assistance can help solve problems along with affirming a sense of control or mastery over life (Thoits 2011). If children have access to one, some, or all of the functions of social support, the impact of ACEs can be possibly mitigated.

ACEs in Sociology

The issue of ACEs is commonly examined in psychology, psychiatry, or children's health literature, but the examination of ACEs from a sociological perspective is fairly limited, especially with the focus on adolescent years. Stritzel (2022) explored how peer influences, contexts of the neighborhood, and previous exposure to ACEs shapes the adolescents' substance use, finding that ACEs does strengthen the association between peer substance use and smoking mainly in neighborhoods with low collective efficacy, and adolescents with a history of ACEs are more likely to be among peer settings and surrounded with friends that use substances, such as alcohol, cigarettes, and other drugs (Stritzel 2022). Jones, Hoffman, and Wheelock (2024) examined Florida high school students and if ACEs were associated with delinquency along with the differences between rural/urban/suburban students and if their environment settings could act as a moderating effect between ACEs and delinquency. Their study revealed that youth who reside in rural settings and have been exposed to ACEs have more delinquent behaviors compared to youth that have experienced ACEs and live in urban/suburban areas, but the delinquency behaviors from those youth in urban/suburban areas are more effected by ACEs (Jones, Hoffman, and Wheelock 2024). Overall, greater attention to ACEs by sociologists is needed.

Expectations for Current Research

In my thesis, I explore the association between childhood exposure to 6 categories of ACEs and adolescent mental health outcomes. Similar to past research that has studied adverse experiences in childhood and adolescent mental health outcomes (Edmunds and Alcaraz 2021; Lee et al. 2020), I expect ACEs in childhood will be negatively associated with both adolescent depression and anxiety. Additionally, my thesis examines if having access to social support can

create a buffer to moderate the negative association between ACEs and adolescent mental health outcomes. While there is no previous research on social support at the time of ACEs and adolescent mental health outcomes, I expect having a positive social support system during the time of experiencing ACEs can help moderate potential future mental health outcomes in youth due to the previous literatures that have delineated the benefits of social support.

DATA and METHODS

This thesis used longitudinal data from The Future of Families and Child Wellbeing Study (FFCWS), previously known as The Fragile Families and Child Wellbeing Study. For the baseline survey, collected between 1998 and 2000, researchers sampled 4,898 children born at hospitals in 20 large U.S. cities (Reichman et al. 2001). At the time of the child's birth, both the mother and father completed surveys that included questions about their relationships, health behaviors, social support, demographics and housing, social programs, education and employment. Follow-up surveys were conducted at one-, three-, five-, nine-, fifteen-, and twenty-two-year intervals. For the purpose of this research, I drew data from the baseline mother survey, year nine mother survey, and the year fifteen children survey.

My analytical sample uses the baseline mother survey because various time invariant characteristics, such as the mother's race, were measured at baseline only. In addition, the social support questions for children were only available in the year 9 mother's survey. The social support variables at year 9 allow me to examine both the adverse childhood experiences that year and the potential influence of social support during those negative experiences. The adolescent mental health outcomes are also only available at the year fifteen children survey, where the youth him or herself self-reports answers for specific survey questions that may indicate symptoms of depression or anxiety.

FFCWS is appropriate to examine the research questions as the longitudinal nature allows me to analyze the association between adverse experiences during late childhood and adolescent mental health. While FFCWS data are not nationally representative because unmarried mothers were oversampled at the baseline of the study (Reichman et al. 2001) and the sampling frame

was restricted to urban areas, the longitudinal nature data with rich measures of ACEs and social support allow for needed investigations on the long-lasting impacts of negative experiences during childhood. I discuss limitations related to generalizability in the conclusion section.

Outcome Variables

I used data from the year 15 children survey to create two variables that capture adolescent depression and anxiety. The measure of depression used responses to the following five statements from the Center for Epidemiologic Studies Depression Scale (CES-D) that are validated and have been used in similar research (Edmunds and Alcaraz, 2021): (1) “I cannot shake off the blues, even with help from my family and my friends,” (2) “I feel sad,” (3) “I feel life is not worth living,” (4) “I feel depressed,” and (5) “I feel happy”. For each statement, response options consisted of a Likert scale ranging from 3 for strongly agree, 2 for agree, 1 for disagree, and 0 for strongly disagree. This coding is maintained for the first four statements; for the last variable, I reverse coded the responses so that higher values represent greater depression. To create the total adolescent depression score I added these the five variables together, creating a total depression that ranges from 0 to 15.

The adolescent anxiety scale is similar to the depression scale. The measure of anxiety is drawn from the modified Brief Symptom Inventory (BSI 18), which include the following six statements: (1) “I have spells of terror or panic,” (2) “I feel tense or keyed up,” (3) “I get suddenly scared for no reason,” (4) “I feel nervous or shaky inside,” (5) “I feel fearful,” and (6) “I feel so restless I can’t sit still.” For each statement, response options were 3 for strongly agree, 2 for agree, 1 for disagree, and 0 for strongly disagree. I combined these 6 items together to

create the adolescent anxiety scale that ranges from 0 to 18 with higher scores representing greater levels of anxiety.

Figure 1 presents a histogram that shows the distribution of depression scores. Approximately 27% of the respondents had a score of 0 on the depression scale, around 47% had a score between 1 to 4, and roughly 26% had a score of 5 and higher. Figure 2 presents a histogram that shows the distribution for the anxiety outcomes. 14% of youth had a score of 0 on the anxiety scale, 39% had a score between 1 to 4, and 47% reported a score of 5 or more.

[Figure 1 and Figure 2 Here]

Adverse Childhood Experiences and Social Support

I considered six distinct categories of ACEs: (1) child physical abuse, (2) child emotional abuse, (3) child physical neglect, (4) child emotional neglect, (5) household incarceration, and (6) maternal depression. The first four categories involve the abuse and neglect aspect of ACEs, and the last two categories focus on household dysfunction, specifically looking at potential criminal behaviors and child exposure to mental illness. The individual survey questions that I used to create each category are described in Table 1.

[Table 1 Here]

For each of the adverse experiences mentioned in Table 1, I created a dichotomous variable. If the mother reported any occurrence of a particular adverse experience within the past year, I coded the child as 1. If the mother reported the child had never experienced a particular ACE, I coded the child as a 0. Additionally, because I am specifically looking at the potential moderating effects of social support, which were only captured at year 9, if the mother reported

that a child had previously experienced a given ACE but not in the past year, then I also coded the child as a 0 for that ACE. I then summed the final six variables to create a count of ACE categories that ranged from 0 to 4, with 0 indicating no ACEs, 1 indicating the child experienced one category of ACEs, 2 indicating the child experienced two categories of ACEs, 3 indicating the child experienced three categories of ACEs, and 4+ indicating child experienced 4 to 6 categories of ACEs. The descriptive statistics for the ACEs categories are shown in Table 2. About 6% of the children experienced 0 ACEs, 21% experienced 1 ACEs, 47% experienced 2 ACEs, 19% experienced 3 ACEs, and around 7% experienced 4 to 6 ACEs. Additional descriptive statistics for the overall ACEs distribution are found in Table 3.

[Table 2 and Table 3 Here]

My measure of social support is from the year 9 survey, the only wave when child's social support questions were available. The child's mother, not the child, answered a series of questions related to access to social support. The questions asked about different sources of support that the child could ask for help or advice. Specifically, mothers were asked "Suppose {child} had a problem. Whom might {the child} ask for help or advice other than you?". The mothers were then asked about a series of possible sources of assistance: father; grandparents on either the mother's or the father's side; other relatives; and friends, neighbors, or co-workers. For each source of support, I created a dichotomous variable (1=yes, could ask this source of support, 0=no, could not ask this source of support). I then created a variable that captures whether the respondent had low, medium, or high levels of social support with low social support ranging from a 0 to 1 source, medium social support ranging from 2 to 3 sources, and high social support when there were 4 or 5 sources.

Table 4 reports descriptive statistics of aspects of social support, which includes help from each source and each level of social support the primary caregiver reported at year 9. Overall, almost half of respondents reported low levels of support or help from 0 to 1 source; about one-third reported medium levels of support or help from 2 to 3 sources; and one-fifth of the participants reported high social support that includes help either from 4 sources or help from all sources.

[Table 4 Here]

Control Variables

Demographic control variables include mother's race/ethnicity (non-Hispanic White, Hispanic, African American, and other race), mother's education (less than high school, high school, some college, and college+), mother's marital status (married or not married to the child's father at year 9), mother's household income (divided by 10,000), child's self-reported age (year 15 survey), child's race/ethnicity (non-Hispanic White, Hispanic, African American, and other race), child's gender, child's health that was reported by primary caregiver, and whether the mother received any public assistance in the past twelve months at year 9.

To examine early signs of health issues or potential struggles of health problems, I created a variable to measure the child's health, which is a scale that ranges from 1 to 5: 1 indicating excellent health, 2 very good, 3 good, 4 fair, and 5 poor. By looking at whether the mother is a recipient of public assistance, this can help determine material hardships experienced by the mother and her emotional struggles with financials may impact the child while the child could passively experience the material aspect of hardship as well. If the mother received any

public assistance, Supplemental Nutrition Assistance Program (SNAP) or food stamps and Temporary Assistance for Needy Families (TANF) or welfare (cash assistance), in the past twelve months of the year 9 survey, I created a dichotomous variable to capture whether she received public assistance (1=yes) or did not receive any public assistance (0=no).

Table 5 presents overall descriptive statistics for all variables. About 6% of the children had 0 ACEs, 21% had 1 ACEs, 47% had 2 ACEs, 19% had 3 ACEs, and 7% had 4 to 6 ACEs. The mean number of depressive symptoms experienced by youth in this sample is approximately three on a scale of 0 to 15. The average number of anxiety symptoms experienced by the same sample is roughly 4.88 on a scale of 0 to 18. The mother earns on average around forty-seven thousand U.S. dollars as the household income. The race and ethnicity composition of the sample of both the mother and the child is half African American, around a quarter is Hispanic, roughly one-fifth is non-Hispanic White, and under ten percent is other race. The majority of the mothers in the sample had a high school education, 30% had less than a high school education, 26% had some college or technical schooling, and 11% had a college or graduate degree. Most of the mothers (70%) are unmarried or single. About 51% of the youth are male and 49% of the youth are female, and they are on average 15 years old at the time of the interview. The child's health status reported by the mother at year 9 is mostly excellent (56%), 28% reported very good, 13% as good, 3% as fair, and almost no reports of poor health. Roughly 13% of the mother reported she had received some form of public assistance around the last 12 months of the year 9 survey.

[Table 5 Here]

Analytic Strategy

To examine associations between ACEs during late childhood and adolescent mental health outcomes, I first estimate a series of OLS regression models. I first estimate bivariate associations, examining the relationship between ACEs categories at year 9 and depression symptoms at year 15 without controls. I then estimate a multivariable OLS regression model that adds in all the controls. I then estimate the same models for adolescent anxiety. Finally, to look at the potential mediating effects of social support, I estimate OLS regression models for each outcome (year 15 depression and anxiety) that include an interaction between ACEs and social support level, plus all control variables. In all models, to test for non-linear associations, I ran regression models with number of ACEs as a categorical variable.

FINDINGS

Table 6 presents result from OLS regression models where adolescent depression is the outcome. Model 1 shows the unadjusted association between the number of ACEs categories (0, 1, 2, 3, 4+) and depression. In Model 1, relative to those who did not experience any ACEs, exposure to adverse childhood experience was associated with a .67 increase in depression score when the child experienced 1 ACEs, .71 increase in score when 2 ACEs were experienced, 1.15 increase score when 3 ACEs were experienced, and 1.35 increase in depression score for 4-6 ACEs at age 15 ($p \leq .001$). Model 2 adds all the demographic controls for both mother and children and maintains statistical significance for the association between ACEs and depression score where when the youth experienced 1 ACEs at year 9, they had a .83 increase in depression score at year 15; when 2 ACEs were experienced as a child, .82 increase in depression score in adolescent; 1.15 increase in depression score when 3 ACEs were experienced as a child; and 1.25 increase in depression score as adolescent when 4 to 6 ACEs were experienced as a child ($p \leq .001$).

The results also show that depression score at age 15 is lower if the mother of the teenager completed some college or has a college degree compared to mother of the teenager who did not graduate high school. On the other hand, depression score is higher if the teenagers are girls. All the health status categories of the children, besides good, are statistically significant, showing an increase in depression score as the health status becomes poorer. In addition, holding all the covariates constant, living in a household that have received public assistance in the past year is associated with a .51 ($p \leq .01$) increase in depression score relative to adolescents in households that did not receive public assistance in the past year.

[Table 6 Here]

Figure 3 graphs the estimates from Table 6, showing that as the respondent experiences more categories of ACEs, depression score increases. The predicted score for depression when the child experiences 0 ACEs is about 2.13 and the predicted score for depression increases as the child is exposed to more adverse experiences. A child who experiences four to six ACEs has a predicted score for depression of 3.38.

[Figure 3 Here]

Table 7 presents results from two OLS regression models where anxiety is the outcome. Model 3 shows no statistically significant difference in anxiety between those who did not experience any ACEs and those exposed to 1 or 2 categories of ACEs. However, relative to those who did not experience any ACEs, exposure to 3 categories of adverse childhood experiences at year 9 is associated with a .86 increase in anxiety score at year 15, and exposure to 4-6 categories of ACEs at year 9 is associated with a .96 increase in anxiety score as an adolescent ($p \leq .05$). Model 4 looks at the same ACEs scale with anxiety but adding all the control variables. Even after accounting for these other characteristics the findings remain similar.

Similar to the depression results, teenagers with mothers who have completed at least some college show a statistically significant decrease of .48 ($p \leq .05$) in anxiety score; and teenage girls are associated with a statistically significant increase of .64 ($p \leq .001$) in anxiety score compared to teenage boys. For anxiety, the health status rated good ($b = .58$, $p \leq .01$) and poor ($b = 5.11$, $p \leq .05$) are statistically significant and showing an increase in anxiety score as the health status becomes poorer. Unlike the depression results, public assistance received in the past year is not associated with anxiety.

[Table 7 Here]

Figure 4 presents the predicted anxiety scores by the number of ACEs from the estimates in Table 6. The figure shows the minimal differences in anxiety scores for children who have been exposed to 0, 1, or 2 ACEs, but there is significance shown on the respondents who have experienced 3 or 4 more ACEs categories. The predicted anxiety score for those who experienced 3 to 4 or more ACEs is 5.20 to 5.21 respectively.

[Figure 4 Here]

To understand whether social support moderates associations between experiences of ACEs and adolescent depression or anxiety, I estimated regression models with an interaction between ACEs and social support level. Table 8 displays the results from these models, and Figures 5 and 6 display these estimates as predicted scores. Overall, the results show no significant interaction effect, suggesting that social support during the experiencing of ACEs at year 9 does not have a moderating effect on adolescent depression or anxiety.

[Table 8 Here]

[Figure 5, 6 Here]

DISCUSSION

Adverse childhood experiences are common and linked to negative health consequences such as mental health conditions, drug use, and detrimental disease conditions (Schilling, Aseltine, and Gore 2007; Felitti et al. 1998). With childhood and adolescence being two of the most critical developmental stages of a person, it is especially pivotal to understand how ACEs affect the mental health of a person during these stages. Additionally, research that investigates actions that can be done to alleviate the impact of ACEs is needed. Research suggests that social support is one of the factors that can help people who have previously experienced ACEs, but previous studies have not explored if having access to social support at the time of ACEs can moderate the effects of ACEs.

The empirical results from this research indicate that ACEs experienced at age 9 are associated with worse mental health outcomes at age 15. Specifically, there is a strong association between adverse childhood experiences and adolescent depression even after controlling for demographic variables from both the mother and the child. Similarly, there is an association between multiple categories of adverse childhood experiences and adolescent anxiety after controlling for demographic variables. Given the average number of depression symptoms experienced by youth is roughly 3 and the average number of anxiety symptoms experienced by youth is 4.88, there is a meaningful association between ACEs and adolescent depression and anxiety. For example, for the youths who had experienced anywhere between 3 to 6 ACEs at year 9, depression scores increased by 1.15 and anxiety scores increased by .93, relative to adolescents who did not experience any ACEs. Additionally, due to the potential beneficial effects of social support on physical and mental well-being, I examined interactions between

ACEs and social support, but I did not find a statistically significant interaction between social support and ACEs.

The findings suggest experiencing various abuse, neglect, household dysfunctions, and potentially witnessing parental depressive behaviors during childhood does emotionally damage the children's mental development leading to worse mental health conditions in adolescence, which is consistent with prior research on ACEs and adolescent mental health outcomes regarding depression and anxiety (Lee et al. 2020; Elmore and Crouch 2020). On the contrary, the findings on social support are inconsistent with previous research on social support that stated social support as a useful coping resource (Thoits 1995) and potentially have an effect on alleviating psychological distress and mitigating a sense of vulnerability (Chi et al. 2022).

There are other notable findings from this study. First, children with mothers who have at least some college education have a decreased score for both depression and anxiety scale compared to mothers who did not complete high school. Second, teenage females are more likely to have a higher depression or anxiety score than teenage males. This difference could be due to that women have a significantly higher risk than men in terms of anxiety and mood disorders (Kessler et al. 2005). Third, I found different results between depression and anxiety score in regard to households that received public assistance in the year 9. For the public assistance differences, previous research by Edmunds and Alcaraz (2021) who studied childhood material hardship and adolescent mental health found hardships experienced at age 9 and 15 do influence depression and anxiety age 15 (Edmunds and Alcaraz 2021). The findings from this study are similar in the depression aspect, yet the lack of association between anxiety score and the public assistance received in the current research creates a disparity from the previous research. This disparity could be due to the study by Edmunds and Alcaraz (2021) included more aspects of

hardships, such as food, housing, utilities, and medical insecurities, but this study looked solely at receipt of public assistance.

Limitations

There are a few limitations to my research. First, this thesis only focused on ACEs and social support when the children were approximately 9 years old. This is because the year 9 survey is the only wave when measures of child's access to support were available. The positive aspect of exploring year 9 is that the children are more cognizant of their environment and parental behaviors compared to if they were in early childhood. However, other ages are also important to explore in a longitudinal aspect. Also, because data are only available at year 9, I am unable to study the potential cumulative effects of ACEs throughout childhood. Second, there is a plethora of survey questions offered by FFCWS data, but there are no survey questions that could address all ACEs categories. For example, FFCWS lacks measures of sexual abuse or the perceived unfair treatment by race/ethnicity potentially due to discrimination. Third, the data is not representative, urban sample that oversampled non-married mothers; the extent to which these findings are generalizable to rural or suburban areas is unknown. Fourth, the social support measures within the FFCWS dataset may not encompass the multitudes of social support that could have a greater impact on children experiencing ACEs. All the social support questions examined in this thesis surrounds the main theme that child could ask family member, relatives, and others for "help" or "advice", which could be emotional or instrumental support, but there are no specifications and other attributes of social support, informational or appraisal support, were not available to explore. It is possible that different measures of support may find that social support can lessen the effects of childhood ACEs on adolescent mental health. Lastly, the

ACEs were self-reported by mothers. Due to desirability bias, many parents may underreport negative behaviors. They also may forget or misunderstand their actions as non-abusive. As a result, my measure of ACEs likely underestimates the true prevalence of ACEs and the association between ACEs and adolescent mental health outcomes.

Implications

Despite these limitations, this study found an association between adverse childhood experiences, such as abuse, neglect, and household dysfunction, and worse adolescent mental health outcomes in regard to depression and anxiety. Worse mental health outcomes could well affect adolescent school achievement and lead to persistent mental health problems, negative coping mechanisms, and worse socioeconomic status in adulthood. While there is previous research that looks at ACEs and other factors, such as self-control (Jones, Pierce, and Chapple 2008), these findings further the current literature of ACEs and mental health outcomes.

Future research should examine ACEs in different childhood and adolescent years and other health outcomes like physical issues or other mental disorders. In addition, future research should examine a wider range of social support measures, including emotional and financial, to further explore the potential moderating effects of social support.

The results emphasize the importance of protecting children from toxic environments, and that the schools and communities that interact with children should be aware of signs that a child may be abused. The issue of ACEs should not be taken lightly considering the long reaching consequences of ACEs on mental health. Moreover, the results further understandings of the social determinants of mental health outcomes. Negative mental health outcomes, including depression or anxiety, are commonly attributed to biological factors, such as genetics

or physical health conditions, but my study adds to literature showing that social conditions are important for understanding mental health outcomes.

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Figure 1. Histogram of Adolescent Depression

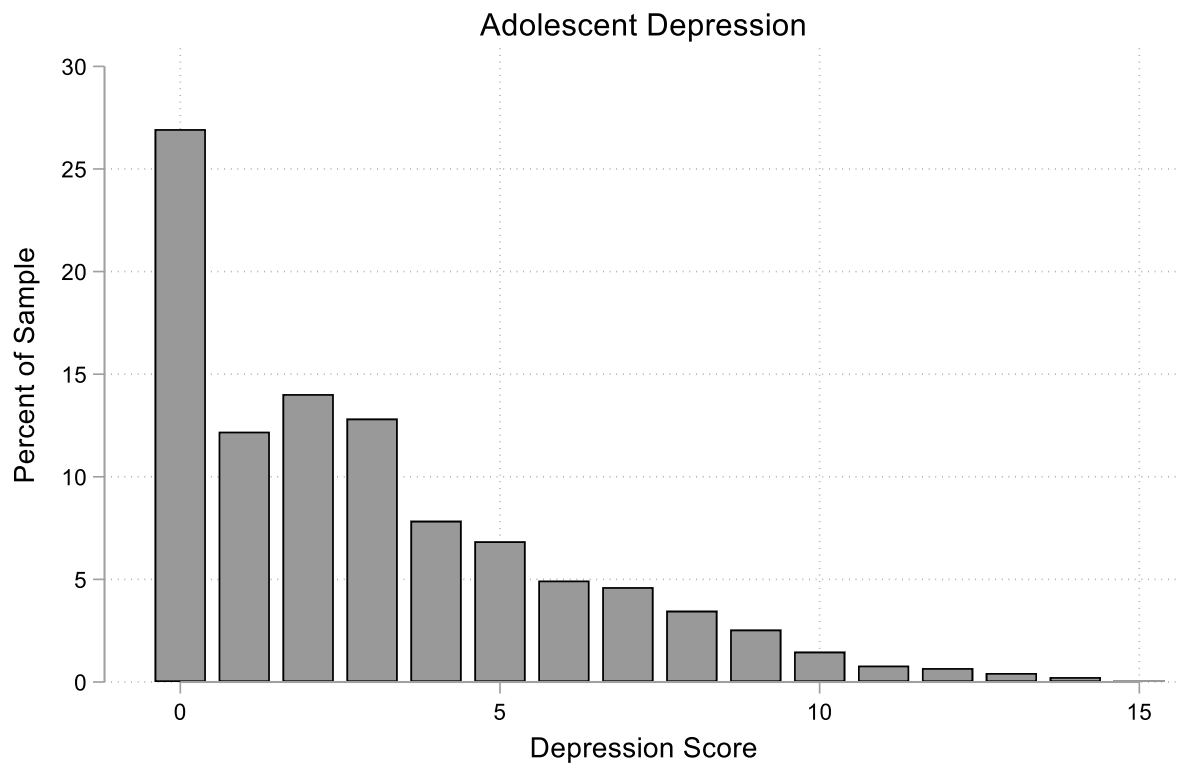


Figure 2. Histogram of Adolescent Anxiety

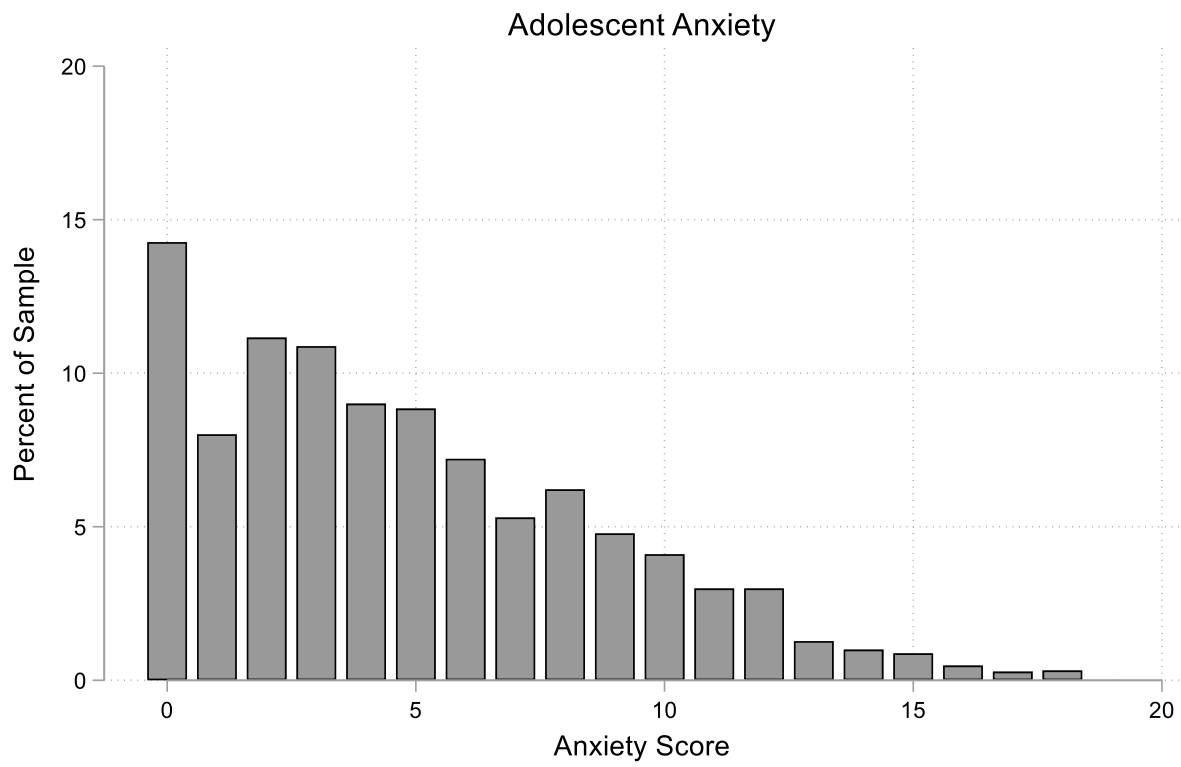


Figure 3. Predicted Depression Score by Number of ACEs

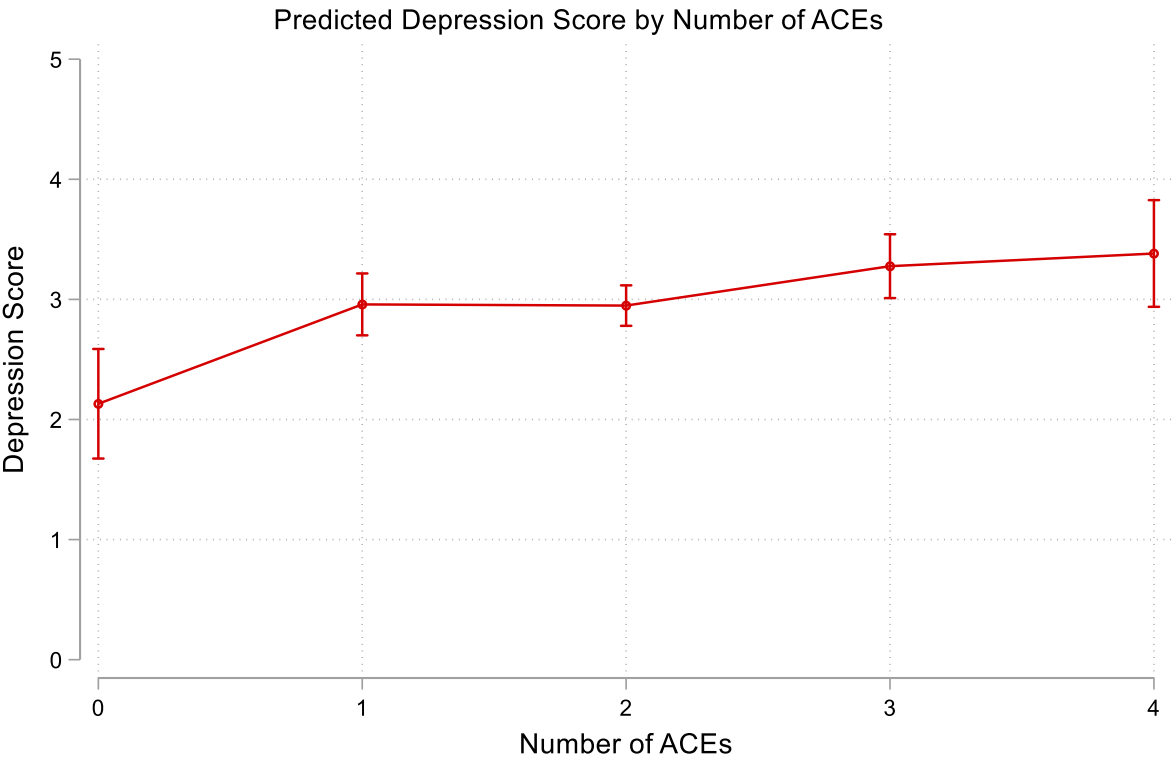


Figure 4. Predicted Anxiety Score by Number of ACEs

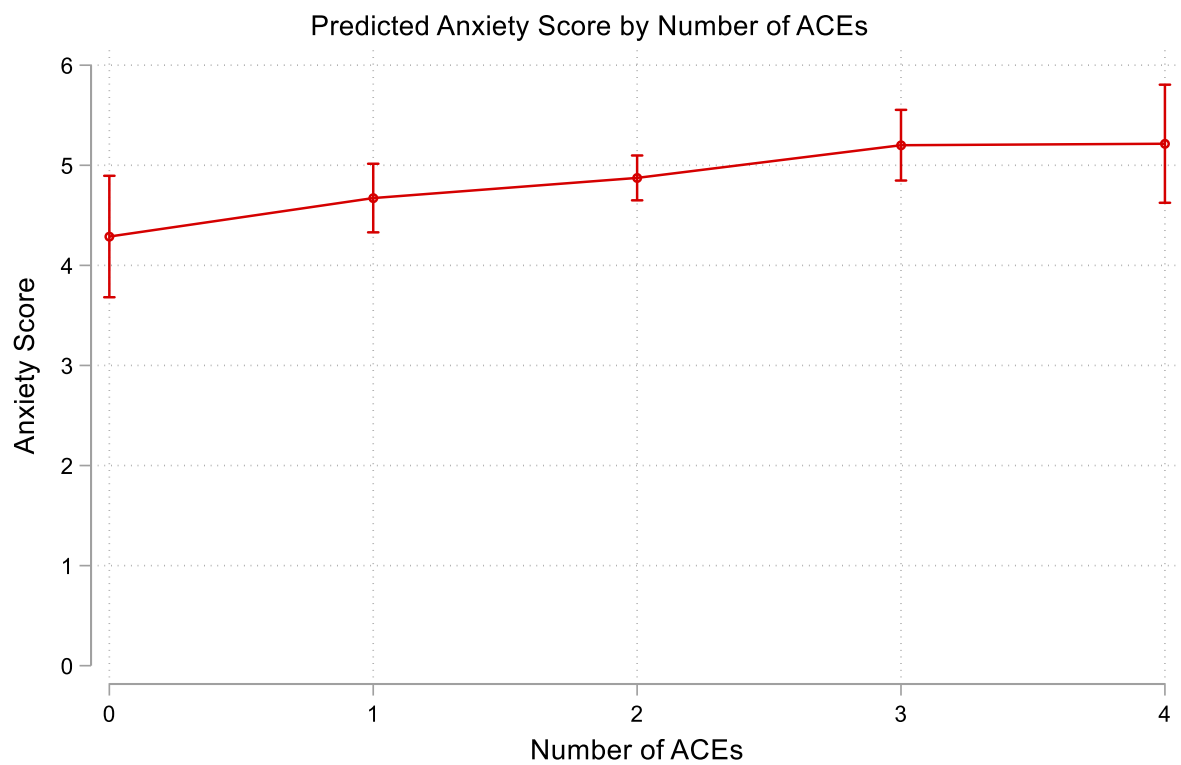


Figure 5. Predicted Depression Score by ACEs and Social Support Level

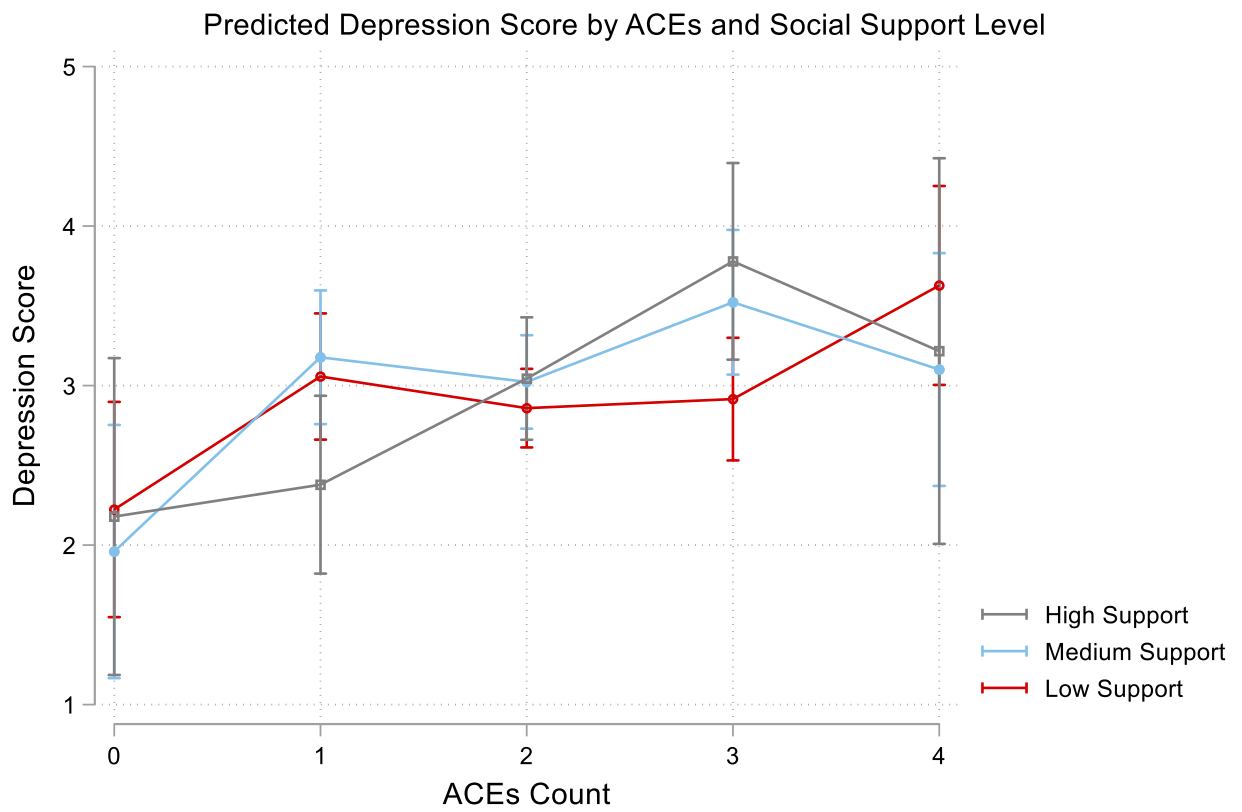


Figure 6. Predicted Anxiety Score by ACEs and Social Support Level

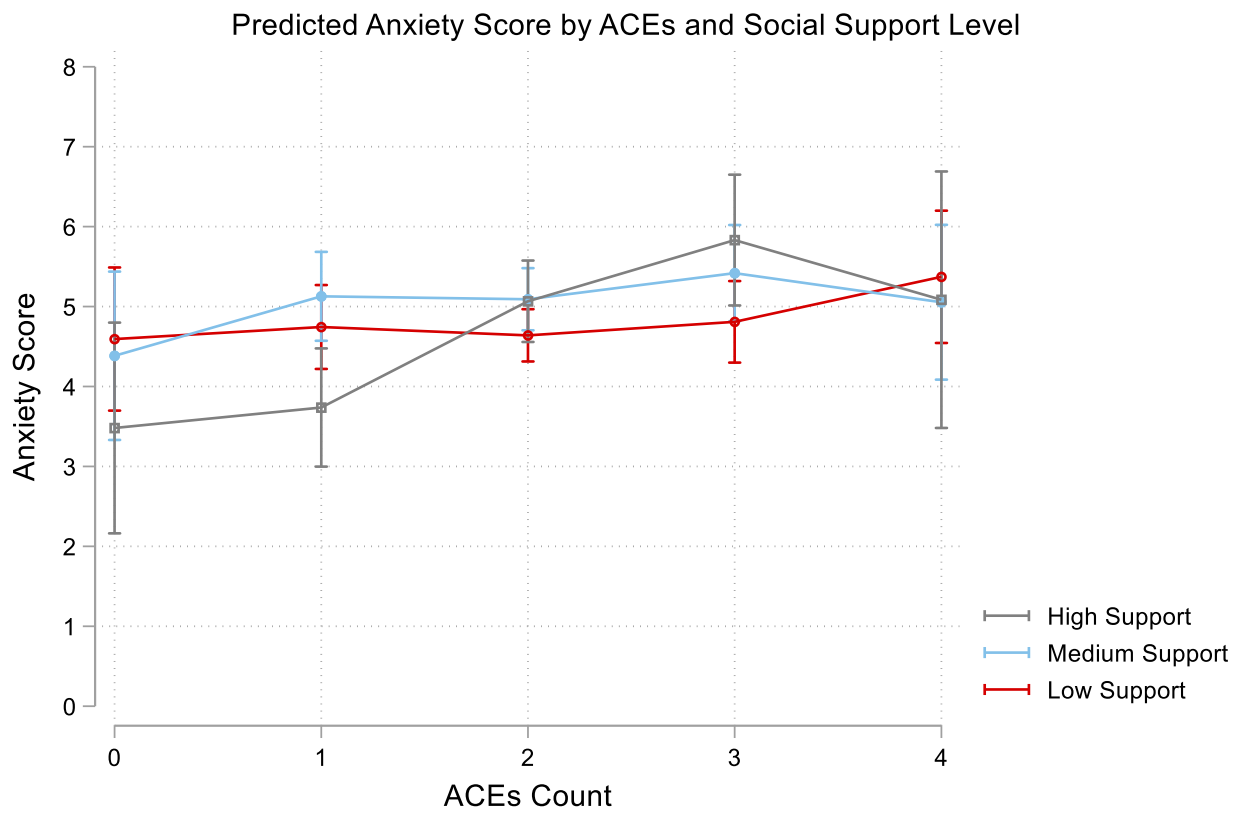


Table 1. Individual ACEs Survey Questions

Categories	Questions	Had experiences out of the total sample (N=2,509)
Physical Neglect	1. “was not able to make sure (child) got the food he/she needed” 2. “not able to make sure (child) got to a doctor or hospital when needed” 3. “were so drunk/high that you had a problem taking care of your child”	5.90%
Emotional Neglect	1. “so caught up with your own problem that you were not able to show love to your child”	12.28%
Physical Abuse	1. “shook child” 2. “hit child on bottom with a hard object” 3. “spanked him/her on the bottom with your bare hand” 4. “slapped child on hand, arm, or leg” 5. “pinched child”	67.04%
Emotional Abuse	1. “ever swore or cursed at child” 2. “shouted, yelled or screamed at child” 3. “said you would send child away or kick child out of the house” 4. “called him/her dumb or lazy or some other name like that” 5. “threatened to spank or hit child but did not actually do it”	91.11%
Parental Incarceration	1. (Constructed) Mother and father reports, father in jail at nine-year interview	7.17%
Parental Depression	1. Mother meets depression criteria at year-nine	16.98%

Table 2. Descriptive Statistics of ACEs by Category

Categories of ACEs	Percent
0	6.46
1	20.69
2	46.83
3	19.13
4+	6.90

Note: N=2,509

Table 3. Descriptive Statistics of Overall ACEs Distribution

Number of ACEs	Percent
0	6.46
1	20.69
2	46.83
3	19.13
4	5.78
5	1.08
6	0.04

Note: N=2,509

Table 4: Descriptive Statistics for Social Support (N = 2,509)

	Mean/Prop.
<u>Support</u>	
Help from no sources	.05
Help from 1 source	.41
Help from 2 sources	.20
Help from 3 sources	.14
Help from 4 sources	.10
Help from all sources	.09
<u>Support Levels</u>	
Low	.46
Medium	.34
High	.20

Table 5: Overall Descriptive Statistics (N = 2,509)

	Mean/Prop.	SD
<u><i>ACEs Count</i></u>		
0	.06	
1	.21	
2	.47	
3	.19	
4+	.07	
Youth depression scale	2.99	3.00
Youth anxiety scale	4.88	3.95
Mother's household income	4.67	5.12
<u><i>Mother's race/ethnicity</i></u>		
Non-Hispanic White	.22	
African American	.51	
Hispanic	.24	
Other	.03	
<u><i>Mother's education</i></u>		
Less HS	.30	
HS	.32	
Some Coll, Tech	.26	
College or Grad	.11	
Marital status	.70	
Child's gender	.49	
Youth age at time of Youth interview (years)	15.48	.68
<u><i>Child's race/ethnicity</i></u>		
Non-Hispanic White	.18	
African American	.50	
Hispanic	.25	
Other	.08	
<u><i>Child's health status (Y9)</i></u>		
Excellent	.56	
Very good	.28	
Good	.13	
Fair	.03	
Poor	.00	
Public assistance (Y9)	.13	

**Table 6: OLS Regression Results Predicting Depression Symptoms at Age 15.
(N=2,509)**

	Model 1 <i>Coef.</i>	Model 2 <i>Coef.</i>
1 ACEs	0.67* (0.27)	0.83** (0.27)
2 ACEs	0.71** (0.25)	0.82*** (0.25)
3 ACEs	1.15*** (0.27)	1.15*** (0.27)
4+ ACEs	1.35*** (0.33)	1.25*** (0.33)
Mother's Household income		-0.03 (0.01)
Mother's race: African American		0.30 (0.34)
Mother's race: Hispanic		0.28 (0.30)
Mother's race: Other		-0.05 (0.41)
Mother's education: HS		-0.05 (0.15)
Mother's education: Some Coll, Tech		-0.44** (0.17)
Mother's education: College or Grad		-0.47 (0.26)
Marital status: not married		0.02 (0.15)
Youth age at time of Youth interview		0.08 (0.09)
Gender: Girl		0.66*** (0.12)
Child's race: African American		-0.47 (0.36)
Child's race: Hispanic		-0.21 (0.31)
Child's race: Other		0.09 (0.32)
Child's health: Very good		0.29*

		(0.14)
Child's health: Good		0.35
		(0.18)
Child's health: Fair		0.80*
		(0.36)
Child's health: Poor		3.50*
		(1.71)
Public assistance: Yes		0.51**
		(0.18)
Constant	2.20***	0.68
	(0.23)	(1.38)
Observations	2,509	2,509

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 7: OLS Regression Results Predicting Anxiety Symptoms at Age 15. (N=2,509)

	Model 3	Model 4
	<i>Coef.</i>	<i>Coef.</i>
1 ACEs	0.21 (0.35)	0.39 (0.35)
2 ACEs	0.44 (0.33)	0.60 (0.33)
3 ACEs	0.86* (0.36)	0.93** (0.36)
4+ ACEs	0.96* (0.43)	0.93* (0.43)
Mother's Household income		-0.02 (0.02)
Mother's race: African American		-0.01 (0.45)
Mother's race: Hispanic		0.36 (0.39)
Mother's race: Other		-0.25 (0.54)
Mother's education: HS		-0.10 (0.20)
Mother's education: Some Coll, Tech		-0.48* (0.22)
Mother's education: College or Grad		-0.42 (0.34)
Marital status: not married		0.13 (0.20)
Youth age at time of Youth interview		-0.11 (0.12)
Gender: Girl		0.64*** (0.16)
Child's race: African American		-0.46 (0.48)
Child's race: Hispanic		-0.22 (0.41)
Child's race: Other		-0.10 (0.42)
Child's health: Very good		0.30 (0.18)

Child's health: Good		0.58*
		(0.24)
Child's health: Fair		0.92
		(0.48)
Child's health: Poor		5.11*
		(2.27)
Public assistance: Yes		0.26
		(0.24)
Constant	4.40***	5.87**
	(0.31)	(1.84)
Observations	2,509	2,509

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 8: Predicting Depression and Anxiety Score by ACEs and Social Support Level. (N=2,509)

	Depression <i>Coef.</i>	Anxiety <i>Coef.</i>
1 ACEs	0.83* (0.40)	0.15 (0.53)
2 ACEs	0.64 (0.37)	0.05 (0.49)
3 ACEs	0.69 (0.40)	0.22 (0.53)
4 ACEs	1.40** (0.47)	0.78 (0.62)
Support Level: Medium	-0.26 (0.53)	-0.21 (0.70)
Support Level: High	-0.04 (0.61)	-1.11 (0.81)
Low Social Support by 0 ACEs	0.00 (0.00)	0.00 (0.00)
Medium Social Support by 0 ACEs	0.00 (0.00)	0.00 (0.00)
High Social Support by 0 ACEs	0.00 (0.00)	0.00 (0.00)
Low Social Support by 1 ACEs	0.00 (0.00)	0.00 (0.00)
Medium Social Support by 1 ACEs	0.38 (0.61)	0.59 (0.80)
High Social Support by 1 ACEs	-0.63 (0.70)	0.11 (0.93)
Low Social Support by 2 ACEs	0.00 (0.00)	0.00 (0.00)
Medium Social Support by 2 ACEs	0.43 (0.56)	0.66 (0.75)
High Social Support by 2 ACEs	0.23 (0.65)	1.54 (0.87)
Low Social Support by 3 ACEs	0.00 (0.00)	0.00 (0.00)
Medium Social Support by 3 ACEs	0.87 (0.61)	0.82 (0.81)
High Social Support by 3 ACEs	0.91 (0.71)	2.14* (0.95)

Low Social Support by 4+ ACEs	0.00 (0.00)	0.00 (0.00)
Medium Social Support by 4+ ACEs	-0.26 (0.72)	-0.11 (0.96)
High Social Support by 4+ ACEs	-0.37 (0.92)	0.83 (1.23)
Mother's age (years)	0.01 (0.01)	-0.01 (0.01)
Mother's Household Income	-0.03 (0.01)	-0.02 (0.02)
Mother's race: African American	0.31 (0.34)	-0.02 (0.45)
Mother's race: Hispanic	0.27 (0.30)	0.35 (0.39)
Mother's race: Other	-0.08 (0.41)	-0.28 (0.54)
Mother's education: HS	-0.07 (0.15)	-0.09 (0.20)
Mother's education: Some Coll, Tech	-0.45** (0.17)	-0.45* (0.22)
Mother's education: College or Grad	-0.47 (0.27)	-0.28 (0.36)
Marital Status: not married	0.04 (0.15)	0.11 (0.20)
Youth age at time of Youth interview (years)	0.08 (0.09)	-0.11 (0.12)
Gender: Girl	0.66*** (0.12)	0.64*** (0.16)
Child's race: African American	-0.49 (0.36)	-0.49 (0.48)
Child's race: Hispanic	-0.22 (0.31)	-0.25 (0.41)
Child's race: Other	0.07 (0.32)	-0.13 (0.42)
Child's health: Very Good	0.29* (0.14)	0.30 (0.18)
Child's health: Good	0.37* (0.18)	0.61* (0.25)
Child's health: Fair	0.81* (0.36)	0.96* (0.48)

Child's health: Poor	3.34 (1.71)	4.92* (2.27)
Public Assistance: Yes	0.51** (0.18)	0.26 (0.24)
Constant	0.65 (1.43)	6.49*** (1.90)
Observations	2,509	2,509

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05

