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# The Impact of Conventional and Expanded Adverse Childhood Experiences (ACEs) on Juvenile Offending Outcomes

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## Dedications

Starting my doctoral degree as a recent immigrant and mother was no easy feat. However, I got through it with the unrelenting support of my husband, David. It is truly a blessing having you in my life. To my children, Jenzen and Jazarah, thank you for your unwavering love and understanding when mummy was "working all the time." I did it for you. To my parents and my siblings, thank you for believing in me and always encouraging me to keep going when I needed to hear it the most.

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**Contents**

**Abstract**

Previous research has established a correlation between conventional adverse childhood experiences (ACEs) and juvenile offending. However, the possible moderating effect expanded ACEs has on this relationship remains unclear. Using the 2019 Minnesota Student Survey (MSS), the study included 278 youth from juvenile correctional facilities in Minnesota to examine the impact of conventional ACEs on juvenile offending, the impact of expanded ACEs on juvenile offending, and the impact of conventional ACEs on juvenile offending, moderated by expanded ACEs. Findings revealed a statistically significant positive effect of conventional ACEs on juvenile offending. Expanded ACEs had a significant negative relationship with juvenile offending. However, expanded ACEs were not significantly predictive of juvenile offending when controlling for the influence of conventional ACEs. Clinical implications and implications for future research are also discussed.

## Introduction

Everyone experiences stressful events at some time or another. At manageable levels, stress can improve focus, memory, motivation, academic performance, and job performance (Jarinto, 2010; National Scientific Council on the Developing Child [NSCDC], 2014; Pavithra & Sivakumar, 2019; Piefke & Glienke, 2017; Strack et al., 2017). However, toxic stress caused by significant and pervasive adverse situations, particularly those experienced before age 18, has been found to negatively impact later development (Centers for Disease Control and Prevention [CDC], 2020; NSCDC, 2014). Specifically, exposure to adversity prior to age 18 can result in lifelong negative biological, psychological, and social consequences.

The literature on long-term negative effects of exposure to individual childhood adversity is well-established (Browne & Finkelhor, 1986; Finkelhor & Berliner, 1994; Lansford et al., 2007). However, researchers have found that childhood adversities are often highly interrelated and co-occur (Dong et al., 2004; Finkelhor, Ormrod, & Turner, 2009; Finkelhor, Shattuck, Turner, & Hamby, 2013; Finkelhor, Shattuck, Turner, & Hamby, 2015). As such, there is growing interest in examining the effects of multiple childhood adversities on health and wellbeing (Cronholm et al., 2015; Felitti et al., 1998).

One of the current terms used to classify multiple childhood adversities is adverse childhood experiences (ACEs). Felitti et al. (1998) first introduced the concept of ACEs, which they identified as stressors that occur in the home (conventional ACEs), such as childhood neglect, exposure to household dysfunction, and abuse. Cronholm et al. (2015) later added to the definition of ACEs to include community-level stressors (expanded ACEs), such as experiencing racial discrimination, experiencing bullying, living in poverty, and living in unsafe neighborhoods, after they determined conventional ACEs alone did not adequately represent

childhood adversity experienced by multiple sociodemographic groups. Overall, research on multiple adverse events that occur in childhood provides a more thorough assessment of the magnitude and complexity of ACEs and their long-term effects than research on the analysis of individual childhood adversities alone (Cronholm et al., 2015; Felitti et al., 1998).

Even after controlling for factors such as race, gender, sex, and socioeconomic status, there remain a number of negative outcomes linked to ACEs (Cronholm et al., 2015; Felitti et al., 1998). Some of these specific outcomes include brain abnormalities, physical ill health, mental health disorders, school and employment difficulties, substance abuse, and later victimization (Cronholm et al., 2015; De Bellis et al., 1999). Furthermore, the more categories of ACEs accumulated, the greater the risk of long-term negative effects, which can undermine an individual's ability to effectively and efficiently cope with stressors (CDC, 2020). This, in turn, can lead to poor behavioral outcomes, such as juvenile offending (Buffington et al., 2010; Fagan & Novak, 2017).

Juvenile offending is a pervasive and chronic issue that affects both juvenile offenders and society. Moreover, the relationship between conventional ACEs and juvenile offending is well documented (Brown & Shillington, 2017; Buffington et al., 2010; DeLisi et al., 2017; Fox et al., 2015). A dose-response relationship exists between conventional ACEs and juvenile offending outcomes, such that the more categories of these ACEs experienced, the greater the risks of serious and violent offending. Similarly, research conducted on variables now included in the expanded ACEs scale also shows that a positive correlation exists between childhood adversities that occur in the community and juvenile offending outcomes (Barnert et al., 2015; Bender & Losel, 2011; Bogart et al., 2013; Calvert, 2002; Jiang et al., 2011). It is therefore

imperative that clinicians and other stakeholders understand the relationship between ACEs and juvenile offending in order to better serve the youth who experienced these toxic stressors.

The current literature on the simultaneous effects of both conventional ACEs and expanded ACEs on juvenile offending is sparse (Cronholm et al., 2015). Therefore, the purpose of this study was to examine the combined effects of conventional ACEs and expanded ACEs on juvenile offending outcomes in a sample of juvenile offenders in Minnesota. These data highlight the dose-response relationship between both types of ACEs and juvenile offending outcomes. This in turn can potentially aid in the formulation of new and/or integrated treatment approaches specific to addressing both conventional and expanded ACEs.

## Literature Review

### ACEs

ACEs refer to traumatic events that occur prior to age 18 that negatively impact development across the lifespan (Kalmakis & Chandler, 2013). There are currently two categories of ACEs; conventional ACES and expanded ACES. A number of long-term negative effects are associated with the experience of ACEs (CDC, 2020; Felitti et al., 1998). Therefore, in order to potentially reduce the negative effects associated with ACEs, it is important to understand the concept of ACEs, their neurobiological and environmental impact, and protective factors of ACEs.

**Conventional ACEs.** The concept of conventional ACEs was first introduced by Felitti et al. (1998) in their study of 17,337 predominantly White adult patients at Kaiser Permanente's San Diego Health Appraisal Clinic, which investigated the impact of 10 different childhood adversities on health outcomes in adulthood. These 10 childhood adversities include abuse (sexual, physical and emotional), neglect (physical and emotional), and household dysfunction (household mental health disorders, household substance abuse, incarcerated household members, household physical violence, and parental separation or divorce) (CDC, 2020; Felitti et al., 1998). Felitti et al. (1998) developed a 10-item questionnaire to measure exposure to conventional ACEs, which was based on prevalence of these ACES among the sample, with score values ranging from 0-10 (CDC, 2020; Felitti et al., 1998). As part of the research procedure, participants in Felitti et al.'s (1998) study received a physical examination, answered questions about their health, and completed an ACEs questionnaire about their possible experience of the 10 ACEs under investigation prior to age 18. The study produced three major

findings about ACEs that have influenced subsequent research on the impact that these phenomena have on developmental trajectory (CDC, 2020).

First, Felitti and colleagues (1998) found ACEs are prevalent. Findings revealed 64% of respondents endorsed having at least one ACE, with 12% of these respondents reporting that they experienced four or more ACEs (Felitti et al., 1998). Specific to abuse, 28.3% of the overall sample reported that they were exposed to physical abuse during childhood, followed by 20.7% who endorsed that they experienced sexual abuse, and 10.6% who noted that they experienced emotional abuse. For neglect, 14.8% of all study participants stated that they experienced emotional neglect, while 9.9% reported that they were physically neglected prior to age 18. In terms of household dysfunction, 26.9% of all respondents revealed that they were exposed to household substance abuse, 23.3% experienced parental divorce, 19.4% resided in households with family members who had mental health disorders, 12.7% witnessed their mothers being treated violently, and 4.7% of participants reported that, during childhood, they had a household family member who was incarcerated.

Second, experiencing four or more ACEs significantly increased the risk of negative health outcomes (CDC, 2020; Felitti et al., 1998). Findings from the study revealed possible behavioral risk outcomes that resulted from exposure to four or more ACEs included smoking, substance abuse, lack of physical activity, and chronic absenteeism from work (Felitti et al., 1998). Physical health outcomes of experiencing four or more ACEs gleaned from medical records is associated with an increased risk of obesity, heart disease, cancer, broken bones, sexually transmitted diseases (STDs), and chronic obstructive pulmonary disease (COPD). Furthermore, two mental health risk outcomes linked to exposure to four or more ACEs included depression and increased risk of suicide attempts. These health-related risk factors, in turn, are

related to decreased life expectancy. For example, on average, individuals who experienced six or more ACEs had lifespans that ended 20 years earlier than individuals with no ACEs.

Third, ACEs are cumulative (CDC, 2020; Felitti et al., 1998). For instance, for every individual who endorsed having at least one ACE, there was an 87% chance that the individual had experienced a total of two or more ACEs (Felitti et al., 1998). More specifically, 16% of respondents in the study reported that they experienced two ACEs, 9.6 % endorsed exposure to three ACEs, and 12.5% reported exposure to four or more ACEs. Altogether, the study identified a strong dose-response relationship between categories of ACEs endorsed and health-related outcomes, supporting the cumulative effects of ACEs. Since Felitti et al.'s (1998) study established this cumulative effect, subsequent studies on these adverse experiences examine ACEs in clusters rather than individually (CDC, 2020).

Although Felitti et al.'s (1998) study established a positive relationship between conventional ACEs and health-related outcomes, limitations of this study were identified. One limitation related to measurement. Felitti et al. (1998) used self-report questionnaires to assess the number of ACEs participants were exposed to prior to age 18. This increases the likelihood of under-or over-reporting by participants, due to possible discomfort with disclosure or forgetfulness. There was also no clear definition of what each ACE experience entailed; therefore, endorsement of ACEs was based on the respondents' perception of having experienced these childhood adversities. Another limitation of this study is whereas a strong association was found between conventional ACEs and health-related outcomes, the study is cross-sectional in nature and causality cannot be established from these findings. Furthermore, the sample was comprised of primarily White and middle-class participants, so findings are not generalizable to racial and ethnic minority groups and individuals from lower socioeconomic backgrounds.

Conversely, an identified strength of the study is the validity and reliability of the psychometric properties of the questionnaire used to measure ACEs.

**The Minnesota ACEs Survey.** Despite its limitations, the original ACEs study (Felitti et al., 1998) provided a foundation for future research on the long-standing effects of childhood adversity. Since then, over 100 studies have been conducted relative to ACEs (Hurley-Swayze & Buskovick, 2015). In 2011, the state of Minnesota collected data on the experience of ACEs among 13,520 adults residing in Minnesota using the Behavioral Risk Factor Surveillance System (BRFSS) survey (Minnesota Department of Health [MDH], 2011). Eight ACEs were investigated: physical abuse, emotional abuse, sexual abuse, household substance abuse (alcohol use and drug use), parental separation or divorce, household mental illnesses, witnessed domestic violence, and incarcerated household member (MDH, 2011). Physical and emotional neglect were not included in this study and the researchers did not address their decision to exclude these ACEs.

Consistent with Felitti et al.'s (1998) study, MDH (2011) found childhood adversity is a common experience among Minnesota residents. Results indicated 28% of participants reported that they experienced emotional abuse during childhood, followed by 16% who endorsed that they experienced physical abuse, and 28% who noted that they experienced sexual abuse (MDH, 2011). For household dysfunction, 24% of respondents revealed that they were exposed to alcohol abuse by a household member, 21% experienced parental separation or divorce, 17% resided in households with family members who had mental health disorders, 14% witnessed domestic violence in the home, 10% reported exposure to drug use, and 7% of participants reported during childhood that they had a household family member who was incarcerated.

Similar to Felitti et al. (1998), MDH (2011) also found a positive correlation between ACEs and adverse health outcomes. For example, ACEs were linked to medical health problems such as asthma, diabetes, and obesity. A behavioral risk outcome included smoking. Mental health disorders associated with ACEs among Minnesota residents included depression, anxiety, and alcohol abuse. Furthermore, compared to respondents who reported having no ACEs, those with four or more ACEs rated their overall health status as fair or poor.

The results of the study also showed individuals commonly experience more than one ACE during childhood (MDH, 2011). The findings revealed 60% of the study's participants had two or more ACEs. In their study, 22% of respondents experienced two ACEs, 15% had three ACEs, 9% endorsed four ACEs, and 15% of Minnesotans reported that they experienced five or more ACEs. These figures suggest experiencing one ACE increases the likelihood of experiencing other ACEs. These results also point to the rationale for examining ACEs collectively rather than separately.

As with the Felitti et al. (1998) study, the Minnesota ACEs study has several limitations. One limitation of this study is that physical and emotional neglect were not included as variables under investigation and no rationale was provided to justify this decision. Another limitation of this study is that the study focused on the number of categories of ACEs participants were exposed to, so the possible impact of the severity and frequency of ACEs for this specific sample remain unclear. Furthermore, the retrospective nature of the study increases the potential for over or under-reporting due to memory lapses and social desirability bias. An identified strength is this study highlights the prevalence of ACEs in the state of Minnesota, which brings attention to the need to respond to the impact of ACEs on developmental trajectory.

**Expanded ACEs.** The ACEs literature has now expanded the original ACEs' categories of childhood adversities that occur in the home to include community-level stressors in the ACEs framework (Cronholm et al., 2015; Finkelhor et al., 2013; Finkelhor et al., 2015). One major critique of the conventional ACEs scale was that it did not entail other common childhood adversities that occurred outside the home that negatively impact development. Therefore, based on research conducted by Cronholm et al. (2015), additional adversity items were added to expand upon the original ACEs scale. Examples of these expanded ACEs include experiencing racial and/or ethnic discrimination, bullying victimization, growing up in foster care, and living in an unsafe neighborhood (Cronholm et al., 2015; Wade et al., 2014). These studies conducted on expanded ACEs have highlighted the importance of including this category of adversity in the ACEs framework because it was determined that ACEs occurring in the home did not sufficiently represent childhood adversity (Cronholm et al., 2015; Finkelhor et al., 2013; Finkelhor et al., 2015).

Finkelhor et al. (2015) conducted a study to determine whether adding community-level childhood adversities predicted mental health and physical health outcomes better than conventional ACEs alone. The researchers analyzed the 2014 National Survey of Children's Exposure to Violence, which is a database that included telephone interviews with 1,949 youth aged 10-17 years and their caregivers about the youth's experience of childhood adversities, physical health concerns, and psychological distress. The 10 original ACEs were variables examined in the study, along with additional community-level childhood adversities, including low socioeconomic status, peer victimization, peer isolation/rejection, and exposure to community violence.

Finkelhor et al. (2015) found of the 10 conventional ACEs investigated, parental divorce/separation, exposure to domestic violence in the home, household substance abuse, and the incarceration of a family member did not significantly contribute to mental health or physical health outcomes. Conversely, peer victimization, peer isolation, and community violence were significant predictors of psychological distress, while low socioeconomic status significantly predicted health status. These findings further suggest that adding community-level stressors to the conventional ACEs framework better predicted participants' mental health and physical health outcomes than did conventional ACEs alone.

Similarly, Cronholm et al. (2015) conducted a cross-sectional study to examine the prevalence of conventional and expanded ACEs among Pennsylvania residents. More specifically, telephone interviews were conducted with 1,784 adults in Southeast Pennsylvania using the Philadelphia (PHL) ACEs Survey. This survey included 9 of the 10 original ACEs, with parental divorce/separation being excluded from the survey, since local data suggested that this ACE did not accurately reflect the complexities of parental relationships in the sample. Furthermore, community stressors were added to the survey and included experiencing racism, experiencing bullying, witnessing violence, having a history of residing in foster care, and living in an unsafe neighborhood.

Results indicated 72.9% of respondents endorsed having at least one conventional ACE, 63.4% noted having at least one expanded ACE, and 49.3% reported experiencing both conventional and expanded ACEs (Cronholm et al., 2015). Results of this study also revealed 13.9% of respondents experienced expanded ACEs only, which would have gone undetected if conventional ACEs alone were assessed. Therefore, adding expanded ACEs to the original ACEs scale is warranted, as conventional ACEs alone do not adequately measure childhood adversity.

While the studies conducted by Cronholm et al. (2015) and Finkelhor (2015) found including community-level ACEs to the original ACEs framework better represented the different childhood adversities experienced by participants, the studies did not include an all-inclusive list of childhood adversities. As such, it is likely that there are other childhood adversities not included in these studies that might negatively impact health and well-being. To better understand the impact conventional and expanded ACEs have on development, it is advantageous to explore factors such as the long-term neurobiological effects associated with exposure to ACEs.

**Neurobiological Impact of ACEs.** For decades, researchers representing different fields, including psychology, psychiatry, and education have studied the neurobiological impact of individual and specific categories of childhood adversities on developmental trajectory (Bremner & Vermetten, 2001; Penza et al., 2003; Perry et al., 1995; Teicher et al., 2002). However, given that different categories of childhood adversities co-occur, the last decade has seen an increase in research focused on the effect of an integration of different childhood adversities on wellbeing. More specifically, the literature on ACEs indicates early childhood experiences contribute to changes in neurobiological systems (Berens et al., 2017; DeBellis, Keshavan, et al., 1999; Kalmakis et al., 2015; Liu et al., 2017; Lu et al., 2013; Lu et al., 2019; Miller et al., 2015; Palmos et al., 2019; Taylor et al., 2011; Tyrka et al., 2013; Watt et al., 2019). Some of the neurobiological systems negatively impacted by ACEs include the brain, the hypothalamic-pituitary-adrenal (HPA) axis, and the peripheral nervous system.

ACEs have been linked to decreased gray matter volume of the prefrontal cortex (PFC) and a reduction in the volume of the amygdala (DeBellis, Keshavan, et al., 1999; Lu et al., 2019). The prefrontal cortex plays a pivotal role in executive functioning (working memory and

cognitive control), as well as in emotion, stress, and behavior regulation (Liu et al., 2017). Changes in this nerve center is associated with the development of psychopathology, such as major depressive disorder (MDD). Furthermore, a smaller amygdala is linked to overall functional changes within this system, which increases the risk of this system over-reacting to emotional stimuli.

One of the limitations of the studies conducted by DeBellis, Keshavan et al. (1999) and Liu et al. (2017) on the impact of ACEs on the brain is both studies were cross-sectional and cause-effect relationships cannot be made. DeBellis, Keshavan et al. (1999) and Lu et al. (2019) had relatively small samples in their studies (129 and 78, respectively), which reduces the reliability of findings. Furthermore, given that the participants in the study conducted by Lu et al. (2019) were adults, and children and adolescent's brains continue to develop and change into adulthood, this study does not offer much information about the impact of trauma on children and adolescent's developing brains. Conversely, DeBellis, Keshavan et al. (1999)'s sample included children and adolescents and contributes to the literature on the impact of ACEs on children and adolescent's brain development. Another noted strength was that DeBellis, Keshavan et al. (1999) and Lu et al. (2019) included control groups in their analyses, which increases the validity of findings by minimizing the effect of confounding factors on the results.

In addition to changes in brain activity, HPA axis dysregulation is also associated with exposure to ACEs (Clemens et al., 2020; Kalmakis et al., 2015). The HPA axis manages reactions to stress and when this system is activated by stressful events, cortisol is released into the bloodstream (DeBellis, Baum et al., 1999; van Voorhees & Scarpa, 2004). In the short-term, this is beneficial because cortisol helps mobilize the body to meet the demands of stressful situations. However, repeated activation of the HPA axis in response to chronic and toxic stress

results in HPA axis hyper-reactivity and hypo-reactivity (van Voorhees & Scarpa, 2004). One of the possible negative consequences of HPA axis hyper-reactivity and hypo-reactivity is the ability of the HPA to function effectively and efficiently in stressful situations is reduced, which is linked to the long-term increase in cortisol that is detrimental to health, since cortisol is neurotoxic at high levels. For example, high levels of cortisol are linked to depression (Hankin, 2012; van Voorhees & Scarpa, 2004), cardiovascular disease (Cozma et al., 2017), attention difficulties (Schloss et al., 2018; van Voorhees & Scarpa, 2004), and learning and memory deficits (van Voorhees & Scarpa, 2004).

A limitation of the studies conducted by Clemens et al. (2020), DeBellis, Baum et al. (1999), and Kalmakis et al. (2015) is that they are cross-sectional in nature, which precludes causal inference. Another limitation is the relatively small sample size of the studies decreases the generalizability of the studies' findings. For example, there were 91 participants in the study conducted by Clemens et al. (2020) and 55 participants in the study conducted by Kalmakis and colleagues (2015), which compromises the reliability of findings. Furthermore, the study conducted by Kalmakis et al. (2015) included adult participants, which does not provide information about ACEs relative to child and adolescent brain development. However, Clemens et al. (2020), DeBellis, Baum et al. (1999), and van Voorhees & Scarpa (2004) included children and adolescents in their studies, which contributes to the literature on the impact of trauma on this population's brain development. The use of hair samples to measure cortisol levels was another identified strength of the studies conducted by Clemens et al. (2020) and Kalmakis et al. (2015), since this method reduces the potential for diurnal changes, which is a common drawback when saliva is used to test cortisol levels.

Along with HPA axis dysregulation, there also appears to be a correlation between number of ACEs participants experienced and levels of neurotrophic factors, with higher levels of neurotrophic factors being associated with higher levels of ACEs endorsed (Lu et al., 2013; Miller et al., 2015; Watt et al., 2019). Neurotrophic factors facilitate brain development and changes within this system can result in alterations in neural structures and neuronal death. Furthermore, alterations in neuronal structures and neuronal death can result in reduced ability to adapt to stressful situations. One such neurotrophic factor correlated with ACEs is the vascular endothelial growth factor (VEGF), which facilitates behavioral control (Lu et al., 2013). Other neurotrophic factors that can be negatively impacted by ACEs include the brain derived neurotrophic factor (BDNF) (Watt et al., 2019) and the insulin-like growth factor (IFG-1) (Miller et al., 2015), both of which play pivotal roles in the regulation of neuronal survival and neurogenesis.

One of the limitations of the studies conducted to examine the relationship between childhood adversity and neurotrophic factors is they are cross-sectional studies and findings do not demonstrate causality. Another limitation is the relatively small samples. For example, Lu et al. (2013) had a sample of 60 participants, Miller et. al (2015) included 65 participants, and Watt et al.'s (2019) study comprised of 93 participants. This reduces the generalizability of findings. Further, the retrospective self-report measures used in these studies are prone to under-and/or over-reporting, which limits the reliability of findings. Another limitation is that the studies conducted by Lu et al. (2013), Miller et al. (2015), and Watt et al. (2019) included adult participants, which does not provide information about ACEs relative to child and adolescent brain development. Despite their limitations, research on the impact of ACEs on neurobiology consistently show a relationship between exposure to multiple childhood adversities and

interruption of the functioning of neurobiological systems, which can potentially impair the individual's ability to cope with stress/stressors.

**Environmental Impact of ACEs.** A number of studies also explored the impact of ACEs on the environmental level (Bethell et al., 2014; Blodgett and Lanigan, 2018; Chartier et al., 2010; Mosley-Johnson et al., 2018; Perez et al., 2016; Peterson et al., 2015; Poole et al., 2018; Topitzes et al., 2016; Zielinski, 2009). These studies produced findings that showed possible ways in which ACEs impact people's interactions with their environment. Some of the environmental-level burdens associated with ACEs include school difficulties, employment problems, social/interpersonal difficulties, and economic strain.

ACEs have been linked to a number of school difficulties (Bethell et al., 2014; Blodgett and Lanigan, 2018). Bethell and colleagues (2014) examined the impact of ACEs on 95,677 children aged 6-17 years using the 2011-2012 National Center of Health Statistics (NSCH), which is a parent/caregiver-report survey used to examine the prevalence of ACEs among children and its impact on children's health and development. They found even after controlling for demographic factors of age, race/ethnicity, and sex, as well as health status factors, including household income and special health care needs status, children exposed to two or more ACEs were over two times more likely to repeat a grade in school and were not as engaged in school compared to peers with one or no ACEs. In a subsequent study, Blodgett and Lanigan (2018) investigated the relationship between conventional ACEs and academic risk in a sample of 2,101 elementary school children from 10 elementary schools in Washington State, based on reports from teachers, principals, and school psychologists. ACEs under investigation included community violence and six of the 10 original ACEs, with the remaining four – neglect, physical abuse, emotional abuse, and sexual abuse – being reworded since positive endorsement of these

ACEs would potentially result in mandated reporting and the risk of breaching confidentiality. Findings from this study revealed after accounting for potential barriers to school success, such as gender and school poverty, compared to children who were not exposed to ACEs, children who experienced three or more ACEs were three times more likely to have poor grade-level academic performance and five times more likely to have poor school attendance.

One limitation of the studies conducted by Bethell et al. (2014) and Blodgett and Lanigan (2018) is the findings relied solely on informant report and it is likely informants were not privy to some of the ACEs students experienced, which might result in an underestimation of the prevalence of ACEs. Another limitation is the study conducted by Bethell et al. (2014) included five out of 10 original ACEs, so the impact sexual abuse, physical abuse, verbal abuse, emotional neglect, and physical neglect potentially have on findings remains unclear. One limitation specific to the study conducted by Blodgett and Lanigan (2018) is they adapted the questions on four of the 10 original ACEs without testing the psychometric properties of these questions. Therefore, the validity and reliability of the ACEs questionnaire used in the study is unknown. Conversely, one major strength of the studies conducted by Bethell et al. (2014) and Blodgett and Lanigan (2018) is the adjustment for confounding factors, which increases the validity of there being a true positive association between ACEs and school difficulties.

ACEs were also associated with increased likelihood of unemployment (Topitzes et al., 2016; Zielinski, 2009). Zielinski (2009) conducted a cross-sectional study that involved 5,004 adults using archival data collected between 1990-1992 from the National Comorbidity Survey, which examines the etiology and course of psychopathology to investigate the relationship between different types of childhood abuse and employment status in adulthood. The results indicated compared to participants who had not experienced any type of childhood adversity,

those who experienced childhood adversity were about two times more likely to be unemployed or to have a household member be unemployed. Similarly, Topitzes et al. (2016) conducted a cross-sectional in-person survey with 199 low-income and primarily Black men actively seeking employment from a workforce development agency to assess whether there was an association between conventional ACEs and employment-related difficulties. The study found 40% of men who had five or more ACEs reported unemployment, which undermined their ability to attain current employment and maintain financial stability.

The cross-sectional nature of these studies makes it impractical to infer causation. Additionally, the study conducted by Topitzes et al. (2016) comprised of a relatively small sample size of only low-income and primarily Black men from one facility, thus limiting the generalizability of findings to different populations. However, both studies produced consistent findings relative to the positive relationship between ACEs and unemployment,

In addition to the association between ACEs and unemployment, a relationship between ACEs and social/interpersonal difficulties has also been established (Mosley-Johnson et al., 2018; Poole et al., 2018). In their longitudinal cohort study, Mosley-Johnson et al. (2018) examined the impact of ACEs on 6,323 adult participants' perception of social wellbeing (social contribution, acceptance of others, meaningfulness of society, social actualization, and social integration) using data from three survey waves of the Midlife Development in the United States, which is a longitudinal study of health and well-being. They discovered abuse, household dysfunction, and financial strain were all positively correlated with participants' perception of lower social-wellbeing. Similarly, Poole et al. (2018) recruited 4,006 adults from primary care clinics to analyze the association between ACEs and interpersonal difficulties using self-report

questionnaires. After controlling for various demographic variables, the researchers found ACEs predicted interpersonal deficits, with emotion dysregulation mediating this relationship.

There are several limitations to these studies on ACEs and unemployment. For example, the use of self-report measures is a limitation because it increases the probability of over and/or underreporting of ACEs. Furthermore, in the study conducted by Mosley-Johnson et al. (2018), participants who self-identified as White, female and married, and those who were middle aged and had higher income and educational levels were more likely to complete all waves of the survey, which reduces the ability to generalize findings to other populations. An identified strength is the studies conducted by Mosley-Johnson et al. (2018) and Poole et al. (2018) both included well-defined control variables, reducing the influence of confounding variables in the studies' outcomes, which in turn increases the validity of findings in both studies.

Specific to the financial burden ACEs places on society, Peterson et al. (2018) conducted a study to provide updated data on the lifetime cost of maltreatment and the annual economic cost of child maltreatment in the United States. In this study, child maltreatment included neglect, physical abuse, sexual abuse, and psychological maltreatment. Peterson et al. (2018) found in 2015, the estimated economic cost of providing care for individuals in the United States who experienced child maltreatment was $428 billion per annum, which is an increase in the 2010 estimate of $124 billion per annum. Additionally, these economic costs have lifelong economic consequences. More specifically, the approximate lifetime cost of providing care to individuals who were maltreated is $2.0 trillion, which is also an increase in the 2010 estimate of $585 billion. Findings from Peterson et al. (2018) showed these economic costs accounted for loss of productivity, health care utilization, special education costs, child welfare costs, and criminal justice expenditures.

A limitation of this study is that since these estimated figures only represent the economic costs associated with child maltreatment, it can be concluded the inclusion of other types of ACEs would result in an increase in these estimated costs. Another limitation is most recent estimates use data from 2015, which might not reflect the current lifetime cost and annual economic burden of child maltreatment. In terms of strengths, by comparing data that show a steady increase in the economic costs of child maltreatment in the United States, Peterson et al. (2018) highlighted the extent of the problem and the need to formulate prevention strategies to reduce the risk of child maltreatment. However, given that the neurobiological and environmental impact of ACEs point to the burden ACEs places on both the individual and society as a whole, it is also important to review some of the protective factors related to ACEs, since these factors can mitigate some of the negative effects that ACEs have across the lifespan.

**Protective Factors.** Everyone fares differently in response to toxic stress. The literature identified a number of biopsychosocial components that can buffer some of the harmful effects associated with ACEs (Beutel et al., 2017; Logan-Greene et al., 2017; McLafferty et al., 2018; Poole et al., 2017). Some of these protective factors include social support, optimism, and resilience.

A cross-sectional study conducted by McLafferty et al. (2018) showed having social support mitigates stress related to ACEs. In their study, McLafferty et al. (2018) surveyed 1,986 English-speaking adults from Ireland to assess childhood adversity and social networks. The researchers used archival data collected between 2004-2008 from the Northern Ireland Study of Health and Stress (NISHS), which is a survey on mental health. Childhood adversities included in the study were: parental mental health disorders, substance abuse in the household, criminal behavior, violence in the home, physical abuse, sexual abuse, neglect, and physical punishment.

Of the 1,986 participants in the study, 87.9% or 1,774 endorsed experiencing all ACEs under investigation. Specific findings found a dose-response relationship existed between ACEs and psychopathology, such that higher rates of ACEs increased the risk of psychological disorders over the life-course. Interestingly, findings further indicated that individuals who reported having social support, such as close relationships with primary caregivers and strong peer relationships, were less likely to develop psychopathology compared to respondents who did not endorse having social support.

In similar fashion, Logan-Greene et al. (2017) conducted a cross-sectional study, which found social support moderated the relationship between ACEs and recidivism among justice-involved youth. Archival data was obtained from a sample of 5,378 justice-involved youth in Washington using the Washington State Juvenile Court Assessment (WSJCA), which measures risk and protective factors related to juvenile offending in different psychosocial domains. Three domains of childhood adversity were examined, including maltreatment, family dysfunction, and social disadvantage. Results of this study revealed that antisocial support increased the likelihood of recidivism, while prosocial support from adults and peers reduced distress related to ACEs and resulted in lower rates of recidivism.

Due to the cross-sectional nature of these studies, causal inferences cannot be made. Furthermore, the dataset used by McLafferty et al. (2018) excluded non-English speakers, which precludes the generalizability of findings to this population. Despite these limitations, both studies provide useful information regarding social support as a buffer against the negative effects of ACEs with different populations.

Optimism and self-efficacy are also associated with a reduction in the harmful effects of ACEs. Beutel et al. (2017) conducted a cross-sectional study to identify the impact that specific

traits of resiliency had on individuals with ACEs. The study comprised of a German community sample of individuals aged 14 to 92 years, using archival data collected in 2013. The Brief Resilience Coping Scale (BRSC; Sinclair & Wallston, 2004) was one assessment used in the study's dataset, which is a self-report measure that assesses creative and active problem-solving skills. Another assessment used was the German Support Questionnaire (Kleim et al. (2015), a self-report measure that assesses perceived social support. Finally, the Childhood Trauma Screener (CTS; Grabe et al., 2012) was a self-report measure used to assesses the experience of abuse and neglect. Beutel et al. (2017) found individual traits such as optimism and self-efficacy mitigated the long-term harmful effects of ACEs on distress. Respondents who experienced ACEs, but identified themselves as optimistic and self-efficacious, reported less adverse outcomes than individuals with ACEs who did not perceive themselves as possessing these traits.

One limitation of Beutel et al.'s (2017) study is information was extrapolated based on self-report. This increases the probability of under and/or over-reporting of ACES, which may impact the reliability of findings. Another limitation is that Beutel et al. (2017) only included two forms of childhood adversities, so the influence that other ACEs might have on psychopathology and resilient coping remains unclear. Conversely, all questionnaires used were identified as reliable and valid instruments, which is a major strength of the study.

Poole et al. (2017) conducted a cross-sectional study to examine the role resilience (the ability to focus under stress, problem solving skills, and tolerance of negative affect) played in buffering against depression in individuals with a history of ACEs. Participants included 3,509 adults from primary care clinics in Canada. Measurement of childhood adversity included the Adverse Childhood Experiences Questionnaire (ACEs-Q; Felitti et al., 1998). Subjective symptoms of depression were assessed using the 9-item Patient Health Questionnaire (PHQ-9;

Kroenke & Spitzer, 2002). Finally, the Connor Davidson Resilience Scale (CDRS; Connor & Davidson, 2003) was the assessment used to assess psychological resilience. Results concluded a dose-response relationship existed between the experience of ACEs and symptoms of depression. Interestingly, the association between ACEs and depression was weaker among participants with high resilience compared to those with low resilience.

A limitation of the findings by Poole et al. (2017) is that 83% of the participants identified as White, which decreased the generalizability of findings to other racial and ethnic groups. Also, as with other cross-sectional studies, this study precludes causal inference. However, Poole et al. (2017) used measures with sound psychometric properties, which is a strength of the study.

It is important to note although the literature has identified positive buffers against the harmful effects of ACEs, there are currently no evidence-based treatments developed specifically for individuals with high ACE scores (Finkelhor, 2019). It is therefore important that more research is conducted to expand on protective factors identified in the literature and appropriate interventions are implemented to reduce the impact of ACEs and prevent future risk. In addition to understanding various components of ACEs, it is important to have a clear conceptualization of juvenile offending, in order to better understand the effects that ACEs have on juvenile offending behaviors.

**Juvenile Offending**

The United States Department of Justice (USDJ, 2018) defined juvenile offending as any crime typically committed by someone under the age of 18. In some states, individuals over the age of 18 but under the age of 21 are also deemed juvenile offenders if the crime they committed occurred prior to their eighteenth birthday. Also, depending on the state's law, it is possible for

juvenile offenders to be penalized as adults, which is based on factors such as the type of crime committed and/or the severity of the offense.

In addition to age, gender, and race/ethnicity are other demographic factors that aid in understanding juvenile offending behaviors. Specific to gender, the Office of Juvenile Justice and Delinquency Prevention (OJJDP, 2018) noted a disparity in the involvement of boys in the juvenile justice system, in that boys are five times more likely to engage in juvenile offenses than girls. In terms of racial and ethnic disparities, minority youth are more likely to be arrested, referred to court, and penalized as adults than their White counterparts for similar offenses. Socioeconomic status was also associated with juvenile offending, such that youths from lower socioeconomic backgrounds are more likely to engage in juvenile offending behaviors compared with youths from higher socioeconomic backgrounds. As such, there are a disproportionate number of boys, racial/ethnic minorities, and individuals from lower socioeconomic backgrounds in the juvenile justice system.

Statistics on juvenile offending indicate that over the last decade, juvenile arrests in the United States have decreased at a steady rate (OJJDP, 2018). More specifically, in 2017, there were approximately 807,700 juvenile arrests, which was 59% less than the number of arrests of individuals under the age of 18 in 2008. However, these promising statistics are likely due to the fact that many juvenile offenses, particularly those committed by White youth, are not reported and are addressed informally instead. As a result, these offenses are not represented in the juvenile arrest statistics (OJJDP, 2018). Despite the steady decline of juvenile arrests, juvenile offending continues to be a major concern in contemporary society. It is therefore beneficial to have an accurate view of the types of offenses committed by juveniles, the categories of juvenile

offenders who commit these offenses, and risk and protective factors of juvenile offending to gain additional knowledge geared toward preventative strategies.

**Types of Juvenile Offenses.** Based upon their research, the OJJDP (2018) classified juvenile offenses using crime indices. Based on these crime indices, there are three categories of juvenile offenses. These include status offenses, property crimes or nonviolent offenses, and violent crimes (Barrett & Katsiyannis, 2016; Snyder et al., 2003).

Status offenses are noncriminal behaviors that are legal among adults, but are violations of the law when committed by minors (Development Services Group, Incorporated, 2015; Snyder et al., 2003). There are typically five primary status juvenile offenses, which include curfew violations, underage drinking, running away from home, truancy, and "ungovernable/incorrigible" behavior, the latter being the inability of a minor to be governed by parental authority (Snyder et al., 2003). Status offenses are deemed minor offenses and are usually managed by the family court as opposed to the juvenile justice court.

Alternately, property crimes are classified as more serious offenses than status offenses (Snyder et al., 2003). These crimes are also referred to as nonviolent offenses (Barrett & Katsiyannis, 2016) and are defined as the illegal possession of or damage to the property of another person (Finkelhor & Ormrod, 2000; Snyder et al., 2003). These crimes are committed for monetary, material, or personal gain. Furthermore, they occur in the absence of the owner of the stolen or damaged property (Finkelhor et al., 2000). Examples of property crimes include burglary, arson, theft, larceny, and minor property destruction (Barrett & Katsiyannis, 2016; Finkelhor et al., 2000; Snyder et al., 2003).

The third classification of juvenile offenses includes violent offenses, which are crimes that entail the use of force or threats of force upon the targeted individual (Finkelhor et al.,

2000). These crimes involve contact between the initiator and the target and may or may not include the use of a weapon. Examples of violent crimes include murder, rape, robbery, and terrorism.

**Types of Juvenile Offenders.** In addition to different categories of juvenile offenses, there are also different types of juvenile offenders. However, there is currently no consensus regarding fixed categories of juvenile offenders. Instead, different researchers use different criteria to categorize juvenile offenders.

Snyder et al. (2003) identified three categories of minors who offend: serious child delinquents, other juvenile delinquents, and children who engage in persistent disruptive behaviors. Serious child delinquents are children who commit serious crimes, such as homicide and rape, which would be classified as major offending. Other delinquent offenders refer to minors who commit juvenile offenses that do not meet criteria for serious offending. Finally, individuals who engage in persistent disruptive behaviors refer to youth who engage in behaviors such as incorrigibility and truancy, which increases their risk of committing more serious offenses.

Baglivio et al. (2014) highlighted six categories of juvenile offenders, which include serious offenders, violent offenders, chronic offenders, serious, violent and chronic (SVC) offenders, non-serious, violent and chronic offenders, and not serious, violent or chronic offenders. Serious offenders are youth who have a history of a minimum of one felony, but less than four felonies. Violent offenders are offenders with a history of a felony due to targeting someone or due to being charged for possession of a weapon. Chronic offenders are individuals with a history of four or more misdemeanors or felonies. Serious, violent and chronic offenders refer to youth who have engaged in serious, violent and chronic offenses. Furthermore, in order

to be classified as serious, violent and/or chronic offenders, felonies must have resulted in a history of diversion, a withhold of adjudication, adjudication, deferred prosecution, and/or adult court referral. Non-serious, violent, and chronic offenders are youth who have engaged in up to two categories of serious, violent and chronic offenses. For example, this category would include youth who have engaged in serious and violent offenses, but who are not chronic offenders. Finally, not serious, violent, or chronic offenders are individuals whose crimes do not meet criteria for serious, violent, or chronic offenses.

One of the major limitations of the studies conducted by Snyder et al. (2003) and Baglivio et al. (2014) is the variability in the descriptions of typology on juvenile offenders. As such, the categories of juvenile offenders provided by Snyder et al. (2003) and Baglivio et al. (2014) are only to be used as guidelines to classify offenders, which might vary by state. This is so since the definition of a felony and other crimes can differ by state. Although these guidelines were based on research, the lack of consensus used to define and categorize juvenile offenders and offenses decreases the reliability and validity of research on juvenile offending.

**Risk Factors.** Based on these statistics specific to serious, violent, and chronic offending (SVC offending), it is important to identify risk factors that can increase the likelihood of engaging in these offenses to potentially minimize these risks. There are a number of risk factors that appear to contribute to the prevalence of SVC offending. For example, individual, family, and community factors can increase the risk of engaging in SVC offending (Department of Justice, 1998).

For individual factors that predict SVC offending, Auffrey et al. (1999) found having a history of assaultive behavior to be the greatest predictor of SVC offending. Additionally, von Dorn and Williams (2003) identified individuals who displayed a higher need for power and

safety than the environment could provide to be almost two times more likely to become SVC offenders compared to individuals who did not have such high power and safety needs. Personality characteristics, such as low self-esteem and poor impulse control was also identified as individual predictors of SVC offending (Logan-Greene et al., 2017; Parker et al., 2005). Furthermore, compared to offenders who committed their first offense in adolescence, offenders who committed their first offense as young children were at increased risk of becoming SVC offenders (Snyder et al., 2003).

Specific to family factors, youth who experienced violence in the home were about three times more likely to engage in SVC offending than those who did not experience household violence (von Dorn & Williams, 2003). In addition to family violence, von Dorn and Williams (2003) found witnessing parental discord and poor parental supervision to be linked to SVC offending. Barrett et al. (2016), Liu and Miller (2020), and Logan-Greene et al. (2017) further support this position, with findings that revealed having family problems and having poor parental supervision were positively correlated with future offending behaviors.

For community factors, von Dorn and Williams (2003) identified individuals who had positive perceptions of gangs to be almost two times more likely to engage in SVC offending than individuals who did not hold these positive views. Similarly, Evans et al. (2016), Liu and Miller (2020), and Martinez and Abrams (2013) determined that having negative peer influences was a predictor of early and persistent offending throughout adolescence. Evans et al. (2016) also found endorsement of racial discrimination to be correlated to SVC offending.

**Protective Factors.** There appear to be a number of protective factors that can buffer the negative effects of juvenile offending. Specifically, these protective factors decrease the risk of youth engaging in different types of juvenile offenses (Auffrey et al., 1999; Calvert, 2002). Some

of these protective factors include high educational level, history of psychiatric hospitalizations, engagement in prosocial activities, social support, and history of medical illness of a family member (Auffrey et al., 1999; Calvert, 2002; Jeon & Chun, 2017; Logan-Greene et al., 2017).

Auffrey et al. (1999) and Calvert (2002) conducted studies that identified academic history as a predictor of juvenile offending status. Both studies examined juvenile offender populations in the United States and found that the higher the educational level (at or above grade level), the less likely these youth were to engage in juvenile offenses. Calvert (2002) further noted the protective effect of higher educational levels likely stems from the supportive school and home environments that foster academic achievement. Consistent with the findings by Auffrey et al. (1999) and Calvert (2002), Jeon and Chun (2017) conducted a study with Korean youth, which also found a positive correlation between higher educational level and juvenile offending.

Another protective factor that can potentially reduce the risk of violent juvenile offending is a history of psychiatric hospitalization (Auffrey et al., 1999). Auffrey et al. (1found youth with a history of psychiatric hospitalizations were one twelfth as likely to be arrested for a violent crime compared to youths without a history of psychiatric hospitalizations. The researchers concluded that this finding likely relates to the intensive and multidisciplinary nature of inpatient treatments, which are more effective than the treatment received in outpatient settings or no treatment.

Involvement in prosocial activities was also correlated to lower rates of violent juvenile offending (Calvert, 2002). In his research, Calvert (2002) found a positive relationship existed between the amount of time spent on prosocial activities, such as religious groups and sporting activities, and involvement in violent forms of juvenile offending. As such, the more time youth

spent on community activities, the less likely they were to engage in violent acts of juvenile offending.

Social support has also been positively associated with a lower risk of violent juvenile offending (Jeon & Chun, 2017; Logan-Greene et al., 2017). More specifically, Jeon and Chung (2017) and Logan-Greene et al. (2017) found prosocial support from family members, peers, teachers or other adults provided youth with positive influences they can turn to, which in turn reduced the likelihood of youth engaging in juvenile offending behaviors. Logan-Greene et al. (2017) further added prosocial support can result in the reduction of stress and can promote self-regulation. Prosocial support is therefore important in improving the overall functioning of youth.

A history of physical illness of a household member was also identified as a protective factor of violent juvenile offending (Auffrey et al., 1999). It was inferred that the link between empathy and physical illness acts as a deterrent to youth who might otherwise be susceptible to committing violent crimes. One limitation of these studies is that the use of correlational data does not predict risk or protection of juvenile offending. Another limitation is that these studies do not control for cofounding variables, such as socioeconomic status and race, which could affect results. Yet another limitation is some of the literature on this topic is more than 10-years-old. It is therefore unclear whether some of these risk and protective factors are applicable to youth in present society. Conversely, there are a number of studies conducted in the last five years that provide robust information regarding risk and protective factors of serious, violent, and chronic juvenile offending, which can aid in reducing the risk of juvenile offending and increasing overall well-being among youth. Since different childhood adversities have been

identified as risk factors that can contribute to juvenile offending, it is important to examine this relationship in the ACEs literature.

## ACEs and Juvenile Offending

The literature on ACEs and juvenile offending, though sparse, has identified a positive correlation between ACEs and juvenile offending. For example, research has found having experienced ACEs increases the risk of juvenile offending (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017; Fox et al., 2015).

**The Impact of Conventional ACEs on Juvenile Offending.** There appears to be a positive correlation between ACEs and behavioral outcomes, such that the more ACEs accumulated, the greater the risk for juvenile offending (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017). Baglivio et al. (2015) conducted a study that examined the effects of ACEs on offending trajectories of 64,329 adjudicated juvenile offenders using the Florida Department of Juvenile Justice's (FDJJ) archival data records. They found the cumulative influence of having multiple categories of ACEs increased the likelihood of multiple arrests from childhood through late adolescence. They also found having five or more ACEs was linked to earlier age of first arrest.

Similarly, Brown and Shillington (2017) examined a sample of 1,054 juvenile offenders ages 11-17 years from the National Survey of Child and Adolescent Well-Being (NSCAW II) database to determine whether protective adult relationships moderated the association between conventional ACEs and juvenile offending. The 10 conventional ACEs were measured using the original ACEs self-report questionnaire, while protective adult relationships were measured using the Longitudinal Studies of Child Abuse and Neglect (LongSCAN) self-report questionnaire. Finally, juvenile offending was measured using the Denver Youth Survey, which

is a 36-item self-report questionnaire. Brown and Shillington (2017) found that while youth who endorsed having protective relationships with adults were less likely to engage in juvenile offenses, these protective relationships did not moderate the link between ACEs and juvenile offending. They also found with each additional ACE endorsed, the risk of engaging in juvenile offenses increased by approximately 24%.

In another study, DeLisi et al. (2017) conducted a cross-sectional study to examine the significance between number of ACEs endorsed and commitment of sexual assault, homicide and serious person and/or property offending among a sample of 2,520 confined male juvenile offenders. Seven conventional ACEs were investigated, including poverty in the home, household gang membership, sexual abuse, emotional abuse, youth violence toward family members in the home, and multiple family members residing in the home. These variables are not consistent with the original ACEs investigated by Felitti et al. (1998) with DeLisi et al. (2017), noting their desire to include diverse indicators of childhood adversity in their study. Data on the type of commitment and offending history were obtained from official state records, while information about exposure to ACEs was gathered using standardized instruments by state personnel. Findings determined having two or more ACEs increased the likelihood of juveniles being imprisoned for sexual offenses. These findings are congruent with those of earlier studies (Baglivio et al., 2014; Massachusetts Alliance of Juvenile Court Clinics [MAJCC], 2012), which showed that, compared to the general population, youth involved in the juvenile justice system were more likely to have higher rates of ACEs.

Furthermore, while some researchers have not identified specific ACEs linked to juvenile offenses (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017), others have found that a relationship exists between the type of ACEs experienced and the type of juvenile

offenses committed (Basto-Pereira et al., 2016; Fox et al., 2015; Zingraff et al., 1993). In studies conducted by Basto-Pereira et al. (2016), Fox et al. (2015), and Zingraff et al. (1993), abuse and neglect were common predictors of juvenile justice involvement and criminal persistence in early adulthood. Specifically, Zingraff et al. (1993) conducted a cross-sectional study to determine whether a correlation exists between child maltreatment and problem behaviors among youth in North Carolina. The sample consisted of 655 maltreated children with a mean age of 15 years, using data obtained from the North Carolina Central Registry of Child Abuse and Neglect. These children were compared to a sample of 281 children with no history of child maltreatment. Zingraff et al. (1993) found after controlling for factors such as age, sex, and race, children with a history of physical abuse and neglect were reported for engaging in juvenile offending behaviors at higher rates than the comparison group.

Fox et al. (2015) conducted a cross-sectional study to examine the impact of ACEs on serious, violent, and chronic offending in Florida. The sample included 22,575 youth offenders aged 9-18 years using data collected between 2007-2012 from the Florida Department of Juvenile Justice's (FDJJ) criminal database. All 10 original ACEs were analyzed except parental separation/divorce, which was not included in the FDJJ's criminal database. Findings revealed physical abuse in childhood was commonly linked to interactions with the juvenile justice system. Fox et al. (2015) also found as ACEs increased, the risk of becoming a serious, violent, and chronic (SVC) offender increased by 35%. This relationship remained present even after controlling for age of onset, race, level of impulsivity, gender, family income, and peer influence.

Basto-Pereira et al. (2016) conducted a cross-sectional study to examine the effect of childhood adversity on juvenile offending and recidivism in Portugal. The sample comprised of

75 young adults with juvenile sentences in 2010-2011 when they were 12-15 years old. These participants were recruited from probation and juvenile justice offices. This sample was compared to 240 young adults from a community sample obtained from high schools, universities, workplaces, sports organizations, and social welfare systems. Participants were administered the Portuguese version of the original ACEs questionnaire to identify ACEs experienced. Results indicated all types of abuse were prevalent in the offender group compared to the community sample. Prevalence of sexual abuse, physical abuse, domestic violence in home, parental separation/divorce, and incarcerated household member was more than two times higher among offenders than the community sample. Basto-Pereira et al. (2016) also found sexual abuse to be the childhood adversity that increased the likelihood of juvenile offending and persistence in crime.

The studies on the impact of conventional ACEs on juvenile offending in this review are all cross-sectional in nature, which precludes causal inference. Self-report measures were also used to assess variables such as ACEs, which can reduce the reliability and validity of findings, due to possible over-and/or underreporting on questionnaires completed. Furthermore, parental separation/divorce was not included in the study conducted by Fox et al. (2015), so it is unclear of the role that this ACE potentially plays in juvenile offending, if any. Conversely, one major strength of these studies is data all show consistent findings relative to the positive correlation between conventional ACEs and juvenile offending.

**The Impact of Expanded ACEs on Juvenile Offending.** While few studies have investigated the relationship between the conventional ACEs framework and juvenile offending, it does not appear that any studies have explored the cumulative effect that expanded ACEs have on offending outcomes. Instead, the expanded ACEs literature has investigated individual effects

of different variables on juvenile offending that are now considered part of the expanded ACEs framework (Barnert et al., 2015; Bender & Losel, 2011; Bogart et al., 2013; Calvert, 2002; Jiang et al., 2011). Some of the expanded ACEs linked to juvenile offending include experiencing racial discrimination, growing up in an unsafe neighborhood, engaging in bullying behaviors, and experiencing bullying victimization.

Bogart et al. (2013) conducted a cross-sectional study to analyze the relationship between perceived racial and/or ethnic discrimination and problem behaviors among 5,119 fifth grade Black, Latino, and White preadolescents in Alabama, California, and Texas. This study revealed perceived discrimination was a predictor of problem behaviors among Black and Latino preadolescents. When the estimated effects of discrimination were removed, there was a decrease in the disparity in problem behaviors between Blacks and Whites and Latinos and Whites. Based on these findings, elimination of discrimination could likely reduce problem behaviors among preadolescent students who are targets of such discrimination.

In two other studies, Barnert et al. (2015) and Calvert (2002) sought to determine whether there was an association between perception of neighborhood quality and juvenile offending. Both studies found participants' perception of neighborhood safety influenced their level of involvement in juvenile offending behaviors. Specifically, Calvert 's (2002) study comprised of 1,621 adolescents using data collected in 1977 and 1978 from the National Youth Survey, which assesses attitudes and behaviors on a variety of topics. Calvert (2002) found that, compared to respondents who reported growing up in safe neighborhoods, participants who reported poor neighborhood quality were at increased risk of involvement in the juvenile justice system. In a subsequent study, Barnert et al. (2015) conducted a cross-sectional analysis via semi-structured interviews with 20 incarcerated youth, aged 12-17 years, from a detention center in Los Angeles

County. They found respondents who perceived their neighborhoods as unsafe and chaotic were more likely to report higher rates of problem behaviors and subsequent incarceration than participants who perceived their environments as safe.

Bender and Losel (2011), Jiang et al. (2011), and Smith and Ecob (2007) found a relationship existed between bullying behaviors and juvenile offending. In their study, Smith and Ecob (2007) sought to track the link between offending and victimization. This cross-sectional analysis comprised of 4,300 adolescents from Edinburg using longitudinal data from the Edinburg Study of Youth Transitions and Crime, which addresses questions related to offending behaviors among adolescents. Data was first collected in 1998 when youth were approximately 12-years-old and continued being collected for six consecutive years. After analyzing five waves of data and controlling for factors such as sex, social class, risky activities, personality, and weak social bonds, Smith and Ecob (2007) found a positive correlation between youth who initiate bullying and those who engage in offending behaviors, are targets of crime, and are targets of bullying.

Bender and Losel (2011) conducted a cross-sectional study that included 63 German male participants with a mean age of 25-years-old using secondary data from the Erlangen-Nuremberg Study, which assesses bullying at school in Bavaria. The study determined even after controlling for perceived family problems, such as low socioeconomic status and inconsistent parenting, bullying behaviors at school was a strong predictor of juvenile offending and antisocial outcomes in early adulthood. This study also found physical bullying behaviors to be a greater predictor of juvenile offending than verbal or indirect forms of bullying behaviors.

The study conducted by Jiang et al. (2015) sought to determine whether a link existed between bullying behaviors and involvement in the criminal justice system. The study comprised

of 570 boys and 379 girls from Canada with a mean age of 10 years, using data collected in 2001 and 2009 from the Stop Now And Plan (SNAP) program, which is an evidence-based program for children with conduct problems. This study found initiators of bullying were at increased risk of engaging in criminal offenses than non-bullies after age 12. More specifically, youth identified as initiators of bullying were approximately two times more likely to engage in juvenile offenses than non-bullies.

In addition to studies conducted on the relationship between bullying behaviors and juvenile offending, research also highlighted the association between bully victimization and juvenile offending (Cullen et al., 2008; DeCamp & Newby, 2015; Lauritsen et al., 1991; Wong & Schonlau, 2013). For example, Wong and Schonlau (2013) conducted a cross-sectional study to investigate the effect of bullying victimization on juvenile offending. The study comprised of 8,833 respondents aged 12-17 years, using longitudinal data obtained from the 1997 National Longitudinal Survey of Youth (NLSY97), which gathers information on different topics, such as health, substance use, and criminal activity. Wong and Schonlau (2013) found after controlling for age, sex, race, and household income youth who were bullied, particularly those who were targets of bullying prior to age 12, were at increased risk of engaging in offending behaviors. Some of these offending outcomes included assault, theft, vandalism, and running away from home.

Taking a different approach, DeCamp and Newby (2015) and Lauritsen et al. (1991) examined the interrelatedness of being a target of bullying and juvenile offending. More specifically, Lauritsen et al. (1991) conducted a cross-sectional study to examine the link between offending and victimization among adolescents. The sample included 1, 725 participants aged 11-17 years who were assessed using longitudinal data from the National

Youth Survey (NYS), which provides information on the prevalence of substance use and juvenile offending. After analyzing five waves of data from the NYS, it was concluded offending behavior seems to increase the risk of bullying victimization among offenders.

Furthermore, DeCamp and Newby (2015) conducted a cross-sectional study to explore the long-term effects of bullying victimization. The study included 980 male participants and 733 female participants using data from the 1997 National Longitudinal Survey of Youth (NLSY97). DeCamp and Newby (2015) found regardless of gender, targets of bullying were more likely to engage in theft, assault, vandalism, and were also more likely to run away from home than non-targets. Targets of bullying were also more likely to have school suspensions. Specific to gender, male targets of bullying were more likely to join gangs than non-targets.

In another study, Cullen et al. (2008) explored the interaction effects that impacted the victimization-offending relationship. The study comprised of 2,437 middle school children from Virginia using a school survey administered in 2000 that assessed bullying and school violence. The mean age of students was 12 years. Results showed victimized youth with weak school social bonds and aggressive attitudes were more likely to engage in juvenile offenses than youth with stronger social bonds and less aggressive attitudes.

The studies that examined the relationship between expanded ACEs and juvenile offending are cross-sectional in nature, so causal conclusions cannot be drawn from them. Furthermore, the studies conducted by Barnert et al. (2015) and Bender and Losel (2011) comprised of small sample sizes, 20 and 63, respectively, which potentially decreases the validity and reliability of findings. Another limitation is a number of these studies, specifically those by Bender and Losel (2011), Jiang et al. (2015), and Smith and Ecob (2007) were conducted outside of the United States and findings from these studies might not be

generalizable to the United States population. In contrast, a strength of these studies is that findings provide evidence that community-level factors contribute to juvenile offending.

Overall, the studies conducted on conventional ACEs, expanded ACEs, and juvenile offending rely on correlational methodology, which precludes causation. Furthermore, the studies inadequately and oftentimes do not control for confounding factors. There also seems to be a failure in much of the studies to account for demographic variables, such as race/ethnicity and socioeconomic status that might have impacted results. These limitations reduce the validity and reliability of the findings.

Conversely, the literature on conventional and expanded ACEs has consistently established that a positive relationship exists between childhood adversity and juvenile offending. These studies showed youth with a higher number of ACEs were more likely to be involved in the juvenile justice system than adolescents with fewer or no ACEs. The reviewed studies also revealed a victim-offender overlap, such that many juvenile offenders were also targets of offenses themselves. These findings, in turn, suggest that ACEs have far-reaching negative consequences that affect the individual, as well as society. Therefore, examining the combined effects of conventional ACEs and expanded ACEs can lead to the development of new interventions or new approaches to interventions to address the complex interplay among conventional ACEs, expanded ACEs, and juvenile offending.

**Research Rationale**

Experiencing adversity in childhood has been linked to juvenile offending (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017; Fox et al., 2015). Research suggests that as the number of conventional ACEs increases, the risk of engaging in juvenile offenses also increases (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017; Fox et al.,

2015). Research has also shown that, for childhood adversities that occur in the home, child maltreatment, specifically sexual abuse and physical abuse, are two of the greatest predictors of juvenile offending (Basto-Pereira et al., 2016; Fox et al., 2015).

Until recently, the definition of ACEs was limited to traumatic events that occur in the home (Cronholm et al., 2015). Community-level stressors such as witnessing community violence, bullying victimization, experiencing racial discrimination, and living in an unsafe environment were not classified as ACEs, although they were identified as factors that contribute to juvenile offending (Barnert et al., 2015; Bender & Losel, 2011; Bogart et al., 2013; Cronholm et al., 2015; Mennis et al., 2011). These community-level stressors have now been added to the ACEs scale under the umbrella term expanded ACEs, as it was determined conventional ACEs alone did not adequately measure adversity in childhood (CDC, 2020).

Despite advances in ACEs research, the impact that conventional ACEs and expanded ACEs simultaneously have on the risk of juvenile offending remains unclear. Therefore, the present study sought to fill this gap in the literature by comparing the separate and simultaneous effects of ACEs that occur in the home and ACEs that occur in the community have on juvenile offending outcomes. This research was critical as it proposes to highlight the advantage of including both types of ACEs in research to more accurately predict juvenile offending outcomes. By extension, a more accurate prediction of juvenile offending could identify the unique treatment needs of students who experienced both conventional ACEs and expanded ACEs, which can inform the creation of new and/or improved interventions to ensure more effective and integrative treatment.

The present study used the 2019 Minnesota Student Survey (MSS) to explore the relationship between conventional ACEs and juvenile offending, the relationship between

expanded ACEs and juvenile offending, and the influence of conventional ACEs on juvenile offending, moderated by expanded ACEs. There were three hypotheses.

Hypothesis 1. Conventional ACEs will be positively related to juvenile offending, such that higher conventional ACEs scores will predict higher juvenile offending scores.

Hypothesis 2. Expanded ACEs will be positively related to juvenile offending, such that higher expanded ACEs scores will predict higher juvenile offending scores.

Hypothesis 3. Expanded ACEs will moderate the relationship between conventional ACEs and juvenile offending, such that higher expanded ACEs scores will result in a stronger positive relationship between conventional ACEs and juvenile offending.

Previous research suggests that adding expanded ACEs to the conventional ACEs scale better predicts mental health outcomes (Cronholm et al., 2015). It would therefore better predict juvenile offending outcomes.

## Method

### Participants

In 2019, approximately 172,000 individuals participated in the 2019 MSS (Minnesota Department of Health [MDH], 2019). This included 170,128 5th, 8th, 9th, and 11th grade students attending public, non-public, charter, and tribal schools. There were also 2,497 students from alternative schools and area learning centers represented in the survey. Furthermore, 278 respondents from correctional facilities were included in the survey. Overall, participants' ages ranged from 11-21 years.

The sample analyzed in this study included archival data from the 2019 MSS on 278 youth aged 11-21 years from juvenile correctional facilities across the state of Minnesota (MDH, 2019). Given that the focus of this study was to determine the impact of ACEs on juvenile offending, only data from this population was included in the study. Exclusion criteria included 2019 MSS participants from public, non-public, charter, tribal, and alternative schools, since the study's aims were not applicable to these participants of the survey.

The current sample included 195 males and 83 females (MDH, 2019). The racial composition of the sample consisted of 87 students who identified as White, 49 students who identified as Black/African American, 39 American Indians, 3 Asians/Asian Americans, and 83 students who identified with more than one race. In addition, there were 2 youths who did not specify their racial identity. In terms of ethnic identity, 15 students identified as Hispanic or Latinx.

Table 1 *Distribution of the sample by age.*

**Table 1**

| *Age* | *Number of participants* |
|---|---|

| | |
|---|---|
| 11 | 5 |
| 12 | 8 |
| 13 | 18 |
| 14 | 56 |
| 15 | 54 |
| 16 | 62 |
| 17 | 57 |
| 18 | 15 |
| 21 | 1 |

While participants' ages ranged from 11-21 years, there were no participants in the 19-20 age range. Furthermore, most of the participants were 16-years-old (n = 62), while there was one student aged 21 years.

**Procedure**

The MSS is an anonymous and voluntary survey that is conducted by the Minnesota Department of Education (MDE), Health, Human Services, and Public Safety to analyze behavioral and relationship trends of students over a period of time (MDH, 2019). The MSS was first administered in 1989 and has been conducted every three years in all public-school districts in Minnesota, including elementary schools, high schools, alternative schools, charter schools, tribal schools, and juvenile correctional facilities. From its inception until 2010, grade levels included 6$^{th}$, 9$^{th}$, and 12$^{th}$ grades. In 2013 and 2016, the survey was administered to 5$^{th}$, 8$^{th}$, 9$^{th}$, and 11$^{th}$ graders. The current 2019 survey continues to represent students in 5$^{th}$, 8$^{th}$, 9$^{th}$, and 11$^{th}$ grade. Questions in the survey span a variety of positive and negative behaviors and activities, including substance use, safety, sexual activity, violence, physical activity, health status, and quality of relationships with family members, school personnel, and members in the community.

There are currently two modes by which the MSS can be administered (MDH, 2019). The primary method is the online administration, which is available to all survey participants. A

secondary method is the paper administration, which is an option for students in juvenile correctional facilities. While both methods can be used, they cannot be used simultaneously in a single setting. Items on the paper survey are identical to those on the online survey. Furthermore, in order to ensure the inclusion of diverse students, the online MSS includes a text-to-speech option.

The results of the MSS are available for public viewing on the Minnesota Department of Education's official website (MDH, 2019). Results of the survey are also distributed to schools and districts that participated in the survey. In addition, researchers and other individuals who would like to use the information for analysis can also request survey data. For this study, data were obtained electronically from the 2019 MSS' archival database. Items relevant to the study were obtained and categorized as conventional ACEs, expanded ACEs, or juvenile offending. Items in each category were then recoded as binary (yes/no) or Likert measures, with "yes" responses and higher scores representing higher levels of ACEs and higher levels of juvenile offending behaviors.

**Materials**

The 2019 MSS was administered to students in 5$^{th}$, 8$^{th}$, 9$^{th}$, and 11$^{th}$ grades. The study comprised of archival data and therefore no materials were used in the current study.

**Measures**

The current study included three primary measures: conventional ACEs, expanded ACEs, and juvenile offending. These three measures were obtained from archival records of students who participated in the 2019 MSS. Each is described below.

**Conventional ACEs Measurements.** Conventional ACEs were measured using seven items from the 2019 MSS. See Table 2 (below) for a comparison between questions on the original ACEs questionnaire and questions on the MSS related to ACEs.

**Table 2**

| *Original ACEs questionnaire*<br><br>While you were growing up, during your first 18 years of life… | *MSS ACEs questions* |
|---|---|
| Did an adult or person at least five years older than you ever touch or fondle you or have you touch their body in a sexual way, or attempt or actually have oral, anal, or vaginal intercourse with you? | Has any relative/family member ever pressured, tricked, or forced you to do something sexual or done something sexual to you? |
| Did a parent or other adult in the household often push, grab, slap, or throw something at you, or ever hit you so hard that you had marks or were injured? | Has a parent or other adult in your home ever hit, beat, kicked or physically hurt you in any way? |
| Did a parent or other adult in the household often swear at you, insult you, put you down, or humiliate you, or act in a way that made you afraid you might be physically hurt? | Does a parent or other adult in your home regularly swear at you, insult you, or put you down? |
| Did you live with anyone who was a problem drinker or alcoholic, or who used street drugs? | Do you live with anyone who drinks too much alcohol? [and] do you live with anyone who uses illegal drugs or abuses prescription medication? |
| Was a household member depressed or mentally ill, or did a household member attempt suicide? | Do you live with anyone who is depressed or has any other mental health issues? |
| Was your mother or stepmother often pushed, grabbed, slapped, or had something thrown at her, or sometimes or often kicked, bitten, hot with a fist, or hot with something hard or ever repeatedly hot over at least a few minutes or threatened with a gun or a knife? | Have your parents or other adult in your household ever slapped, hit, kicked, punched or beat each other up? |

| | |
|---|---|
| Did a household member go to prison? | Have any of your parents or guardians ever been in jail or prison? |
| Did you often or very often feel that no one in your family loved you or thought you were important or special, or your family didn't look out for each other, feel close to each other, or support each other? | No question included in the MSS |
| Did you often or very often feel that you didn't have enough to eat, had to wear dirty clothes, and had no one to protect you, or your parents were too drunk or high to take care of you or take you to the doctor if you needed it? | No question included in the MSS |
| Were your parents ever separated or divorced? | No question included in the MSS |

Note: Parental separation or divorce, and neglect were not included in this study because questions specific to these conventional ACEs were not present in the 2019 MSS.

Items related to abuse, household substance abuse, household mental health disorders, and household physical violence consisted of binary (yes/no) responses, while items related to the incarceration of family members included three possible response options. Responses specific to the incarceration of family members included, "None of my parents or guardians has ever been in jail or prison; Yes, I have a parent or guardian in jail or prison right now; [and] Yes, I have had parent or guardian in jail or prison in the past."

**MSS Conventional ACEs Scale.** The conventional ACEs scale is a continuous, independent variable that was used in this study. There were seven measures of conventional ACEs in the 2019 MSS. Five of these items (sexual abuse, physical abuse, emotional abuse, household substance abuse, and household physical violence) comprised of binary (yes/no) responses. For the purpose of this study, these responses were recoded as 0 (no) and 5 (yes). This

coding decision was made to reflect the difference in severity between "yes" responses relative to "no" responses.

The item related to the incarceration of family members was recoded as follows: 0 (none of my parents or guardians has ever been in jail or prison) and 5 (yes, I have had a parent a parent or guardian in jail or prison in the past or I have a parent or guardian in jail or prison right now). Previous incarceration was rated as "5" due to stigma associated with incarceration, which continues to negatively impact children when the incarcerated parent/guardian is released from jail/prison. Current incarceration was also coded as "5, since it is hypothesized that this experience would lead to adverse outcomes such as changes in family dynamics, income, etc. Possible scores for conventional ACEs ranged from 0-35, with higher scores indicating a greater number of ACEs experienced. A Kuder-Richardson Formula 20 (KR-20) was conducted to measure the internal consistency of the conventional ACEs scale. The KR-20 score was .724, which is close to 1, and therefore indicates an acceptable level of internal consistency for the conventional ACEs scale.

**Expanded ACEs Measurements.** Expanded ACEs were measured using three items from the 2019 MSS. These three items were related to racial discrimination, "During the last 30 days, how often have other students harassed or bullied you [based on] your race, ethnicity, or national origin?" being a victim of physical bullying, "During the last 30 days, on how many days have other students at school pushed, shoved, slapped, hit or kicked you when you weren't kidding around?" and perception of living in an unsafe neighborhood, "How much do you agree or disagree with the following statement? -I feel safe in my neighborhood." Physical bullying victimization will be examined because the literature suggested that this form of bullying is the greatest predictor of juvenile offending (Bender & Losel, 2011). Witnessing community violence

was not included in this study because questions specific to this expanded ACE were not present in the MSS.

Items based on racial discrimination and victim of physical bullying comprised of five Likert scale response options. These items included, “never; once or twice; about once a week; several times a week; everyday.” The perception of living in an unsafe neighborhood was also rated on a five-point scale and included, “strongly agree; agree; neither agree nor disagree; disagree; strongly disagree.”

**MSS Expanded ACEs Scale.** The expanded ACEs scale is another continuous, independent variable that was used in the study. There were three categories of expanded ACEs in the 2019 MSS. Two of these items (racial discrimination and being a target of bullying) comprised of five-point Likert scale responses (never; once or twice; about once a week; several times a week; everyday). In order to reflect the frequency of these experiences, these responses were rated as 0 (never); 1 (once or twice); 2 (about once a week); 3 (several times a week); and 4 (everyday).

The perception of living in an unsafe neighborhood consisted of five possible response options (strongly agree; agree; neither agree nor disagree; disagree; strongly disagree). Each response on this item were recoded as follows: 0 (strongly agree); 1 (agree); 2 (neither agree nor disagree); 3 (disagree); and 4 (strongly disagree). The rationale for recoding these possible responses was to better reflect the level of intensity of study participants’ perception of living in an unsafe environment. Based on the coding for expanded ACEs, scores ranged from 0-12, with higher scores representing a higher number of expanded ACEs endorsed. A Cronbach’s alpha was conducted to measure the internal consistency of the expanded ACEs scale. The final

analysis showed that Cronbach's alpha for expanded ACEs was .309, which is closer to 0 than 1, and therefore indicates a low level of internal consistency for the expanded ACEs scale.

**Juvenile Offending Measurements.** Juvenile offending behaviors were measured using three items from the 2019 MSS. The first item addressed shoplifting and asked, "How often have you taken something from a store without paying for it?" The second question was related to concerns of property destruction and asked, "How often have you damaged or destroyed property?" Finally, the third question, specific to running away from home asked, "How often have you run away from home?" Furthermore, each item specific to juvenile offending behaviors included identical response ratings, "Never; once or twice; 3-5 times; 6-9 times; 10 or more times."

**MSS Problematic Behavior Scale.** The problematic behavior scale was a continuous, dependent variable in the study. There were three categories of this measure in the 2019 MSS. These included items related to shoplifting, property destruction, and running away from home. Each of these questions included the same five possible responses (never; once or twice; 3-5 times; 6-9 times; and 10 or more times). To better establish the frequency of problematic behaviors, responses were rated as 0 (never), 1 (once or twice), 2 (3-5 times), 3 (6-9 times), and 4 (10 or more times). The sum of items was calculated, with a minimum possible score of 0 and a maximum possible score of 12. Scores on the problematic behavior scale ranged from 0-12, with higher scores indicating more instances of problematic behaviors. A Cronbach's alpha was also conducted to measure the internal consistency of the problematic behavior scale. The Cronbach's alpha for problematic behaviors was .711, which is close to 1, and therefore indicates an acceptable level of internal consistency for the problematic behavior scale.

**Covariate.** This study included participants aged 11-21 years. Given the wide spread in age of participants in this study, the youngest participants have 10 years less opportunity to experience ACEs than the older participants. Therefore, to reduce the likelihood of age as a confounding variable related to exposure to ACEs, this variable was added as a covariate to increase the accuracy of results.

## Data Analysis

**Research Design.** This study included a quantitative, non-experimental research design. A multiple linear regression analysis was used for all three hypotheses because the present study included two independent variables (conventional ACEs and expanded ACEs) used to predict the continuous outcome of juvenile offending. This analysis also included age as a covariate. The first hypothesis was that conventional ACEs would be positively related to juvenile offending, such that higher conventional ACEs scores would predict higher juvenile offending scores. This hypothesis was answered by the main effect of conventional ACEs on juvenile offending. The second hypothesis was that expanded ACEs would be positively related to juvenile offending, such that higher expanded ACEs scores would predict higher juvenile offending scores. The second hypothesis was answered by the main effect of expanded ACEs on juvenile offending. Finally, the third hypothesis was that expanded ACEs would moderate the relationship between conventional ACEs and juvenile offending, such that higher expanded ACEs scores would result in a stronger positive relationship between conventional ACEs and juvenile offending.

**Power and Effect Size.** An a priori power analysis was conducted to determine the effect size needed to detect significant findings in this study. Given the sample size of 278, for hypothesis 1 and hypothesis 2, the effect size was determined to be 0.4, which represents a small

to medium effect size. For hypothesis 3, the effect size was assessed to be .05 or larger, which represents a small to medium effect size.

**Software.** The data obtained from the 2019 MSS was analyzed using the 24th edition of the Statistical Package for the Social Sciences (IBM) computer program. In addition, multiple linear regression tests were used for data analysis.

## Ethical Considerations

**Consent.** The information used in this study was collected from the 2019 MSS. The MSS is a voluntary survey that uses a passive consent procedure, on which parents and legal guardians received a written notice about the nature of the survey. This written notice included a section to complete a note if parents/guardians chose to decline the invitation for their children to participate in the study. This procedure assumes parents and legal guardians have consented to their children's participation in the survey and therefore, all children are included in the study unless their parents and legal guardians decline their children's participation in the survey. Furthermore, by refusing to engage in the MSS on the day of administration, students are not assenting to participate. There are no repercussions for individuals who opt out of participating in the survey.

**Risk.** This study examined archival data with no risk of harm in the present study.

**Deception.** There was no deception used in the current study.

**Confidentiality.** Parents and legal guardians of the 2019 MSS' participants were informed that the information collected from the survey would be confidential. To ensure confidentiality, identification codes were used in lieu of identifying information, such as participants' names (MDH, 2019).

**Information and Debriefing.** The current study analyzed 2019 MSS archival data on which parents and legal guardians of participants in the survey provided passive consent for researchers to use the findings of the 2019 MSS for research purposes. Findings from the survey were provided to the MDH for their health records. No other ethical considerations specific to information and debriefing of respondents were applicable to this study.

**Retention of Data.** Data obtained for this study were stored on an encrypted flash drive. The data will be deleted five years after the completion of the study. If the study is published, data will be kept for five years from the date of publication, which is in accordance with the American Psychological Association's (APA) guidelines regarding the retention of data.

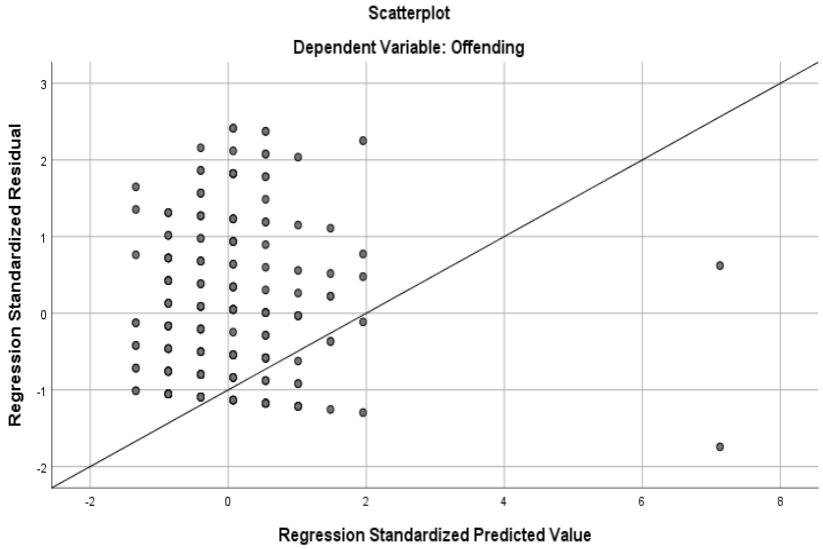
**Permissions.** Prior to data collection, Institutional Review Board (IRB) approval was obtained from Augsburg University to conduct the current research study. Permission was then obtained from the MSS Interagency Team (2019) to use the 2019 MSS archival dataset for research purposes. No other approvals or permissions regarding the use of the current dataset or research were required because archival data was used in this study.

## Results

### Covariate

Prior to conducting the regression analysis, a scatterplot was created to test the assumption of linearity in the model. To test this assumption, the relationship between age and juvenile offending was examined.

**Figure 1** *Scatterplot of Standardized Predicted Values and Standardized Residuals for Covariate.*




The regression analysis of the scatterplot showed a relatively linear relationship, suggesting that the data did not require any transformations before running the regression. However, noteworthy is that age did not significantly predict juvenile offending ($F(1,228) = 1.71$, $p = .192$).

**Assumptions.** After running the initial analysis, the assumption of collinearity for the relationship between age and juvenile offending was examined in the model (analysis). This assumption was examined to ensure predictor variables were not correlated with each other. If correlated, it would be difficult to accurately make conclusions regarding which predictor

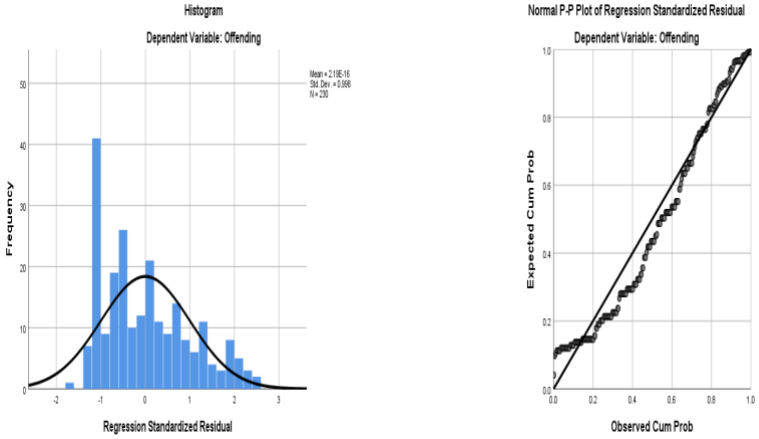
variable was responsible for the variance in the outcome variable (Field, 2018). Pearson's correlation ($r$ = -.086), is below the expected .9 value, suggesting no evidence of multicollinearity. Collinearity diagnostics were also examined for an eigenvalue below the cut off of 2. The eigenvalue for age is (.010), which is well below 2. As such, the variance proportions were assessed to ensure that the percent of the variance in which age accounted for was close to 1. The variance proportion for age is 1, which suggests that there is no evidence of multicollinearity in the model. To further assess the assumption of multicollinearity in the model, the Tolerance and VIF values were examined. It is expected that the Tolerance should be more than 0.2 and the VIF should be less than 10. The Tolerance and VIF values were both 1, again, suggesting no evidence of multicollinearity in the model.

Casewise diagnostics and the residuals statistics were examined for evidence of bias in the model. Bias was assessed since highly influential cases or outliers, which differ significantly from other cases in the model, can impact the accuracy of the results (Field, 2018). It is expected that 95% of standardized residuals should lie between ±2 with 5% of cases expected to fall outside these limits. Ten cases were identified with standardized residuals ±2, or 4.35% of the cases, which shows there is no concerns with bias in the model. It is also expected that 99% of standardized residuals should lie between ±2.5 with 1% of cases expected to fall outside these limits. There were no values lying outside these limits, suggesting that the model is valid. Further, the maximum value for Cook's distance is .573, which is less than 1, indicative that no cases are overly influential to warrant exclusion from the analysis.

The assumption of normality was then tested by examining the histogram and normal probability plot. This assumption was examined to ensure the data fit a bell curve shape. If the

assumption of normality is violated, results can be misleading or incorrect, depending on the extent of the violation (Field, 2018).

**Figure 2** *Histogram and Normal Probability Plot of Regression Standardized Residuals for Covariate.*

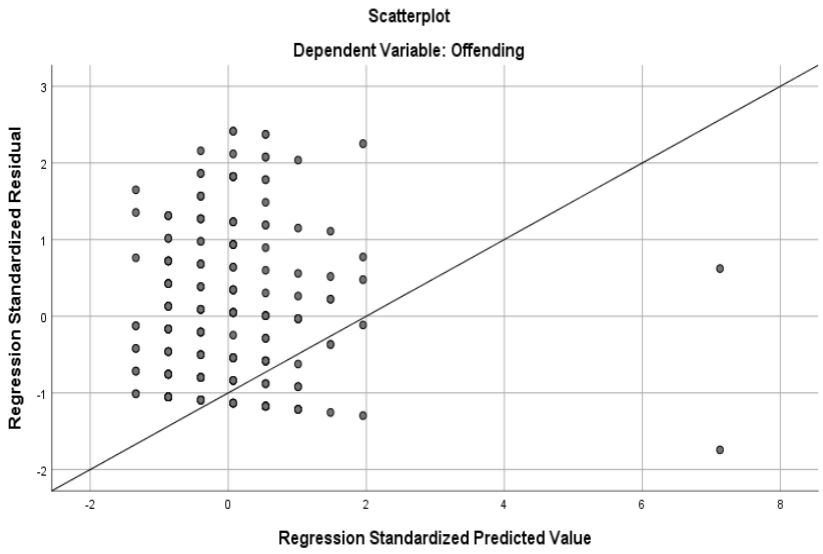



The histogram appeared to have a relatively normal curve with a slightly positive skew. The normal probability plot also showed some evidence of positive skew. However, the positive skew in the data does not invalidate the confidence intervals and significance tests because of the central limit theorem and the sample size (n = 230), which is greater than 30. The central limit theorem is a statistical concept which states that when a sample is large (greater than 30), the sampling distribution tend to form a bell shape, regardless of the shape of the population distribution from which the sample was obtained (Field, 2018). Based on these factors, the data fit the assumption of normality.

Next, the assumptions of linearity and homoscedasticity were assessed by examining the plot of standardized predicted values against the standardized residuals. Linearity in the model is represented by a straight line, which assumes a relationship exists between the predictor and the outcome variables (Field, 2018). The assumption of homoscedasticity is met when the residuals (error in the relationship between the predictor and outcome variables) at each point of any

predictor variable remains constant. This assumption is important as it increases the accuracy of results.

**Figure 3** *Scatterplot of Standardized Predicted Values and Standardized Residuals for Covariate.*




The scatterplot suggests the model meets the assumption of linearity, since the cloud of dots are around the line. However, there appears to be a violation of the assumption of homoscedasticity, as the cloud of dots are not evenly spaced out around the line, showing a greater spread for younger participants in the study. Bootstrapping is therefore recommended to correct for the violation of homoscedasticity.

**Final Regression Analysis.** The final regression analysis was conducted using bootstrapping with bias accelerated (BCa) 95% confidence intervals to ensure a robust regression to account for the heteroscedasticity identified in the model. Descriptive statistics provided the mean and standard deviation for juvenile offending and age in the model.

**Table 3** *Descriptive Statistics for juvenile offending and age*

| Variable | $\bar{x}$ | $\sigma$ |
|---|---|---|

| | | |
|---|---|---|
| Juvenile offending | 3.81 | 3.39 |
| Age | 15.15 | 2.13 |

The model summary suggested that when age was added to the model, this predictor accounted for 0.7% of the variation in juvenile offending ($R^2$ = .007). The adjusted $R^2$ is .003. From ANOVA, the model indicated adding age did not better predict juvenile offending, F (1,228) = 1.71, p = .192).

**Table 4** *Linear model of age as a predictor of juvenile offending.*

| | ***B*** | ***SE B*** | ***β*** | ***p*** |
|---|---|---|---|---|
| Step 1 | | | | |
| Constant | 5.817 | 1.608 | | .001 |
| Age | -.138 | .105 | -.086 | .192 |

*Note.* $R^2$ = .007

Table 4 illustrates the *b*-value and standardized *b*-value for age in relation to juvenile offending. The model shows that age did not significantly predict juvenile offending (p = .192).

**Hypothesis 1**

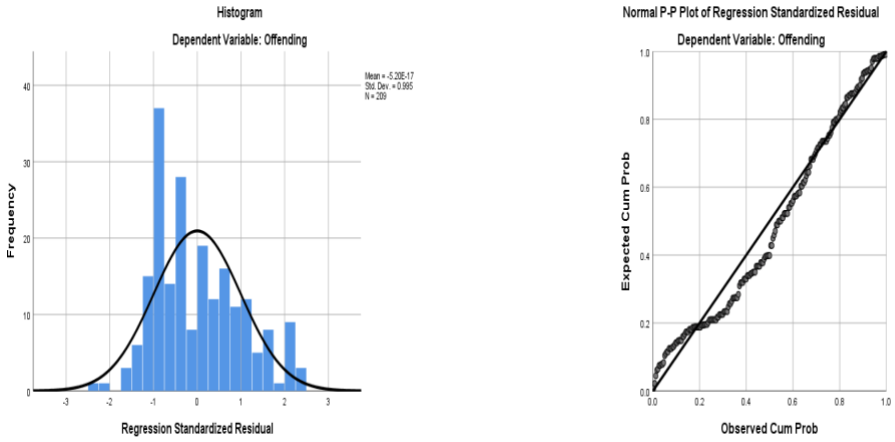
Next, a multiple regression analysis was conducted to determine whether a relationship exists between conventional ACEs and juvenile offending, with age included as a covariate. First, the assumption of collinearity was examined in the model. Pearson's correlation for age (*r* = -.083) and conventional ACEs (*r* = .338), are below the expected .9 value, suggesting no evidence of multicollinearity. Collinearity diagnostics were also examined for an eigenvalue below the cut off of 2. The eigenvalue for age is .010, while the eigenvalue for conventional ACEs is .315, which are both below 2. As such, the variance proportions were assessed to ensure that the percent of the variance in which age accounted for was close to 1. The variance

proportion for age is .99 and for conventional ACEs is .93, which suggests that there is no evidence of multicollinearity among the predictors in the model. To further assess the assumption of multicollinearity in the model, the Tolerance and VIF values were examined. The Tolerance and VIF values for age and conventional ACEs were both 1, again, suggesting no evidence of multicollinearity in the model.

Casewise diagnostics and the residuals statistics were examined for evidence of bias in the model. Fourteen cases were identified with standardized residuals ±2, or 6.7% of the cases, which suggests potential evidence of bias in the model. However, there were no standardized residual values lying outside ±2.5, suggesting that the model is valid. Further, the maximum value for Cook's distance is .907, which is less than 1, indicative that no cases are overly influential to warrant exclusion from the analysis.

The assumption of normality was then tested by examining the histogram and normal probability plot.

**Figure 4** *Histogram and Normal Probability Plot of Regression and Standardized Residuals for Hypothesis 1.*

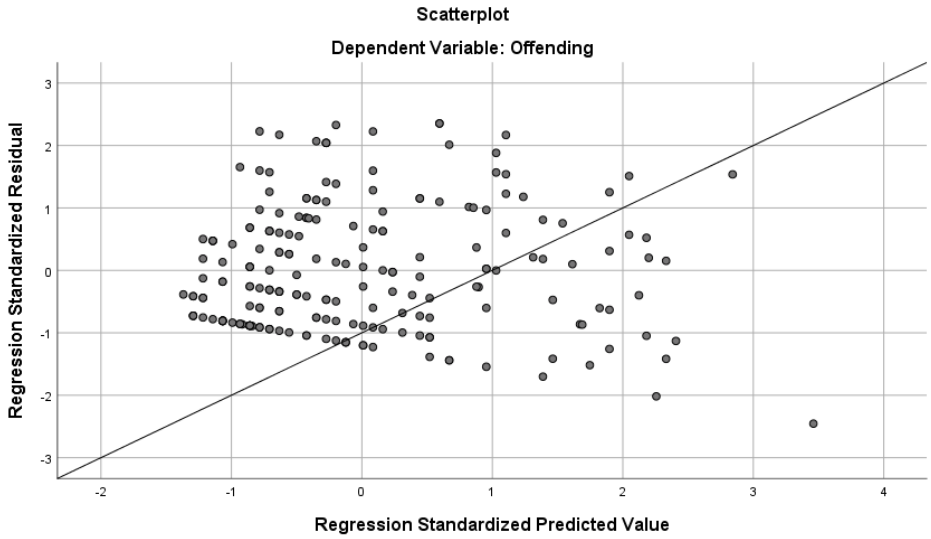



The histogram appeared to have a relatively normal curve with a slightly positive skew. The normal probability plot also showed some evidence of positive skew. However, the positive

skew in the data does not invalidate the confidence intervals and significance tests because of the central limit theorem and the sample size (n = 209), which is greater than 30. Based on these factors, the data fit the assumption of normality.

Next, the assumptions of linearity and homoscedasticity were assessed by examining the plot of standardized predicted values against the standardized residuals.

**Figure 5** *Scatterplot of Standardized Predicted Values and Standardized Residuals for Hypothesis 1.*




The scatterplot suggests the model meets the assumption of linearity, since the cloud of dots are around the line. However, there appears to be a violation of the assumption of homoscedasticity, as the cloud of dots are not evenly spaced out around the line, showing a funnel that become more spread across the graph. Bootstrapping is therefore recommended to correct for the violation of homoscedasticity.

**Final Regression Analysis.** The final regression analysis was conducted using bootstrapping with bias accelerated (BCa) 95% confidence intervals to ensure a robust regression

to account for the heteroscedasticity identified in the model. Descriptive statistics provided the mean and standard deviation of age in the model.

**Table 5** *Descriptive Statistics for juvenile offending, age, and conventional ACEs*

| Variable | $\bar{x}$ | $\sigma$ |
|---|---|---|
| Juvenile offending | 3.81 | 3.38 |
| Age | 15.14 | 2.18 |
| Conventional ACEs | 13.28 | 11.21 |

In the model summary, conventional ACEs predicted 11.8% of the variance in juvenile offending ($R^2 = .118$). The adjusted $R^2$ for conventional ACEs is .109. From ANOVA, the model indicates that conventional ACEs was significantly better at predicting juvenile offending compared to age only $F (2, 206) = 25.88$, $p = .000$.

**Table 6** *Linear model of age and conventional ACEs as predictors of juvenile offending.*

| | *B* | *SE B* | *β* | *p* |
|---|---|---|---|---|
| Step 1 | | | | |
| Constant | 5.747 | 1.64 | | .001 |
| Age | -.128 | .107 | -.083 | .234 |
| Step 2 | | | | |
| Constant | 3.797 | 1.595 | | 0.18 |
| Age | -.087 | .102 | -.056 | .392 |
| Conventional ACEs | .101 | .020 | .334 | .000 |

*Note.* $R^2 = .007$ for Step 1; $\Delta R^2 = .118$ for Step 2.

Table 6 illustrates the *b*-value and standardized *b*-value for age and conventional ACEs in relation to juvenile offending. Independently, age did not significantly predict juvenile offending. Standardized beta shows that as conventional ACEs increases by one standard deviation, juvenile

offending increases by .334 standard deviations. Independently, conventional ACEs has a small to medium-sized effect (.338) in the model and significantly predicted juvenile offending (p = .000).

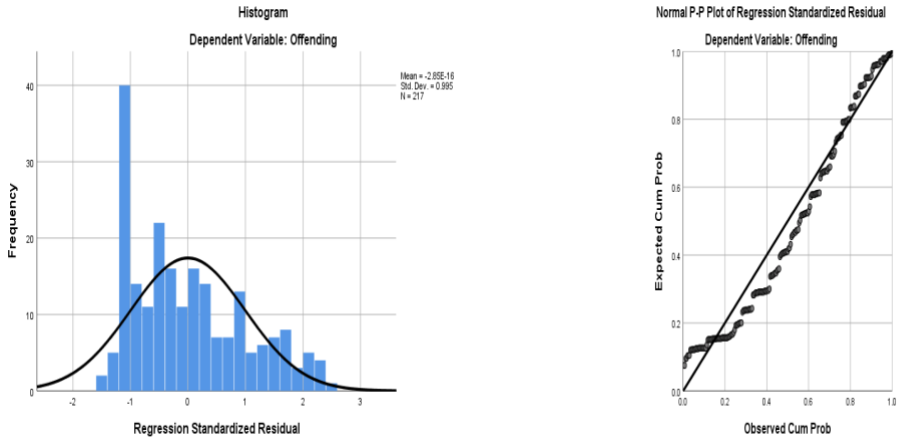
**Hypothesis 2**

Next, a multiple regression analysis was conducted to determine whether a relationship exists between expanded ACEs and juvenile offending, again adding age as a covariate. First, the assumption of collinearity was examined in the model. Pearson's correlation for age ($r$ = -.083) and expanded ACEs ($r$ = .338), are below the expected .9 value, suggesting no evidence of multicollinearity. Collinearity diagnostics were also examined for an eigenvalue below the cut off of 2. The eigenvalue for age is .007, while the eigenvalue for expanded ACEs is .033, which are both below 2. As such, the variance proportions were assessed to ensure that the percent of the variance in which age accounted for was close to 1. The variance proportion for age is .90 and for expanded ACEs is (.94), which suggests that there is no evidence of multicollinearity among the predictors in the model. To further assess the assumption of multicollinearity in the model, the Tolerance and VIF values were examined. The Tolerance value for age and expanded ACEs were both .994, while the VIF values for both predictors was 1, suggesting no evidence of multicollinearity in the model.

Casewise diagnostics and the residuals statistics were examined for evidence of bias in the model. Ten cases were identified with standardized residuals ±2, or 4.61% of the cases, which suggests that there is no evidence of bias in the model. There were no standardized residual values lying outside ±2.5, suggesting that the model is valid. Further, the maximum value for Cook's distance is .384, which is less than 1, indicative that no cases are overly influential to warrant exclusion from the analysis.

The assumption of normality was then tested by examining the histogram and normal probability plot.

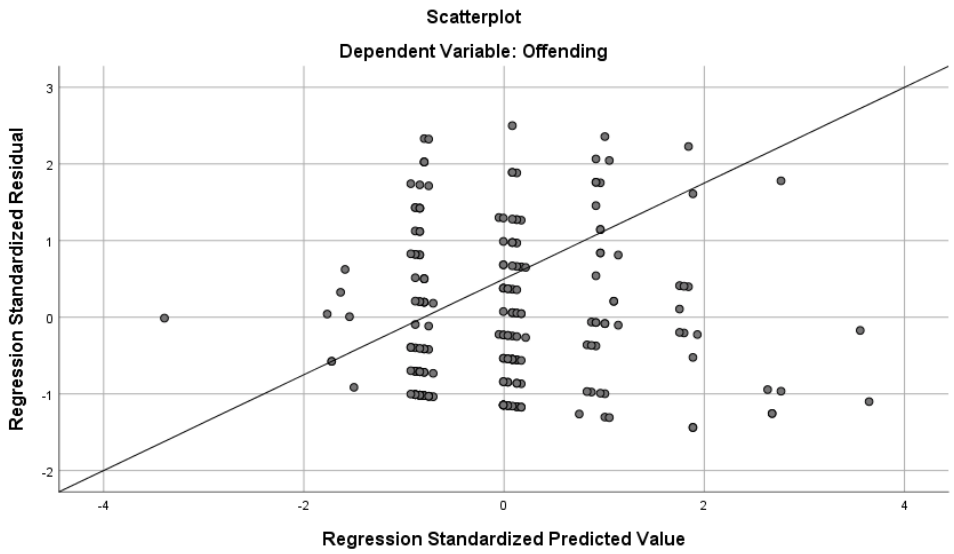
**Figure 6** *Histogram and Normal Probability Plot of Regression and Standardized Residuals for Hypothesis 2.*




The histogram appeared to have a relatively normal curve with a slightly positive skew. The normal probability plot also showed some evidence of positive skew. However, the positive skew in the data does not invalidate the confidence intervals and significance tests because of the central limit theorem and the sample size (n = 209), which is greater than 30. Based on these factors, the data fit the assumption of normality.

Next, the assumptions of linearity and homoscedasticity were assessed by examining the plot of standardized predicted values against the standardized residuals.

**Figure 7** *Scatterplot of Standardized Predicted Values and Standardized Residuals for Hypothesis 2.*




The scatterplot suggests the model meets the assumption of linearity, since the cloud of dots are around the line. However, there appears to be a violation of the assumption of homoscedasticity, as the cloud of dots are not evenly spaced out around the line, showing a funnel that become more spread across the graph. Bootstrapping is therefore recommended to correct for the violation of homoscedasticity.

The final regression analysis was conducted using bootstrapping with bias accelerated (BCa) 95% confidence intervals to ensure a robust regression to account for the heteroscedasticity identified in the model. Descriptive statistics provided the mean and standard deviation of age and expanded ACEs in the model.

**Table 7** *Descriptive Statistics for juvenile offending, age, and expanded ACEs*

| Variable | $\bar{x}$ | $\sigma$ |
|---|---|---|
| Juvenile offending | 3.76 | 3.30 |
| Age | 15.29 | 1.84 |
| Expanded ACEs | 5.08 | 1.13 |

In the model summary, expanded ACEs predicted 2.4% of the variance in juvenile offending ($R^2$ = .024). The adjusted $R^2$ for expanded ACEs is .014. From ANOVA, the model indicates that expanded ACEs was significantly better at predicting juvenile offending compared to age only F (2,214) = 5.04, p = .026.

**Table 8** *Linear model of age and expanded ACEs as predictors of juvenile offending.*

| | ***B*** | ***SE B*** | ***β*** | ***p*** |
|---|---|---|---|---|
| Step 1 | | | | |
| Constant | 4.23 | 1.89 | | .020 |
| Age | -.043 | .123 | -.024 | .724 |
| Step 2 | | | | |
| Constant | 6.37 | 2.06 | | 0.002 |
| Age | -.023 | .122 | -.013 | .853 |
| Expanded ACEs | -.446 | .199 | -.152 | .026 |

*Note.* $R^2$ = .001 for Step 1; $\Delta R^2$ = .024 for Step 2.

Table 8 illustrates the *b*-value and standardized *b*-value for age and expanded ACEs in relation to juvenile offending. Independently, age did not significantly predict juvenile offending (p = .853). There was a negative relationship between expanded ACEs and juvenile offending, such that as expanded ACEs increased by one-unit, juvenile offending decreased by .446 units (*b* = -.446). Standardized beta shows that as expanded ACEs increased by one standard deviation, juvenile offending decreased by .152 standard deviations. Independently, expanded ACEs had a small-sized effect (.152) in the model, but significantly predicted juvenile offending (p = .026).

**Hypothesis 3**

Finally, a moderation analysis with PROCESS macro (Hayes, 2013) was used to explore the interaction effect between conventional ACEs and expanded ACEs in relation to juvenile offending. Age was included in the model as a covariate.

**Table 9** *Linear model of predictors of juvenile offending, with 95% bias corrected confidence intervals reported in parentheses. Confidence intervals and standard errors based on 5000 bootstrap samples.*

| | ***B*** | ***SE B*** | ***t*** | ***p*** |
|---|---|---|---|---|
| Step 1 | | | | |
| Constant | 3.3 [-.15, 9.2] | 3.3 | 1 | .31 |
| Age | .03 [-.34, .23] | .21 | .14 | .89 |
| Conventional Aces (centered) | .09 [.05, .13] | .02 | 4.1 | .00 |
| Expanded ACEs (centered) | -.39 [-.84, .03] | .23 | -1.75 | .83 |
| Conventional ACEs x Expanded ACEs | -.00 [-.05, .04] | .02 | -.21 | .83 |

*Note.* $R^2 = .12$

Table 9 indicates a significant positive influence of conventional ACEs on juvenile offending (p = .00), However, the relationship between expanded ACEs and juvenile offending was not significant (p = .83). The results further indicate the relationship between conventional ACEs and juvenile offending is not moderated by expanded ACEs (p = .83).

## Discussion

Conventional ACEs have been consistently shown to positively predict juvenile offending (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017). Recently, expanded ACEs were included in the ACEs framework, as it was determined that conventional ACEs alone did not adequately represent childhood adversity experienced by multiple sociodemographic groups (Cronholm et al., 2015). However, despite the inclusion of expanded ACEs within the ACEs framework, existing studies on ACEs do not focus on the simultaneous impact both conventional ACEs and expanded ACEs have on juvenile offending outcomes. Instead, there exists research on conventional ACEs and their outcomes, separate from expanded ACEs variables and their outcomes. Therefore, the current study sought to investigate the relationship between conventional ACEs and juvenile offending, the relationship between expanded ACEs and juvenile offending, and to determine whether expanded ACEs moderated the relationship between conventional ACEs and juvenile offending.

### Relationship between Conventional ACEs and Juvenile Offending

The first hypothesis was that conventional ACEs would be positively related to juvenile offending, such that higher conventional ACEs scores would predict higher juvenile offending scores. Previous research indicated higher ACEs scores predicted increased maladaptive outcomes (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017), so it was hypothesized that higher conventional ACEs scores would also result in higher juvenile offending scores. This hypothesis was confirmed. The present study found a significant positive dose-response relationship between the effects of conventional ACEs on juvenile offending, which was consistent with the findings of previous studies (Baglivio et al., 2015; Brown & Shillington, 2017; DeLisi et al., 2017).

However, despite this significant finding, conventional ACEs only predicted 11.8% of the variance in juvenile offending. This means that 88.2% of the variation in juvenile offending remained unaccounted for in the current research. In other words, the findings suggest that there are other factors that might also influence juvenile offending. A consideration to be made is that data collected in the MSS was for the purpose of analyzing behavioral and relationship trends among students and not for examining the impact of ACEs on juvenile offending. As such, the current study was limited to data collected in the MSS for the purpose of that study. Consequently, only seven of ten conventional ACEs were available for use in the current study. Emotional neglect, physical neglect, and parental separation or divorce were not included in the MSS, so their impact on juvenile offending is unknown. It is likely that the inclusion of these variables in the current study might have predicted more of the variance in juvenile offending. Furthermore, the omission of these variables from the conventional ACEs scale likely reduces the reliability and validity of the findings, since the measure was not used in a standardized manner.

**Relationship between Expanded ACEs and Juvenile Offending**

The second hypothesis was that expanded ACEs would be positively related to juvenile offending, such that higher expanded ACEs scores would predict higher juvenile offending scores. Although the literature does not identify a specific cluster of expanded ACEs which predict juvenile offending, research has established a positive association between community-level childhood adversity and juvenile offending (Barnert et al., 2015; Bender & Losel, 2011; Bogart et al., 2013; Cronholm et al., 2015; Mennis et al., 2011). Based on the findings from these studies, it was hypothesized that the expanded ACEs identified in the current study would have a positive association with juvenile offending. This hypothesis was not confirmed. Expanded

ACEs predicted less juvenile offending in the present study, but when conventional ACEs were included in the model, the significant relationship between expanded ACEs and juvenile offending dissipated. However, the current study revealed that expanded ACEs only accounted for 2.4% of the variance in juvenile offending. This means that 97.6% of other influential factors remained unaccounted for in the study.

One explanation for expanded ACEs accounting for only 2.4% of the variance in juvenile offending is that the MSS did not include a comprehensive list of expanded ACEs in their study. More specifically, only three types of expanded ACEs, including the experience of bullying, racism, and the perception of living in an unsafe neighborhood were available for use in the present study. The inclusion of only three types of expanded ACEs in the MSS resulted in the low internal consistency of the expanded ACEs scale. It is possible that the low reliability of the expanded ACEs scale in the current study contributed to the inconsistent results regarding the relationship between expanded ACEs and juvenile offending. There are other expanded ACEs, such as low socio-economic status, that have been linked to juvenile offending behaviors (Cho & Lee, 2021; Finkelhor et al., 2013; Leslie et al., 2019). As such, it is recommended that other expanded ACEs variables are included in future research to potentially strengthen the relationship between expanded ACEs and juvenile offending.

**Interaction Effect of Conventional ACEs and Expanded ACEs on Juvenile Offending**

The third hypothesis was that expanded ACEs would moderate the relationship between conventional ACEs and juvenile offending, such that higher expanded ACEs scores would result in a stronger positive relationship between conventional ACEs and juvenile offending. Previous research suggested adding expanded ACEs to the conventional ACEs scale more accurately predicts mental health outcomes (Cronholm et al., 2015). Given that adding expanded ACEs to

the conventional ACEs scale more accurately predicted mental health outcomes, the hypothesis was made that adding expanded ACEs to the conventional ACEs scale would also more accurately predict juvenile offending outcomes. However, the hypothesis was not confirmed and the moderation analysis did not yield significant results. Similar to above, the lack of a significant moderation effect could be due to the low internal consistency of the expanded ACEs scale. Three additional considerations are offered.

One consideration is that the current study explored the relationship between ACEs and juvenile offending as being dose-dependent. Therefore, including seven variables in the conventional ACEs scale and only three variables in the expanded ACEs scale narrows the scope of the impact expanded ACEs would likely have on juvenile offending. It would therefore be beneficial for future studies to include the 10-item conventional ACEs questionnaire and additional variables to the expanded ACEs to better predict juvenile offending outcomes.

Another consideration is that the juvenile offending scale was also limited to three variables; shoplifting, property destruction, and running away from home, which are classified as property crimes and status offenses (Barrett & Katsiyannis, 2016; Finkelhor et al., 2000; and Snyder et al., 2003). However, violent crimes, such as vandalism, physical violence, and armed robbery were not included as juvenile offenses in the present study. Interestingly, a number of expanded ACEs have been linked to more violent crimes. For example, a study conducted by Baskin and Sommers (2014) found that exposure to community violence was associated with serious and violent offending. As such, future research that includes more diversity in the types of juvenile offenses might provide more comprehensive findings on the relationship between ACEs and juvenile offending.

A third consideration is juvenile offenders' placement (i.e., juvenile correctional facilities) at the time they completed the MSS. One issue related to their placement is that since some respondents were likely incarcerated for more than 30 days at the time of the study, and given that the expanded ACEs questions inquired about their current (i.e., last 30 days) experience of expanded ACEs, expanded ACEs would likely have had less of an impact on juvenile offending behaviors, compared to if respondents resided in the community. Another issue related to placement is that juvenile correctional facilities are controlled/restrictive environments and some of the questions represented in the juvenile offending scale inquired about current offending behaviors, which would not be applicable to participants because of the controlled/restrictive environment they were in at the time of the study. Future research can therefore focus on assessing a history of exposure to expanded ACEs and juvenile offending behaviors with this population in order to obtain more accurate and relevant data.

**Covariate**

Given that the ages of participants in the current sample ranged from 11-21 years, the youngest participants had 10 years less opportunity to experience ACEs than the older participants. As such, age was added as a covariate to reduce the likelihood of this factor being a confounding variable related to exposure to ACEs and to increase the accuracy of results. It was determined that age would influence juvenile offending, such that older participants would have higher juvenile offending scores due to having more time to offend than the younger participants in the sample.

However, the current study found that there was no relationship between juvenile offending and age. Although age did not significantly impact the overall results, it is advantageous to explore possible explanations for this to inform future research. Two

explanations are provided. According to a developmental theory on adolescent psychopathology proposed by Moffitt (1993), there are two major developmental trajectories of conduct problems among adolescents; life-course persistent antisocial behavior and adolescence limited antisocial behavior. Moffitt (1993) noted that life-course persistent adolescent antisocial activities begin early in childhood and continue throughout the lifespan, while adolescence limited conduct behaviors are limited to adolescence. Given the heterogeneity of the age of participants, it is likely that the present study comprised of youth representing both pathways, which might explain the non-significant finding.

Also noteworthy is that there are other demographic variables that might potentially be added as covariates in future research that were not accounted for in the present study. For example, many expanded ACEs are positively associated with minority status (Cho & Lee, 2021). Future studies can therefore explore possible relationships among race/ethnicity, ACEs, and juvenile offending.

**Limitations and Future Directions**

The current study presents with a number of other considerations, which should be noted to better understand the current research findings and to inform future research. A key limitation is the present study is cross-sectional in nature, which precludes causal inferences. To address this limitation, future research can focus on using longitudinal designs to identify possible causal effects of ACEs on juvenile offending. Longitudinal designs can explore changes in the impact of ACEs and offending behaviors among youth over time, which can potentially identify youth at increased risk of offending due to their experience of ACEs.

The study relied on data from adjudicated youth in Minnesota, which may not be generalizable to similar populations in other states. Furthermore, since youth in the present study

were adjudicated, comparisons cannot be made between the current population and non-adjudicated youth. These limitations suggest a need for future research that expand beyond Minnesota and include both justice-involved and non-adjudicated youth.

The conventional ACEs questionnaire is a reliable and valid tool used to measure childhood adversity. However, the questionnaire does not consider a number of dimensions of childhood adversity that can likely impact juvenile offending behaviors. More specifically, whereas the questionnaire focuses on the number of categories of ACEs participants were exposed to, the possible impact of the severity or frequency of ACEs experienced by the sample remain unclear. It would be advantageous to administer a supplemental survey to respondents in order to gather this information or to expand the conventional ACEs questionnaire to include this information.

Another limitation is that the expanded ACEs scale only included three items, and demonstrated low internal consistency. This is problematic because the primary aim of the present study was to highlight the importance of including expanded ACEs to the ACEs framework, given that previous studies suggest that conventional ACEs did not adequately represent childhood adversity. In particular, the present study sought to establish that higher expanded ACEs scores would result in a stronger positive relationship between conventional ACEs and juvenile offending. It seems likely that the non-significant finding from this moderation analysis was a result of the low internal consistency of the expanded ACEs scale. The formulation of an expanded ACEs questionnaire is therefore indicated.

Furthermore, the self-report and retrospective nature of the study increases the potential for over or under-reporting due to memory lapses and social desirability bias. In particular, given the sensitive nature of some of the questions asked in the survey, respondents might be guarded

when completing such questionnaires due to a possible desire to protect the self. Future studies could use other-report measures, such as reports from parents and guardians to corroborate information provided in self-reports, or to obtain information that was not obtained from the self-reports. By including multiple sources of information in research, researchers obtain a more complete and balanced view of the respondents' experiences.

Additionally, a few of the variables used in the present study are based on the respondents' perception of these experiences. For example, the expanded ACEs scale included a variable which asked about participants' perception of living in an unsafe neighborhood. In its current wording, this variable is prone to an array of interpretations. Future studies can specify factors that make a neighborhood unsafe to improve consistency in the way respondents interpret this variable.

Scales used in the current study assess adversity at different timeframes. In particular, the conventional ACEs scale assesses adversity that occurred throughout childhood (i.e., prior to age 18), while the expanded ACEs measure of being a target of bullying only assesses the respondents' current (i.e., the last 30 days) experience of this ACE. Future studies can assess expanded ACEs across childhood to obtain more robust data. This limitation also highlights the need for a comprehensive, standardized measure to assess the experience of expanded ACEs.

Another limitation is that respondents were adjudicated youth who were detained in juvenile detention centers at the time of the study. As mentioned previously, the expanded ACEs questions assessed current (i.e., in the last 30 days) exposure to expanded ACEs and did not account for the fact that some respondents might have been housed at these facilities for more than 30 days. For example, the item assessing community safety would not be applicable if participants were detained at the juvenile detention centers for longer than 30 days at the time of

the study. The item assessing bullying might also be difficult to assess because of the controlled/restrictive environment participants were in and the possible desire to underreport such occurrences in a correctional setting.

The exclusion of a number of demographic factors is also a limitation of the present study. While age was a control variable in the study, the study did not include analyses related to other demographic factors such as race/ethnicity, culture, geographic location, and socioeconomic status, which can likely impact the study's findings. As such, it is inherently difficult to determine whether these factors obscured or accentuated the association between ACEs and juvenile offending. Future research can therefore focus on including these demographic factors to increase the accuracy of the findings.

**Clinical Implications**

Furthermore, there are a number of implications the findings of this study have for clinical, applied, and other settings. Finkelhor et al. (2009) note that there is currently a reactive stance used to identify juvenile offenders. However, given that a positive relationship has been established between conventional ACEs and juvenile offending, the conventional ACEs questionnaire can be used as an early screening and assessment tool to identify children and adolescents exposed to ACEs and who are at risk for involvement in the juvenile justice system. By using a more proactive stance, screening and assessment for ACEs can result in referrals for appropriate treatment services. These referrals, in turn, can help prevent and/or mitigate the long-term effects of such childhood adversities.

Currently, there is no formal measure used to identify and assess expanded ACEs. In the current study, the expanded ACEs scale relied on available items in the 2019 MSS, which only encompassed three items. The Cronbach's alpha measuring the reliability of these three items

demonstrated low internal consistency. The development of a formal measure to identify and assess expanded ACEs is therefore warranted.

The findings also highlight the need for interventions to effectively treat children and adolescents exposed to ACEs. In particular, trauma-informed service delivery can be provided to promote recovery, to build resilience, and to enhance protective factors among youth with ACEs before they enter the juvenile justice system. Such interventions can be used as a tool to empower this population to buffer the negative effects of ACEs. Interventions can include consultation with individuals who encountered ACEs to ensure their unique needs are addressed. For example, since an unspecified number of ACEs can be added to the ACEs framework to predict juvenile offending, interventions can be thoughtfully tailored to the unique cluster of ACEs experienced by each child or adolescent to promote more positive outcomes.

Another implication is that findings emphasize the advantage of teaching parenting skills to parents and primary caregivers so they are equipped to manage stress and the challenges related to parenting. For example, education can be provided to parents and primary caregivers about ways to promote healthy childhood brain development during the prenatal period and after birth. Education can also include information about the cycle of abuse to facilitate positive parenting practices and reduce children and adolescent's exposure to ACEs. Another parenting skill strategy is providing education on the benefits of engaging in disciplinary practices that are congruent with children and adolescent's temperament to promote healthy parent-child interactions.

The study also highlights the importance of increasing school personnel's awareness of ACEs and the problematic behaviors associated with them. This can promote the development and implementation of school-based programs and policies geared toward addressing bullying,

aggression, and other problematic behaviors among children and adolescents. School-based programs and policies can also be an alternative to suspending or expelling students who engage in externalizing behaviors as a result of exposure to ACEs, which in turn can reduce youth's involvement in the juvenile justice system.

Furthermore, with the prevalence of ACEs among justice-involved youth, it would be beneficial to educate law enforcement personnel and members of the juvenile justice system about ACEs. Through education, these agencies can improve their understanding of how childhood adversities negatively impact overall functioning. Education can also increase the likelihood that problematic behaviors associated with ACEs are addressed through social and behavioral health services, instead of sentencing juvenile offenders to juvenile detention facilities, particularly for first time offenders.

Prevention efforts and the early identification of ACEs can improve the overall health of communities and reduce the health care, social services, and justice-related costs associated with ACEs. However, primary prevention strategies require the collaborative efforts of caregivers and individuals in the health care, education, law enforcement, and juvenile justice settings. Additionally, juvenile offending cannot be understood separately from ACEs, since the literature consistently shows that they are interrelated. Therefore, it is important to conduct ongoing research to better understand this complex relationship in order to implement programs, policies, and interventions, not only to prevent ACEs, but to reduce juvenile offending behaviors.

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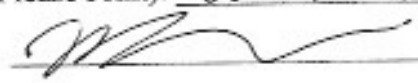
Author's Signature:  Date: 05/20/2022

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