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## The Prevalence of Adverse Childhood Experiences (ACE) in the Lives of Juvenile Offenders

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### Abstract

The study of adverse childhood experiences (ACEs) and their negative repercussion on adult health outcomes is well documented. In a population of insured Californians, a dose-response relationship has been demonstrated among 10 ACEs and a host of chronic physical health, mental health, and behavioral outcomes. Less widely studied is the prevalence of these ACEs in the lives of juvenile offenders, and the effect of ACEs on children. This study examines the prevalence of ACEs in a population of 64,329 juvenile offenders in Florida. This article reports the prevalence of each ACE and assigns an ACE composite score across genders and a risk to reoffend level classification, and compares these with ACE studies conducted on adults. Analyses indicate offenders report disturbingly high rates of ACEs and have higher composite scores than previously examined populations. Policy implications underline the need to screen for and address ACEs as early as possible to prevent reoffending and other well-documented sequelae.

### Introduction

Adverse childhood experiences (ACEs) refer to the following 10 childhood experiences researchers have identified as risk factors for chronic disease in adulthood: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, violent treatment towards mother, household substance abuse, household mental illness, parental separation or divorce, and having an incarcerated household member.

ACEs were first described in 1998 by Felitti, Anda and colleagues with the publication of the seminal study, "Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study" (Felitti et al., 1998). Through a prospective study co-piloted with Dr. Robert Anda of the Centers for Disease Control and Prevention (CDC), including 17,421 insured, well-educated, adult patients, these researchers were able to identify the 10 childhood experiences, just mentioned, that positively correlate with chronic disease in adulthood (Stevens, 2012). While the prevalence of ACEs among this middle-class population shocked many at the time, ACEs have since been shown to have an even higher prevalence in special populations, such as children of alcoholics (Dube et al., 2001).

An individual's ACE score is expressed as the total number of reported ACEs measured in a binary, yes/no

fashion. For example, a positive response to a question on sexual abuse would score 1 point, whether there were one or 100 incidents. The concept of an ACE composite score is central to our understanding of the effect of ACEs. Empirical evaluations have shown that ACEs are common, highly interrelated, and exert a powerful cumulative effect on human development (Anda, Butchart, Felitti, & Brown, 2010). This “cumulative stressor approach,” based on the co-occurrence and cumulative effect of these experiences, necessitates their examination as a collective composite, as opposed to the historical approach of examining one or only a few adverse exposures, which misses the broader context in which they occur. The use of the ACE score as a measure of the cumulative effect of traumatic stress exposure during childhood is consistent with the latest understanding of the effects of traumatic stress on neurodevelopment (Anda et al., 2010; Anda et al., 2006).

The implications of high ACE scores are well documented in the medical literature (Anda et al., 2010; Anda et al., 2006). While they were first identified as risk factors for chronic disease, they have more recently been identified with immediate negative consequences, such as chromosome damage (Shalev et al., 2013) and functional changes to the developing brain (Anda et al., 2010; Cicchetti, 2013; Danese & McEwen, 2012; Teicher et al., 2003). Furthermore, high ACE scores have been linked to a number of sexually risky behaviors, such as having 50 or more sexual partners, intercourse before age 15 (Hillis, Anda, Felitti, & Marchbanks, 2001), and becoming pregnant as a teenager (Hillis et al., 2004). Higher cumulative ACE scores have been shown to increase the odds of smoking, heavy drinking, incarceration, and morbid obesity, along with increased risk for poor educational and employment outcomes and recent involvement in violence (Bellis, Lowey, Leckenby, Hughes, & Harrison, 2013). Higher ACE scores have been shown to significantly increase the odds of developing some of the leading causes of death in adulthood, such as heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease. Prior studies have shown that for children who have experienced four or more ACEs, the odds of having one of the above-mentioned negative health outcomes in adulthood are up to 12 times greater than those of children who have not had such exposure (Felitti et al., 1998).

### **Adverse Experiences and Justice-Involved Youth**

Prior research on adverse and traumatic experiences, as well as mental health problems of juvenile justice-involved youth, has revealed higher prevalence rates of adversity and trauma for these youth compared to youth in the general population (Dierkhising et al., 2013). Furthermore, compared to youth in the general population, juvenile justice-involved youth have been found to have a greater likelihood of having experienced multiple forms of trauma (Abram et al., 2004), with one-third reporting exposure to multiple types of trauma each year (Dierkhising et al., 2013). Placement in Child Protective Services and foster care due to parental maltreatment made unique contributions to the risk for delinquency in 99,602 officially delinquent youth, compared to the same number of matched youth in one study (Barrett, Katsiyannis, Zhang, & Zhang, 2013).

In the realm of criminology we know that among offenders, experiencing childhood physical abuse and other forms of maltreatment leads to higher rates of self-reported total offending, violent offending, and property offending, even after controlling for prior delinquent behavior (Teague, Mazerolle, Legosz, & Sanderson, 2008). Experiencing parental divorce has also been well documented to have a strong association with delinquency, with meta-analysis on the topic showing moderate effect sizes (Amato, 2001). Even with the increased social acceptability and increased prevalence of divorce in recent decades, the differences in delinquency between youth exposed to parental divorce and those from intact families has not decreased (Amato, 2001; D’Onofrio et al., 2005).

In a novel design using adoptive and biological families, Burt, Barnes, McGue, & Iacono (2008) were able to demonstrate that the association with delinquency was driven by the experience of parental divorce rather than mediated by common genes. Exposure to parental incarceration has also demonstrated an association with delinquency and other maladaptive behaviors (Geller, Garfinkel, Cooper, & Mincy, 2009; Murray & Farrington, 2008; Parke & Clarke-Stewart, 2002). Examining 411 males in a longitudinal study, Murray and Farrington (2005) showed parental imprisonment, above and beyond other types of separation, predicted antisocial and delinquent outcomes, even after controlling for other childhood risk factors, up to age 32. Exposure to marital violence in childhood has also been examined in order to assess whether witnessing such events uniquely contributes to later behavioral problems and/or delinquency. Herrera and McCloskey (2001) employed a prospective design with 299 children interviewed regarding forms of abuse in the family and a subsequent court record search 5 years later. Findings indicate exposure to marital violence predicted referral to juvenile court. These findings support prior research, including meta-analyses, indicating that exposure to domestic violence leads to a range of internalizing and externalizing behavior problems (Evans, Davies, & DiLillo, 2008; Moylan et al., 2010).

In the one known application of ACE indicators to a sample of juvenile offenders, Tacoma Urban Network and Pierce County Juvenile Court used data from a risk assessment instrument to measure ACE prevalence among juvenile offenders and examined the effectiveness of interventions with high-scoring youth (Grevstad, 2010). They found the juveniles had roughly three times more ACEs than the population reported by Felitti and Anda, and those with higher ACE scores had more substance abuse, self-harm behaviors, and school-related problems such as disruptive behaviors, substandard performance, and truancy.

By extrapolating ACE scores from the standardized assessment tool used within the Florida Department of Juvenile Justice (FDJJ), described below, we demonstrate that increased ACE scores correlate with increased risk to reoffend. Furthermore, and more importantly, we show that juvenile offenders are a special population with a particularly high rate of ACEs. This finding has profound policy implications that underline the need to screen for and address ACEs as early as possible to prevent reoffending and other well-

documented sequelae.

### Gender Differences in ACE Exposure and Repercussions

In regard to gender differences in ACE exposure among justice-involved youth, females have reported higher levels of exposure to sexual assault and interpersonal victimization while males have reported higher rates of witnessing violence (Cauffman, Feldman, Waterman, & Steiner, 1998; Ford, Chapman, Hawker, & Albert, 2007; Wood, Foy, Layne, Pynoos, & James, 2002). Dierkhising and colleagues, in examining trauma histories of 658 justice-involved youth, found relatively similar rates of exposure to each of 19 different types of trauma, with the exception of sexual abuse and sexual assault, in which female youth had significantly higher rates (Dierkhising et al., 2013). With respect to justice system involvement, prior studies have shown that males, in particular, who experience maltreatment are prone to violent behavior and delinquency (Chen, Propp, deLara, & Corvo, 2011; Mass, Herrenkohl, & Sousa, 2008; Yu-Ling Chiu, Ryan, & Herz, 2011). Other studies have found that a significantly greater number of maltreated females (including all forms of abuse) committed violent offenses as juveniles or adults than non-maltreated females; by contrast, there were no significant differences in prevalence rates of violent offending for maltreated versus non-maltreated males (Herrera & McCloskey, 2001; Widom & Maxfield, 2001). Still others examining an offending population and physical abuse, in particular, have found no sex differences for heightened risk of violent offending (Teague et al., 2008). The current study is the first to assess gender differences in ACE composite scores in a juvenile justice population.

### The Positive Achievement Change Tool Risk/Needs Assessment

Risk assessment tools have progressed both in methodology, as well as accuracy, and can be categorized in terms of four “generations” (Andrews & Bonta, 2003). The first generation risk assessments rely on clinical/professional judgment, or the “gut feeling” approach; the second generation adds actuarial assessments with static predictors; the third generation includes actuarial assessments with static and dynamic predictors; and the fourth generation includes actuarial assessments with static and dynamic predictors plus protective factors and strengths. A key strength of fourth-generation risk assessments is that they clearly link the results from the tool to a case management plan. Furthermore, the inclusion of both risk and protective factors highlights one of the distinguishing characteristics of fourth-generation risk assessment instruments: that is, increased attention to the linkage between assessment and case management (Andrews & Bonta, 2003). Fourth-generation risk assessment tools build on individualized strengths to construct a prosocial orientation so that factors related to both responsivity and learning styles are considered when placing individuals in treatment.

The Positive Achievement Change Tool (PACT) is a fourth-generation actuarial risk/needs assessment designed to assess a youth’s overall risk to reoffend, as well as to rank-order criminogenic needs/dynamic risk factors. The assessment process is designed as a semi-structured interview and utilizes Motivational Interviewing techniques (Miller & Rollnick, 2002). There are two versions of the PACT: the Pre-Screen, with 46 items, and the Full Assessment, consisting of 126 items. Both versions produce identical overall risk to reoffend classifications (low, moderate, moderate-high, high) for any given youth. The overall risk to reoffend score is based on a matrix of the criminal history and social history sub-scores (see Table 1; see also Baglivio, 2009, for further explanation of PACT domains and scoring). The PACT assesses static, dynamic, and protective factors; rank orders criminogenic needs/dynamic risk factors, which are automated into a case plan; and requires reassessments to gauge rehabilitative progress.

**Table 1. PACT Risk Classifications**

	Criminal History Score		Social History Risk Score	
	0 to 5	6 to 9	6 to 9	10 to 18
<b>0 to 5</b>	Low	Low	Moderate	
<b>6 to 8</b>	Low	Moderate	Moderate-High	
<b>9 to 11</b>	Moderate	Moderate-High	High	
<b>12 to 31</b>	Moderate-High	High	High	

Note. The Overall Risk Classification of the PACT is derived from a matrix of the Criminal History (0-31) and Social History (0-18) sub-scores. For example, a youth scoring 13 on Criminal History and a 7 on Social History would be classified as High risk to reoffend.

### Assessment Scoring, Composition, and Protocol

The Pre-Screen and Full Assessment both produce a criminal history sub-score (extent and seriousness of prior offending and justice system placements) and a social history sub-score (individual, family, and environmental risk factors). The overall risk score and the criminal and social history sub-scores for an individual youth are always identical for both the Pre-Screen and the Full Assessment, as the questions used for scoring are identical in each tool. In other words, if a youth were administered both a Pre-Screen and a Full Assessment, his or her overall risk score, criminal history sub-score, and social history sub-score would be identical. The reason for completing a Full Assessment is to gain a greater understanding of the youth’s situation and past experiences. The PACT Full Assessment consists of 12 domains, 11 containing questions

comprising the social history sub-score, one of which is used to produce the criminal history sub-score (see Table 2 for PACT domains by assessment type). Each of the 12 domains has a risk score and most have a protective score.

**Table 2. PACT Domains**

Pre-Screen		Full Assessment	
Domain #	Domain Name	Domain #	Domain Name
1	Record of Referrals	1	Record of Referrals
2	Social History	2	Gender
3	Mental Health	3A	School History
4	Attitude/Behavior Indicators	3B	Current School Status
		4A	Historic Use of Free Time
		4B	Current Use of Free Time
		5A	Employment History
		5B	Current Employment
		6A	History of Relationships
		6B	Current Relationships
		7A	Family History
		7B	Current Living Arrangements
		8A	Alcohol and Drug History
		8B	Current Alcohol and Drugs
		9A	Mental Health History
		9B	Current Mental Health
		10	Attitudes/Behaviors
		11	Aggression
		12	Skills

Note. Pre-Screen does not contain all relevant items to create ACE scores, which are present in the Current Living Arrangements domain of the Full Assessment.

The PACT is heavily adapted from the validated Washington State Juvenile Court Assessment (WSJCA), which has been in use since 1998 (Washington State Institute for Public Policy, 2004). The FDJJ, together with a private vendor, used the WSJCA as a guide and altered questions to reflect terminology used in Florida, and added questions related to mental health, depression, and suicide. The process used was similar to that used to develop the Youth Assessment and Screening Instrument (YASI), which is also based on the Washington model (Orbis Partners, 2000). The PACT has domains and formatting similar to the Washington model and the YASI. The PACT contains domains reflective of the "Central Eight" risk factors espoused by Andrews and Bonta (2003).

The current policy of the FDJJ is to assess each youth entering the system using the PACT Pre-Screen. Youth scoring at moderate-high or high risk to reoffend on the Pre-Screen are then administered the Full Assessment. The PACT Full Assessment is then repeated every 90 days for youth under FDJJ supervision who initially scored at moderate-high or high risk to reoffend. Youth on probation supervision who score at low or moderate risk to reoffend are reassessed every 180 days. Any time a youth's score indicates moderate-high or high risk, reassessment is performed using the Full Assessment. Any youth placed in a residential commitment facility, a day treatment program, or the FDJJ's Redirection Program (intensive community-based

family therapy, predominately Multisystemic Therapy, Functional Family Therapy, or Brief Strategic Family Therapy) is also assessed using the Full Assessment. The PACT assessment has been validated across multiple samples of youth in the FDJJ, and this validation has been published in multiple peer-reviewed journals and independent research agency reports (Baglivio, 2009; Baglivio & Jackowski, 2013; Winokur-Early, Hand, & Blankenship, 2012). These validation studies have shown the PACT overall risk score, criminal history sub-score, and dynamic social history sub-score to be significant predictors of reoffending across gender and racial and ethnic subgroups. Logistic regression models and overlapping 95% Confidence Intervals for Area Under Curve (AUC) statistics have all illustrated similar findings.

Data collected by the PACT assessment process for the purpose of predicting the likelihood of re-offense and the identification of intervention alternatives for the screened population includes information reflecting all of the domains examined in the original ACE study. Also included in the PACT Full Assessment screening tool are extensive behavioral data in educational, drug/alcohol use, delinquency, and other family/social domains for tens of thousands of juvenile offenders over the course of several years.

### Current Focus

For the purposes of the current study, we used the PACT data to create ACE scores for each youth, making it possible to conceptually replicate the original ACE study focusing on proximate relationships between ACEs and childhood behaviors that can result in social, academic, and legal problems for youth. It is likely that related health risk behaviors (use of alcohol, tobacco, or drugs and sex with multiple partners) will lead to poor health, impaired mental health, and chronic disease reported in the original and subsequent ACE studies (Anda et al., 2010; Cicchetti, 2013; Danese & McEwen, 2012; Felitti et al., 1998; Teicher et al., 2003). In contrast to ACE studies conducted with adults, the current study suffered less from challenges of retrospective recall of childhood events, since these events were much more recent for the current sample. In keeping with prior ACE studies, we ascertained the following 10 ACEs correlated with a host of chronic physical, mental health, and behavioral problems among youth:

1. Emotional Abuse
2. Physical Abuse
3. Sexual Abuse
4. Emotional Neglect
5. Physical Neglect
6. Family Violence
7. Household Substance Abuse
8. Household Mental Illness
9. Parental Separation or Divorce
10. Household Member Incarceration

In the study described here we examined the prevalence of each ACE, as well as the proportions of youth with different ACE scores. We further examined these proportions and prevalence rates across genders to uncover differences between male and female juvenile offenders. As this is one of the only articles examining ACEs in a population of juvenile offenders, we believe this study endorses the ascertainment of ACEs in young people. We believe the ACE score is as useful for the disciplines of criminology and social science as for the fields of health and medicine. It is worthwhile to emphasize that the vast majority of prior ACE studies have asked adults to recall ACEs, while the current study ascertained the same adverse experiences as recalled and reported more recently by youth. The purpose of this study was to examine the prevalence of the 10 specific ACEs and the ACE composite score in justice-involved youth. Prior ACE research has documented the negative outcomes from cumulative exposure; this study illustrates the extraordinarily high prevalence of ACEs in this special population, and seeks to raise both the understanding and level of concern among the academicians and practitioners who care for them.

### Methodology

The data for this study included aggregated PACT assessments for each youth. We performed secondary data analysis of an existing database of all PACT assessments conducted in Florida. Because the study used secondary analysis of de-identified data, no consent or assent from youth or parents was required. IRB approval was obtained from the University of Florida IRB. Only youth assessed with the PACT Full Assessment between January 1, 2007 and December 31, 2012 were included in the study. Only youth who had "aged out" of the juvenile justice system (turned 18, the age of majority in Florida) were included so as to capture the full range of ACEs. This resulted in a final sample of 64,329 unduplicated youth who were assessed with the PACT Full Assessment and had turned 18 between January 1, 2007 and December 31, 2012.

This sample represents the entire population of juveniles who had received an official referral (equivalent of an adult arrest) in Florida, who have since reached the age of 18, and who had been assessed with the PACT Full Assessment. However, because the PACT Full Assessment is the only tool ascertaining all 10 ACEs, there is a bias toward oversampling more serious delinquents. Youth whose scores indicate they are at low or moderate risk to reoffend may not receive the Full Assessment. Most youth who score at low or moderate risk to reoffend and who receive the Full Assessment are those whose treatment plan includes placement in resource-intensive services such as day treatment or residential programs. While 64,329 youth who turned 18 during the study period were assessed with the PACT Full Assessment, an additional 136,691 youth who turned 18 during that time were assessed only with the PACT Pre-Screen, prohibiting the creation of ACE scores for those youth. Therefore, while we captured ACE scores for all youth receiving a Full Assessment

(approximately 32% of all juvenile offenders), caution should be used in generalizing the results to all juvenile offenders in Florida.

### Sample Demographics

Table 3 shows the race/ethnicity and gender breakdown of the full sample. The sample was 78.3% male and 38.2% White. In terms of risk to reoffend levels as assessed by the PACT, 29.3% (27% males, 37.4% females) of the youth were at low risk, 15.6% (15.3% males, 16.8% females) were at moderate risk, 21.7% (22.2% males, 19.8% females) were at moderate-high risk, and 33.5% (35.5% males, 26.1% females) were at high risk. This sample included substantial numbers of youth who were at low and moderate risk to reoffend.

**Table 3. Sample Demographics**

Subgroup	Percent of Total
White Males	29
White Females	9
Black Males	34
Black Females	9
Hispanic Males	13
Hispanic Females	3
"Other" Males	3
"Other" Females	1
Total Sample Size	64,329

Note. Numbers reported in each row as percentages except Total Sample Size row reported as number of youth; percentages may not add to 100 due to rounding.

### Creation of ACE Scores

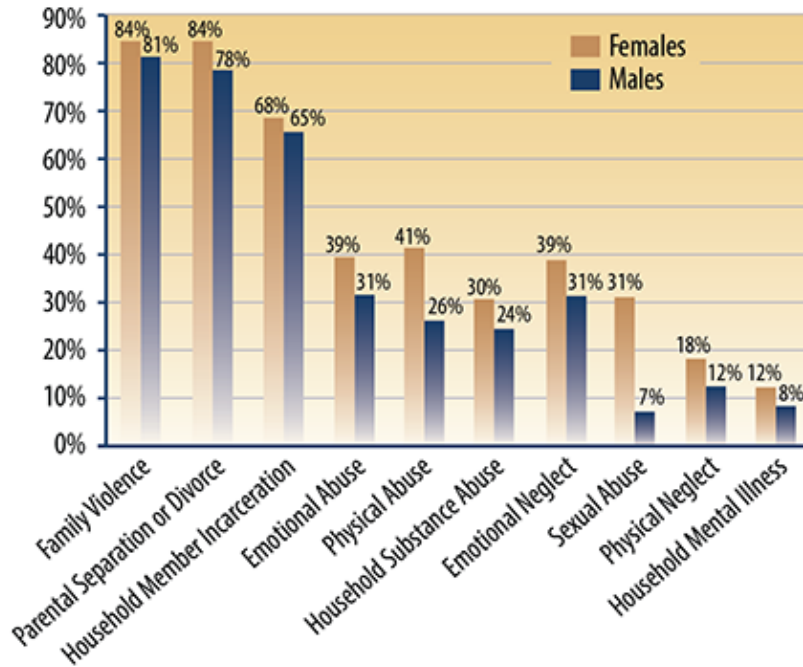
Each ACE was treated as a dichotomous variable (coded yes or no). As the PACT requires frequent reassessment, any indication of a yes response to a PACT-assessed ACE is counted as a positive ACE and included in the ACE score. For example, if a youth did not indicate a history of sexual abuse at initial Full Assessment but did indicate such history upon reassessment, the positive indication was used. Alternatively, if a youth did indicate history of sexual abuse, for example, at initial assessment but did not indicate this at reassessment, the positive response was still carried forward and used in the current study. The PACT is an automated assessment process in which the user (juvenile justice staff, usually a probation officer or case manager) inputs responses to each item on an online server. The responses indicated from the prior assessment (if one has been conducted) are highlighted for the current user to see. This methodology allows the user to see prior responses. In the case of sexual abuse reported on one assessment and not reported on a later assessment, the user would recognize the discrepancy and obtain relevant follow-up information from the youth to complete the assessment accurately. While this methodology is biased toward positive responses, it removes the likelihood of discounting positive responses obtained by individual juvenile justice professionals who managed to build a strong rapport with any given youth and hence were able to elicit more personal information during the interview.

Appendix A aligns the PACT questions and responses used to identify ACE measures for the current project with ACE questions from previous studies. There are 10 distinct PACT ACE measures: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, family violence (including domestic violence, verbal intimidation, yelling, heated arguments, and threats of physical abuse), household substance abuse, household mental illness, parental separation/divorce, and household member incarceration. Each ACE measure was coded as dichotomous (either the youth did not have a history of the indicator, which was coded as 0, or the youth did have a history, which was coded as 1), in keeping with all prior ACE studies that use the ACE composite score to examine the dose-response relationship to health problems and other negative life outcomes. The composite PACT ACE score is the sum of PACT ACE measures, ranging from 0 to 10, as is reported in prior ACE studies. Seven ACE measures were used in wave 1 of the groundbreaking Adverse Childhood Experiences Study: psychological, physical, and sexual abuse; household substance abuse; mental illness; mother treated violently; and criminal behavior in household (Felitti et al., 1998). The additional three measures of physical and emotional neglect, and parental separation/divorce, were added in wave 2 of the ACE Study (Dong et al., 2004). Because most subsequent literature uses 10 ACE indicators, we selected PACT questions representing all 10 for the current study (Appendix A). As in other studies examining adverse childhood experiences as composite ACE scores, the wording of the questions is slightly different from that used in the original ACE Study, yet accurately reflects the original intent of the concepts.

## Results: ACE Prevalence

Figure 1 illustrates the prevalence rates of each ACE indicator by gender. ACE indicators vary from a low of 7% male prevalence for sexual abuse to a high of 84% female prevalence for both family violence and parental separation or divorce. The top three most prevalent ACE indicators were the same for both males and females: family violence, parental separation or divorce, and household member incarceration. Two-thirds or more of the Florida juvenile offenders reported these three ACEs. The least commonly reported ACE indicator for males were sexual abuse, household mental illness, and physical neglect, while the lowest three for females were household mental illness, physical neglect, and emotional neglect. Sexual abuse was reported 4.4 times more frequently by females than by males (31% and 7%, respectively). With the exception of sexual abuse, the ACE rank order by prevalence across genders was similar. However, as illustrated by Figure 1, females had a higher prevalence than males on every single ACE indicator.

**Figure 1. Prevalence of ACE Indicators by Gender.**

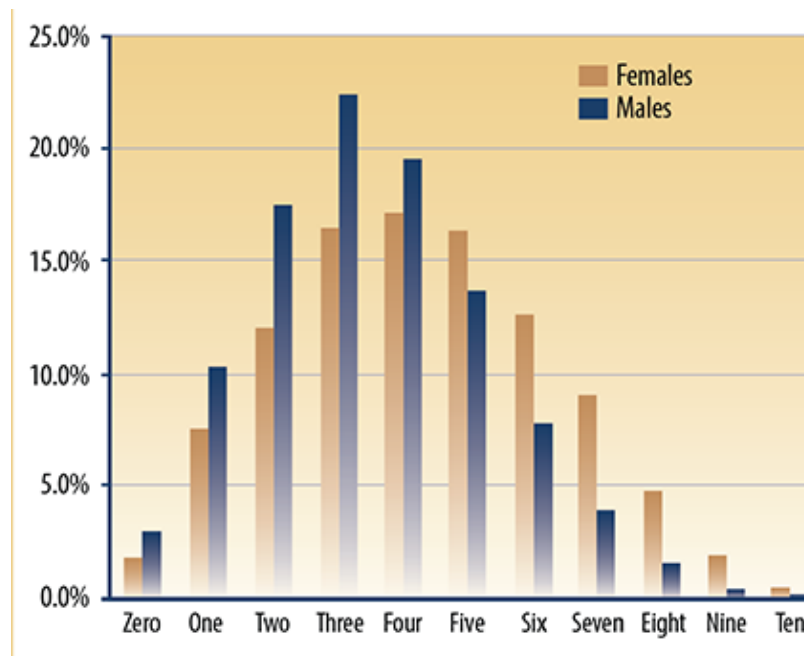


The individual differences in ACE prevalence rates between males and females were statistically significant, using independent samples t-tests with a Bonferroni correction requiring a  $p$ -value less than .0045, with females having a higher prevalence rate of each ACE for all 10 ACE indicators, all at  $p < .001$ . Examination of effect sizes using Cohen's  $d$  reveals that the majority of the differences were small (Cohen's  $d$  less than .5). Cohen's  $d$  for sexual abuse was the largest, at .92, and the ACE composite score was the second largest, at a moderate .59. These results are consistent with prior findings that the main gender difference in ACEs is the prevalence of sexual abuse (Cauffman et al., 1998; Dierkhising et al., 2013).

Prior ACE studies have indicated a dose-response relationship between ACE scores and negative outcomes, with higher ACE scores correlating most strongly with negative outcomes (Brown et al., 2009; Felitti et al., 1998). Figure 2 illustrates the prevalence of ACE scores in the current study by gender. Only 3.1% of the males and 1.8% of the females reported no ACEs. Approximately 10% of the males reported just one ACE compared to 7.6% of the females.

**Figure 2. Prevalence of ACE Score by Gender.**





Of the males, 27.4% reported five or more ACEs compared to 45.1% of the females. Of the 62,536 youth who reported one or more ACEs, 90% reported at least two, 73% reported at least three, 52% reported at least four, and 32% reported five or more.

Of the 13,692 females with one or more ACE indicators, 92% reported at least two ACEs, 80% reported at least three, 63% reported at least four, and 46% reported five or more.

Of the 48,844 males who reported at least one ACE indicator, 89% reported two or more, 71% reported three or more, 48% reported four or more, and 28% reported five or more.

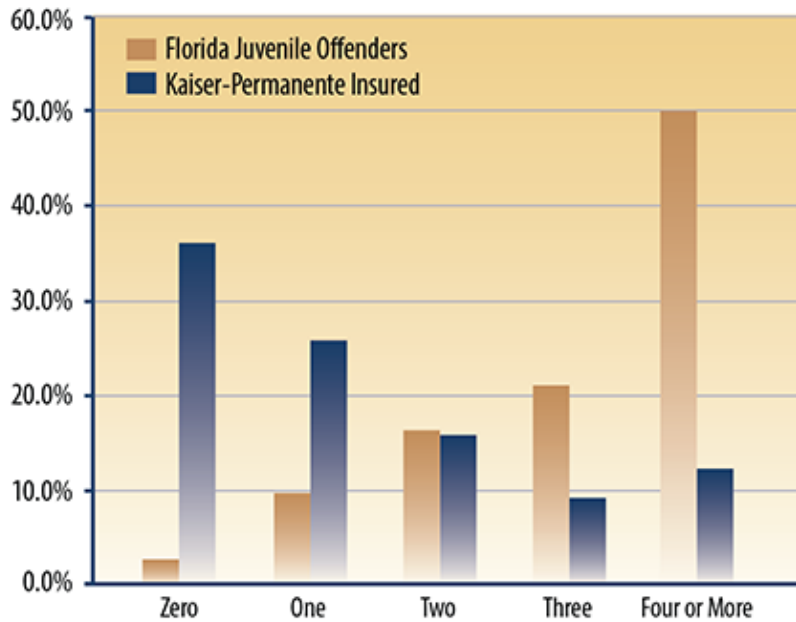
These results indicated female youth reported more ACEs than males, and a higher percentage of those who reported at least one ACE also reported others. The average composite ACE score for females was 4.29, while the average for males was 3.48 (difference statistically significant at  $p < .001$ ). That is, the average female in our sample reported at least four ACE indicators while the average male reported three or four ACE indicators.

### Comparing Juvenile Offenders to the Original ACE Study

As illustrated in Figure 3, the population of juvenile offenders in the current study differs markedly from the sample of adults described in the original ACE study conducted by Felitti and colleagues (Felitti et al., 1998) and the vast majority of ACE studies that followed. As illustrated in Figure 3, juvenile offenders are 13 times less likely to report zero ACEs (2.8% compared to 36%) and four times more likely to report four or more ACEs (50% compared to 13%) than Felitti and Anda's Kaiser Permanente-insured population of mostly college-educated adults. These results suggest that the juvenile offenders in this study were significantly more likely to have ACE exposure and to have multiple ACE exposures than the adults in Felitti and Anda's study population. Based on the adverse health outcomes correlated with ACE exposure described above, these results have important implications for the preventive health care of justice-involved youth: that is, preventive care could reduce their future need for mental health treatment; addictions treatment; and treatment for chronic lung, liver, heart, and kidney disease, as well as diabetes.

**Figure 3. Comparison of ACE Scores Between Juvenile Offenders and Kaiser-Permanente Study.**



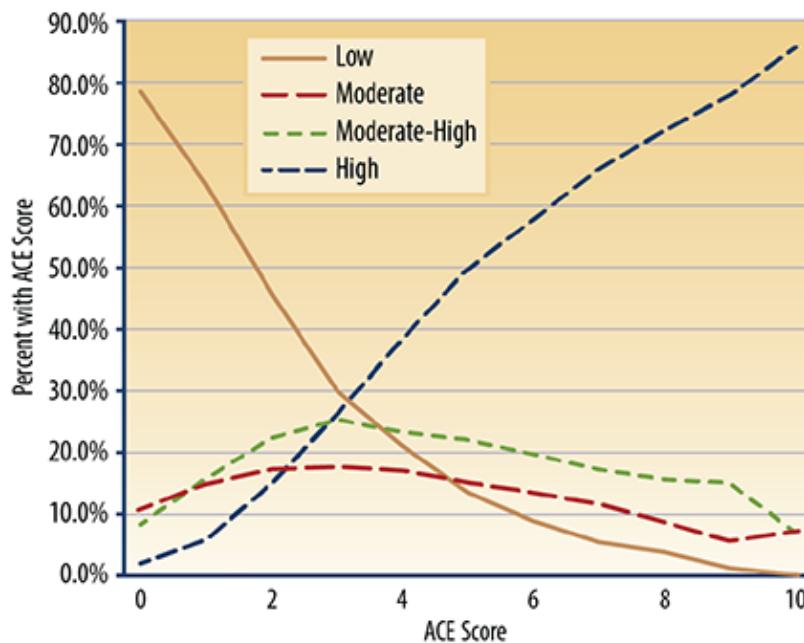


Note. Prevalence for insured adults based the entire ACE Study sample (n=17,337) as posted by the CDC available at <http://www.cdc.gov/ace/prevalence.htm>.

**Risk to Reoffend Level Differences**

A primary purpose of the PACT is to classify youth according to four levels of risk to commit criminal offenses in the future, ranging from low to moderate, moderate-high, and high risk. As indicated, the current study included only youth assessed using the PACT Full Assessment (not the PACT Pre-screen), which resulted in a higher risk sample than an “all youth referred (arrested)” sample. Therefore, we examined whether ACE scores differed by PACT risk levels. Figure 4 shows the percentage of youth having ACE sums zero through 10 who are at low, moderate, moderate-high, or high risk to reoffend according to the PACT. As shown, low-risk youth are the most prevalent group reporting ACE scores of zero through three. Low-risk youth are 35.6 times more likely than high-risk youth to report no ACE indicators. Conversely, high-risk youth are more likely than low-risk youth to report more than three ACEs; to include more than one-half the youth with ACE scores over six; and to include more than three-quarters of the youth reporting ACE scores of nine or 10. Low-risk youth comprise 44% of youthful offenders reporting between zero and three ACE indicators (14,225 of 32,096 youth), while high-risk youth comprise 49.6% of all youth reporting four or more ACE indicators (15,996 of 32,233 youth). As Figure 4 shows, the higher the risk to reoffend, the higher the number of reported ACEs.

**Figure 4. ACE Scores by PACT risk level.**



We employed one-way analysis of variance (ANOVA) to further explore the ACE indicator differences across risk to reoffend levels (results not shown for brevity). We used a Bonferroni correction requiring a p-value of less than .0045 (due to performing 11 simultaneous comparisons). For each ACE indicator and the ACE

composite score, there were significant differences between the four risk level groups (all at  $p < .0001$ ). In an examination of Eta-squared for each of the 10 ACE indicators, five had medium or higher effect sizes (Eta-squared greater than .06). The five indicators with medium or higher effect sizes were emotional abuse, physical abuse, physical neglect, family violence, and household member incarceration. The ACE composite score had an Eta-squared of .22. This indicates 22% of the variance in the PACT risk to reoffend category is explained by the ACE composite score.

Post hoc analyses (utilizing Tamhane tests for multiple comparisons) suggested that four of the ACE indicators and the ACE composite score showed significant differences among each of the risk levels, with significantly increasing prevalence as risk stratification increased. In other words, youth at low risk to reoffend had the lowest prevalence of ACEs and those at high risk had the highest prevalence of ACEs. The four indicators that followed this pattern were physical neglect (ACE 5), family violence (ACE 6), household substance abuse (ACE 7), and household member incarceration (ACE 10). The remaining six ACE indicators followed a similar pattern, yet the differences between the prevalence for youth at moderate and moderate-high risk to reoffend were not statistically significant. Prevalence of these six ACE indicators for youth at moderate and moderate-high to reoffend were significantly higher than prevalence for youth at low risk and significantly lower than prevalence for high-risk youth, but prevalence rates were statistically equivalent to one another. High-risk youth had significantly higher prevalence rates than all other groups on all ACE indicators and the ACE composite score, all at  $p < .001$ .

## Discussion

ACEs not only increase the chances of involvement in the juvenile justice system, but increase the risk of re-offense. A focused effort on early identification of ACEs, and intervention for ACEs with a goal of improving youth life circumstances and preventing criminal behavior, may reduce the likelihood of and costs related to juvenile criminal activities. Most current policies in child welfare focus on secondary prevention instead of primary prevention of ACEs. Primary prevention efforts should be tailored to meet the needs of parents, teachers, health professionals, and law enforcement. For parents, an important effort would be to improve public awareness of adult behaviors, which can optimize or hamper children's brain development. Parenting skills and early childhood brain development could be emphasized during the prenatal period and during well-child checkups after birth. It is not too early to teach brain development skills in high school, since high school students are merely one sexual experience away from being tomorrow's parents. Furthermore, many high school students participate in the care of smaller children. For health professionals, screening for ACEs is needed at periodic intervals during childhood, with referrals for counseling and other services when ACEs are identified. When school or health professionals observe behaviors such as overeating, substance abuse, smoking, disruptive classroom behavior, and bullying, a screening for a history of ACEs can be obtained and used to determine the appropriate intervention. When school personnel observe such behaviors, suspending or expelling students from school may deprive youth of the safest environment they can access. In-school programs to address bullying, disruptive classroom behavior, and aggression can keep youth in safe environments while they learn self-regulatory skills. Law enforcement and judicial awareness of ACEs will enhance the likelihood that the root causes of problematic behaviors will be addressed with social and behavioral health services. Individuals with ACEs often use maladaptive or antisocial behaviors as strategies to cope with stress; such behaviors will not dissipate during periods of detention or incarceration without focused intervention.

Early detection, intervention, and treatment services can be cost-effective in the educational, health, and justice systems when warning signs of ACEs are present. Reducing the taxpayer expenditures associated with the juvenile justice system, special education, and special health care needs can have compounded benefits in terms of adult productivity. Successful interventions in childhood have the potential to stop the intergenerational risks of ACEs, thereby multiplying cost savings. Early childhood intervention programs addressing ACEs have demonstrated significant benefit–cost ratios. One such intervention displayed a return of \$5.70 for every dollar spent by the time a child reached age 27, \$8.70 in life-cost savings, and notable cost savings in crime reduction (Larkin & Records, 2007).

In response to ACE studies, Washington state has changed public policy to address the relationship between ACE scores, health-related problems, and criminal involvement. Potential savings and improvement in productivity led Washington state legislators to pass an ACE reduction law (SHB 1965, 2011) on June 15, 2011. SHB 1965 from the state of Washington is an innovative example of a bold and dramatic shift in thinking for legislators and policymakers (Kagi and Regala, 2012). Washington is the first state to recognize ACEs such as child abuse and neglect, parental substance abuse, and witnessing domestic violence as a "powerful common determinant of a child's ability to be successful at school and, as an adult, to be successful at work, to avoid behavioral and chronic physical health conditions, and to build healthy relationships" (SHB 1965, C32, L11, E2, Sec. 1, 2011). Other states, including Florida, have the potential to pursue similar advances in primary prevention, community engagement, and policy.

One way communities can get involved is by developing strategies to build childhood resilience and to increase protective factors. Resilient children possess skills needed to positively respond to obstacles and difficulties they may face, including ACEs. Dr. Kenneth Ginsburg, a pediatrician at the Children's Hospital of Philadelphia, advocates the development of strong relationships between adults and children to decrease stress and increase competence. Adults who foster resilience-facilitating relationships may or may not be biological parents. A resilience guide for parents and teachers produced by the American Psychological Association (American Psychological Association, 2011) suggests providing children and teens with a safe place during times of high academic and emotional stress. Parents and teachers are often the first adults to recognize childhood distress and can serve as the first line in helping children to cope with stress and build

resiliency. A school- or community-based safe place that focuses on relaxation activities such as yoga, meditation, tai chi, and prayer can build resilience and reduce stress by empowering children to modulate their stress responses and enhance their personal perceptions of safety. Children with high resilience tend to be more successful in school, happier, and less depressed. Youth development programs for children, parents, and teachers should integrate activities that build resilience and address ACEs so that children develop confidence, self-control, and responsibility. These interventions and programs have the potential to keep children from engaging in risky social and health behaviors.

Finally, programs and policies should target prevention and early identification of ACEs to improve general health and reduce future medical, social service, and criminal justice costs. Development of educational curricula, health programs, and policies to detect and treat physical abuse, emotional abuse, sexual abuse, and substance abuse among youth has the potential to reduce their involvement in the criminal justice system. Increased primary prevention will require collaborative efforts and effective communication across health, education, and community programs. Reducing exposure to ACEs can build resilience, which may ultimately reduce youth involvement in crime and criminal justice system costs.

By the time youth reach the juvenile justice system they are past the point of primary prevention and have entered the realm of secondary prevention and/or intervention. A fundamental tool in secondary prevention is the implementation of Trauma-Informed Care (TIC), with a central precept of asking “What has happened to you?” rather than the customary “What is wrong with you?” The ACE composite score is precisely a measure of “what has happened to you.” Juvenile justice systems should implement and reinforce TIC training for all staff who have contact with juveniles in order to help them understand traumatic and posttraumatic reactions (Griffin, Germain, & Wilkerson, 2012), as well as to help them make appropriate referrals to clinically trained mental health professionals (Dierkhising et al., 2013). Perhaps the most important component for justice systems is the implementation of trauma screening and assessment for all youth entering the system, as well as the provision of evidence-based, trauma-informed treatment and interventions for youth identified. Ideally, these are holistic and multisystemic interventions that recognize the child’s experiences within the family.

In light of findings that females have higher rates of exposure to all ACE indicators than males (especially sexual abuse and the ACE composite score), yet have lower rates of delinquent involvement, gender-specific intervention strategies should be examined since there may be gender differences in response to exposure to traumatic circumstances. Exposure to ACEs manifests itself differently among females than males (e.g., females have more internalizing behaviors, mental health symptoms, and self-mutilation; males exhibit more externalizing and acting-out behaviors). Furthermore, a much higher percentage of female violent offenses exclusively involve domestic violence, as opposed to more heterogeneous violent offenses for males (Herrera & McCloskey, 2001). The justice system may be reluctant to intervene with females until they have reached a higher threshold of delinquency (and perhaps ACE exposure) than males. Herrera and McCloskey (2001) state “to date little is known about how exposure to family violence in childhood effects males and females differently with respect to subsequent delinquency . . . If there are gender differences in the etiology of crime, these services need to be recast to take into consideration the unique needs of female as well as male offenders” (p. 1039).

### Limitations and Directions for Policy

The current study constructs ACE indicators and an ACE composite score in an attempt to illustrate the high cumulative traumatic exposure of justice-involved youth compared to adult nondelinquent samples. A major limitation in assessing ACE prevalence is the use of the PACT Full Assessment, which is more likely to be administered to youth with higher risk to reoffend. Yet, more than one-third of our sample are youth at low and moderate risk to reoffend, with the remainder at moderate-high and high risk, from a state with a diverse population. Therefore, caution should be used in generalizing this study’s results to all justice-involved youth or to youth in other states. Additional limitations include our use of existing assessment questions to gather the 10 ACE indicators rather than using statements identical to those of the original ACE research. Another limitation is that we cannot make any claims regarding youth not involved in the juvenile justice system, since our sample entirely comprises justice-involved youth. We believe our conceptualizations remain true to the original ACE indicators. Our intent is to demonstrate the seriousness of cumulative traumatic exposure in this special population.

### Conclusion

The current study presents findings from a large sample of more than 64,000 Florida youth who happen to be juvenile offenders. Our future research will examine how ACEs contribute to more immediate behavioral outcomes across multidisciplinary domains of school, peer associations, family, substance abuse, and employment, as well as criminal behaviors, all available within the data we have amassed. Furthermore, future research should address the relative contributions of each distinct ACE on myriad outcomes. Past and ongoing ACEs are the thread that unifies this unique population, and how we address the impact of those experiences should be the target of policy analysis and development to the greatest extent possible. Perhaps doing so is the key to “what works” after all.

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## Appendix A. Creation of PACT ACE Score Measures

### ACE Study Measures

1. How often did a parent, stepparent, or adult living in your home swear at you, insult you, or put you down?
2. How often did a parent, stepparent, or adult living in your home act in a way that made you afraid that you might be physically hurt?

Identification: A respondent was defined as being emotionally abused during childhood if the response was either often or very often to question 1 or sometimes, often, or very often to question 2.

1. How often did a parent, stepparent, or adult living in your home push, grab, slap or throw something at you?
2. How often did a parent, stepparent, or adult living in your home hit you so hard that you had marks or were injured?

Identification: A respondent was defined as being physically abused during childhood if the response was either sometimes, often or very often to question 1 or if there was any response other than never to question 2.

Each respondent was asked whether an adult, relative, family friend, or stranger who was at least 5 years older than the respondent had ever:

### PACT ACE Measures

#### Measure 1: Emotional Abuse

1. Family willingness to help support youth:
  - a. Consistently willing to support youth
  - b. Inconsistently willing to support youth
  - c. Little or no willingness to support youth
  - d. Hostile, berating, and/or belittling to youth
2. Level of conflict between parents, between youth and parents, among siblings:
  - a. Some conflict that is well managed
  - b. Verbal intimidation, yelling, heated arguments
  - c. Threats of physical abuse
  - d. Domestic violence: physical/sexual abuse

Identification: A respondent would be defined as being emotionally abused during childhood if the response was either d. on the first question (hostile, berating, and/or belittling to youth), or answers b. or c. on the second question (verbal intimidation, yelling, heated arguments; or threats of physical abuse).

#### Measure 2: Physical Abuse

1. History of violence/physical abuse: (Includes suspected incidents of abuse, whether or not substantiated, but excludes reports proven to be false):
  - a. Not a victim of violence/physical abuse
  - b. Victim of violence/physical abuse at home
  - c. Victim of violence/physical abuse in a foster/group home
  - d. Victimized or physically abused by family member
  - e. Victimized or physically abused by someone outside the family
  - f. Attacked with a weapon
2. Level of conflict between parents, between youth and parents, among siblings:
  - a. Some conflict that is well managed
  - b. Verbal intimidation, yelling, heated arguments
  - c. Threats of physical abuse
  - d. Domestic violence: physical/sexual abuse

Identification: A respondent would be defined as being physically abused during childhood if the response was any response other than a. (not a victim of violence/physical abuse) on question 1. Additionally, a respondent would be defined as physically abused if question 2. response d. was yes (domestic violence: physical/sexual abuse), but only when the same juvenile gave negative answers to a question of history of sexual abuse/rape.

#### Measure 3: Sexual Abuse

1. History of sexual abuse/rape: (Includes suspected incidents of abuse if disclosed by youth, whether or not reported or substantiated, but excludes reports proven to be false):
  - a. Not a victim of sexual abuse/rape
  - b. Sexually abused/raped by family member

1. Touched or fondled the respondent's body in a sexual way;
2. Had the respondent touch his or her body in a sexual way;
3. Attempted to have any type of sexual intercourse (oral, anal, or vaginal) with the respondent; or
4. Actually had any type of sexual intercourse (oral, anal, or vaginal) with the respondent.

Identification: Respondents were classified as sexually abused during childhood if they responded affirmatively to any of the four questions.

Identification: A respondent would be defined as being sexually abused during childhood if the response was any response other than a. (not a victim of sexual abuse/rape) on question 1. Additionally, a respondent would be defined as sexually abused if question 2 was answered with a yes to d. (domestic violence: physical/sexual abuse), but only when the same juvenile gave negative answers to a question of history of physical abuse.

#### Measure 4: Emotional Neglect

Questions used to define emotional neglect were adapted from the Childhood Trauma Questionnaire (CTQ). Five CTQ items were used. Response categories were never true, rarely true, sometimes true, often true, and very often true. These items were scored on a Likert scale ranging from 1 to 5, respectively. For emotional neglect, all items were reverse scored, then added.

\*The neglect questions/scales were developed for the Wave 2 survey, and some of the earlier studies do not use the neglect measures.

1. There was someone in my family who helped me feel important or special
2. I felt loved
3. People in my family looked out for each other
4. People in my family felt close to each other
5. My family was a source of strength and support

Identification: Scores of 15 or higher (moderate to extreme on the CTQ clinical scale) defined the respondents as having experienced emotional neglect.

1. Support network for family: Extended family and/or family friends who can provide additional support to the family:
  - a. No support network
  - b. Some support network
  - c. Strong support network
2. Family willingness to help support youth:
  - a. Consistently willing to support youth
  - b. Inconsistently willing to support youth
  - c. Little or no willingness to support youth
  - d. Hostile, berating, and/or belittling to youth
3. Family members youth feels close to or has a good relationship with:
  - a. Does not feel close to any family member
  - b. Feels close to mother/female caretaker
  - c. Feels close to father/male caretaker
  - d. Feels close to male sibling
  - e. Feels close to female sibling
  - f. Feels close to extended family

Identification: A respondent would be defined as being emotionally neglected if the response to question 1 was a. (no support network) or the response to question 2 was c. (little or no willingness to support youth) or d. (hostile, berating, and/or belittling to youth), or the response to question 3 was a. (does not feel close to any family member).

#### Measure 5: Physical Neglect

Questions used to define physical neglect were adapted from the Childhood Trauma Questionnaire (CTQ). Five CTQ items were used. Response categories were never true, rarely true, sometimes true, often true, and very often true. These items were scored on a Likert scale ranging from 1 to 5, respectively. For physical neglect, items 2 and 5 were reverse-scored, and all five scores were added.

1. I didn't have enough to eat
2. I knew there was someone there to take care of me and protect me
3. My parents were too drunk or too high to take care of me
4. I had to wear dirty clothes
5. There was someone to take me to the doctor if I needed it

1. History of being a victim of neglect\*:
  - a. Not a victim of neglect
  - b. Victim of neglect

Identification: A respondent would be defined as being physically neglected if the response to question 1 was b. (victim of neglect).

\*Neglect includes the negligent or dangerous act or omission that constitutes a clear and present danger to the child's health, welfare, or safety, such as: Failure to provide adequate food, shelter, clothing, emotional nurturing, or health care.



Identification: Scores of 10 or higher (moderate to extreme on the CTQ clinical scale) defined the respondents as having experienced physical neglect.

### Measure 6: Family Violence

Battered mother (Was your mother [or step-mother]):

1. Sometimes, often, or very often pushed grabbed, slapped, or had something thrown at her?
2. Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard?
3. Ever repeatedly hit over at least a few minutes?
4. Ever threatened with or hurt by a knife or gun?

Identification: A respondent would be identified as having a history of household dysfunction if any response to questions 1–4 was affirmative.

1. Level of conflict between parents, between youth and parents, among siblings:
  - a. Some conflict that is well managed
  - b. Verbal intimidation, yelling, heated arguments
  - c. Threats of physical abuse
  - d. Domestic violence: physical/sexual abuse
2. History of witnessing violence:
  - a. Has not witnessed violence
  - b. Has witnessed violence at home
  - c. Victim of violence/physical abuse in a foster/group home
  - d. Has witnessed violence in a foster/group home
  - e. Has witnessed violence in the community
  - f. Family member killed as a result of violence

Identification: A respondent would be defined as having a history of household dysfunction if the response to question 1 were b. (verbal intimidation, yelling, heated arguments), c. (threats of physical abuse), or d. (domestic violence), or if the response to question 2 was positive for b. (has witnessed violence at home), or d. (has witnessed violence in a foster/group home).

### Measure 7: Household Substance Abuse

1. As a child, did you ever: Live with anyone who was a problem drinker or alcoholic?
2. As a child, did you ever: Live with anyone who used street drugs?

Identification: A respondent would be defined as having a history of household substance abuse if a response to either question was affirmative.

1. Problem history of parents who are currently involved with the household:
  - a. No problem history of parents in household
  - b. Parental alcohol problem history
  - c. Parental drug problem history
  - d. Parental physical health problem history
  - e. Parental mental health problem history
  - f. Parental employment problem history
2. Problem history of siblings who are currently involved with the household:
  - a. No siblings currently in household
  - b. No problem history of siblings in household
  - c. Sibling alcohol problem history
  - d. Sibling drug problem history
  - e. Sibling physical health problem history
  - f. Sibling mental health problem history
  - g. Sibling employment problem history

Identification: A respondent would be defined as having a history of household substance abuse if responses b. (parental alcohol problem) or c. (parental drug problem) in question 1, or responses c. (sibling alcohol problem) or d. (sibling drug problem) in question 2 was identified.

### Measure 8: Household Mental Illness

1. Was a household member depressed or mentally ill?
2. Did a household member attempt suicide?

Identification: A respondent would be defined as having a history of household mental illness if a response to either question was affirmative.

1. Problem history of parents who are currently involved with the household:
  - a. No problem history of parents in household
  - b. Parental alcohol problem history
  - c. Parental drug problem history
  - d. Parental mental health problem history
  - e. Parental physical health problem history
  - f. Parental employment problem history
2. Problem history of siblings who are currently involved with the household:
  - a. No siblings currently in household
  - b. No problem history of siblings in household
  - c. Sibling alcohol problem history
  - d. Sibling drug problem history
  - e. Sibling mental health problem history
  - f. Sibling physical health problem history
  - g. Sibling employment problem history

Identification: A respondent would be defined as having a history of household mental illness if response d. (parental mental health problem) in question 1, or response e. (sibling mental health problem) in question 2 was identified.

**Measure 9: Parental Separation/Divorce**

Were your parents ever separated or divorced?

Identification: A respondent would be identified as having a history of parental separation/divorce if the question was answered affirmatively.

1. All persons with whom the youth is currently living:
  - a. Living alone
  - b. Transient (street)
  - c. Biological mother
  - d. Biological father
  - e. Nonbiological mother
  - f. Nonbiological father
  - g. Older sibling(s)
  - h. Younger sibling(s)
  - i. Grandparent(s)
  - j. Other relative(s)
  - k. Long-term parental partner(s)
  - l. Short-term parental partner(s)
  - m. Youth's romantic partner Youth's child
  - n. Foster/group home
  - o. Youth's friends

Identification: A respondent would be defined as having a history of parental separation/divorce if responses c. (biological mother) and d. (biological father) are not both selected.

**Measure 10. Incarcerated Household Member**

Did a household member go to prison?

Identification: A respondent would be defined as having a history of an incarcerated household member if the question was answered affirmatively.

1. History of jail/imprisonment of persons who were ever involved in the household for at least 3 months:
  - a. No jail/imprisonment history in family
  - b. Mother/female caretaker
  - c. Father/male caretaker
  - d. Sibling drug problem history
  - e. Older sibling
  - f. Younger sibling
  - g. Other member
2. Jail or prison history of persons who are currently involved in the household:
  - a. No jail/imprisonment history in family
  - b. Mother/female caretaker
  - c. Father/male caretaker
  - d. Sibling drug problem history
  - e. Older sibling
  - f. Younger sibling
  - g. Other membe

r Identification: A respondent would be defined as having a history of an incarcerated household member if any response other than a. (no jail/imprisonment history in family) for question 1 or question 2 was identified.