

# Maltreatment, Child Welfare, and Recidivism in a Sample of Deep-End Crossover Youth

Michael T. Baglivio<sup>1</sup> · Kevin T. Wolff<sup>2</sup> · Alex R. Piquero<sup>3</sup> · Shay Bilchik<sup>4</sup> · Katherine Jackowski<sup>1</sup> · Mark A. Greenwald<sup>5</sup> · Nathan Epps<sup>5</sup>

Received: 24 October 2015 / Accepted: 17 December 2015  
© Springer Science+Business Media New York 2015

**Abstract** Although research has oft-documented a maltreatment–delinquency link, the effect of involvement in—and timing of—child welfare system involvement on offending has received less attention. We examine whether the timing of child welfare involvement has differential effects on recidivism of deep-end juvenile offenders (youth who have been adjudicated delinquent by the court and placed in juvenile justice residential programs). The current study uses a large, diverse sample of 12,955 youth

completing juvenile justice residential programs between 1 January 2010 and 30 June 2013 in Florida (13 % female, 55 % Black, 11 % Hispanic). Additionally, we explore the direct effects of childhood traumatic events on delinquency, as well as their indirect effects through child welfare involvement using structural equation modeling. The findings indicate that adverse childhood experiences fail to exert a direct effect on recidivism, but do exhibit a significant indirect effect on recidivism through child welfare involvement, which is itself associated with recidivism. This means that while having exposures to more types of childhood traumatic events does not, in and of itself, increase the likelihood of re-offending, effects of such experiences operate through child welfare placement. Differences in the effects of maltreatment timing and of adverse childhood experiences are observed across sex and race/ethnicity subgroups. Across all racial subgroups, exposures to adverse childhood experiences have a significant effect on the likelihood of child welfare placement, yet child welfare placement exerts a significant effect on recidivism for White and Hispanic youth, but not for Black youth. Only Hispanic female and White male youth with overlapping child welfare and juvenile justice cases (open cases in both systems at the same time during the study period) were more likely to recidivate than their delinquent-only counterpart youth. Crossover status (child welfare and juvenile justice involvement, whether prior or open cases) was essentially irrelevant with respect to the re-offending of Black youth completing juvenile justice residential programs. The findings indicate the effects of exposure to adverse childhood experiences, and child welfare system and juvenile justice system involvement on re-offending are not uniform across subgroups of youth but that earlier child welfare involvement is more detrimental than concurrent child welfare system involvement when it does matter.

---

✉ Michael T. Baglivio  
Michael.Baglivio@us.g4s.com

Kevin T. Wolff  
kwolff@jjay.cuny.edu

Alex R. Piquero  
apiquero@utdallas.edu

Shay Bilchik  
Shay.bilchik@gmail.com

Katherine Jackowski  
Katherine.Jackowski@us.g4s.com

Mark A. Greenwald  
Mark.Greenwald@djj.state.fl.us

Nathan Epps  
Nathan.Epps@djj.state.fl.us

<sup>1</sup> G4S Youth Services, LLC, 6302 Benjamin Rd., Suite 400, Tampa, FL 33625, USA

<sup>2</sup> John Jay College of Criminal Justice, 524 West 59th St., New York, NY 10019, USA

<sup>3</sup> University of Texas at Dallas, 800 W. Campbell Rd., GR31, Richardson, TX 75080, USA

<sup>4</sup> Center for Juvenile Justice Reform, 3300 Whitehaven St. NW, R. 5045, Washington, DC 20007, USA

<sup>5</sup> Florida Department of Juvenile Justice, 2737 Centerview Drive, Tallahassee, FL 32399, USA

**Keywords** Maltreatment · Child welfare system · Crossover youth · Recidivism · Serious youthful offenders

## Introduction

Childhood maltreatment remains a significant social problem in the U.S., as evidenced by the 3.4 million referrals involving 6.3 million children received by Child Protective Services agencies during federal fiscal year 2012 (U. S. Department of Health and Human Services 2013). Partly due to the demonstrated link between maltreatment and delinquency, the Juvenile Justice and Delinquency Prevention Act (JJDP) requires states to promote information-sharing on child welfare matters with the juvenile delinquency court. The repercussions of maltreatment as these youth enter and progress through adolescence are intensified as such traumatic experiences have consistently been shown to predict delinquency (Barrett et al. 2014a; Caspi et al. 2002; Godinet et al. 2014; Widom 1989), as well as increase recidivism for juvenile offenders (Dembo et al. 1995; Dembo et al. 1993). Maltreated youth have evidenced delinquency rates 47 % greater than youth without at least one substantiated maltreatment allegation (Ryan and Testa 2005), are 38 % more likely to commit violent crimes (Widom 1989), have an earlier age of delinquency onset (Barrett et al. 2014b; Dannerbeck and Yan 2011; Halemba and Siegel 2011; Rivera and Widom 1990), and have more arrests and are more likely to be incarcerated in adulthood (English et al. 2004; Fagan 2005; Maxfield and Widom 1996; Mersky and Topitzes 2010). Being neglected or abused in childhood has been shown to increase the likelihood of arrest as a juvenile by 59 %, as an adult by 28 %, and of committing a crime involving violence by 30 % (Widom and Maxfield 2001).

These consistent findings make “crossover youth”—those with both an abuse/neglect and a delinquency history—a unique subset of offenders (Bender 2010; Herz et al. 2010; Onifade et al. 2014). Unfortunately, while there is a growing literature regarding the correlates associated with pathways to serious youthful offending (Mulvey et al. 2004, 2010), much less is known about the pathways by which maltreated youth become juvenile offenders, necessitating a need for better understanding of this link in order to disrupt the Cycle of Violence (Bender 2010; see also Onifade et al. 2014; Smith and Thornberry 1995). Additionally, with the exception of prevalence rates of maltreatment, almost no prior work has examined the maltreatment-delinquency link among higher-risk serious offender “crossover youth” placed in juvenile justice residential commitment facilities.

The purpose of this study is to examine the childhood maltreatment-delinquency link in a sample of youth offenders completing juvenile justice residential facility

placement. We examine characteristics associated with juvenile offenders having a history of child welfare involvement that was still current/open, or which had closed within the last 5 years. We use structural equation modeling to examine the pathways by which Adverse Childhood Experiences (ACE), a commonly used measure of the extent of childhood exposure to traumatic events, operate directly and indirectly through child welfare involvement on subsequent recidivism, controlling for many prominent risk factors of delinquency. Therefore, we examine whether traumatic childhood experiences, including abuse, directly relate to offending, or whether these experiences have indirect effects on offending through child welfare involvement. Furthermore, the study examines whether a history of prior child welfare involvement is less criminogenic than concurrent child welfare-juvenile justice involvement. Importantly, and a key extension from prior work in this area, we present sex and race/ethnicity-specific models. As such, this study is arranged accordingly: First we clarify definitions regarding “crossover youth”, followed by a review of the research surrounding maltreatment and delinquency. Next, we introduce the concept of ACEs and the role those adverse childhood experience exposures play in adolescent development, delinquency, and negative life outcomes. Then, the data, methods, and analytic strategy are presented, followed by results and finally conclusions and policy implications.

## Crossover Youth

### Definitions and Prevalence

The Georgetown University Center for Juvenile Justice Reform (CJJR) has striven to clarify definitions of youth having various involvements with both the juvenile justice and child welfare systems. As stated elsewhere (Herz et al. 2010), the term “crossover youth” includes any youth who has experienced maltreatment and also engaged in delinquency, regardless of whether abuse or delinquency have come to the attention of those respective systems. Dually-served youth, in contrast, have penetrated, at some point in time, both the child welfare and juvenile justice systems (though not necessarily at the same time). These youth are also commonly referred to as dual-jurisdiction youth or dually-involved youth (Halemba et al. 2004). Dually-adjudicated youth represent a distinct subgroup of dually-involved youth in that they are concurrently adjudicated by both the child welfare and juvenile justice systems (meaning their child welfare and juvenile justice placements/involvement overlap). A youth may become a dually-served youth in one of three primary ways. The

most frequent pathway occurs when a youth penetrates the child welfare system and then later commits a crime while under the care and custody of child protective services. A second pathway involves a youth with prior, but not current, contact with the child welfare system who is “referred” for a crime (equivalent to an adult arrest), thereby entering the justice system. A third possible pathway occurs when a youth with no prior child welfare system contact enters the delinquency system and the case is referred to child protective services for further investigation of suspected abuse or neglect. Regrettably, as noted previously (see Herz et al. 2006; Herz and Ryan 2008; Herz et al. 2010), due to a lack of systematic data sharing or integration of information systems, dually-served youth often represent a “hidden” population as professionals in either system are often unaware of the youth’s involvement in the counterpart system.

With respect to prevalence, most prior work has focused on the percentage of child welfare-involved youth that penetrate the juvenile justice system. For instance, findings show between 9 and 29 % of child welfare youth engage in delinquency (Kelley et al. 1997; Smith and Thornberry 1995; Widom 1989; Zingraff et al. 1993), though findings from a Queensland, Australia cohort were slightly smaller, at 5 % (Stewart et al. 2002). Unfortunately, findings related to prevalence of juvenile justice youth with child welfare histories are more limited. One study of Arizona youth found dually-involved youth compose a larger proportion of juvenile justice youth at the deeper end of the system continuum, finding only 1 % of diversion youth with child welfare history, but 7 % of probation supervision youth, 11 % of detained youth, 12 % of youth committed to the state’s department of juvenile corrections, and 42 % of youth simultaneously placed on probation and in a private group home/residential treatment (Halemba et al. 2004). Similar estimates were found in Lucas County, Ohio, where 45 % of juvenile offenders on probation had been previously or concurrently referred to the child welfare system, and 89 % of those incarcerated by the juvenile court had contact with the county’s child services agencies (Halemba and Lord 2005). These more localized rates confirm the broader findings that the prevalence of childhood maltreatment among juvenile offenders is substantially greater than that in the general population (Wiebush et al. 2001).

With respect to traumatic experience exposures, crossover youth in both Los Angeles and Arizona have been shown to evidence a familial history of criminal behavior, mental health problems, substance abuse, and violence (Herz et al. 2010). Specifically, 72 % of crossover youth in Los Angeles had parental substance abuse, 24 % parental mental health problems, 36 % parental offending, and 33 % were exposed to domestic violence. Higher

prevalence rates of these parental/household problem exposures for crossover youth were also found in Arizona (Herz et al. 2010).

### **Prior Findings Regarding Dual Child Welfare and Juvenile Justice System Exposure**

Examining differences in juvenile justice processing, youth with a history of child welfare involvement have been found less likely to receive community-based sanctions and more likely to receive delinquency dispositions to group homes or secure facilities than youth not involved in the child welfare system, even after controlling for demographics and offense type (Ryan et al. 2007). However, additional findings showed dependent youth are no less, or more, likely to have their first delinquency case dismissed. Foster care youth without prior delinquency involvement have been found more likely to be detained than nondependent delinquent youth (Conger and Ross 2001), with some research finding crossover youth 9 times as likely to be placed in a detention center (Halemba et al. 2004). It has been asserted that this is based on juvenile justice staff not knowing the appropriate child welfare representatives to contact, leading to the youth being detained. Furthermore, dependent youth have been shown to enter the juvenile justice system due to less serious offenses than their nondependent counterparts. Stakeholders have expressed concerns that dependent youth have been treated differently, and foster parents expressed concerns regarding disposition outcome bias against dependent youth (Freundlich and Morris 2004). Prior work has articulated the historic inability of the juvenile justice and child welfare systems to work in tandem to provide coordinated service provision to crossover youth, illustrating instead that “rather than receiving care from multiple systems, the needs of these youth are often neglected as a result of dividing lines” between the educational, child welfare, and juvenile justice systems (Herz et al. 2010; p. 305). This has led some to argue the differential handling of maltreated youth is itself a risk factor for delinquency (Bender 2010; Onifade et al. 2014).

Prior work has shown mixed findings with respect to the success of placements within the welfare system and subsequent delinquency. Jonson-Reid and Barth (2000) found youth who receive child welfare services after investigation are less likely to be subsequently incarcerated than those for whom no services were provided, though females placed in foster care were particularly at risk for subsequent juvenile justice residential placement. Ryan and Testa (2005) found that youth placed with individuals who were, or in settings of, non-biological family members were more than twice as likely to be delinquent as those remaining with biological families, and those placed in

group homes having double the odds of delinquency as foster care placements (Ryan et al. 2008). Unfortunately, prior work has also indicated weak predictive validity of a juvenile risk assessment for classifying risk of recidivism when used with maltreated youth, yielding a non-significant Area Under Curve (AUC) statistic of .49 (the equivalent of chance; Onifade et al. 2014). Additional research shows placement stability matters, as those with 4 or more placements were more likely to engage in delinquency relative to youth with 3 or fewer placements (Ryan et al. 2010).

Until recently, the maltreatment-delinquency literature has focused almost exclusively on the initial risk of offending (Ryan et al. 2007). Compared to delinquent youth without child welfare system involvement, recidivism rates of crossover youth are twice as high (Barrett et al. 2014b; Halemba et al. 2004; see also Chang et al. 2003). Additionally, an analysis of a sample of 581 crossover youth in Los Angeles found recidivism was predicted by older age at arrest, having a substance abuse problem, and school truancy, while those charged with a probation violation were less likely to recidivate (Herz et al. 2010). Unfortunately, that study did not include a delinquent-only comparison group, meaning there is no way of knowing whether recidivism of crossover youth is predicted by different risk factors than delinquent youth without maltreatment histories. More recently, comparison of dually-involved youth with a delinquent-only group found a 56 % recidivism rate for the dually-involved and a 41 % rate for the delinquency-only youth (Huang et al. 2012). This finding supports prior work showing maltreated delinquent youth were 1.58 times more likely to re-offend than non-maltreated offenders (Ryan 2006). Findings from both studies were similar to the 1.38–1.62 times increased likelihood of recidivism for maltreated delinquent youth found in a sample of Singapore youth offenders (Li et al. 2015). Examining 286 youth released from a juvenile justice residential program, Ryan (2006) found maltreated youth evidenced a 50 % recidivism rate, in comparison to 37 % for youth without substantiated physical abuse or neglect. These findings build on meta-analytic work indicating a small but significant effect size of maltreatment on recidivism (Cottle et al. 2001). The Singapore study (Li et al. 2015) is unique in that the authors controlled for more than 15 risk factors across personal characteristics, household environment, and parental background domains, while still finding a significant link between maltreatment and delinquency. Recently, a study of 1500 crossover youth and 1200 comparison juvenile justice-only youth showed crossover youth having higher risk factors and lower protective factors than delinquent-only youth (Lee and Villagrana 2015). Additionally, they found female crossover youth have similar levels of offending and re-offending as

male non-crossover youth, further highlighting the need for gender-specific examination in crossover studies.

One study examined differences in the timing of maltreatment and juvenile recidivism. Specifically, the likelihood of recidivism of delinquent youth in the state of Washington was examined for youth with closed (prior) dependency cases, compared with youth with open (concurrent) dependency cases, and those without child welfare system histories (Ryan et al. 2013). These scholars hypothesized that concurrent jurisdiction, while often the preferred model, may exacerbate recidivism based on the complexity of cases, deficits in information sharing, conflicting agency missions, increased scrutiny of both a probation officer and dependency case worker, and the fact that the case is still open, meaning some level of maltreatment may still be occurring (arguably, closed cases have a greater degree of assurance that maltreatment has subsided). Controlling for measures across family, education, peer association, substance use, and attitudes and beliefs (all using items from the Washington State Juvenile Court Assessment, WSJCA, risk/needs assessment), youth with open substantiated neglect cases (dually-adjudicated youth) were at greatest risk of recidivism, compared to delinquent-only, and those with closed prior dependency cases (Ryan et al. 2013). Cox regression models including controls as well as a measure of a closed prior substantiated neglect case and a measure of an open substantiated neglect case (with delinquent-only youth serving as the reference group) indicated only the dually-adjudicated youth were at increased likelihood of recidivism (once controls were included). Youth with closed substantiated neglect cases were no more likely to recidivate than delinquent-only youth. Of note, being Black, Hispanic, lacking consistent parental supervision, antisocial peer association, and using alcohol or drugs were also significant predictors of rearrest. These findings led to conclusions that the timing of maltreatment matters with respect to recidivism (Ryan et al. 2013). This echoed work using data from the Rochester Youth Development Study showing that younger children may be more “developmentally resilient” and capable of overcoming long-term negative repercussions once the deleterious conditions are addressed (as evidenced by the closing of a dependency case), and that perhaps child welfare interventions are more effective with younger youth than adolescents (see Smith et al. 2004). Interestingly, the dually-adjudicated cases were not, on average, cases that opened many years ago and were never closed out; rather the dually-adjudicated cases open at later points in time than the closed dependency cases. This raises the question of whether the increased recidivism was truly due to multi-agency open cases, or the proximity of the dependency placement to the delinquency placement, echoing Ryan et al.’s (2013, p. 462) conclusion that “future



investigations of child welfare and juvenile justice ought to pay close attention and in fact disentangle” delinquent youth with prior and concurrent child welfare system involvement.

The current study aims to replicate and build on these findings by providing an analysis of an all-delinquent sample that compares dually-adjudicated youth, youth with a prior but recently closed dependency case, and non-maltreated youth, while controlling for measures across individual, household, and parental domains. In light of the significance of timing of maltreatment findings, we classify only maltreatment cases that were still open, or were closed within 5 years of the delinquency placement examined for recidivism. Furthermore, based on a lack of previous research, we employ a sample of youth from the deepest end of the juvenile justice continuum: youth completing juvenile justice residential commitment placement. To our knowledge, the Ryan (2006) study of 286 youth released from one residential program in the Midwest between 1992 and 1993 is the only prior work to examine the maltreatment-delinquency link in a sample of youth released from a juvenile justice residential program setting.<sup>1</sup> Qualitative work in this area has indicated the coordination of child welfare and juvenile justice services to be the most absent for youth in juvenile correctional facilities (Halemba and Lord 2005). The difficulty of transition back to the community from residential placement is likely exacerbated by issues such as a lack of clarity regarding where a youth may be placed upon release, what any aftercare requirements or supervision may be (and who will oversee said requirements), and the presence or lack of a viable support network.

### Theoretical Backdrop for the Impact of Adverse Childhood Experiences on Adolescent Development and Delinquency

Developmental theories of antisocial behavior often consider the impact of childhood conditions and the youth’s home environment on offending patterns. Although there are several relevant theories in this area, such as Agnew’s (1992) General Strain Theory, one especially noteworthy and often-tested framework is Moffitt’s (1993) developmental taxonomy. The two prominent pathways of adolescent limited and life-course persistent offending are distinct in that the latter typology evidences “pathological” backgrounds marked by neurocognitive problems, inadequate parenting, and behavioral problems during childhood

(Moffitt 2006; Moffitt and Caspi 2001). Neuropsychological deficits, however, must interact with adverse environments for life-course persistent offending to materialize, indicating that developmental exceptionalities/learning deficits may be necessary but not sufficient to initiate the risk; they must be juxtaposed with adverse rearing environments (Moffitt 1993; Tibbetts and Piquero 1999). Notably, these circumstances are transactional wherein the poorly regulated child behaviors may be met with neglectful, punitive, or inconsistent parenting, which in turn further disrupts neurological functioning (Duke et al. 2010; Granic and Lamey 2002; Granic and Patterson 2006; Lynch and Cicchetti 1998). The effect of maltreatment on delinquency appears cumulative, as youth who experience multiple forms of maltreatment are at the greatest risk of violence and delinquency (Bender 2010; see Crooks et al. 2007; Currie and Tekin 2006; Mersky and Reynolds 2007).

### Adverse Childhood Experiences (ACE)

Research has noted family factors predictive of delinquency are similar to characteristics present in neglectful and abusive families; most notably domestic violence and parental history of mental illness, substance abuse, or prior incarceration (Howell 1995; Dannerbeck and Yan 2011; Wiebush et al. 2001). Recently, the cumulative stressor ACE score concept has entered the criminological discourse (Baglivio et al. 2015). Adverse childhood experiences refer to ten types of experience: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, domestic violence toward the youth’s mother, household substance abuse, household mental illness, parental separation/divorce, and jail/imprisonment history of a household member (Centers for Disease Control and Prevention 2015). The adverse childhood experiences concept acknowledges the complex and cumulative nature of risk factors through the process of summing risk factors and associating the composite score with relevant outcomes (see Rutter 1983). The ACE score (0–10) is the cumulative sum of those ten exposures, where each exposure is counted as a binary yes/no, regardless of the frequency or severity of each exposure.<sup>2</sup> Prior work has found adverse childhood experience exposures are common, highly interrelated, and exert a powerful cumulative effect on human development (Anda et al. 2010; Dong et al. 2004). This interrelatedness was replicated in a juvenile

<sup>1</sup> Li et al. (2015) included 480 youth in correctional institutions in Singapore. However, the sample was not disaggregated to examine these youth separate from the remaining 3264 youth offenders on community supervision.

<sup>2</sup> Concerns have been noted over ACE scores regarding the exclusion of additional exposures such as peer rejection, witnessing violence outside of the family, low socioeconomic status, and low academic achievement (see Finkelhor et al. 2012). Nevertheless, we argue the ACE exposures used in the current study (those of the CDC ACE score) are consistent with developmental theories that highlight the relevance of parental/familial contexts and circumstances.

offending sample such that the presence of a given adverse experience increases the odds of having any other additional adverse childhood experience exposure by an average of 2.3 times, and up to 1286 times versus those without the given ACE (Baglivio and Epps 2015). The high prevalence of adverse childhood experiences and the level of interrelatedness among those exposures support the concept of a composite score being central to understanding their effects, and that examining individual trauma type exposures separately, or attempting to ascertain unique effects of a few, misses the broader context in which they occur. High levels of interrelatedness shows exposures to additional adverse experiences are more likely given exposure to any particular trauma, suggesting that exposure to adverse childhood experiences is non-random. The current study uses the 10-item ACE score, as it is the score espoused by the Centers for Disease Control and Prevention (CDC 2015), and is backed by multidisciplinary research.

Extensive analyses, which began and remains most prominent in medical research, have documented the implications of high ACE scores on both long- and short-term negative health and life outcomes (Anda et al. 2010). Higher ACE scores were initially associated with increases in the leading causes of death in adulthood, including heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease (Anda et al. 2006; Chartier et al. 2010; Dube et al. 2003; Felitti et al. 1998). That original ACE Study shows the odds of experiencing these types of deaths in adulthood are roughly 12 times higher for individuals who experienced four or more ACEs compared to those without such exposure (Felitti et al. 1998). Short-term negative outcomes related to higher ACE scores include an increase in the odds of smoking, heavy drinking, intravenous drug use, morbid obesity, incarceration, violence perpetration, and poor educational and employment outcomes in a retrospective cross-sectional survey of 1500 randomly sampled individuals (stratified by economic disadvantage) aged 18–70 in the United Kingdom (Bellis et al. 2014). Additionally, sexual promiscuity, teenage pregnancy, and intercourse prior to age 15 are more likely for those with higher ACE scores (Hillis et al. 2001; Hillis et al. 2004). With respect to adolescent samples, among 7th–12th grade students, those witnessing domestic violence and those having a history of physical or sexual abuse were up to 3 times more likely to have early onset alcohol use (Hamburger et al. 2008). While examining six types of adverse childhood experiences on over 130,000 students, each additional type of traumatic exposure increased the risk of violence perpetration by 35–144 % (Duke et al. 2010). Violence included both interpersonal (delinquency, weapon-carrying, fighting, bullying, and dating violence) as well as self-directed (attempted suicide, self-mutilation)

violence. Recent trajectory-based analyses among a sample of juvenile offenders has implicated higher ACE scores in the increased likelihood of membership in an early-onset, chronic offending group, even after controls for individual, familial, and personal history risk factors were included (Baglivio et al. 2015).

Adverse childhood experience exposure is negatively related to normal adolescent development through its deleterious effects on neurobiology. This is evidenced through findings of a dose–response relationship between adverse childhood experience exposures with negative neurological consequences, such as chromosome damage (Shalev et al. 2013) and functional changes to the developing brain (Anda et al. 2010; Cicchetti 2013; Danese and McEwen 2012; Teicher et al. 2003). Childhood maltreatment occurring during critical adolescent developmental periods can disrupt neurological development and lead to neurobiological deficits (Painter and Scannapieco 2013). Chronic stress has also been found to impair brain development (Twardosz and Lutzker 2010), such as that arguably evident in conditions of increased adverse exposures. Traumatic exposure has been implicated in changes to the development of the prefrontal cortex and pathways between the prefrontal cortex and the amygdala (Anda et al. 2006; Bremner 2003). These prefrontal maturation alterations may negatively impact self-regulatory behavioral and emotional responses, including delinquency, interpersonal violence, drug and alcohol use, and suicidal or self-mutilating behaviors (Evans-Chase 2014). Developmental traumatology studies parallel these findings, indicating long-lasting changes to biological and cognitive functioning (Lanius et al. 2011; Mills et al. 2010).

Higher prevalence of adverse childhood experiences have been found in special populations, including children of alcoholics (Dube et al. 2001) and justice system-involved youth (Baglivio et al. 2014), in comparison to the mostly middle-class original ACE study of adults assessed via self-reported retrospective recall. With respect to sex differences in adverse childhood experience exposure prevalence among justice-involved youth, similar rates have been found for adverse childhood experience indicators with the exception of sexual abuse, where rates were four times higher for females (Baglivio et al. 2014). Additionally, prior work has indicated increased adverse childhood experience exposure in disadvantaged communities (Baglivio et al. 2015), conditions which disproportionately affect minority youth, who are disproportionately represented in both the juvenile justice and child welfare systems. More extensive exposure to adverse childhood experiences (higher ACE scores) has not only been shown to increase the likelihood of re-offending for youth completing juvenile justice community-based placements (such as probation supervision), but higher prevalence of

exposures also leads to a shorter time between juvenile justice service completion and subsequent arrest (Wolff et al. 2015). In sum, adverse childhood experience-specific research shows high prevalence rates of exposure among juvenile offenders, high interrelatedness among exposures, cumulative effects of adverse childhood experiences on long- and short-term outcomes, including violence and delinquency, and higher ACE scores predictive of early-onset chronic offending prevalence trajectories.

Despite the consistent evidence underlying the adverse effects of adverse childhood experiences, there is strong debate over whether youth with unsubstantiated abuse/neglect reports evidence the same risks as those with substantiated abuse/neglect reports (Chiu et al. 2011; Halemba and Lord 2005; Kohl et al. 2009; Leiter et al. 1994). Drake et al. (2003) found no differences in reoccurrence of maltreatment rates or school performance outcomes, yet unsubstantiated cases were at lower risk of delinquency than youth with substantiated maltreatment. Additional prior work examining over 38,000 Los Angeles youth has indicated youth with substantiated reports of maltreatment have 2.2 times the relative risk of arrest than youth with unsubstantiated reports (Chiu et al. 2011), leading to conclusions in support of the investigation and substantiation process being relevant in considerations of risk for future offending. Certainly there is some overlap of risk with prior work finding the majority of crossover youth coming from families with household substance abuse, domestic violence, family problems, parental mental health issues, and parental incarceration histories (Halemba et al. 2004). The current study contributes to this debate by considering the timing of official child welfare placement, while examining the effects of self-reported abuse/neglect through the ACE score on recidivism.

### The Importance of Examining Race/Ethnicity and Sex Subgroups

Recently, arguments for examining differences across race/ethnicity and sex were echoed based on differential rates of personal and vicarious exposure to the criminal justice system, parental offending and imprisonment and resultant family disruption and system mistrust, which helps explain the “intergenerational cycle of system involvement that tends to characterize the backgrounds” of both male and female minority offenders (Broidy et al. 2015, pp. 144). Black and Hispanic youth experience substantially greater rates of contact (and repeat contact) with the juvenile justice system, an effect which remains even after controlling for child welfare history and timing of that history in previous “crossover youth” work (Ryan et al. 2013). Examining child welfare formal placement of over 13,000 Los Angeles youth with either relatives (kinship care) or

non-relatives found that Black and White males served in child welfare kinship care placements had significantly higher risk for delinquency, while for Hispanic males and females such placements significantly decreased the likelihood of delinquency (Ryan et al. 2010). No effects of kinship care were found for Black or White females. The authors hypothesized the protective effect of kinship care for Hispanics may be based on the greater emphasis on family cohesion and interdependence evident with Hispanic youth and families (see also Smith and Krohn 1995). Given the preference of child welfare systems is to place youth with family members, the results of this study provide cause for concern for the universality of that approach.

Prior work has shown the reported prevalence of victimization of female juvenile offenders exceeds that of male offenders (Ryan et al. 2013; Wood et al. 2002), while other work has found boys more likely to have substantiated maltreatment during childhood than girls (Barrett et al. 2014a). Additionally, the emotional and behavioral responses to abuse differ by sex, with males more often displaying externalizing reactions such as aggression, violence, and conduct problems, with females internalizing and exhibiting symptoms/responses such as depression, suicidal/self-mutilation behaviors/thoughts, and eating disorders (Leadbeater et al. 1999). Maltreated females have been found more likely to have comorbid substance abuse and delinquency, which was not true of abused males (Widom and White 1997), underscoring the heightened role that trauma plays in female substance abuse. These contrasts suggest differences in delinquency outcomes and pathways, necessitating subgroup analyses by sex.

Additionally, females have been shown to have a 35 % higher subsequent maltreatment rate in a sample of youth already with both dependency and delinquency involvement (Huang et al. 2012). Race/ethnicity was not related to re-reporting of maltreatment in that analysis. Furthermore, with respect to race/ethnicity, prior work examining child welfare service provision and subsequent incarceration of 159,549 maltreated youth across 10 counties in California found the provision of services did not change the risk of incarceration for White youth, while significant decreases in risk of incarceration were found for Black and Hispanic youth (Jonson-Reid and Barth 2000). Child abuse, domestic violence, and their collective exposure increased the likelihood of internalizing and externalizing outcomes in adolescence in the prospective Lehigh Longitudinal Study (Moylan et al. 2010). In support of a cumulative stressor approach, youth with the dual exposures were at elevated risk compared to non-exposed youth, and interestingly, there were no sex differences in outcome likelihood in that prospective analysis. Maltreatment has been linked to violent behavior and delinquency for males only in some prior work (Chen et al. 2011; Mass et al. 2008;

Chiu et al. 2011), though other research evidences significantly more maltreated females committing violent offenses as both juveniles and adults than non-maltreated females, and no violent offending differences for similar groups of males (Herrera and McCloskey 2001; Widom and Maxfield 2001). Additional prior work examining an offending population and physical abuse in particular using an offending sample has not found sex differences for heightened risk of violent offending (Teague et al. 2008).

A structural equation modeling analysis of almost 200,000 South Carolina youth indicated that childhood maltreatment was a significant predictor of a “delinquency tendency” measure (composed of age at 1st referral and a second referral) in the girls-only model, but was insignificant for boys (Barrett et al. 2014a). Sex differences in the direct and indirect effects of official maltreatment suggest the need for future research to provide “better understanding of these complex interactions...if we are to develop programs to prevent and address delinquency among girls” (Barrett et al. 2014b, p. 124). We attempt to contribute to that line of inquiry and advance the field by examining direct effects of self-reported childhood traumatic exposures (the ACE score) on recidivism, as well as their potential indirect effects on recidivism that operate through official maltreatment. To our knowledge, no prior work has used structural equation modeling to examine the indirect and direct pathways of self-reported adverse childhood experience exposure and official childhood maltreatment on recidivism in sex and race/ethnicity-specific models, while controlling for many prominent risk factors. Prior work stresses the need to control for background characteristics between youth with and without maltreatment, as both childhood maltreatment and delinquency may be preceded by a common set of risk factors (Li et al. 2015; Margolin and Gordis 2000; Widom 1989).

## Current Study

Despite a widespread consensus that childhood maltreatment contributes to the likelihood of delinquency, there is a paucity of research contributing to the understanding of the pathways underlying that link. This is especially the case with respect to recidivism of deep-end juvenile justice youth. Bender (2010) has called for the use of samples with adequate sizes to examine sex differences that can disentangle temporal order as well as studies that employ structural equation modeling to investigate intervening risk factors in the maltreatment-delinquency link. Additionally, we are aware of only one study that examines recidivism differences based on the timing of the maltreatment by separating closed dependency cases from those with concurrent delinquency involvement (Ryan et al. 2013). We

build off this recent work by Ryan and colleagues in several important ways, including (1) controlling for self-reported childhood traumatic events (through the ACE score) for all three groups of delinquency-only, closed dependency, and concurrent dependency youth, (2) controlling for a wider range of criminal history indicators, as well as additional prominent risk factors, (3) including sex and race/ethnicity-specific models, (4) examining Hispanic youth in Florida which may arguably be different than the Los Angeles and Arizona Latino youth examined in prior work discussed above, and (5) using structural equation modeling to examine the pathways by which childhood traumatic events lead to recidivism. The current study examines the pathways by which childhood traumatic events lead to delinquency, as well as differential effects based on the timing of dependency involvement in a sample of deep-end juvenile justice residential placement completers. As a collective, these features highlight the uniqueness of our study for understanding recidivism among a deep-end sample of youth and adolescent offenders.

The focus of the current study yields the following testable hypotheses: (1) Both youth with prior (dually-involved) or overlapping during the study period (dually-adjudicated) child welfare system involvement will be more likely than delinquent-only youth to recidivate, (2) the increased likelihood of youth with prior (dually-involved) and overlapping (dually-adjudicated) child welfare system involvement to re-offend will hold true across sex and race/ethnicity subgroups, (3) higher ACE scores (more childhood traumatic exposures) will exert both a direct effect on recidivism, and an indirect effect on recidivism operating through its effect on child welfare involvement, controlling for prominent risk factors, and (4) significant direct and indirect effects of adverse childhood experiences on recidivism will hold across subgroups.

## Methods

### Sample

Data for the current study include all Black, Hispanic, and White youth who completed a juvenile justice residential commitment program in the state of Florida between 1 January 2010 and 30 June 2013 (N = 12,955).<sup>3</sup> Additionally, child welfare indicators for each of these youth were

<sup>3</sup> 52 youth were classified for race/ethnicity as “other” and were removed from the current study. Of the 52 youth, 4 youth (7.7 %) had 1 child welfare placement (none of the youth had more than 1 child welfare placement in the last 5 years). By sex, 16 % of the females classified as “other”, and 6.5 % of the males classified as “other” had a child welfare placement.



provided. Child welfare information was provided by the Florida Department of Children and Families, and includes start and end dates for all placements/involvement that were currently open, or had closed within the previous 5 years. This allowed for the identification of youth as having child welfare involvement concurrent with the residential placement (dually-adjudicated), having child welfare involvement within 5 years of the residential placement, but ending prior to that placement (dually-involved), or having no child welfare involvement within the last 5 years (classified as delinquent-only in the current study). Official Florida Department of Juvenile Justice records from its Juvenile Justice Information System centralized database were used for demographic and placement information. The information system maintains all social, offense, placement, and risk assessment history data for all youth referred to the Florida Department of Juvenile Justice (equivalent to an adult arrest). The ACE scores and the risk factor measures used in the current study (described below) were taken from Community Positive Achievement Change Tool (C-PACT) and Residential Positive Achievement Change Tool (R-PACT) risk/need assessment information also maintained in the information system.

The C-PACT is the risk/needs assessment used by the Florida Department of Juvenile Justice to classify youth according to risk to re-offend (low, moderate, moderate-high, or high risk). This assessment is administered to each youth after arrest. The tool has a prescreen and a full assessment version (46 and 126 items, respectively). Both versions produce identical risk to re-offend classifications, but the full assessment groups items into 12 domains and additionally produces domain risk and protective scores (such as a school domain, aggression domain, and relationships domain). All youth scoring low or moderate risk who are disposed to any community services (including diversion services) are assessed every 180 days using the prescreen, while youth scoring moderate-high or high risk are assessed with the full assessment every 90 days. Youth being considered for residential commitment placement are administered the full assessment. The only use of the community tool for the current study was to obtain the adverse childhood experience indicators to allow for creating the ACE score.

Youth placed in juvenile residential commitment programs in Florida are assessed with the R-PACT. Initial assessment occurs within 30 days of admission to assist with individualized treatment/case plan development for each youth. Similar to the community full assessment described above, this residential youth risk/need assessment tool assesses youth for risk and protective factors across 12 domains (the same domains as the community tool described above). Each youth is assessed every

90 days from the initial assessment to measure treatment progress and guide any treatment/case plan revisions. Finally, the residential youth assessment is administered to each youth just prior to exit from the residential program. Examining ratings comparing the initial and exit assessments indicates the extent to which risk factors have been reduced and protective factors increased throughout residential placement. Two prior studies have shown the exit risk scores produced by this tool are predictive of subsequent recidivism, with those youth having more risk more likely to re-offend (Baglivio 30 2015; Hay 2013). For the current study, individual items were taken from this residential youth assessment to be included as prominent risk factor controls in the examination of the pathways by which childhood traumatic exposures lead to recidivism as well as in examining how the timing of child welfare involvement is related to re-offending.

To provide context, in Florida, only a judge can order placement of a youth in a Florida Department of Juvenile Justice residential program. All youth placed in such programs are administered the community youth risk assessment (C-PACT) described above, as well as are evaluated by a licensed psychologist. The youth are placed in the residential programs for an indeterminate period of time, with release based on completion of an individualized performance/treatment plan, rather than a predetermined length of stay. The performance/treatment plans contain goals that address the youth's specific risk factors (based on the risk assessment and the comprehensive evaluation conducted by the psychologist). All youth who have not obtained a high school or equivalent diploma must attend school, taught by certified teachers. Youth attend treatment groups and individual counseling sessions (provided by licensed or supervised therapists) based on their individualized needs. Group services predominantly include cognitive behavioral interventions (to address criminal thinking/thinking errors), skills training groups, substance abuse prevention or intervention (based on the youth's substance use history and/or diagnoses), sex offender services (based primarily on offending history), mental health group services (such as healthy relationships, identifying internal and external triggers, anger management), and family therapy.<sup>4</sup> All residential programs have a behavior

<sup>4</sup> The current study does not evaluate the effectiveness of the services provided to residential youth. As the current study uses the assessment risk factors just prior to release, all treatment effects on risk/needs factors has been taken into account to provide the clearest assessment of the youth prior to the recidivism follow-up period. Future work should examine which specific interventions, in what dosages, best reduce the effects of childhood trauma exposure on subsequent re-offending.

management system (token economy) which requires level attainment for increased privileges.

## Measures

### Official Recidivism

Recidivism is measured as a subsequent juvenile referral or adult arrest for an offense that occurs within 1 year of the date of release from the juvenile commitment facility, meaning each youth was followed for exactly 365 days subsequent to release. Both juvenile and adult records were used as some youth were 18 or older at release, or turned 18 years of age during the follow-up period. The arrest must have occurred in Florida to be counted. Some youth may have been arrested after the 1-year follow-up, though those arrests were not counted in the current study. Of note, technical/non-law violations (such as curfew violations, lack of restitution payment, failed urinalysis results, or other administrative violations of probation) were not included as recidivism.

### Child Welfare Involvement

Following Ryan et al. (2013), we use the terms dually-involved and dually-adjudicated to describe youth with child welfare and delinquency histories. Youth not classified as dually-involved or dually adjudicated in the current study are considered delinquent-only. We use the term child welfare placement and involvement interchangeably. The intent is not that the term “placement” indicates removal of the youth when discussing child welfare “placement”/involvement. Both voluntary cases/petitioned cases and removal of the youth are captured; as such our terminology includes receiving in- or out-of-home services. Unfortunately, data do not permit discrimination across nuances of system involvement, such as whether a youth was removed from his/her household due to allegations that were later proven false or unjustified. Data simply indicate the youth was involved, for some reason, with the child welfare system, and the dates of such involvement.

### *Dually-Involved*

Youth in the delinquency system with a closed dependency case/placement are classified as dually-involved. For the current study that classification was given to all youth who had child welfare involvement within the last 5 years, but for whom such involvement was closed prior to the residential placement (the residential placement did not overlap with the child welfare involvement).

### *Dually-Adjudicated*

Dually-adjudicated represents youth with a concurrently open case in both child welfare and juvenile justice.<sup>5</sup> Youth classified as dually-adjudicated for the current study had child welfare involvement that overlapped with the dates of the residential placement in some way (the child welfare involvement could have ended at some point during the residential stay, or could have continued after the residential stay, but the two involvements must have overlapped at some point).

### ACE Score

Though designed to classify youth according to risk of recidivism, the full community youth juvenile justice risk/need assessment (C-PACT) contains items that were used to create all 10 adverse childhood experience exposures of the composite ACE score. As all youth being placed in residential programs are required to be assessed with the full assessment, these items from the assessment administered just prior to placement were used to create ACE scores for each youth. The exact items, responses, and coding used to create ACE scores from this assessment have been reported elsewhere (Baglivio et al. 2014). Each exposure was scored dichotomously (yes/no) and exposures were summed for a cumulative ACE score ranging from 0 (unexposed to any) to 10 (exposed to all ten categories). Consistent with each prior ACE study reviewed above, self-reported items are appropriate for capturing adverse childhood experiences (see Felitti et al. 1998; Anda et al. 2010). In contrast to adverse childhood experience exposure studies with adults, the current study suffered less from the challenges of retrospective recall of childhood events as the exposures are more contemporary for the younger sample. In keeping with prior ACE score studies in the social and medical sciences (Dube et al. 2004; Dong et al. 2004), and all ACE score studies explicitly using juvenile offender samples (Baglivio et al. 2015) the following ten adverse childhood experiences were ascertained: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, family violence, household substance abuse, household mental illness,

<sup>5</sup> An anonymous reviewer disagreed with our use of the term dually-adjudicated, holding that youth are not “adjudicated” in the child welfare system. At the same time, many family court systems initiate proceedings through a dependency petition, with the child either being adjudicated dependent or with the petition being dismissed. Therefore, we retain the use of the term “dually-adjudicated”. Dually-adjudicated throughout the manuscript refers to youth with cases open in both the child welfare and juvenile justice system at the same time at some point during the study period (open cases in each system overlapped at some point).

parental separation or divorce, and household member incarceration.

A brief description of each adverse childhood experience and responses indicating being exposed are: (1) Emotional abuse: Parents/caretakers were hostile, berating, and/or belittling to youth; (2) Physical abuse: The youth reported being victimized or physically abused by a family member; (3) Sexual abuse: The youth reported being the victim of sexual abuse or rape; (4) Emotional neglect: The youth reported no support network, little or no willingness to support the youth by the family, or that youth does not feel close to any family member; (5) Physical neglect: The youth has a history of being a victim of neglect (includes a 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 food, shelter, clothing, nurturing, or health care); (6) Family violence: The level of conflict between parents included verbal intimidation, yelling, heated arguments, threats of physical abuse, domestic violence, or the youth has witnessed violence at home or in a foster/group home; (7) Household substance abuse: Problem history of parents and/or siblings in the household includes alcohol or drug problems; (8) Household mental illness: Problem history of parents and/or siblings in the household includes mental health problems; (9) Parental separation/divorce: Youth does not live with both mother and father; and (10) Incarceration of household member: There is a jail/prison history of family members.

### **Criminal History Indicators**

Criminal history indicators are taken from the residential youth assessment administered to the juvenile just prior to release from the residential program. Unlike other domains of the residential youth assessment, all criminal history items are automated from the information system and are based on official records.

#### *Age at First Offense*

The age of the youth at the time he/she was first arrested is categorized by the residential youth assessment. Categories include 12 and under, 13–14, 15, 16, and over 16 (coded 1–5 respectively with higher values indicating an older age at first arrest).

#### *Prior Detention Placements*

Instances of the youth being detained in secure detention for at least 48 h are captured and categorized by the assessment. Categories include none, one, two, and three or more (coded 1–4, respectively). Higher scores indicate more instances of prior detention confinement.

#### *Prior Residential Placements*

The number of juvenile justice residential commitment placements a youth has had is categorized as none, one, or two or more (coded 1–3, respectively). Youth scoring higher on this measure have had more instances of prior residential commitment placement.

#### *Prior Misdemeanor Offenses*

The total number of arrests for which the most serious adjudicated charge was a non-traffic misdemeanor is categorized by the residential youth assessment. Categories include none or one, two, three or four, and five or more (coded 1–4, respectively). Youth scoring higher on this measure have had more prior adjudicated misdemeanors.

#### *Prior Felony Offenses*

The total number of arrests for which the most serious adjudicated charge was a felony offense is included. Felony offenses are categorized as none, one, two, and three or more (coded 1–4, respectively). Higher scoring youth on this measure have had more prior adjudicated felonies.

### **Individual Risk Indicators**

Individual risk indicators were gleaned from the assessment administered to the youth prior to release from the residential program. This ensures the most current risk is captured prior to the 1-year recidivism follow-up period.

#### *School Conduct*

All youth placed in residential commitment programs in Florida must attend school (provided on-site by qualified teachers). The youth's conduct in the most recent term is captured as no conduct problems versus having conduct problems (coded 0–1, respectively). A positive indication of conduct problems includes either problems during school that required an escalated response or additional staff involvement, and those that required removal from the classroom for excessively disruptive behavior. Verbal prompts by staff (such as to stop talking, pay attention, etc.) are not included as school conduct problems.

#### *School Importance*

An additive scale measuring the importance the juvenile attributes to educational attainment was created from two measures: the extent to which the youth believes there is a value in getting an education (does not believe education is of value, somewhat believes, and believes getting an

education is of value), and the extent to which the youth believes school provides an encouraging environment (does not believe, somewhat believes, and believes school is encouraging). The two items were combined to create the school importance scale ( $\alpha = .862$ ), with higher scores indicating a higher belief in the importance of school.

### *Substance Use*

Substance use is measured using two items; one measuring past alcohol use, and one past drug use. The items were combined to create the current substance use measure, categorized as no past use (of either alcohol or drugs), past use, and past use where such use caused problems in family conflict, health, pro-social peer associations, withdrawal, increased tolerance to drugs/alcohol, or contributed to criminal behavior (coded 0–2, respectively). An identical measure of substance use, categorized in the same manner, was shown to predict early-onset juvenile prevalence offending trajectories (Baglivio et al. 2015). Substance use as assessed by the assessment (described above) for juveniles under community supervision has also been found to be related to recidivism for Florida juvenile offenders generally, Florida serious, violent, and chronic (SVC) offenders (Baglivio et al. 2014), and male Florida offenders (Baglivio 2009).

### *Difficult Temperament*

The general temperament of the youth was assessed through a scale including measures of tolerance for frustration, hostile interpretation of the actions of others, control of aggression, attitude towards responsible law abiding behavior, and acceptance of responsibility for antisocial behavior. Tolerance for frustration is categorized into never gets upset over small things, rarely gets upset, sometimes gets upset, and often gets upset over small things or has temper tantrums (coded 0–3, with higher values indicating more risk in this area). Hostile interpretation of the actions of others is captured as primarily positive view of the intentions/actions of others, primarily negative, and primarily hostile view of the intentions/actions of others in a common non-confrontational situation (coded 0–2, with higher values indicating more risk in this area). Control of aggression includes the categories of no significant problems, often uses alternatives to aggression, sometimes uses alternatives, rarely uses alternatives, and lacks alternatives to control aggression (coded 0–4, with higher values indicating more risk). The youth's attitude toward responsible law abiding behavior is categorized as believing laws apply to him/her, does not believe laws apply or they sometimes apply, and defies or is resentful towards laws (coded 0–2, higher values indicate increased risk). Acceptance of

responsibility for antisocial behavior is captured as accepts responsibility for antisocial behavior, minimizes, denies, justifies, excuses, blames others or believes antisocial behavior is acceptable, and is proud of antisocial behavior (coded 0–2, with higher values indicating increased risk). The five items were then standardized and combined into a “difficult temperament” scale ( $\alpha = .740$ ), with higher values reflecting a more difficult temperament.

### *Impulsivity*

Impulsivity was measured as a single residential youth assessment item capturing the extent to which the youth was impulsive/acts without thinking. The item was categorized into youth who use self-control, impulsive youth, and highly impulsive youth who usually act before thinking (coded 0–2, higher values indicating more impulsivity).

### **Demographics**

Demographic measures used in the current study include sex, race/ethnicity, and age at release. Sex is measured as male (= 1), while race/ethnicity is captured through a series of dichotomous measures for Black (= 1), and Hispanic (= 1), with White serving as the reference group. Age at release captures the age of the youth at the time he/she completed the residential program (measured continuously).

### **Analytic Strategy**

To answer our primary research questions we use a combination of standard logistic regression and structural equation modeling to assess the relationship among adverse childhood experiences (or the ACE score), child welfare status, and youth recidivism. In the first set of analyses, we explore the effect of child welfare involvement on recidivism for both the full and race-ethnicity/sex specific subsamples of previously adjudicated youth, where recidivism reflects a binary measure making logistic regression the primary regression technique of choice. As discussed above, within each of the models we also control for a wide array of known risk factors including the prevalence of adverse childhood experience exposures.

The second half of our analysis explores both the direct and indirect effects of ACEs on juvenile recidivism using a structural equation modeling framework, which allows for the total effect of adverse childhood experience exposures on recidivism to be decomposed into the direct effect and indirect effect (Alwin and Hauser 1975). For example, the effect of adverse childhood experiences on juvenile recidivism was hypothesized to have two distinct parts: a direct effect (ACEs → recidivism) and an indirect effect through welfare dependency status (ACEs → dependency



placement → recidivism). For the latter part of the analysis, Mplus Version 7.31 was utilized (Muthen and Muthén 1998).

## Results

### Descriptive Statistics

Table 1 presents descriptive statistics for the delinquent-only, dually-involved, and dually-adjudicated youth. Of the full sample of 12,955 youth, only 930 (7 %) have been involved in the child welfare system within the 5 years prior to release. To better distinguish the characteristics of the dually-involved cases we compare the characteristics of the three groups: delinquent-only (N = 12,025), dually-involved (N = 323) and dually-adjudicated (N = 607). Just over 85 % of the youth in the full sample were male, 54 % black and nearly 11 % Hispanic. Of the dually-involved youth, nearly 77 % were male, 44 % Black and 12 % Hispanic. Finally, just over 69 % of the dually-adjudicated youth were male, 50 % of who were Black and only 6 % Hispanic, which is approximately half as many Hispanics as the delinquent-only and dually-involved subgroups.

Table 1 also highlights that on average, youth who were involved with child welfare, either in the past or at some point overlapping with their delinquency system involvement, reported a greater number of ACEs than delinquent-only youth (an average of 3.23 for delinquent-only,

compared to 4.66 and 4.80 for concurrently and prior child welfare-involved, respectively). Dually-involved and dually-adjudicated youth also committed a slightly larger number of prior misdemeanors, although a slightly lower number of felonies. Further, youth involved in the child welfare system, on average, had significantly higher scores on the difficult temperament index as well as slightly higher measures of school conduct problems. With respect to the outcome of interest (recidivism), while delinquent-only and dually-adjudicated youth reoffended at nearly the same rate, descriptive results suggest dually-involved youth were more likely to reoffend during the year follow-up period (68.1 vs. 59.7 % and 59.8 %, for delinquent-only and dually-adjudicated youth, respectively).

### Multivariate Results Predicting Re-offending

Table 2 presents the multivariate logistic regression analysis results with child welfare placement and the ACE score predicting juvenile recidivism (rearrest) for the full analysis sample as well as sex specific samples separately. For each sample of youth a total of five models are presented. The first model in each series examines the independent effect of dual-involvement and dual-adjudication without controlling for any of the demographic or personal-risk factors. Models 2–5 build incrementally, ending with a fully-specified model which includes all the individual characteristics considered. As well, bivariate correlations were assessed in order to identify any issues with collinearity. As no correlations were greater than  $r = .30$ ,

**Table 1** Descriptive statistics for delinquent crossover youth

	Delinquent only		Dually involved		Dually adjudicated	
	Mean	SD	Mean	SD	Mean	SD
Recidivism	.597	.491	.681	.467	.598	.491
ACEs	3.232	1.813	4.659	1.827	4.799	1.938
Male	.874	.332	.765	.425	.692	.462
Black	.545	.498	.443	.497	.501	.500
Hispanic	.112	.315	.121	.326	.058	.233
Age at release	17.203	1.289	17.070	1.345	17.248	1.003
Age at first offense	2.001	.990	1.833	.876	1.740	.837
Prior detention placements	2.881	1.099	3.043	1.056	3.196	1.043
Prior residential placements	1.373	.602	1.412	.621	1.394	.598
Prior misdemeanors	2.148	1.067	2.254	1.077	2.486	1.094
Prior felonies	2.771	1.022	2.613	1.025	2.692	1.062
Substance abuse	1.361	.678	1.341	.693	1.249	.705
School conduct	.036	.186	.046	.211	.048	.213
School importance	1.655	.539	1.621	.548	1.670	.515
Difficult temperament	-.012	.689	.156	.690	.162	.692
Impulsivity	.481	.842	.455	.812	.374	.760
N	12,025		323		607	

**Table 2** Multivariate logistic regression results for analysis of crossover youth, full and gender specific samples

	Full sample					Male youth					Female youth				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Dually involved	1.442** (.174)	1.690*** (.212)	1.594*** (.200)	1.587*** (.204)	1.589*** (.204)	1.470** (.208)	1.565** (.226)	1.464** (.212)	1.503** (.224)	1.497** (.223)	2.041** (.488)	2.095** (.511)	2.042** (.502)	1.902* (.476)
Dually adjudicated	1.005 (.085)	1.246* (.110)	1.171 (.105)	1.077 (.099)	1.091 (.101)	1.236* (.131)	1.324** (.143)	1.230 (.134)	1.124 (.126)	1.141 (.128)	1.074 (.168)	1.133 (.180)	1.106 (.178)	1.003 (.167)	1.006 (.168)
Male	-	2.373*** (.127)	2.512*** (.138)	2.307*** (.133)	2.297*** (.133)	-	-	-	-	-	-	-	-	-	-
Black	-	1.838*** (.073)	1.904*** (.077)	1.710*** (.073)	1.695*** (.073)	-	1.983*** (.086)	2.063*** (.091)	1.850*** (.086)	1.834*** (.086)	-	1.190 (.121)	1.209 (.126)	1.050 (.120)	1.040 (.119)
Hispanic	-	1.338*** (.084)	1.384*** (.088)	1.282*** (.083)	1.276*** (.083)	-	1.400*** (.093)	1.457*** (.097)	1.347*** (.093)	1.341*** (.093)	-	1.023 (.207)	1.033 (.209)	.964 (.199)	.947 (.196)
Age at release	-	.810*** (.012)	.817*** (.012)	.771*** (.014)	.775*** (.014)	-	.823*** (.013)	.830*** (.013)	.784*** (.015)	.788*** (.015)	-	.733*** (.029)	.734*** (.029)	.698*** (.034)	.700*** (.034)
ACEs	-	-	1.050*** (.011)	1.021 (.011)	.997 (.012)	-	-	1.056*** (.012)	1.026* (.013)	1.001 (.013)	-	-	1.022 (.027)	1.002 (.028)	.984 (.028)
Age at first offense	-	-	-	.993 (.023)	.990 (.023)	-	-	-	.992 (.025)	.989 (.025)	-	-	-	.994 (.070)	.984 (.069)
Prior detention placements	-	-	-	1.203*** (.023)	1.194*** (.023)	-	1.197*** (.025)	-	1.197*** (.025)	1.188*** (.025)	-	-	-	1.216*** (.061)	1.206*** (.061)
Prior residential placements	-	-	-	1.151*** (.041)	1.176*** (.043)	-	-	-	1.158*** (.045)	1.179*** (.046)	-	-	-	1.111 (.108)	1.161 (.115)
Prior misdemeanors	-	-	-	1.250*** (.025)	1.240*** (.025)	-	-	-	1.260*** (.028)	1.250*** (.028)	-	-	-	1.202*** (.065)	1.194** (.065)
Prior felonies	-	-	-	1.211*** (.026)	1.217*** (.026)	-	-	-	1.207*** (.028)	1.213*** (.028)	-	-	-	1.248*** (.070)	1.253*** (.071)
Substance abuse	-	-	-	1.244*** (.036)	1.227*** (.036)	-	-	-	1.265*** (.040)	1.248*** (.040)	-	-	-	1.068 (.079)	1.061 (.079)
School conduct	-	-	-	1.388** (.150)	1.300* (.142)	-	-	-	1.396** (.167)	1.315* (.159)	-	-	-	1.498 (.388)	1.345 (.357)
School importance	-	-	-	-	.919* (.033)	-	-	-	-	.928 (.036)	-	-	-	-	.858 (.090)
Difficult temperament	-	-	-	-	1.199*** (.037)	-	-	-	-	1.194*** (.040)	-	-	-	-	1.219** (.091)
Impulsivity	-	-	-	-	1.037 (.024)	-	-	-	-	1.031 (.025)	-	-	-	-	1.087 (.082)
Constant	1.481*** (.028)	18.359*** (4.760)	12.773*** (3.464)	5.771*** (1.644)	6.826*** (2.048)	1.653*** (.033)	32.092*** (8.971)	22.681*** (6.560)	9.200*** (2.806)	10.703*** (3.431)	.711*** (.037)	129.608*** (88.971)	11.1907*** (79.335)	57.023*** (42.321)	72.046*** (56.126)
N	12,955					11,174					1781				

Odds Ratios reported with standard errors in parentheses

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

collinearity does not appear to be an issue in the current analysis.

Looking at the first set of models, for the full sample, results of the logistic regression models suggest that dually-involved youth are around 1.5 times more likely to recidivate than delinquent-only youth. Additionally, dually-adjudicated youth are no more (or less) likely to be rearrested than delinquent-only youth in 4 of the 5 full sample models. Similarly, the odds ratios  $>1.0$  indicate that Male youth, Black youth, and Hispanic youth were more likely to reoffend during the follow up period. Those youth who completed the residential programs at an older age were less likely to be rearrested. Interestingly, adverse childhood experience exposures were a significant predictor of recidivism only in Model 3, but once criminal history and individual risk factors were controlled for, the effect became insignificant. In addition to the focal variables, many of the criminal history and personal risk factors were significantly related to reoffending in the full sample. Youth with a larger number of prior detention and/or residential stays, those who previously committed more felony or misdemeanor acts, those reporting substance abuse or school conduct problems and youth with difficult temperaments were all more likely to reoffend during the follow-up period. Finally, youth who reported that school was more important were less likely to recidivate.

Looking at the male and female subsamples, we see that dually-involved youth are again more likely to recidivate than their delinquent-only counterparts. This is true across sex. Dual adjudication is nonsignificant in all but two male models, where it becomes nonsignificant with the inclusion of adverse childhood experiences, criminal history, and individual factors. Age at release has consistent results across all of the models presented, while the differences across race only exist among the full sample and male youth. Similarly, while criminal history, substance abuse and school conduct problems are significant predictors of continued delinquent behavior for males, their effects are insignificant for females. Difficult temperament, however, continues to have a significant effect in both subgroup analyses. Overall, the results presented in Table 2 are consistent with past research and suggest that dually-involved youth are more likely to be rearrested post-release. Interestingly, dually-adjudicated youth are not significantly more likely than their delinquent-only counterparts to be rearrested upon completion of juvenile justice residential programs.

Tables 3 through 5 assess the impact of child welfare placement/involvement on race/ethnic- and sex-specific subsamples. For White youth, dual-involvement and dual-adjudication is significantly associated with a higher likelihood of recidivism, the latter only having a significant effect for males. For Black youth, however, being

involved with the child welfare system is not associated with a higher probability of reoffending, and though nonsignificant, dual-adjudication is associated with a reduced likelihood of rearrest. Finally, a completely different picture emerges for Hispanic youth. For the full sample of Hispanic youth ( $N = 1417$ ), dually-involved youth are not significantly more likely to recidivate, while dually-adjudicated youth are nearly three times as likely to reoffend (Model 5, Table 5). Looking at the sex-specific samples, Hispanic females who were dually-involved or dually-adjudicated were much more likely to reoffend than their delinquent-only counterparts (OR 9.9 and 11.4, respectively).

The results presented in Tables 3, 4 and 5 also suggest that adverse childhood experience exposures do not have a significant effect on juvenile recidivism, net of the commonly considered risk factors. These results run somewhat counter to previous research on childhood maltreatment and delinquent behavior (Bender 2010; see also Onifade et al. 2014; Smith and Thornberry 1995). Our second set of analyses explore this further, using structural equation modeling to assess both the direct and indirect effect of adverse childhood experience exposures on recidivism in this sample of high-risk juvenile offenders completing juvenile residential commitment placement in Florida.

Table 6 displays the results of the structural equation modeling analysis. The purpose of this second set of models is to explore the pathways by which adverse childhood experience exposures may impact juvenile recidivism, including their impact on the likelihood of child welfare placement. Table 6 includes three models as well as three separate panels. The results presented in Panel A explore the impact of adverse childhood experience exposures on placement within the child welfare system by the Department of Children and Families. Panel B mirrors the results presented earlier, exploring the effect of welfare placement and adverse childhood experience exposures on recidivism while controlling for multiple individual-level risk factors. In this portion of the analysis, dually-involved and dually-adjudicated youth were combined into a single group representing youth with any child welfare involvement history (either concurrent or previous). Panel C displays the direct and indirect effects of adverse childhood experience exposures through child welfare placement with the Department of Children and Families. Model 1 includes only the effect of adverse childhood experience exposures on welfare placement in Panel A and excludes the effect of welfare placement on recidivism in Panel B. Model 2 is “identified”, meaning every path in both portions of the model is specified. To facilitate the computation of model fit statistics, only those paths that were significant are included in Model 3, which displays the effect of adverse childhood experience exposures on childhood placement

**Table 3** Multivariate logistic regression results for analysis of white crossover youth, full and gender specific samples

	Full white sample					White male youth					White female youth				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Dually involved	2.017*** (.366)	2.132*** (.392)	1.990*** (.368)	1.993*** (.378)	1.999*** (.379)	2.135*** (.458)	2.149*** (.463)	1.979*** (.428)	2.063*** (.461)	2.050*** (.457)	2.150*** (.754)	2.033*** (.722)	2.213*** (.802)	2.074*** (.767)	2.144*** (.802)
Dually adjudicated	1.426** (.182)	1.579*** (.206)	1.461** (.193)	1.303 (.178)	1.321* (.181)	1.717*** (.272)	1.735*** (.276)	1.558*** (.252)	1.427* (.238)	1.455* (.244)	1.304 (.303)	1.282 (.300)	1.374 (.331)	1.150 (.289)	1.116 (.283)
Male	-	1.825*** (.149)	1.944*** (.163)	1.886*** (.167)	1.872*** (.167)	-	-	-	-	-	-	-	-	-	-
Age at release	-	.844*** (.021)	.852*** (.021)	.807*** (.024)	.811*** (.024)	-	.852*** (.023)	.865*** (.023)	.819*** (.027)	.822*** (.027)	-	.802*** (.048)	.798*** (.048)	.762*** (.056)	.770*** (.058)
ACEs	-	-	1.057*** (.017)	1.027 (.017)	1.001 (.018)	-	-	1.079*** (.019)	1.045* (.019)	1.021 (.020)	-	-	.951 (.039)	.935 (.039)	.912* (.040)
Age at first offense	-	-	-	.960 (.036)	.949 (.036)	-	-	-	.946 (.038)	.938 (.038)	-	-	-	1.010 (.101)	.978 (.099)
Prior detention placements	-	-	-	1.227*** (.039)	1.222*** (.039)	-	1.227*** (.039)	-	1.227*** (.042)	1.222*** (.042)	-	-	-	1.200* (.094)	1.196* (.094)
Prior residential placements	-	-	-	1.164* (.070)	1.200** (.073)	-	-	-	1.138* (.074)	1.166* (.077)	-	-	-	1.296 (.210)	1.393* (.230)
Prior misdemeanors	-	-	-	1.227*** (.042)	1.216*** (.042)	-	-	-	1.227*** (.046)	1.218*** (.046)	-	-	-	1.221* (.101)	1.208* (.101)
Prior felonies	-	-	-	1.147*** (.039)	1.151*** (.040)	-	-	-	1.130** (.042)	1.133*** (.043)	-	-	-	1.247* (.110)	1.245* (.111)
Substance abuse	-	-	-	1.265*** (.063)	1.243*** (.063)	-	-	-	1.364*** (.074)	1.343*** (.074)	-	-	-	.836 (.106)	.826 (.105)
School conduct	-	-	-	1.340 (.269)	1.243 (.252)	-	-	-	1.307 (.277)	1.236 (.265)	-	-	-	1.462 (.937)	1.206 (.786)
School importance	-	-	-	-	.959 (.052)	-	-	-	-	.980 (.057)	-	-	-	-	.849 (.125)
Difficult temperament	-	-	-	-	1.219*** (.060)	-	-	-	-	1.183*** (.065)	-	-	-	-	1.330* (.154)
Impulsivity	-	-	-	-	1.058 (.041)	-	-	-	-	1.041 (.043)	-	-	-	-	1.154 (.125)
Constant	.992 (.031)	11.142*** (4.735)	7.252*** (3.215)	3.552*** (1.663)	3.876** (1.928)	1.083* (.037)	17.157*** (7.926)	10.144*** (4.851)	4.812*** (2.446)	5.047*** (2.718)	.620*** (.050)	27.173*** (28.171)	37.179*** (39.772)	-	24.358*** (23.380)
N	4532				3751										781

Odds Ratios reported with standard errors in parentheses

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$



**Table 4** Multivariate logistic regression results for analysis of black crossover youth, full and gender specific samples

	Full black sample					Black male youth					Black female youth				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Dually involved	1.147 (.210)	1.270 (.242)	1.192 (.228)	1.174 (.229)	1.170 (.228)	1.216 (.262)	1.150 (.251)	1.078 (.236)	1.106 (.248)	1.098 (.247)	1.554 (.565)	1.777 (.664)	1.678 (.628)	1.479 (.564)	1.474 (.563)
Dually adjudicated	.720** (.086)	.904 (.113)	.844 (.107)	.794 (.104)	.799 (.105)	.934 (.140)	.934 (.141)	.874 (.134)	.803 (.127)	.807 (.128)	.771 (.172)	.895 (.204)	.824 (.190)	.790 (.189)	.797 (.191)
Male	-	2.923*** (.220)	3.124*** (.243)	2.853*** (.233)	2.867*** (.236)	-	-	-	-	-	-	-	-	-	-
Age at release	-	.777*** (.016)	.784*** (.016)	.740*** (.018)	.745*** (.018)	-	.795*** (.018)	.801*** (.018)	.754*** (.020)	.760*** (.020)	-	.674*** (.039)	.682*** (.039)	.667*** (.046)	.669*** (.046)
ACEs	-	-	1.059*** (.017)	1.025 (.017)	.999 (.017)	-	-	1.053** (.018)	1.019 (.019)	.990 (.019)	-	-	1.090* (.042)	1.061 (.043)	1.045 (.043)
Age at first offense	-	-	-	1.022 (.035)	1.025 (.035)	-	-	-	1.034 (.037)	1.036 (.037)	-	-	-	9.19 (.097)	9.20 (.098)
Prior detention placements	-	-	-	1.199*** (.033)	1.186*** (.033)	-	-	-	1.195*** (.036)	1.182*** (.035)	-	-	-	1.210** (.086)	1.195* (.085)
Prior residential placements	-	-	-	1.173** (.057)	1.198*** (.059)	-	-	-	1.199*** (.063)	1.222*** (.065)	-	-	-	1.009 (.135)	1.044 (.142)
Prior misdemeanors	-	-	-	1.300*** (.036)	1.288*** (.036)	-	-	-	1.320*** (.040)	1.307*** (.040)	-	-	-	1.180* (.090)	1.167* (.089)
Prior felonies	-	-	-	1.211*** (.036)	1.222*** (.037)	-	-	-	1.211*** (.040)	1.223*** (.040)	-	-	-	1.214* (.095)	1.224** (.096)
Substance abuse	-	-	-	1.207*** (.047)	1.192*** (.047)	-	-	-	1.203*** (.052)	1.186*** (.051)	-	-	-	1.195 (.117)	1.193 (.118)
School conduct	-	-	-	1.488** (.206)	1.371* (.193)	-	-	-	1.506** (.237)	1.399* (.223)	-	-	-	1.498 (.451)	1.318 (.411)
School importance	-	-	-	-	.890* (.048)	-	-	-	-	.904 (.052)	-	-	-	-	.808 (.134)
Difficult temperament	-	-	-	-	1.239*** (.054)	-	-	-	-	1.252*** (.060)	-	-	-	-	1.188 (.127)
Impulsivity	-	-	-	-	1.014 (.033)	-	-	-	-	1.011 (.034)	-	-	-	-	1.047 (.123)
Constant	1.961*** (.051)	58.808*** (21.174)	40.709*** (15.224)	15.137*** (5.983)	17.887*** (7.428)	2.220*** (.063)	116.694*** (45.318)	89.226*** (35.562)	29.508*** (12.473)	33.924*** (15.037)	.827*** (.061)	652.208*** (635.977)	376.434*** (378.438)	140.922*** (148.976)	196.326*** (216.621)
N	7006					6128					878				

Odds Ratios reported with standard errors in parentheses

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Table 5** Multivariate logistic regression results for analysis of hispanic crossover youth, full and gender Specific samples

	Full hispanic sample					Hispanic male youth					Hispanic female youth				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Dually involved	1.619 (.569)	1.843 (.665)	1.882 (.685)	2.052 (.763)	2.058 (.765)	1.330 (.521)	1.301 (.513)	1.329 (.529)	1.459 (.598)	1.470 (.603)	6.263* (5.179)	6.263* (5.229)	6.167* (5.175)	8.699* (8.175)	9.911* (9.628)
Dually adjudicated	2.878* (1.227)	3.359** (1.459)	3.413** (1.486)	3.027* (1.335)	3.062* (1.355)	2.438 (1.132)	2.475 (1.151)	2.521* (1.178)	2.336 (1.120)	2.379 (1.145)	10.737* (11.799)	11.512* (12.762)	11.508* (12.758)	10.037* (11.476)	11.354* (13.479)
Male	-	2.462*** (.487)	2.409*** (.490)	2.016*** (.427)	1.981** (.420)	-	-	-	-	-	-	-	-	-	-
Age at release	-	.851*** (.039)	.849*** (.039)	.813*** (.044)	.808*** (.044)	-	.856*** (.041)	.854** (.041)	.825*** (.047)	.819*** (.047)	-	.788 (.130)	.785 (.130)	.659* (.134)	.654* (.137)
ACEs	-	-	.985 (.032)	.979 (.034)	.974 (.036)	-	-	.987 (.034)	.981 (.035)	.974 (.038)	-	-	1.021 (.121)	.967 (.126)	.997 (.145)
Age at first offense	-	-	-	.945 (.067)	.946 (.067)	-	-	-	.920 (.067)	.921 (.068)	-	-	-	1.537 (.448)	1.518 (.457)
Prior detention placements	-	-	-	1.134* (.066)	1.132* (.066)	-	-	-	1.123 (.069)	1.120 (.069)	-	-	-	1.331 (.264)	1.334 (.267)
Prior residential placements	-	-	-	1.028 (.121)	1.018 (.122)	-	-	-	1.025 (.130)	1.013 (.130)	-	-	-	.859 (.308)	.881 (.329)
Prior misdemeanors	-	-	-	1.102 (.068)	1.101 (.068)	-	-	-	1.085 (.069)	1.081 (.070)	-	-	-	1.253 (.299)	1.221 (.303)
Prior felonies	-	-	-	1.392*** (.087)	1.387*** (.087)	-	-	-	1.382*** (.090)	1.375*** (.090)	-	-	-	1.678* (.418)	1.725* (.441)
Substance abuse	-	-	-	1.311** (.118)	1.308** (.118)	-	-	-	1.342** (.126)	1.339** (.126)	-	-	-	1.025 (.344)	1.069 (.366)
School conduct	-	-	-	1.060 (.400)	1.032 (.390)	-	-	-	.981 (.399)	.958 (.392)	-	-	-	1.235 (1.347)	1.859 (2.220)
School importance	-	-	-	.875 (.100)	.875 (.100)	-	-	-	-	.841 (.101)	-	-	-	-	1.624 (.760)
Difficult temperament	-	-	-	1.023 (.094)	1.023 (.094)	-	-	-	-	1.038 (.100)	-	-	-	-	.923 (.319)
Impulsivity	-	-	-	1.069 (.072)	1.069 (.072)	-	-	-	-	1.088 (.076)	-	-	-	-	.700 (.216)
Constant	1.390*** (.077)	9.940** (7.970)	11.087** (9.270)	4.628 (4.064)	6.710* (6.212)	1.504*** (.087)	22.400*** (18.672)	24.341*** (20.970)	8.070* (7.315)	12.776** (12.194)	.559** (.113)	32.099 (89.908)	30.763 (86.472)	32.579 (98.690)	14.314 (45.807)
N	1417					1295					122				

Odds Ratios reported with standard errors in parentheses

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Table 6** SEM models assessing effect of ACE and child welfare placement on recidivism

	Model 1		Model 2		Model 3	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Panel A: effect of ACE and other youth-level characteristics on DCF placement						
ACEs	.193	.010***	.193	.010***	.193	.010***
Male	-	-	-.283	.045***	-.282	.045***
Black	-	-	-.104	.039**	-.104	.039**
Hispanic	-	-	-.123	.066	-	-
Age at first offense	-	-	-.088	.022***	-.087	.022***
Prior detention placements	-	-	.072	.018***	.072	.018***
Prior residential placements	-	-	-.022	.032	-	-
Prior misdemeanors	-	-	.051	.018**	.051	.018**
Prior felonies	-	-	.003	.020	-	-
Substance abuse	-	-	-.141	.026***	-.141	.026***
School conduct	-	-	.101	.085	-	-
School importance	-	-	-.008	.034	-	-
Difficult temperament	-	-	-.045	.027	-	-
Impulsivity	-	-	.001	.023	-	-
Panel B: effect of DCF placement and ACE on juvenile recidivism						
DCF Placement	-	-	.047	.022*	.047	.022*
ACEs	.008	.007	-.001	.008	-.001	.008
Male	.503	.035***	.517	.035***	.521	.035***
Black	.312	.026***	.317	.026***	.317	.026***
Hispanic	.139	.039***	.145	.039***	.137	.039***
Age at first offense	-.101	.013***	-.097	.013***	-.095	.013***
Prior detention placements	.101	.012***	.097	.012***	.097	.012***
Prior residential placements	.043	.021*	.044	.021*	.045	.021*
Prior misdemeanors	.101	.012***	.099	.012***	.099	.012***
Prior felonies	.099	.013***	.099	.013***	.100	.013***
Substance abuse	.094	.018**	.101	.018***	.102	.018***
School conduct	.22	.063**	.216	.063**	.23	.063**
School importance	-.028	.021	-.028	0.021	-	-
Difficult temperament	.133	.018**	.135	.018**	.133	.018**
Impulsivity	.011	.014	.011	.014	-	-
Panel C: direct, indirect and total effect of ACE on juvenile recidivism						
Direct	-	-	-.001	.008	-.001	.008
Indirect	-	-	.009	.004*	.009	.004*
Total	-	-	.008	.007	.008	.007

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

while controlling for other significant predictors, while also examining the effect of all variables on recidivism. For the full model (Model 3) the fit statistics provided by MPlus suggest that this model represents a good fit to the data (RMSEA = .007; CI .000–.015; CFI = .997; TLI = .986).

As can be seen in Panel A, adverse childhood experience exposures are associated with a greater likelihood of childhood welfare placement (overlapping with delinquency involvement or prior to). This effect holds when all individual characteristics are included. Those youth who reported a greater number of adverse childhood experiences were significantly more likely to be involved in the child welfare system. Moving on to Panel B, similar to results presented above, child welfare system placement is associated with a significantly greater likelihood of recidivism. Finally, as shown in Panel C, while adverse childhood experience exposures do not have a significant direct effect on recidivism within this sample of previously adjudicated youth, the indirect effect of adverse childhood experience exposures through child welfare placement is statistically significant and in the expected, positive direction. This is a potentially important finding, one which will be considered at length in the discussion below.

Tables 7 and 8 include the results of the structural equation modeling analysis utilizing the sex- and race-specific subgroups, respectively. As seen in Table 7, the finding that a greater number of adverse childhood experience exposures increases the likelihood of child welfare involvement holds up across both male and female subgroups. Interestingly, however, child welfare placement only has a significant effect on recidivism for male youth. While the coefficient for females fails to obtain significance, it is again in the predicted, positive direction. The direct and indirect effects of adverse childhood experience exposures displayed in Panel C are also consistent with the results from the full sample. Adverse childhood experience exposures have a significant indirect effect on recidivism through their impact on the likelihood of child welfare placement for male youth. The effect for females, however, is not significant ( $p > .05$ ).

Looking at the race-specific structural equation modeling results, across all racial subgroups, adverse childhood experience exposures have a significant effect on the likelihood of child welfare placement for each of the three groups considered. The effect of child welfare placement on recidivism, however, varies from group to group. For White and Hispanic youth child welfare placement is associated with a significantly greater risk of recidivism, while for Black youth the effect is not statistically significant and is virtually indistinguishable from zero. Similarly, the indirect effects of adverse childhood experience exposures on recidivism through child welfare placement shown in Panel C are significant for Whites and Hispanics,

but again this effect is not significant for Black youth. These results closely resemble those shown in Tables 3, 4 and 5 where the effect of dual-involvement or dual-adjudication was seen to have a significant impact on recidivism among White and Hispanic youth, yet yielded insignificant effects for Black youth.

## Discussion

Youth and adolescents are oftentimes unfortunate victims of child maltreatment. Not surprisingly, researchers have carefully considered the potential adverse effects that maltreatment may have across life course domains, including delinquency. In this paper, we sought to build upon and extend the research in this area in several ways. Using a large sample of serious youthful offenders from the state of Florida, we assessed the inter-relationships between adverse childhood experiences (ACEs), child welfare involvement, and a large array of risk factors for their prediction of recidivism. In so doing, not only did we examine the potential direct and indirect effects of key predictors, but we also performed our analyses across race/ethnicity and gender, which has heretofore not been considered in such a manner. Finally, we also pay careful consideration to “crossover” youth, or young persons who are dually-involved and/or dually-adjudicated in the juvenile and child welfare systems, as some have argued maltreatment increases the risk of delinquency, and the way the system(s) treats maltreated youth exacerbates that risk (Onifade et al. 2014).

We hypothesized that both dually-involved and dually-adjudicated youth would be at increased risk for subsequent re-offending, and that this effect would hold across sex and race/ethnicity subgroups. This proved far more nuanced than expected as comprehensive models show dually-involved youth more likely to re-offend across most subgroups, but not Black or Hispanic males, or Black females. Additionally, only Hispanic female and White male dually-adjudicated youth were more likely to recidivate than delinquent-only White youth. Crossover status (dual-involvement or dual-adjudication) was essentially irrelevant with respect to the recidivism of Black youth completing juvenile justice residential programs. Finding dual-involvement more criminogenic than dual-adjudication runs counter to the one prior study examining child welfare timing finding that youth with open substantiated neglect cases (dually-adjudicated youth) were at greatest risk of recidivism, compared to delinquent-only and dually-involved youth in Washington State (Ryan et al. 2013). However, that analysis examined only neglect cases, so perhaps physical/sexual abuse cases would yield effects similar to those of the current study.



**Table 7** SEM models assessing effect of ACE and child welfare placement on recidivism, gender-specific samples

	Male youth						Female youth					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Panel A: effect of ACE and other youth-level characteristics on DCF placement												
ACEs	.196	.012***	.196	.012***	.196	.012***	.181	.022***	.181	.022***	.180	.022***
Black	-	-	-.125	.044**	-.125	.044**	-	-	-.025	.089	-.028	.089
Hispanic	-	-	-.144	.073*	-	-	-	-	-.048	.165	-	-
Age at first offense	-	-	-.070	.025**	-.071	.025**	-	-	-.154	.050**	-.147	.049**
Prior detention placements	-	-	.067	.021**	.067	.021**	-	-	.092	.038**	.092	.038**
Prior residential placements	-	-	-.016	0.035	-	0.035	-	-	-.055	.076	-	-
Prior misdemeanors	-	-	.046	.020*	.046	.020*	-	-	.070	0.04	.072	.039
Prior felonies	-	-	.005	0.022	-	0.022	-	-	.001	.044	-	-
Substance abuse	-	-	-.142	.030***	-.143	.030***	-	-	-.119	.054**	-	-
School conduct	-	-	.083	0.097	-	0.097	-	-	.135	.178	-	-
School importance	-	-	.013	0.038	-	0.038	-	-	-.104	.081	-	-
Difficult temperament	-	-	-.035	0.031	-	0.031	-	-	-.077	.059	-	-
Impulsivity	-	-	-.006	0.025	-	0.025	-	-	.042	.058	-	-
Panel B: effect of DCF placement and ACE on juvenile recidivism												
DCF	-	-	.051	.026*	.051	.026*	-	-	.037	.046	.039	.046
ACEs	.010	.008	.0000	.009	.0001	.009	.002	.017	-.005	.019	-.006	.019
Black	.359	.028***	.366	.028***	.365	.028***	.028	.069	.029	.069	.026	.069
Hispanic	.167	.042***	.174	.042***	.165	.042***	-.007	.124**	-.005	.123	-.011	.124
Age at first offense	-.094	.014***	-.090	.014***	-.089	.014***	-.160	.037**	-.154	.038**	-.149	.037**
Prior detention placements	.098	.013***	.095	.013***	.095	.013***	.106	.030	.102	.031**	.102	.031**
Prior residential placements	.047	.023*	.048	.023*	.049	.023*	.015	.059	.017	.059	.017	.059
Prior misdemeanors	.109	.013***	.107	.013***	.107	.013***	.050	.032	.048	.032	.049	.032
Prior felonies	.099	.014***	.099	.014***	.100	.014***	.098	.033**	.098	.033**	.100	.033**
Substance abuse	.105	.019***	.112	.020***	.113	.020***	.006	.044	.010	.045	.011	.045
School conduct	.223	.069**	.219	.070**	.230	.069**	.255	.154	.251	.155	.287	.152
School importance	-.022	.023	-.023	.023	-	.023	-.077	.062	-.073	.062	-	-
Difficult temperament	.129	.020**	.131	.020**	.130	.020**	.145	.046**	.148	.046**	.147	.046**
Impulsivity	.008	.015	.008	.015	-	.015	.032	.046	.030	.046	-	-
Panel C: direct, indirect and total effect of ACE on juvenile recidivism												
Direct	-	-	.0001	0.034	.0001	0.034	-	-	-.005	.019	-.006	.019
Indirect	-	-	.010	.005*	.010	.005*	-	-	.007	.008	.007	.008
Total	-	-	.010	.008	.010	.008	-	-	.002	.017	.001	.017

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Table 8** SEM models assessing effect of ACE and child welfare placement on recidivism, race-specific samples

	White youth						Black youth						Hispanic youth					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Panel A: effect of ACE and other youth-level characteristics on DCF placement																		
ACEs	.202	.016***	.202	.016***	.202	.016***	.180	.015***	.180	.015***	.180	.015***	.221	.037***	.221	.037***	.22	.037***
Male	-	-	-.269	.074***	-2.59	.074***	-	-	-.307	.063***	-3.11	.063***	-	-	-.355	.178*	-.356	.176*
Age at first offense	-	-	-.098	.034**	-.092	.033**	-	-	-.087	.034**	-.089	.033**	-	-	-.035	0.07	-.036	.069
Prior detention placements	-	-	.071	.029*	.069	.029*	-	-	.072	.026**	.072	.026**	-	-	.115	0.067	.116	.066
Prior residential placements	-	-	-.013	0.054	-	-	-	-	-.025	.042	-	-	-	-	-.076	0.159	-	-
Prior misdemeanors	-	-	.08	.029**	.079	.029**	-	-	.031	.025	.032	.025	-	-	.063	0.067	.065	.066
Prior felonies	-	-	.066	.031*	-	-	-	-	-.056	.028**	-	-	-	-	.059	0.071	-	-
Substance abuse	-	-	-.211	.043***	-.204	.043***	-	-	-.086	.036*	-.089	.036*	-	-	-.209	.107**	-.021	.104*
School conduct	-	-	-.156	.179	-	-	-	-	.167	0.102	-	-	-	-	.216	0.367	-	-
School importance	-	-	-.014	.051	-	-	-	-	-.004	0.05	-	-	-	-	-.014	0.12	-	-
Difficult temperament	-	-	-.069	.043	-	-	-	-	-.016	0.038	-	-	-	-	-.087	0.106	-	-
Impulsivity	-	-	.053	.036	-	-	-	-	-.029	0.033	-	-	-	-	-.054	0.083	-	-
Panel B: effect of DCF placement and ACE on juvenile recidivism																		
DCF Placement	-	-	.132	.035***	.133	.035***	-	-	-.050	.032	-.050	.032	-	-	.212	.069**	.209	.069**
ACEs	.013	0.011	-.014	.013	-.014	.013	.007	0.01	.016	.012	.016	.012	0	.022	-.047	.027	-.045	.027
Male	.380	.053**	.416	.055***	.418	.054***	.642	.049***	.626	.050***	.630	.050***	.375	.128***	.450	.129***	.458	.129***
Age at first offense	-.109	.02**	-.096	.021***	-.095	.021***	-.095	.019***	-.099	.019***	-.099	.019***	-.111	.039**	-.103	.041*	-.101	.04**
Prior detention placements	.119	.019**	.110	.020***	.109	.02***	.093	.017***	.096	.017***	.096	.017***	.073	.036*	.049	.038	.050	.038
Prior residential placements	.075	.037*	.077	.038*	.076	.037*	.038	.028	.037	.028	.040	.028	-.035	.072	-.019	.078	-.027	.072
Prior misdemeanors	.092	.021**	.082	.021***	.081	.021***	.120	.016***	.121	.016***	.122	.016***	.040	.037	.027	.039	.028	.039
Prior felonies	.069	.021**	.060	.021***	.071	.021***	.101	.018***	.099	.018***	.101	.018***	.180	.038***	.167	.040***	.182	.038***
Substance abuse	.105	.031**	.132	.032***	.134	.032***	.074	.023***	.069	.024**	.069	.024**	.138	.055	.183	.060**	.183	.059**
School conduct	.173	0.118	.195	.118	.171	.117	.256	.08**	.265	.08**	.275	.079**	.069	.222	.025	.214	.083	.221
School importance	.0001	0.032	.001	.032	-	-	-.050	.032	-.005	.032	-	-	-.067	.068	-.064	.069	-	-
Difficult temperament	.141	.03**	.150	.030***	.140	.030***	.153	.026***	.152	.026***	.157	.026***	.022	.056	.040	.059	.022	.056
Impulsivity	.024	0.023	.017	.024	-	-	-.001	0.02	-.003	0.02	-	-	.028	.041	.039	.043	-	-
Panel C: direct, indirect and total effect of ACE on juvenile recidivism																		
Direct	-	-	-.014	.013	-.014	.013	-	-	.016	.012	.016	.012	-	-	-.047	.027	-.045	.027
Indirect	-	-	.027	.007***	.027	.007***	-	-	-.009	.006	-.009	.006	-	-	.047	.017**	.046	.017**
Total	-	-	.013	.011	.013	.011	-	-	.007	.010	.007	.010	-	-	.000	.022	.001	.022

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

The third and fourth hypotheses posited that the ACE score would have both a direct and indirect effect on recidivism with youth having higher scores more likely to re-offend, regardless of sex or race/ethnicity. The direct impact of adverse childhood experience exposures on recidivism was never evidenced for any subgroup of youth. This finding may point to the difference between traumatic experiences and maltreatment reaching the severity for official involvement and corresponds to prior work finding substantiated maltreatment cases having higher risk of arrest than unsubstantiated reports (Chiu et al. 2011), though certainly additional research is warranted before that debate can be settled. With respect to the indirect effect of adverse childhood experience exposures through child welfare involvement, our findings suggest a significant effect exists for the full sample, males, White youth, and Hispanic youth. Black youth and females did not evidence any significant (direct or indirect) effect of adverse childhood experience exposures on recidivism. This finding is noteworthy in light of arguments that traumatic histories may be more relevant for female offending and those arguing for gender-specific services in light of the potentially unique pathways that females have to offending (see Covington 2003; Daly 1992; Holtfreter and Morash 2003; Reisig et al. 2006). Additionally, our findings indicate neither child welfare involvement nor adverse childhood experience exposures were related to recidivism for Black youth completing residential placements. While most prior work on the maltreatment-delinquency link has examined risk for initial delinquency, a growing body of research has examined recidivism of already delinquent youth (cf. Barrett et al. 2014b; Herz et al. 2010). However, as noted above no prior work has examined juvenile offenders completing residential commitment programs exclusively. As very little prior work has examined desistance of youth in the “deep-end” of the juvenile justice system (Lussier et al. 2015; Mulvey et al. 2004), future research should attempt to replicate our findings of differential effects across race/ethnicity and over longer follow-up periods.

The failure to detect a (direct or indirect) effect of increased adverse childhood experience exposures on recidivism for female youth is consistent with the prior research reviewed above, though in contrast to our hypotheses. Specifically, sex differences have been found in emotional and behavioral responses to abuse, with males more often displaying externalizing reactions such as aggression, violence, and conduct problems, but females internalizing and exhibiting symptoms/responses such as depression, suicidal/self-mutilation behaviors/thoughts, and eating disorders (Leadbeater et al. 1999). Perhaps females suffering adverse exposures internalize such experiences, while male exhibit more overt acting out/

delinquency. Maltreatment has been linked to violent behavior and delinquency for males only, as discussed above, (Chen et al. 2011; Mass et al. 2008; Chiu et al. 2011), though others have found significantly more maltreated females committing violent offenses as both juveniles and adults than non-maltreated females, or no violent offending differences across sex (Herrera and McCloskey 2001; Teague et al. 2008; Widom and Maxfield 2001). Future work should attempt to distinguish the effects of maltreatment across offending categorizations such as drug, property, and violent offending to better untangle potential sex differences. Still, it should be remembered that prominent developmental theories of offending, such as Moffitt’s (1993) developmental taxonomy which informs the current study, postulate that neuropsychological deficits must interact with adverse environments for life-course persistent offending to materialize. Moffitt’s work has found that males indeed do have a higher prevalence of such deficits, which would lead to females not necessarily evidencing increased recidivism likelihood in the presence of only adverse environments.

The lack of significance of maltreatment (exposures or child welfare involvement) for Black youth may be a result of differential effectiveness of rehabilitation services across race/ethnicity. Perhaps the services provided within residential programs were more effective for White and Hispanic youth, but only for those White and Hispanic youth without significant trauma histories. Future work should attempt to disentangle the effects of childhood traumatic exposure, as well as child welfare system involvement, while considering the types of services received within residential programs, as well as the dosage and fidelity of those services. Additionally, and echoing critiques of the ACE score by others (Finkelhor et al. 2012), our measure of adverse childhood experience exposures does not account for frequency or severity of each exposure, or additional exposures (such as witnessing violence in the community), that may be more prevalent for Black youth and which may strengthen the relationship of childhood traumatic experiences to re-offending for those youth.

Additionally, future work should examine the effects of timing of maltreatment on recidivism of juvenile justice-involved youth with complete child welfare involvement information. Data in the current study allowed for examination of youth with child welfare involvement within the last 5 years in the current study. This limitation may be responsible for there being only 323 youth that had closed child welfare cases (dually-involved) in the current study. While this allowed for testing the effects of proximate versus current child welfare involvement, and during adolescence, it prohibited testing of child welfare involvement across all of childhood and adolescence.

Future work would be well served to examine differences in delinquent outcomes for child welfare involvement across specific age ranges, beginning as early in life as possible. Additionally, more complete data would allow for examining cases in which child welfare services may have been provided, or youth removed from households, where investigations determined such removals were unfounded/unjustified.

### Policy Implications

Youth involved in the child welfare system have found to be at increased risk for involvement in delinquency, as demonstrated in the current study's addition to a growing body of work indicating the same. This alone demonstrates the need for the child welfare, juvenile justice and related systems of care, such as education and behavioral health, to work in a more collaborative manner. This study and others like it also call into question the manner in which the child welfare and juvenile justice systems work to mitigate the possibility that youth that have had adverse childhood experience exposures and exposure to one or the other system have their needs met as fully as possible. This highlights the need for special attention to stable and supportive education experiences, positive peer groups, substance use and mental health treatment, and most significantly family-centered therapeutic interventions (cf. Piquero et al. 2009). It also calls for the appropriate sharing of information across child welfare and juvenile justice systems, as these youth are clearly a unique group of adolescents and subset of offenders that requires enhanced case management (Onifade et al. 2014). The court, child welfare workers, and juvenile justice staff must be cognizant of the involvement (both prior and current) with each system, which necessitates protocols for (1) identifying these youth as early as possible upon entry to either system, and (2) sharing of information between system representatives in a standardized and consistent manner that supports aligned case assessment, planning and management.

Prior work (Halemba and Lord 2005) has indicated the importance of this alignment and suggested the use of a court liaison position as a point person to obtain system involvement information, make informed decisions regarding dual-system youth placed in juvenile detention centers, order and assist investigations of abuse/neglect, and improve communication between child welfare case-workers and juvenile justice probation/supervision staff. Best practices dictate a process to immediately identify any dual-jurisdiction case that enters either system (Conger and Ross 2001; Siegel and Lord 2004), followed by comprehensive assessment of the youth and the family's needs as well as a safety assessment of every youth in the household

for potential further maltreatment. Additional best practices include dual-jurisdiction court systems (Herz et al. 2006) with one judge/one family calendaring and/or dedicated dockets for dual-jurisdiction youth, joint supervision, specialized case manager and juvenile probation officer units for crossover youth, joint case plans (Wiig et al. 2003), specialized training to alert staff to the impact of abuse/neglect and adverse childhood experience exposures (Wiig and Tuell 2004), and "braided" discretionary funding, de-categorized to use for any of the wide array of services as indicated for dually-involved or adjudicated youth (Bender 2010).

Much of this early work culminated in the development of the Crossover Youth Practice Model by the Center for Juvenile Justice Reform at Georgetown University's McCourt School of Public Policy, which brings together all of these individual practices and others, and places them into an overarching set of policies and practices that help to create greater coherence and cohesiveness in how cases involving dually-involved or dually-adjudicated youth are handled by the child welfare and juvenile justice systems, both individually and collectively (Stewart et al. 2010). This study affirms the need for this type of "codified" set of policies and practices that can be fine-tuned when applied to an individual jurisdiction with its idiosyncratic state laws, court procedures and local practices.

This study also focuses on the initial child welfare experiences of dually-involved and dually-adjudicated youth and suggests that those experiences alone may have a significant impact on the youths' dual status. In this regard exposure to adverse childhood experiences may increase the probability that the youth will behave in a manner that results in their entry into the juvenile justice system, but it also appears that the child welfare system experience, i.e. type of placement, number of placement changes and school instability that results from child welfare case practice that fails to meet the well-being needs of the youth, may further exacerbate those probabilities.

### Implications for Youth Placed in Juvenile Justice Residential Programs

The current study goes further in that it examines the link between maltreatment and delinquency as it relates to the higher risk serious offender group of crossover youth in juvenile justice residential placement. This is a meaningful addition to the literature that has the potential to inform policymakers and practitioners across the juvenile justice and child welfare systems.

With respect to dually-involved and dually-adjudicated youth placed in residential juvenile justice facilities, the need for an enhanced system of collaboration may be even more intensified; yet whether this level of attention is

provided is in need of greater exploration and may not be the case in many jurisdictions. Indeed, while in recent years there has been more collaboration and aligned case assessment, planning and ongoing management between child welfare, juvenile justice and related systems for dual status cases being served at the community level, this study shines a light on the need for this level of collaboration to extend to cases in which dually-involved or dually-adjudicated youth have been committed for placement in a juvenile justice residential setting. There is a case to be made, supported by this study, that as long as there is a safety concern involving the youth's family the child welfare caseworker should maintain contact with the juvenile justice case manager and focus on both the progress the youth is making while in residential placement and when preparing for return to the community. In regard to the former case consideration, programming within facilities should include comprehensive trauma treatment, including identification of internal and external triggers and coping strategies. In regard to the latter case consideration, transition concerns of where the youth will return once released require communication between systems and active aligned case management around issues such as whether reunification with parents, placement with relatives, or foster care or group home placement is recommended. The finding in this study that dually-adjudicated youth appear to have lower recidivism rates—especially when compared to dually-involved youth—suggests that there may be some aligned case management that is benefiting the youth in placement; whereas in dually-involved cases the child welfare system is likely not engaged. While involvement in the juvenile justice system does not provide a basis to reopen a child welfare case, historical involvement may call for some level of communication concerning underlying issues that may still be serving as criminogenic factors. Without some level of coordinated case management, many of these youth may end up reoffending and/or aging out of one or both of these two systems without the support systems needed for a successful transition into adulthood. Permanency considerations, therefore, must also be an essential component of the case planning process, i.e., youth being discharged from care and supervision with meaningful connections to supportive adults that are expected to remain in place over time.

An overarching concern reflected in this study also focuses on the need to develop these approaches in a very targeted manner when it comes to race, ethnicity, and gender. The findings suggest great variation in how males and females within the population of Black, Hispanic and White youth are impacted by adverse childhood experience exposures and child welfare and juvenile justice system involvement. A jurisdiction wishing to improve their policies and practices around dually-involved and dually-

adjudicated youth will need to examine their current policies and practices across these domains and enhance their work on behalf of this population of youth accordingly—whether served in the community or in a deep-end juvenile justice residential setting.

In short, continued focus is needed on the mechanisms by which the maltreatment-delinquency effect acts, including better identification of the interrelationships between childhood traumatic experiences, system involvement, and anti-social behavior. Understanding these processes will serve to better inform the development, targeting, and implementation of prevention and intervention services, including programs and services provided in deep-end juvenile justice residential facilities, in order to deflect youth from detrimental outcomes, such as continued or escalated offending. Understanding that there is a maltreatment-delinquency link is far from understanding the nuanced relationships underlying that link and the efficacy of programmatic and policy efforts aimed at ameliorating its effects on youth and development during adolescence.

Further, jurisdictions that seek to act on this study's findings and the related policy and practice implications must commit to fundamentally changing the manner in which the child welfare, juvenile justice, education and behavioral health systems align their case practices in relation to dually-involved and dually-adjudicated youth. Creating and adopting written protocols, training staff in accordance with those protocols, and establishing performance measures and quality assurance indicators are essential if these practices are to be adopted and maintained with fidelity. Systems and the workers that comprise them will need this level of guidance and support if the needs of the youth identified in this study are to be appropriately addressed.

The late childhood/early adolescent period of the life course is both a transitory and potentially tumultuous time in which youth are exposed to a variety of positive and, unfortunately, negative experiences. Understanding the short- and long-term impacts of those experiences is especially important in developing both better theoretical models but also for informing prevention and intervention strategies that seek to undo the deleterious effects of childhood stressors. Continued work on this issue is important for preventing criminal careers that progress into adulthood, but more humanely for helping youth recover from their injurious upbringings, experiences, and interactions with ill-prepared justice and child welfare systems.

## Conclusion

Prominent developmental theories of antisocial behavior, such as Moffitt's developmental taxonomy (1993), often consider the impact of childhood conditions and the

youth's home environment on offending patterns. The current study examined both the direct impact of exposure to adverse childhood experiences on re-offending, and the indirect impact of such exposures through child welfare system involvement. Employing a large, diverse, sample of approximately 13,000 youth (13 % female, 55 % Black) who completed a juvenile justice residential program, the deepest-end juvenile justice system placement, in Florida, findings indicate increased exposure to traumatic childhood events increases the likelihood of re-offending indirectly through child welfare system involvement, and that child welfare involvement within the past 5 years, but not concurrent with delinquency system involvement, was most related to recidivism.

The current study builds on prior research by presenting only the second examination related to the timing of child welfare involvement (prior to, or concurrent with delinquency system involvement) and examining serious juvenile offenders returning to their communities from residential placement. Furthermore, we examined the repercussions of childhood trauma and system involvement across race/ethnicity and sex, which has previously been ill-explored. Policy implications include enhanced collaboration between child welfare and juvenile justice systems. The current study also contributes to the study of adolescence more globally. We see childhood traumatic events as relevant for increasing the likelihood of child welfare involvement, which in turn increases the likelihood that offenders placed in juvenile residential programs will re-offend upon return to their communities. This echoes prior work finding those with higher degrees of adverse childhood experience exposure at increased likelihood of having serious, chronic offending patterns throughout adolescence (Baglivio et al. 2015; Fox et al. 2015) and highlights the importance of prevention efforts to thwart maltreatment, and intervention efforts aimed at decreasing the effects of maltreatment on delinquency, substance abuse, and school failure.

Adolescents marred by the experiences of multiple traumatic childhood events are at increased likelihood of both entering the child welfare and the juvenile justice systems. Those youth unfortunate enough to experience exposure to abuse as well as both child welfare and delinquency system exposure are a distinct subset of youth most at-risk for negative outcomes in adolescence and young adulthood, and arguably the most likely to lack social and family support systems necessary to build resilience. Additionally, maltreatment occurring during critical adolescent developmental periods has been shown to disrupt neurological development and lead to neurobiological deficits (Painter and Scannapieco 2013), which have implications for adolescents' ability to self-regulate behavior and emotional responses, increasing delinquency,

interpersonal violence, drug and alcohol use, and suicidal or self-mutilating behaviors (Evans-Chase 2014). This impairment in self-regulation may further exacerbate harsh parenting practices (or supervision by teachers or correctional staff) out of frustration in dealing with affected youth who evidence impulsivity, hyperactivity, and cognitive deficits (Duke et al. 2010; Lynch and Cicchetti 1998). This countercyclical relationship has repercussions across family, school, and social institutional domains. It is our hope the study of adolescence enhances its focus on these most underprivileged youth.

**Author Contributions** MB conceived of the project and its design, drafted a majority of the manuscript, participated in the design of study methodology, and participated in cleaning the data and creating appropriate measures. KW drafted a significant portion of the manuscript, participated in the design of study methodology, and performed the vast majority of statistical analyses. AP drafted significant portions of the manuscript, participated in the design of study methodology, consulted on statistical analysis, and coordinated editing of manuscript drafting. SB provided significant drafting of the manuscript, guided policy implications from study results and provided key insight into measurement and results from findings. KJ conceived of the research project and its design, drafted sections of the manuscript, provided editorial support, and participated in cleaning the data. MG provided both assistance with drafting of the manuscript, editorial support, insight into the juvenile and child welfare systems, procured the data, obtained approval for use of the data, and provided input into appropriate analysis of the data. NE cleaned the data, combined data from both juvenile justice and child welfare systems, was integral in the design of the primary measures of the study, and provided editorial support. All authors read, edited, and approved the final manuscript.

**Conflicts of interest** The authors report no conflict of interests.

**Ethical Approval** Approval for this project was acquired from the Florida Department of Juvenile Justice Institutional Review Board.

## References

- Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, *30*, 47–88.
- Alwin, D. F., & Hauser, R. M. (1975). The decomposition of effects in path analysis. *American Sociological Review*, *40*, 37–47.
- Anda, R. F., Butchart, A., Felitti, V. J., & Brown, D. W. (2010). Building a framework for global surveillance of the public health implications of adverse childhood experiences. *American Journal of Preventive Medicine*, *39*, 93–98.
- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., & Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience*, *256*, 174–186.
- Baglivio, M. T. (2009). The assessment of risk to recidivate among a juvenile offending population. *Journal of Criminal Justice*, *37*, 596–607.
- Baglivio, M. T., & Epps, N. (2015). The interrelatedness of adverse childhood experiences among high-risk juvenile offenders. *Youth Violence and Juvenile Justice*. doi:10.1177/1541204014566286.



- Baglivio, M. T., Epps, N., Swartz, K., Huq, M. S., & Hardt, N. S. (2014a). The prevalence of adverse childhood experiences (ACE) in the lives of juvenile offenders. *Journal of Juvenile Justice*, 3, 1–23.
- Baglivio, M. T., Jackowski, K., Greenwald, M. A., & Howell, J. C. (2014b). Serious, violent, and chronic juvenile offenders. *Criminology & Public Policy*, 13, 83–116.
- Baglivio, M. T., Wolff, K. T., Epps, N., & Nelson, R. (2015a). Predicting adverse childhood experiences: The importance of neighborhood context in youth trauma among delinquent youth. *Crime and Delinquency*. doi:10.1177/0011128715570628.
- Baglivio, M. T., Wolff, K. T., Jackowski, K., & Greenwald, M. A. (2015b). A multilevel examination of risk/need change scores, community context, and successful reentry of committed juvenile offenders. *Youth Violence and Juvenile Justice*. doi:10.1177/1541204015596052.
- Baglivio, M. T., Wolff, K. T., Piquero, A. R., & Epps, N. (2015c). The relationship between adverse childhood experiences (ACE) and juvenile offending trajectories in a juvenile offender sample. *Journal of Criminal Justice*, 43, 229–241.
- Barrett, D. E., Katsiyannis, A., Zhang, D., & Zhang, D. (2014a). A structural equation modeling analysis of influences of juvenile delinquency. *Behavioral Disorders*, 39, 113–127.
- Barrett, D. E., Katsiyannis, A., Zhang, D., & Zhang, D. (2014b). Delinquency and recidivism: A multicohort, matched-control study of the role of early adverse experiences, mental health problems, and disabilities. *Journal of Emotional and Behavioral Disorders*, 22, 3–15.
- Bellis, M. A., Lowey, H., Leckenby, N., Hughes, K., & Harrison, D. (2014). Adverse childhood experiences: Retrospective study to determine their impact on adult health behaviors and health outcomes in a UK population. *Journal of Public Health*, 36, 81–91. doi:10.1093/pubmed/fdt038.
- Bender, K. (2010). Why do some maltreated youth become juvenile offenders? A call for further investigation and adaption of youth services. *Children and Youth Services Review*, 32, 466–473.
- Bremner, D. (2003). Long-term effects of childhood abuse on brain and neurobiology. *Child and Adolescent Psychiatric Clinics of North America*, 12, 271–292.
- Broidy, L. M., Stewart, A. L., Thompson, C. M., Chrzanowski, A., Allard, T., & Dennison, S. M. (2015). Life course offending pathways across gender and race/ethnicity. *Journal of Developmental and Life-Course Criminology*, 1, 118–149.
- Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., et al. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, 297, 851–854.
- Centers for Disease Control and Prevention. (d). Injury prevention and control: Adverse childhood experiences (ACE) study. Available online: <http://www.cdc.gov/violenceprevention/acesstudy/>. Accessed 20 Aug 2015.
- Chang, J., Chen, J., & Brownson, R. (2003). The role of repeat victimization in adolescent delinquent behaviors and recidivism. *Journal of Adolescent Health*, 32, 272–280.
- Chartier, M. J., Walker, J. R., & Naimark, B. (2010). Separate and cumulative effects of adverse childhood experiences in predicting adult health and health care utilization. *Child Abuse and Neglect*, 34, 454–464.
- Chen, W. Y., Propp, J., deLara, E., & Corvo, K. (2011). Child neglect and its association with subsequent juvenile drug and alcohol offense. *Child and Adolescent Social Work Journal*, 28, 273–290.
- Chiu, Y., Ryan, J. P., & Herz, D. C. (2011). Allegations of maltreatment and delinquency: Does risk of juvenile arrest vary substantiation status? *Children and Youth Services Review*, 33, 855–860.
- Cicchetti, D. (2013). Annual research review: Resilient functioning in maltreated children—Past, present, and future perspectives. *Journal of Child Psychology and Psychiatry*, 54, 402–422.
- Conger, D., & Ross, T. (2001). *Reducing the foster care bias in juvenile detention decisions: The impact of project confirm*. New York, NY: Vera Institute of Justice.
- Cottle, C. C., Lee, R. J., & Heilbrun, K. (2001). The prediction of criminal recidivism in juveniles: A meta-analysis. *Criminal Justice and Behavior*, 28, 367–394.
- Covington, S. S. (2003). A woman's journey home: Challenges for female offenders. In J. Travis & M. Waul (Eds.), *Prisoners once removed: The impact of incarceration and reentry on children, families, and communities* (pp. 67–103). Washington, DC: Urban Institute Press.
- Crooks, C. V., Scott, K. L., Wolfe, D. A., Chiodo, D., & Killip, S. (2007). Understanding the link between childhood maltreatment and violent delinquency: What do schools have to add? *Child Maltreatment*, 12, 269–280.
- Currie, J., & Tekin, E. (2006). *Does child abuse cause crime?* IZA discussion papers, No. 2063.
- Daly, K. (1992). Women's pathways to felony court: Feminist theories of lawbreaking and problem of representation. *Southern Review of Law and Women's Studies*, 2, 11–51.
- Danese, A., & McEwen, B. S. (2012). Adverse childhood experiences, allostasis, allostatic load, and age-related disease. *Physiology & Behavior*, 106, 29–39.
- Dannerbeck, A., & Yan, J. (2011). Missouri's crossover youth: Examining the relationship between maltreatment history and their risk of violence. *Journal of Juvenile Justice*, 1, 78–97.
- Dembo, R., Turner, G., Sue, C. C., Schmeidler, J., Borden, P., & Manning, D. (1995). Predictors of recidivism to a juvenile assessment center. *Substance Use and Misuse*, 30, 1425–1452.
- Dembo, R., William, L., Schmeidler, J., & Christensen, C. (1993). Recidivism in a cohort of juvenile detainees: A 3 1/2 year follow-up. *International Journal of Addiction*, 28, 631–658.
- Dong, M., Anda, R. F., Felitti, V. J., Dube, S. R., Williamson, D. F., Thompson, T. J., et al. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse and Neglect*, 28, 771–784.
- Drake, B., Jonson-Reid, M., Way, I., & Chung, S. (2003). Substantiation and recidivism. *Children Maltreatment*, 8, 248–260.
- Dube, S. R., Anda, R. F., Felitti, V. J., Croft, J. B., Edwards, V. J., & Giles, W. H. (2001). Growing up with parental alcohol abuse: Exposure to childhood abuse, neglect and household dysfunction. *Child Abuse & Neglect*, 25, 1627–1640.
- Dube, S. R., Felitti, V. J., Dong, M., et al. (2003). The impact of adverse childhood experiences on health problems: Evidence from four birth cohorts dating back to 1900. *Preventive Medicine*, 37, 268–277.
- Dube, S. R., Williamson, D. F., Thompson, T., Felitti, V. J., & Anda, R. F. (2004). Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse and Neglect*, 28, 729–737.
- Duke, N. N., Pettingell, S. L., McMorris, B. J., & Borowsky, I. W. (2010). Adolescent violence perpetration: Associations with multiple types of adverse childhood experiences. *Pediatrics*, 125, e778–e787.
- English, D. J., Widom, C. S., & Brandford, C. (2004). Another look at the effects of child abuse. *NIJ Journal*, 251, 23–24.
- Evans-Chase, M. (2014). Addressing trauma and psychosocial development in juvenile justice-involved youth: A synthesis of the developmental neuroscience, juvenile justice and trauma literature. *Laws*, 3, 744–758.
- Fagan, A. A. (2005). The relationship between adolescent physical abuse and criminal offending: Support for an enduring and generalized cycle of violence. *Journal of Family Violence*, 20, 279–290.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., et al. (1998). Relationship of childhood

- abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine*, *14*, 245–258.
- Finkelhor, D., Shattuck, A., Turner, H., & Hamby, S. (2012). Improving the adverse childhood experiences study scale. *JAMA Pediatrics*, *167*, 70–75.
- Fox, B. H., Perez, N., Cass, E., Baglivio, M. T., & Epps, N. (2015). Trauma changes everything: Examining the relationship between adverse childhood experiences and serious, violent and chronic juvenile offenders. *Child Abuse & Neglect*, *46*, 163–173.
- Freundlich, M., & Morris, L. (2004). *Youth involvement in the child welfare and juvenile justice systems: A case of double jeopardy?*. Washington, DC: Child Welfare League of America.
- Godinet, M. T., Li, F., & Berg, T. (2014). Early childhood maltreatment and trajectories of behavioral problems: Exploring gender and racial differences. *Child Abuse and Neglect*, *38*, 544–556.
- Granic, I., & Lamey, A. V. (2002). Combining dynamic systems and multivariate analyses to compare the mother–child interactions of externalizing subtypes. *Journal of Abnormal Child Psychology*, *30*, 265–283.
- Granic, I., & Patterson, G. R. (2006). Toward a comprehensive model of antisocial development: A dynamic systems approach. *Psychological Review*, *113*, 101–131.
- Halemba, G., & Lord, R. D. (2005). Effectively intervening with dual jurisdiction youth in Ohio. *Children, Families, and the Courts, Ohio Bulletin*, *2*, 1–28.
- Halemba, G., & Siegel, G. (2011). *Doorways to delinquency: Multi-system involvement of delinquent youth in King County (Seattle, WA)*. Pittsburgh: National Center for Juvenile Justice.
- Halemba, G., Siegel, G., Lord, R. D., & Zawacki, S. (2004). *Arizona dual jurisdiction study: Final report*. Pittsburgh, PA: National Center for Juvenile Justice.
- Hamburger, M. E., Leeb, R. T., & Swahn, M. H. (2008). Childhood maltreatment and early alcohol use among high risk adolescents. *Journal of Studies on Alcohol and Drugs*, *69*, 291–295.
- Hay, C. (2013). *Residential positive achievement change tool (R-PACT) validation study*. Tallahassee: Florida State University and the State of Florida, Department of Juvenile Justice.
- Herrera, V. M., & McCloskey, L. A. (2001). Gender differences in the risk for delinquency among youth exposed to family violence. *Child Abuse and Neglect*, *25*, 1037–1051.
- Herz, D. C., Krinsky, M., & Ryan, J. P. (2006). Improving system responses to crossover youth. *The Link: Connecting Juvenile Justice and Child Welfare*, *5*, 1–10.
- Herz, D. C., & Ryan, J. P. (2008). *Bridging two worlds: Youth involved in the child welfare and juvenile justice systems, A policy guide for improving outcomes*. Washington, DC: Georgetown University Public Policy Institute, Center for Juvenile Justice Reform.
- Herz, D. C., Ryan, J. P., & Bilchik, S. (2010). Challenges facing crossover youth: An examination of juvenile-justice decision making and recidivism. *Family Court Review*, *48*, 305–321.
- Hillis, S. D., Anda, R. F., Dube, S. R., Felitti, V. J., Marchbanks, P. A., & Marks, J. S. (2004). The association between adverse childhood experiences and adolescent pregnancy, long-term psychosocial consequences, and fetal death. *Pediatrics*, *2*, 320–327.
- Hillis, S. D., Anda, R. F., Felitti, V. J., & Marchbanks, P. A. (2001). Adverse childhood experiences and sexual risk behaviors in women: A retrospective cohort study. *Family Planning Perspective*, *5*, 206–211.
- Holtfreter, K., & Morash, M. (2003). The needs of women offenders: Implications for correctional programming. *Women and Criminal Justice*, *14*, 137–160.
- Howell, J. C. (1995). *Guide for implementing the comprehensive strategy for serious, violent, and chronic offenders*. Washington, DC: U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention.
- Huang, H., Ryan, J. P., & Herz, D. (2012). The journey of dually-involved youth: The description and prediction of rereporting and recidivism. *Children and Youth Services Review*, *34*, 254–260.
- Jonson-Reid, M., & Barth, R. P. (2000). From maltreatment report to juvenile incarceration: The role of child welfare services. *Child Abuse and Neglect*, *24*, 505–520.
- Kelley, B. T., Thornberry, T., & Smith, C. (1997). *In the wake of childhood maltreatment*. Washington, DC: OJJDP Juvenile Justice Bulletin.
- Kohl, P. L., Jonson-Reid, M., & Drake, B. (2009). Time to leave substantiation behind: Findings from a national probability study. *Children Maltreatment*, *14*, 17–26.
- Lanius, R., Vermetten, E., & Pain, C. (2011). *The impact of early life trauma on health and disease: The hidden epidemic*. New York, NY: Cambridge University Press.
- Leadbeater, B. J., Blatt, S. J., & Hertzog, C. (1999). A multivariate model of gender differences in adolescents' internalizing and externalizing problems. *Developmental Psychology*, *35*, 1268–1282.
- Lee, S.-Y., & Villagrana, M. (2015). Differences in risk and protective factors between crossover and non-crossover youth in juvenile justice. *Children and Youth Services Review*, *58*, 18–27.
- Leiter, J., Myers, K. A., & Zingraff, M. T. (1994). Substantiated and unsubstantiated cases of child maltreatment: Do their consequences differ? *Social Work Research*, *18*, 67–82.
- Li, D., Chu, C. M., Goh, J. T. L., Ng, I. Y. H., & Zeng, G. (2015). Impact of childhood maltreatment on recidivism in youth offenders: A matched-control study. *Criminal Justice and Behavior*. doi:10.1177/0093854815598598.
- Lussier, P., McCuish, E., & Corrado, R. R. (2015). The adolescence-adulthood transition and desistance from crime: Examining the underlying structure of desistance. *Journal of Developmental and Life-Course Criminology*, *1*, 87–117.
- Lynch, M., & Cicchetti, D. (1998). An ecological transactional analysis of children and contexts: The longitudinal interplay among child maltreatment, community violence, and children's symptomatology. *Developmental Psychopathology*, *10*, 235–257.
- Margolin, G., & Gordis, E. B. (2000). The effects of family and community violence on children. *Annual Review of Psychology*, *51*, 445–479.
- Mass, C., Herrenkohl, T. I., & Sousa, C. (2008). Review of research on child maltreatment and violence in youth. *Trauma, Violence, & Abuse*, *9*, 56–67.
- Maxfield, M. G., & Widom, C. S. (1996). The cycle of violence revisited 6 years later. *Archives of Pediatrics and Adolescent Medicine*, *150*, 390–395.
- Mersky, J. P., & Reynolds, A. J. (2007). Child maltreatment and violent delinquency: Disentangling main effects and subgroup effects. *Child Maltreatment*, *12*, 246–258.
- Mersky, J. P., & Topitzes, J. (2010). Comparing early adult outcomes of maltreated and non-maltreated children: A prospective longitudinal investigation. *Children and Youth Services Review*, *36*, 22–29.
- Mills, R., Alati, R., O'Callaghan, M., Najman, J., Williams, G., Bor, W., et al. (2010). Child abuse and neglect and cognitive functioning at 14 years of age: Findings from a birth cohort. *Pediatrics*, *127*, 4–10.
- Moffitt, T. E. (1993). Adolescent-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, *100*, 674–701.

- Moffitt, T. E. (2006). Life-course persistent versus adolescent-limited antisocial behavior. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Risk, disorder, and adaptation* (pp. 570–598). New York, NY: Wiley.
- Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Development and Psychopathology, 13*, 255–375.
- Moylan, C. A., Herrenkohl, T. I., Sousa, C., Tajima, E. A., Herrenkohl, R. C., & Russo, M. J. (2010). The effects of child abuse and exposure to domestic violence on adolescent internalizing and externalizing behavior problems. *Journal of Family Violence, 25*, 53–63.
- Mulvey, E. P., Steinberg, L., Fagan, J., Cauffman, E., Piquero, A. R., Chassin, L., & Losoya, S. H. (2004). Theory and research on desistance from antisocial activity among serious adolescent offenders. *Youth Violence and Juvenile Justice, 2*, 213–236.
- Mulvey, E. P., Steinberg, L., Piquero, A. R., Besana, M., Fagan, J., Schubert, C., & Cauffman, E. (2010). Trajectories of desistance and continuity in antisocial behavior following court adjudication among serious adolescent offenders. *Development and Psychopathology, 22*, 453–475.
- Muthén, L. K., & Muthén, L. (1998). *Mplus [computer software]*. Los Angeles, CA: Muthén & Muthén.
- Onifade, E., Barnes, A., Campbell, C., Anderson, V., Petersen, J., & Davidson, W. (2014). Juvenile offenders and experiences of neglect: The validity of the YLS/CMI with dual-status youth. *Children and Youth Services Review, 46*, 112–119.
- Painter, K., & Scannapieco, M. (2013). Child maltreatment: The neurobiological aspects of posttraumatic stress disorder. *Journal of Evidence-Based Social Work, 10*, 276–284.
- Piquero, A. R., Farrington, D. P., Welsh, B. C., Tremblay, R. E., & Jennings, W. G. (2009). Effects of early family/parent training programs on antisocial behavior and delinquency: A systematic review. *Journal of Experimental Criminology, 5*, 83–120.
- Reisig, M. D., Holtfreter, K., & Morash, M. (2006). Assessing recidivism risk across female pathways to crime. *Justice Quarterly, 23*, 384–405.
- Rivera, B., & Widom, C. S. (1990). Childhood victimization and violent offending. *Violence and Victims, 5*, 19–35.
- Rutter, M. (1983). Statistical and personal interactions: Facets and perspectives. In D. Magnusson & V. Allen (Eds.), *Human development: An interactional perspective* (pp. 295–320). New York, NY: Academic Press.
- Ryan, J. P. (2006). Dependent youth in juvenile justice: Do positive peer culture programs work for victims of child maltreatment? *Research on Social Work Practice, 16*, 511–519.
- Ryan, J. P., Herz, D., Hernandez, P., & Marshall, J. M. (2007). Maltreatment and delinquency: Investigating child welfare bias in juvenile justice processing. *Children and Youth Services Review, 29*, 1035–1050.
- Ryan, J. P., Hong, J. S., Herz, D., & Hernandez, P. M. (2010). Kinship foster care and the risk of juvenile delinquency. *Children and Youth Services Review, 32*, 1823–1830.
- Ryan, J. P., Marshall, J. M., Herz, D., & Hernandez, P. (2008). Juvenile delinquency in child welfare: Investigating group home effects. *Children and Youth Services Review, 30*, 1088–1099.
- Ryan, J. P., & Testa, M. F. (2005). Child maltreatment and juvenile delinquency: Investigating the role of placement and placement instability. *Children and Youth Services Review, 27*, 227–249.
- Ryan, J. P., Williams, A. B., & Courtney, M. E. (2013). Adolescent neglect, juvenile delinquency and the risk of recidivism. *Journal of Youth and Adolescence, 42*, 454–465.
- Shalev, I., Moffitt, T., Sugden, K., Williams, B., Houts, R. M., Danese, A., et al. (2013). Exposure to violence during childhood is associated with telomere erosion from 5 to 10 years of age: A longitudinal study. *Molecular Psychiatry, 18*, 576–581.
- Siegel, G., & Lord, R. (2004). *When systems collide: Improving court practices and programs in dual jurisdiction cases*. Pittsburgh, PA: National Center for Juvenile Justice.
- Smith, C., & Krohn, M. (1995). Delinquency and family life among male adolescents: The role of ethnicity. *Journal of Youth and Adolescence, 24*, 69–93.
- Smith, C., & Thornberry, T. P. (1995). The relationship between childhood maltreatment and adolescent involvement in delinquency. *Criminology, 33*, 451–481.
- Smith, C., Thornberry, T. P., & Ireland, T. O. (2004). Adolescent maltreatment and its impact: Timing matters. *The Prevention Researcher, 11*, 7–11.
- Stewart, A., Dennison, S., & Waterson, E. (2002). *Pathways from child maltreatment to juvenile offending*. Final Report: Criminology Research Council.
- Stewart, M., Lutz, L., & Herz, D. H. (2010). *Crossover Youth Practice Model*. Washington, DC: Center for Juvenile Justice Reform, Georgetown University McCourt School of Public Policy.
- Teague, R., Mazerolle, P., Legosz, M., & Sanderson, J. (2008). Linking childhood exposure to physical abuse and adult offending: Examining mediating factors and gendered relationships. *Justice Quarterly, 25*, 313–348.
- Teicher, M. H., Andersen, S. L., Polcari, A., Anderson, C. M., Navalta, C. P., & Kim, D. M. (2003). The neurobiological consequences of early stress and childhood maltreatment. *Neuroscience and Biobehavioral Reviews, 27*, 33–44.
- Tibbetts, S. G., & Piquero, A. R. (1999). The influence of gender, low birth weight, and disadvantaged environment in predicting early onset offending: A test of Moffitt's interactional hypothesis. *Criminology, 37*, 843–878.
- Twardosz, S., & Lutzker, J. R. (2010). Child maltreatment and the developing brain: A review of neuroscience perspectives. *Aggression and Violent Behavior, 15*, 59–68.
- U. S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2013). *Child maltreatment 2012*. <http://www.acf.hhs.gov/programs/cb/research-data-technology/statistics-research/child-maltreatment>.
- Widom, C. S. (1989). The cycle of violence. *Science, 244*, 160–166.
- Widom, C. S., & Maxfield, M. G. (2001). *An update on the "cycle of violence"*. National Institute of Justice: Research brief, 1-8.
- Widom, C. S., & White, H. R. (1997). Problem behaviours in abused and neglected children grown up: Prevalence and co occurrence of substance abuse, crime and violence. *Criminal Behaviour and Mental Health, 7*, 287–310.
- Wiebush, R. G., Freitag, R., & Baird, C. (2001). Preventing delinquency through improved child protective services. U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention. <https://www.ncjrs.gov/pdffiles1/ojdp/187759.pdf>.
- Wiig, J., & Tuell, J. A. (2004). *Guidebook for juvenile justice and child welfare system coordination and integration: A framework for improving outcomes*. Washington, DC: Child Welfare League of America.
- Wiig, J., Widom, C. S., & Tuell, J. A. (2003). *Understanding child maltreatment and juvenile delinquency: From research to effective program, practice, and systemic solutions*. Washington, DC: CWLA Press.
- Wolff, K. T., Baglivio, M. T., & Piquero, A. R. (2015). The relationship between adverse childhood experiences and recidivism in a sample of juvenile offenders in community-based treatment. *International Journal of Offender Therapy and Comparative Criminology*. doi:10.1177/0306624X15613992.

- Wood, J., Foy, D. W., Goguen, C. A., Pynoos, R., & James, C. B. (2002). Violence exposure and PTSD among delinquent girls. *Journal of Aggression, Maltreatment, & Trauma*, 6, 127–147.
- Zingraff, M. T., Leiter, J., Myers, K. A., & Johnsen, M. C. (1993). Child maltreatment and youthful problem behavior. *Criminology*, 31, 173–202.

**Michael T. Baglivio** is Director of Research and Program Development for G4S Youth Services, LLC, tasked with examining the effectiveness of juvenile treatment programming on short- and long-term performance measures and outcomes. For the past 10 years he has evaluated the effectiveness of juvenile justice reform initiatives throughout Florida. His research interests include criminological theory, risk assessment, and life-course criminology.

**Kevin T. Wolff** is an assistant professor at John Jay College of Criminal Justice in New York City. He earned his PhD from the College of Criminology and Criminal Justice at Florida State University. His research interests include the spatial patterning of crime, juvenile justice, criminological theory, and quantitative methods. He is also a research fellow at the Research and Evaluation Center at John Jay and is part of the project devoted to evaluating the Cure Violence program.

**Alex R. Piquero** is Ashbel Smith Professor of Criminology and Associate Dean for Graduate Programs in the School of Economic, Political and Policy Sciences at the University of Texas at Dallas. His research interests include criminal careers, criminological theory, and quantitative research methods. He has received several research, teaching, and service awards and is Fellow of both the American Society of Criminology and the Academy of Criminal Justice Sciences. In 2014, he received The University of Texas System Regents' Outstanding Teaching Award.

**Shay Bilchik** is the founder and director of the Center for Juvenile Justice Reform (CJJR) at the Georgetown University McCourt School

of Public Policy. The Center's purpose is to focus the nation's public policy leaders, across systems of care and levels of government, on the key components of a strong juvenile justice reform agenda. Prior to becoming the director of CJJR, he was president and CEO of the Child Welfare League of America and director of the Office of Juvenile Justice and Delinquency Prevention in the U.S. Department of Justice. He earned his B.S. and J.D. degrees from the University of Florida.

**Katherine Jackowski** is the Director of Performance Evaluation and Training Management for G4S Youth Services, LLC. She directs data collection and performance evaluation of G4S programs, including the development of performance measurement management dashboards, as well as managing the organization and function of the Staff Development and Training Department. Her research interests include program evaluation, performance measurement, and risk assessment change scores.

**Mark A. Greenwald** joined the Florida Department of Juvenile Justice in 2002 and is currently the Director of the Bureau of Research and Data Integrity. He received his Bachelor's degree in criminology and criminal justice from Florida State University, a Master's degree in justice policy and management from Florida Atlantic University, and is currently a doctoral student in the Florida State University College of Criminology and Criminal Justice. Mark supervises 24 professional researchers and data-integrity officers throughout Florida. He oversees the analysis, production, and publication of all department research and evaluation projects.

**Nathan Epps** completed his graduate studies in Criminology in May 1986 at the Florida State University, School of Criminology. He currently works for the Bureau of Research and Data Integrity at the Florida Department of Juvenile Justice (FDJJ). His research interests include trauma-informed care, adverse childhood experiences, and the application of geographical information systems (GIS) software to juvenile justice data.