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Attention, Externalizing, and Internalizing Problems of Youth Exposed to Parental Incarceration

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Abstract

Introduction: Few studies have examined the effects of parental incarceration (PI) on outcomes above and beyond other risk and adverse childhood experiences (ACEs).

Aim: To examine 1) the associations between PI and mental health problems (*attention, externalizing, internalizing, and total behavioral problems*) and 2) the mediating role of current socioeconomic status and cumulative ACEs.

Method: An observational and cross-sectional design was employed. Analyses included hierarchical multivariable linear regression modeling. The analytic sample included 613 adolescents (11 to 17 years).

Results: On average, youth exposed to PI experienced three times as many ACEs compared to youth unexposed. Youth exposed to PI were more likely to have behavioral problems than their unexposed peers. The main effect for all models was attenuated by current economic hardship as well as exposure to increasing numbers of ACEs.

Discussion: Exposure to PI can be viewed as a marker of accumulative risk for intervention since youth impacted by PI are more likely to experience behavioral difficulties and associated adverse childhood experiences.

Implications for practice: Due to the associated adversity that impact youth exposed to PI, mental health providers need to be able to identify and screen for symptoms associated with trauma.

Disclosures

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Keywords

Parental incarceration; adolescent health; child health; prison and jail; parent and child relationship; adverse childhood exposure; youth mental health

Introduction

Nearly 5 million youth, or one in every 14 youth, experienced parental incarceration (PI) at least once during their childhood in the United States (Murphey & Cooper, 2015). Research has further revealed that the exposure to PI is more likely to disproportionately impact African American/Black families and economically disenfranchised families (Murphey & Cooper, 2015). Even worse, prevalence rates often underestimate the true proportion of youth affected by PI or correctional supervision as most studies fail to include parents serving time on probation, or those housed in privately operated facilities.

PI exposure creates more emotional issues and strain in the lives of children than other parental absences such as divorce or military deployment (Phillips & Gates, 2011; Schnittker & John, 2007; Turney, 2014). The process of PI may initially start pre-incarceration through the trauma of witnessing the arrest of a parent (Poehlmann-Tynan, Burnson, Runion, & Weymouth, 2017), to post-incarceration through the denial of housing and employment (Pager, 2003). Further, lack of access to transportation to the prison institution for parental visitation and communication barriers (e.g. time and access restrictions) limit parent-child communication and secure attachment (La Vigne, Davies, & Brazzell, 2008). The difficulty in caregiver arrangements upon incarceration and associated economic strain may, in turn, have lasting harmful effects on youth's adjustment and wellbeing. Shame and stigma with having a parent incarcerated can also adversely affect children in school and community contexts (Phillips & Gates, 2011). Due to the sensitivity of the neurobiological environment and pubertal developmental stage of adolescents, researchers are increasingly interested in the harmful effects of the exposure during this critical developmental time period (Blakemore, Burnett, & Dahl, 2010; Eiland & Romeo, 2013; Luo et al., 2012; Noppe, van Rossum, Vliegenthart, Koper, & van den Akker, 2014). However, limited research and analyses on those exposed to PI have yet to account for pubertal stage of development. A recent integrative review also highlighted the need for better understanding on the contextual specifics of PI (e.g. correlated adversity) and their linkages to internalizing problems (Boch & Ford, 2018). The correlated trauma from these additional strains, perhaps due to the experience of PI, may necessitate important screening and trauma-informed interventions.

Overall, the literature is mixed on mental health outcomes of youth exposed to PI due to varied methodological designs accounting or not accounting for types of correlated adversity (Boch and Ford, 2018). For instance, a recent study found a higher risk of suicidal considerations and behavioral problems in youth (ages 12–19) who had a parent currently incarcerated or previously incarcerated compared to unexposed peers controlling for only two measures of socioeconomic disadvantage (e.g. family structure and poverty) (Davis & Shlafer, 2017). Others found a positive association between lifetime exposure to PI on attention, depression, anxiety, and conduct problems in children (0–18) controlling for five

types of childhood adversity (e.g. child lived with a parent or guardian who got divorced after the child was born; child lived with a parent or guardian who died) (Turney, 2014). However, no effect was observed for those exposed to PI on anxiety and depression after controlling for 16 other types of childhood adversity and parent/child demographics (e.g. neighborhood safety, parental death, parental abuse) (Turney, 2014).

In research examining adolescence to young adulthood, youth (11–21 years) ever exposed to paternal incarceration were more likely to experience “expressive delinquency” (e.g. getting into fights, seriously harming someone, damaging property) compared to unexposed youth, controlling only for youth and parent demographics (Porter & King, 2015). Using data from the same dataset, Swisher and Shaw-Smith (2015) reported more aggressive behavior (e.g. serious physical fighting requiring medical treatment, group fighting) in youth (ages 11–21 years) with a history of PI adjusted by demographics and family structure. Swisher and Shaw-Smith (2015) further examined whether physical abuse or sexual abuse (ever exposed) moderated the relationship between paternal incarceration and their outcomes. Their results indicated that the effect of paternal incarceration on delinquency was greater for those youth with a history of physical or sexual abuse. However, timing of abuse was not accounted for in relation to the exposure of PI.

As noted, in the aforementioned studies, statistical designs included a range and number of socioeconomic and childhood adversity covariates within their analyses. None of which accounted for pubertal stage of development, an important consideration for the adolescent time period. The mixed results may be, in part, due to a lack of including other associated adversity that may also be inextricably tied to the experience of PI. Thus, as research burgeons on the effects of PI on the mental health of adolescents, the aim of this study was to further examine the effects of PI on attention, internalizing, and externalizing problems adjusting for pubertal stage of development, a more comprehensive list of ACEs, and the influence of current economic hardship.

Methods

Design

Secondary data from two parent studies were analyzed: wave 1 of the 2014 Adolescent Development in Context (AHDC) study and the associated Linking Biological to Social Pathways to Adolescent Health and Well-Being (Biosocial Pathways). The present study examined data from the Biosocial Pathways study, a representative subsample of adolescents (N=613) who participated in the first wave of the AHDC study.

The AHDC study aimed to better understand the contributions of contextual exposures on adolescent victimization, risk-taking behavior, mental /physical health, and well-being. The sample is racially, ethnically and socioeconomically representative of the study area, which includes the metropolitan area of Columbus, OH and surrounding suburbs. Households were mailed a flyer describing the study with instructions to call if they were interested in participating. Trained interviewers then called to determine eligibility (youth aged 11–17 years, 1 primary caregiver and English-speaking). The number of completed interviews out of eligible contacted households was 88% in the AHDC study (American Association for

Public Opinion Research, 2016). The response rate was 21.3% (AAPOR, 2016) after adjusting for the estimated percentage of eligible households among those households for whom an attempted contact was made.

Face to face interviews were scheduled and conducted in the home by the trained interviewer who reviewed the informed consent and obtained parental consent and youth assent prior to data collection. The AHDC study currently includes two data collection time points, 1 year apart. Within each wave, trained interviewers collected the data over a 1-week span. A face-to-face interview and self-administered survey were collected from both the youth and the main caregiver. To enhance confidentiality, the caregiver interview was conducted while the youth completed the self-administered survey, and the caregiver survey was self-administered during the youth's face-to-face interview.

The Biosocial Pathways study included a representative subsample of adolescents (N=613) who participated in the first wave of the AHDC study during which chronic stress biomarkers (including hair cortisol) were collected to better understand the relationships among the neuroendocrine pathway (immune function biomarkers), psychosocial/ environmental stressors, and poor health outcomes. For more information on the sampling procedures of the Biosocial Pathways study, please refer to Ford and colleagues (2016). Both studies were approved by the university Institutional Review Board (2010B0369). Due to the rich dataset and comprehensive measures in the AHDC study, this study provides a more robust and current understanding on the effects of PI on mental health outcomes in youth.

Sample

For the present study, data on adolescents that participated in the Biosocial Pathways study were used (a representative subsample of the AHDC study). In this sample, 67 adolescents experienced PI in their lifetime. Due to the number of adolescents missing on stage of pubertal development ($n = 138$, 22% of the proposed analytic sample), multiple imputation procedures using the Markov chain Monte Carlo (MCMC) method were used for missing values. See Table 1 for a breakdown of missing data on variables of interest. As current research highlights, the pubertal stage of development was a critical covariate to include due to the influence of hormones on adolescent behaviors (Chen, Yu, Wu, & Zhang, 2015; Forbes & Dahl, 2010; Walker et al., 2017). In addition, this important consideration has yet to be included in analyses examining the behaviors of youth exposed to PI.

The MCMC multiple imputation procedure assumes a continuous multivariate distribution of the data and also assumes that the data contains missing values that can occur for any of the variables (Allison, 2002). Approximately 40 patterns of missing items resulted by using the PROC MI data command within SAS. Due to the high proportion of cases missing at random on stage of pubertal development and also due to the high number of various missing patterns, multiple imputation procedures were conducted and included all variables of interest (10 imputations) (Allison, 2002; McNeish, 2017). Multiple imputation diagnostics included examination of the relative efficiency of the pooled parameter estimates. Across all models, the relative efficiency remained high (>0.98) indicating confidence in the accuracy of parameter estimation. Sensitivity analyses comparing the

imputed results and the results derived from using case-wise list deletion revealed similar directions and statistically significant effects.

Measures

All measures were caregiver-reported unless otherwise noted in the proceeding section. Of the caregivers who participated in the study, 88% (n = 539) identified as a biological parent in the Biosocial Pathways study.

Primary independent variable of interest—Consistent with prior research, PI was measured via three survey items, “*Has the parent ever been incarcerated in jail or prison... between the child’s ages of 0–5 years, 6–10 years and 11 years and older?*” The items were asked to the caregiver, often identified as a more reliable source than youth report of stigmatizing questions (Youngstrom et al., 2011). A dichotomous measure was created to indicate lifetime exposure to PI if the caregiver responded yes to any of the 3 items.

Dependent variables—Four mental health behavioral problems reported by the caregiver were measured by 19 items assessing common behavioral problems in the Child Behavior Checklist-Brief Problem Monitor (CBCL-BPM; (Achenbach & Rescorla, 2001) – subscales include *attention problems*, *externalizing problems*, *internalizing problems* and *total problem behaviors*. The CBCL-BPM is comprised of items from the Child Behavior Checklist for Ages 6–18 (CBCL/6–18), Teacher’s Report Form (TRF), and Youth Self-Report (YSR) designed to assess the child’s emotional and behavioral problems that occur in the home or at school (Achenbach & Ruffle, 2000). The CBCL-BPM is a valid measure widely used in both academic settings for research purposes and clinical settings for treatment referral (Achenbach & Rescorla, 2001; Achenbach, Dumenci, & Rescorla, 2003; Ebesutani et al., 2010; Ferdinand, 2008). The measure is able to capture youth who may not have had access to mental health services and diagnoses.

Responses for each of the subscales in the CBC-BPM ranged from 1 (“not true”) to 3 (“very true”). A mean composite score for each subscale was created if the caregiver answered at least half of the subscale items. See Table 2 for the items of each behavioral subscale. All dependent variables demonstrated strong reliability as evident by Cronbach’s alpha coefficients greater than 0.70 indicating strong internal consistency by all items in each subscale in the CBCL and by all items in the CBCL. The attention problems subscale consisted of 6 items ($\alpha = 0.85$), the externalizing problems subscale consisted of 7 items ($\alpha = 0.83$), the internalizing problems subscale consisted of 6 items ($\alpha = 0.82$), and the total behavioral problems subscale consisted of averaging all 19 items ($\alpha = 0.90$).

Adolescent demographic characteristics included caregiver reported sex, race/ethnicity, age and foreign-birth of the adolescent. For age, a continuous measure was calculated from the date of birth provided by the caregiver. A dichotomous categorical variable was created to indicate 1 (“male”) or 0 (“female”). Race/ethnicity included non-Hispanic Black, non-Hispanic White (reference category), Latino/Hispanic, Multi-racial/ethnic, Other (Native Hawaiian, or other Pacific Islander, or Asian, or American Indian or Alaska Native). In addition, if the caregiver reported that the birth of the adolescent occurred outside the U.S., responses were coded as 1 (“yes”) and 0 (“no”).

Adolescent pubertal development is an average score measured by 5 survey items asking the adolescent to self-rate their pubertal development (e.g. pubic hair, growth spurt, breast growth, menstruation) consistent with prior research (Petersen, Crockett, Richards, & Boxer, 1988). Male youth were asked to select the best category in regards to growth spurt in height, skin changes, pubic hair, and voice change. Female youth were asked to select the best category in regards to menstruation, breast growth, growth spurt in height, skin changes, and pubic hair. Responses ranged from 1 (“not yet started”) to 4 (“seems completed”) with items coded to indicate completion of pubertal development.

Potential mediators—Socioeconomic characteristics included caregiver education, economic hardship, and total adverse childhood experiences. Caregiver education was measured as less than high school degree or high school degree, some college or an associate’s degree, bachelor’s degree, or master’s degree or above (reference category). Economic hardship was measured as the mean score of three survey items which asked caregivers to rate several items of economic hardship during the past 12 months on a 5-point likert-type scale. One item asked, *“How often did you/your household put off buying something you needed, such as food, clothing, medical care, or housing because you don’t have enough money?”* Responses ranged from 1 (“never”) to 5 (“most or all of the time”) with items coded to indicate worsening economic hardship. The next two questions asked, *“How much difficulty did you/did your household have paying the rent or mortgage because you didn’t have enough money?”*, and *“How much difficulty did you/did your household have paying utilities because you didn’t have enough money?”* Responses ranged from 1 (“no difficulty at all”) to 5 (“a great deal of difficulty”) with items coded to indicate worsening economic hardship.

Adverse Childhood Experiences (ACEs) included a caregiver reported count score of up to 30 different adverse childhood experiences and stressful life events that may have occurred from birth to 11 years and older (total range 0–90). The exact temporal order of when the ACE occurred in relation to the PI is difficult to discern and often co-occur. The ACE items are listed in Table 2.

Analysis

Descriptive and bivariable analyses were conducted to better understand the characteristics of the sample, in addition to the associations between PI and each outcome. The modeling strategy included a series of nested regressions to identify the relationships of our primary predictor with each behavioral outcome while accounting for additional factors. For each outcome, Model 1 estimated the simple relationship between youth exposed to PI and the outcome of interest. Models 2–4 additively controlled for demographic, socioeconomic, and correlated adversity. All analyses were conducted using SAS procedures, version 9.4 (SAS Institute, Cary, NC). Multicollinearity was assessed prior to multivariable modeling; tolerance and variance inflation factors were within normal limits.

Results

Descriptive Statistics

There were 613 youth in the overall sample. The average age of the youth in the overall sample was 14.5 years (standard deviation (SD) = 1.81), identified as White (54.5%, n = 334), non-Hispanic (94.4%, n = 579) and male (51.2%, n = 314). Only 3.8% of the sample was born outside of the United States (n = 23). The mean pubertal developmental score was 3.06 (SD = 0.69, range 1–4) with higher scores indicating completion of puberty. The majority of caregivers in the overall sample had completed some college or their associate's degree (31.8%, n = 195). The total number of ACEs the youth's caregiver reported was approximately 6 (indicating 6 adverse events occurred across three developmental stages – 0–5 years, 6–11 years, and 11 years and older).

Table 3 describes the proportions, means, and differences between youth ever exposed to PI and youth unexposed across all variables of interest. In general, behavioral problems were higher for youth ever exposed to PI in comparison to youth unexposed. The total behavioral problem score was 1.60 (SD = 0.44) for youth exposed to PI compared to 1.39 for youth unexposed to PI (SD = 0.33, p < 0.001). The attention score was 1.69 (SD = 0.58) for youth ever exposed compared to 1.42 (SD = 0.47, p < 0.01). The externalizing problem score was 1.53 (SD = 0.51) for youth ever exposed compared to 1.32 (SD = 0.36, p < 0.001), and the internalizing problem score was 1.57 (SD = 0.48) for those exposed compared to 1.44 (SD = 0.42, p < 0.05). The results also revealed that youth ever exposed to PI experienced an average of 15 *additional* ACEs, compared to youth unexposed to PI, who experienced an average of 4 ACEs. Youth exposed were also more likely to identify as Black/African American, reside with a caregiver with lower educational attainment, and experience more economic hardship than youth never exposed to PI.

Multivariable Linear Regression

Total behavioral problems—Table 4 summarizes the results of the first four models that examined the association between lifetime exposure to PI and total behavioral problems. The results of the baseline model indicated that, on average, youth ever exposed to PI was associated with more total behavioral problems (beta (b) = 0.17, standard error (SE) = 0.05, p < 0.01) compared to youth who were not exposed to PI. The effect of PI on total behavioral problems remained stable and statistically significant upon inclusion of demographic characteristics.

In comparing Model 2 to Model 3, the main effect of PI on behavioral problems decreased in strength once socioeconomic characteristics were included into the model. However, even after adjusting for socioeconomic variables of the youth, exposure to PI remained a statistically significant predictor compared to those unexposed (b = 0.11, SE = 0.05, p < 0.05).

Model 4 indicated that the effect between exposure to PI on total behavioral problems did not remain significant once total number of ACEs was included into the model (b = 0.07, SE = 0.06, p > 0.05). However, the total number of ACEs did not significantly predict an increase in total behavioral problems of the youth (b = 0.01, SE = 0.004, p > 0.05).

Attention problems—Table 5 summarizes the results of the models that examined the association between lifetime exposure to PI and attention problems. The baseline model results indicated that youth ever exposed to PI was associated with higher attention problem scores ($b = 0.22$, $SE = 0.07$, $p < 0.01$). The total effect of PI on attention problems decreased slightly across Models 2 and 3, but remained stable and statistically significant.

Model 4 results indicated that the effect between exposure to PI on attention problem scores did not remain significant once total number of ACEs was included into the model ($b = 0.10$, $SE = 0.06$, $p < 0.05$). On average, adjusting for demographic characteristics, and socioeconomic characteristics, the total number of ACEs did not significantly predict an increase in the mean score of attention problems of the youth ($b = 0.01$, $SE = 0.01$, $p > 0.05$). However,

Externalizing problems—Table 6 summarizes the results of the models that examined the association between lifetime exposure to PI and externalizing problems. The results of Model 1 demonstrated that youth exposed to PI had externalizing problem scores ($b = 0.18$, $SE = 0.05$, $p < 0.01$). In comparing Model 2 to Model 3, the total effect of PI on mean total externalizing score decreased in strength from 0.17 to 0.11 units once socioeconomic characteristics were included in the model.

Model 4 results indicated that the effect between exposure to PI on externalizing problems did not remain significant once the total number of ACEs was included into the model ($b = 0.07$, $SE = 0.06$, $p > 0.05$). However, total number of ACEs did not significantly predict an increase in externalizing problems of the youth ($b = 0.01$, $SE = 0.01$, $p > 0.05$).

Internalizing problems—Table 7 summarizes the results of the models that examined the association between lifetime exposure to PI and internalizing problems. The results of the baseline model indicated no differences between youth exposed to PI on internalizing problems compared to those unexposed ($b = 0.10$, $SE = 0.05$, $p > 0.05$). Model 2 findings indicated that, on average, holding youth demographic variables of interest constant, youth exposed to PI predicted higher internalizing scores ($SE = 0.06$, $p < 0.01$).

In comparing Model 2 to Model 3, the total effect of PI on mean internalizing problems decreased in strength from 0.13 to 0.07 units once socioeconomic characteristics were included into the model. However, exposure to PI did not remain a statistically significant predictor in mean internalizing problems compared to those unexposed ($b = 0.07$, $SE = 0.06$, $p > 0.05$) suggesting full mediation. The total effect of PI on internalizing problems remained non-significant in the fully adjusted model.

Discussion

This study is one of the first to examine the adversity of PI in context of an expansive list of ACEs. The results highlight the extensive instability and adversity that youth exposed to PI may endure. Findings from this study are consistent with extant research examining the adversity of PI on mental health outcomes of youth (Murray, Farrington, & Sekol, 2012; Turney, 2014; Wilbur et al., 2007). In this sample, youth ever exposed to PI were more likely

to have their caregiver report attention, internalizing, externalizing, and total problem behaviors, controlling for demographic characteristics of the youth. Findings also revealed that youth exposed to PI were more likely to have poor attention and externalizing problems, above and beyond socioeconomic characteristics.

While the effect of PI on mental health difficulties remained significant after adjustment of socioeconomic characteristics, the effect of PI on poor attention and externalizing problems decreased in strength. In addition, and more notably, the effect of PI on problematic internalizing problems (e.g. feels worthless, too fearful or anxious) was fully attenuated by current socioeconomic characteristics. These findings suggest that providing financial assistance for basic amenities in households of adolescents *ever* affected by PI may potentially ameliorate adolescent internalizing problems or reduce the severity of attention and externalizing problems. This finding is consistent with the well-documented body of research demonstrating the detrimental effects of poverty on the overall wellbeing of youth (Miller, Chen, & Parker, 2011; Sripada, Swain, Evans, Welsh, & Liberzon, 2014).

However, PI has also been linked to an increased risk of ACEs and social stressors aside from economic hardship (Geller et al., 2011; Western, 2002) that could also be contributing to mental health difficulties. Results revealed that youth ever exposed to PI experienced an average of 15 *additional* ACEs, compared to youth unexposed to PI, who experienced an average of 4 ACEs. The ACES checklist in this study is more comprehensive than other ACES checklists, including more detailed measures on household churning (changes in family structure, household moves). This finding, in conjunction with the well-documented research investigating the cumulative effect of ACEs, indicates that youth exposed to PI may have a much greater likelihood for engaging in maladaptive coping behaviors (e.g. cigarette, alcohol, illicit drug use, or violent delinquent behaviors) and experiencing depression, anxiety and post-traumatic stress disorder (Hussey, Chang, & Kotch, 2006; Lansford et al., 2002) across the lifespan (Felitti et al., 1998). Thus, exposure to PI may be viewed as a marker of accumulative risk for intervention, an important health policy consideration. The effect of PI on attention, externalizing, and total behavioral problems was attenuated and fully mediated by the ACEs measure. However, the ACEs may be in the pathway or occur in direct consequence of having a parent incarcerated (e.g. child went to live with a new caregiver, child was moved into foster care). Either way, the potential trauma associated with these additional ACEs that these vulnerable youths have experienced necessitate screening, trauma-informed care, and interventions.

Limitations

Despite being one of the first studies to examine a more comprehensive checklist of ACEs on the relationship between the exposure to PI on mental health difficulties, several limitations to this study warrant discussion. First, the AHDC and Biosocial Pathways studies were not specifically designed to examine the effects of PI on health outcomes, thus the studies did not include detailed information on the context of PI that may elicit differential effects on health. Such considerations may include the duration of PI (e.g. sentence length), type of offense (e.g. violent or nonviolent), distance to correctional placement, or type of correctional involvement (e.g. private versus state or federally operated facility, parole, or

probation). These limitations are shared across the literature investigating the exposure to PI, as there are limited studies that have exclusively examined the effects of PI (Boch & Ford, 2018). Understanding the differences among these contextual considerations may help inform the development of behavioral interventions as well as public health and social policies. Despite these limitations, this study expands the literature base investigating the context of PI with a more comprehensive checklist of ACEs and correlated disadvantage.

Second, the low sample size of youth exposed to PI ($n = 67$) precluded a more refined examination of PI by developmental timing of exposure and potential differences in the relationships by sex. Third, this study relied on multiple imputation procedures due to the number of youth who were missing on pubertal stage of development. However, while this study relied on multiple imputation procedures, the results are considered more conservative estimates. Multiple imputation ensures that the error associated with the missing data is built into the model, and thus, the standard errors are larger due to the incorporation of uncertainty (Allison, 2002; Dong & Peng, 2013; McNeish, 2017).

Relevance for Clinical Practice

Due to the associated adversity that impact youth exposed to PI, psychiatric mental health (PMH) providers and practitioners need to be able to identify and screen for the exposure to PI and additional ACEs. Findings from this study highlight the need to view the exposure to PI as an accumulative marker of disadvantage related to the effects of associated stress, adversity, and trauma. Screenings can assist providers to use more appropriate interventions. While more research is needed to determine the best evidenced based individual and community level intervention for youth exposed to PI, trauma informed care and interventions can be used. The use of trauma informed care is an important treatment strategy that can be used in this population as it utilizes body-based and cognitive behavioral therapies (Grabbe & Miller-Karas, 2018; Li & Seng, 2018). PMH nurses could also strategize with community or school organizations to implement biobehavioral interventions that target adolescents ever exposed to PI.

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Table 1-

Number of youth in the AHDC wave I cortisol subsample missing data on variables of interest (N=613).

Variable of Interest	Amount Missing % (n)
Ever exposed to parental incarceration	5.4% (33)
<i>Mental health outcomes</i>	
Total behavioral problems	1.1% (7)
Attention behavioral problems	1.3% (8)
Externalizing behavioral problems	1.3% (8)
Internalizing behavioral problems	1.5% (9)
<i>Youth Demographics</i>	
Youth race/ethnicity	0
Black/African American, non-Hispanic	0
Caucasian/White, non-Hispanic	0
Hispanic	0
Multi-racial/ethnic	0
Other	0
Male Youth	0
Youth age	0
Youth foreign born	0
Pubertal developmental stage	22.5% (138)
<i>Socioeconomic Characteristics</i>	
Caregiver education level	0
< High school degree	0
Some college or associate's degree	0
Bachelor's degree	0
Master's degree or higher	0
Economic Hardship	1.6% (10)

Abbreviations: ACEs - Adverse Childhood Experiences and Stressful Life Events Checklist

Table 2-

Items included on the attention, externalizing, and internalizing problem scales and adverse childhood experiences measure.

Measure	Items
Attention problems (6 items) CBCL-BPM	<ul style="list-style-type: none"> — <i>acts too young for his/her age;</i> — <i>can't concentrate, can't pay attention for long;</i> — <i>can't sit still, restless, or hyperactive;</i> — <i>fails to finish things he/she starts;</i> — <i>impulsive or acts without thinking;</i> — <i>inattentive or easily distracted.</i>
Externalizing problems (7 items) CBCL-BPM	<ul style="list-style-type: none"> — <i>argues a lot; destroys things belonging to his/her family or others;</i> — <i>disobedient at home;</i> — <i>disobedient at school;</i> — <i>stubborn, sullen, or irritable;</i> — <i>temper tantrums or hot temper;</i> — <i>threatens people.</i>
Internalizing problems (7 items) CBCL-BPM	<ul style="list-style-type: none"> — <i>feels too guilty;</i> — <i>feels worthless or inferior;</i> — <i>self-conscious or easily embarrassed;</i> — <i>too fearful or anxious;</i> — <i>unhappy, sad, or depressed;</i> — <i>worries.</i>
Adverse childhood experiences and stressful life events (ACEs, 30 items)	<ul style="list-style-type: none"> — <i>child's parents did not live together (due to separation or divorce);</i> — <i>parent had a partner move into the household;</i> — <i>child lived with neither parent;</i> — <i>parent had a partner move out of the household;</i> — <i>parents divorced;</i> — <i>child lived in a household with only one adult present;</i> — <i>child placed with a new caregiver;</i> — <i>eviction or foreclosure;</i> — <i>bankruptcy;</i> — <i>child went to live with a new caregiver;</i> — <i>child moved into a different parent's household;</i> — <i>child moved out of grandparent household;</i> — <i>child moved into grandparent household;</i> — <i>child moved into a different house in the same neighborhood;</i> — <i>child moved into a different neighborhood/community;</i> — <i>child was hospitalized;</i> — <i>family had difficulty paying bills;</i> — <i>family received SNAP/EBT, TANF, food stamps, or other government support;</i>

Measure	Items
	<ul style="list-style-type: none"> — <i>mother or father lost job;</i> — <i>sibling went to jail/prison;</i> — <i>child was homeless/lived in homeless shelter or hotel;</i> — <i>child was moved into foster care;</i> — <i>child witnessed family or neighborhood violence;</i> — <i>child was a victim of family or neighborhood violence;</i> — <i>child was in a serious accident where they or someone else were badly hurt;</i> — <i>death of child's mother;</i> — <i>death of child's father;</i> — <i>death of child's sibling;</i> — <i>death of someone else close to child;</i> — <i>been in a serious accident in which they or someone else was badly hurt.</i>

Note: CBCL-BPM indicates Child Behavior Checklist-Brief Problem Monitor (Achenbach & Rescorla, 2001).

Table 3-

Proportions, means, and bivariable tests of significance comparing youth in AHDC wave I subsample by exposure to parental incarceration (N=613)

	Ever Exposed to PI (n=67)	Never Exposed to PI (n=546)	
	% (n) or mean (SD)	% (n) or mean (SD)	
Outcome variable of interest			
Behavioral Problems (CBCL-BPM)			
Total behavioral problems, range 1–3	1.60 (0.44)	1.39 (0.33)	***
Attention problems, range 1–3	1.69 (0.58)	1.42 (0.47)	**
Externalizing problems, range 1–3	1.53 (0.51)	1.32 (0.36)	***
Internalizing problems, range 1–3	1.57 (0.48)	1.44 (0.42)	*
Youth demographic variables			
Youth race and ethnicity			
Black-African American	43% (29)	26% (137)	**
Hispanic	9.0% (6)	5.3% (27)	
Multi-racial/ethnic	13.4% (9)	6.0% (33)	*
Other	1.5% (1)	2.0% (10)	
White (reference group)	33% (22)	60% (306)	***
Male Youth	57% (38)	50% (258)	
Youth age, range 11–17	14.1 (1.6)	14.6 (1.8)	*
Youth foreign birth	0% (0)	4% (21)	***
Youth pubertal development, range 1–4	3.0 (0.61)	3.07 (0.71)	
Socioeconomic variables of interest			
Caregiver Education			
High school degree or less	25% (17)	15% (77)	*
Some college or Associate's degree	60% (40)	27% (141)	***
Bachelor's degree	9.0% (6)	32% (164)	***
Master's degree or more (reference group)	6.0% (4)	24% (125)	**
Economic Hardship, range 1–5	2.6 (1.02)	1.8 (0.92)	***
Adverse Childhood Experience (ACE), range 0–46	15.5 (8.7)	4.8 (4.8)	***

*
p < 0.05

**
p < 0.01

p < 0.001

Table 4)

OLS regression pooled parameter estimates and standard errors of models predicting total behavioral problems of using multiple imputation procedures N=613

	Model 1	Model 2	Model 3	Model 4
Ever exposed to PI	0.17 (0.06) **	0.17 (0.05) **	0.11 (0.05) **	0.07 (0.06)
<i>Youth Demographics</i>				
Youth race and ethnicity				
Black/AA		-0.03 (0.03)	-0.09 (0.04) **	-0.10 (0.04) **
Hispanic		0.02 (0.06)	-0.02 (0.06)	-0.03 (0.06)
Multiracial		-0.001 (0.06)	-0.01 (0.06)	-0.02 (0.06)
Other		-0.17 (0.12)	-0.15 (0.06)	-0.16 (0.11)
White (reference group)				
Youth male		0.002 (0.03)	0.001 (0.03)	-0.003 (0.03)
Youth age		-0.001 (0.03)	-0.003 (0.01)	-0.003 (0.01)
Youth foreign-born		-0.08 (0.09)	-0.06 (0.08)	-0.05 (0.08)
Youth pubertal development		0.01 (0.03)	0.01 (0.04)	0.003 (0.01)
<i>Socioeconomic characteristics</i>				
Caregiver Education				
HS or less			0.07 (0.05)	0.07 (0.05)
Associate's or some college			0.05 (0.04)	0.04 (0.04)
Bachelor's degree			-0.004 (0.04)	-0.01 (0.04)
Master's degree or > (reference group)				
Economic hardship			0.07 (0.02) ***	0.06 (0.02) **
Adverse childhood experiences				0.01 (0.004)

*
p < 0.05

**
p < 0.01

p < 0.001

Table 5)

OLS regression pooled parameter estimates and standard errors of models predicting attention problems of youth using multiple imputation procedures, N=613

	Model 1	Model 2	Model 3	Model 4
Ever exposed to PI	0.22 (0.07) **	0.19 (0.07) **	0.14 (0.07) *	0.10 (0.08)
<i>Youth demographics</i>				
Youth race/ethnicity				
Black/AA		0.08 (0.05)	0.002 (0.05)	−0.004 (0.05)
Hispanic		0.12 (0.09)	0.08 (0.09)	0.08 (0.09)
Multiracial		0.04 (0.08)	−0.003 (0.08)	−0.02 (0.08)
Other		−0.21 (0.17)	−0.18 (0.16)	−0.19 (0.16)
White (reference group)				
Male Youth		0.09 (0.05)	0.10 (0.05) *	0.10 (0.05) *
Youth age		0.01 (0.02)	−0.001 (0.02)	0.003 (0.02)
Youth foreign-born		−0.04 (0.12)	−0.007 (0.12)	0.001 (0.12)
Youth pubertal development		−0.04 (0.05)	−0.05 (0.05)	−0.05 (0.05)
<i>Socioeconomic characteristics</i>				
Caregiver Education				
HS or less			0.12 (0.07)	0.11 (0.07)
Associate's or some college			0.11 (0.06)	0.10 (0.06)
Bachelor's degree			0.04 (0.06)	0.04 (0.06)
Master's degree or > (reference group)				
Economic hardship			0.07 (0.02) **	0.06 (0.03) *
Adverse childhood experiences				0.01 (0.01)

*
p < 0.05

**
p < 0.01

p < 0.001

Table 6)

OLS regression pooled parameter estimates and standard errors of models predicting mean scores of externalizing problems of youth using multiple imputation procedures, N=613

	Model 1	Model 2	Model 3	Model 4
Ever exposed to PI	0.18 (0.05) **	0.17 (0.06) **	0.11 (0.05) *	0.07 (0.06)
<i>Youth demographics</i>				
Youth race and ethnicity				
Black/AA		0.06 (0.04)	−0.03 (0.04)	−0.03 (0.04)
Hispanic		0.03 (0.07)	−0.01 (0.07)	−0.01 (0.07)
Multiracial		−0.01 (0.06)	−0.04 (0.06)	−0.06 (0.06)
Other		−0.11 (0.13)	−0.08 (0.13)	−0.09 (0.13)
White (reference group)				
Male Youth		−0.007 (0.04)	−0.01 (0.04)	−0.01 (0.04)
Youth age		0.001 (0.01)	−0.001 (0.01)	−0.0004 (0.01)
Youth foreign-born		−0.03 (0.09)	−0.004 (0.09)	0.002 (0.09)
Youth pubertal development		0.03 (0.04)	0.03 (0.04)	0.03 (0.04)
<i>Socioeconomic characteristics</i>				
Caregiver Education				
HS or less			0.14 (0.05) *	0.14 (0.05) *
Associate's or some college			0.11 (0.05) *	0.10 (0.05) *
Bachelor's degree			0.03 (0.04)	0.03 (0.04)
Master's degree or > (reference group)				
Economic hardship			0.07 (0.02) ***	0.06 (0.02) **
Adverse childhood experiences				0.01 (0.004)

*
p < 0.05

**
p < 0.01

p < 0.001

Table 7)

OLS regression pooled parameter estimates and standard errors of models predicting mean scores of internalizing problems of youth using multiple imputation procedures, N=613

	Model 1	Model 2	Model 3	Model 4
Ever exposed to PI	0.10 (0.05)	0.13 (0.06)*	0.07 (0.06)	0.04 (0.07)
<i>Youth demographics</i>				
Youth race and ethnicity				
Black/AA		-0.21 (0.04)***	-0.25 (0.04)***	-0.26 (0.04)***
Hispanic		-0.13 (0.08)	-0.14 (0.08)	-0.15 (0.08)
Multiracial		0.03 (0.07)	0.02 (0.07)	-0.001 (0.07)
Other		-0.20 (0.14)	-0.02 (0.07)	-0.21 (0.13)
White (reference)				
Male Youth		-0.08 (0.04)*	-0.08 (0.04)*	-0.10 (0.04)*
Youth age		-0.01 (0.01)	-0.02 (0.01)	-0.01 (0.01)
Youth foreign-born		-0.16 (0.10)	-0.16 (0.10)	-0.14 (0.10)
Youth pubertal development		0.05 (0.04)	0.06 (0.04)	0.04 (0.04)
<i>Socioeconomic characteristics</i>				
Caregiver Education				
HS or less			-0.03 (0.06)	-0.04 (0.06)
Associate's or some college			-0.07 (0.05)	-0.08 (0.05)
Bachelor's degree			-0.08 (0.05)	-0.08 (0.04)
Master's degree (reference)				
Economic hardship			0.07 (0.02)***	0.06 (0.02)**
Adverse childhood experiences				0.01 (0.004)

*
p < 0.05

**
p < 0.01

p < 0.001