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Adolescent Protective and Risk Factors for Incarceration through Early Adulthood

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Adolescent Protective and Risk Factors for Incarceration and Recidivism: Racial and Ethnic Differences

ABSTRACT

With 2.3 million individuals incarcerated in the US, incarceration remains a pressing social influence on health. While risk factors for incarceration are well known, research has been slow to identify protective factors. Characterizing both protective and risk factors for incarceration and recidivism can inform interventions to prevent incarceration and mitigate its influence on health. Using nationally representative Add Health survey data, we measured the influence of adolescent risk and protective factors for incarceration and recidivism during adolescence and early adulthood. We used multivariate logistic regressions, investigating the relationship between adolescent characteristics (wave I, grades 7-12) , incarceration onset, and incarceration frequency during adolescence and into adulthood (N= 12,136, wave IV, ages 24-32). Adolescent protective factors for incarceration onset and higher incarceration frequency centered on education, including a higher grade point average (AOR= 0.67 [95%CI 0.60, 0.75] for both) and future plans to attend college (AOR=0.65 [95%CI 0.50, 0.86] AOR=0.64 [95%CI 0.48, 0.85], respectively). Risk factors included disruptive behavior (AOR=2.16 [95% CI 1.68, 2.76], AOR=1.88 [95%CI 1.49, 2.39]), physical or sexual abuse in childhood (AOR=1.48 [95%CI 1.21, 1.79] AOR=1.49 [95%CI 1.22, 1.81]), parental incarceration (AOR=2.15 [95%CI 1.75, 2.64] AOR=2.08 [95%CI 1.68, 2.58]), and living with a stepfather figure (AOR 1.57 [95%CI 1.25, 1.97] AOR 1.52 [95%CI 1.22, 1.91]). Stratified analyses demonstrated that Latinos had unique risk profiles compared to African American and White youth. The educational system may be a locus for protective interventions promoting academic achievement and educational aspirations. Tailored approaches for youth of different racial/ethnic groups merit exploration.

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INTRODUCTION

Wide disparities in the U.S. juvenile justice system contribute to health inequities. The United States (U.S.) incarcerates a larger proportion of its youth than any other developed country (Hazel, 2008). More than 700,000 youth under age 18 are arrested annually in the U.S., approximately half of whom have been arrested before (Sickmund, Sladky, Kang, & Puzzanchera, 2019). Youth from racial/ethnic minority groups and low-income families are overrepresented in the U.S. juvenile justice system (Sickmund et al., 2019). Black youth are 5 times more likely and Latino youth 1.5 times more likely to be incarcerated than White youth, indicating a persistent trend of disproportionately minority confinement (Hockenberry, 2018). Cycles of mass incarceration likely exacerbate the health inequities prevalent in many socially disadvantaged communities (Brinkley-Rubinstein & Cloud, 2020). Incarcerated youth have markedly higher medical and mental health morbidity and mortality than the general adolescent population (Braverman & Morris, 2011; Golzari, Hunt, & Anoshiravani, 2006). Additionally, a history of incarceration during adolescence is associated with poor lifetime health, increased mortality risk, and worse social functioning outcomes into adulthood (Barnert et al., 2017; Coffey, Veit, Wolfe, Cini, & Patton, 2003; Pajer, 1998). Thus, adolescents impacted by the U.S. juvenile justice system signify a vulnerable population that face significant health inequities, warranting urgent attention.

Adolescence represents a crucial developmental transition from childhood to adulthood, and a period when individuals may be more at-risk for criminal behavior and more receptive to interventions compared to later in life. The lifetime monetary value to society of preventing one 14-year-old from re-engaging in anti-social behavior is $2.6 to $5.3 million (Cohen &

Piquero, 2009). The prevention of juvenile delinquency and incarceration is critical, and risk factors as well as protective factors may be areas to focus intervention efforts. Thus, careful examination of adolescent protective and risk factors for incarceration is worthwhile.

Beyond low socioeconomic status and racial/ethnic minority group, a dynamic interplay of risk factors at the individual, family, and community level influence the risk of juvenile offending (Farrington, 2003; Tarolla, Wagner, Rabinowitz, & Tubman, 2002). Review articles summarizing risk factors for juvenile offending underscore key individual factors, such as low educational achievement, poor mental health, and substance use. Additionally, family factors, such as parental incarceration, large family size, family structures that do not include two biological parents, lack of parental monitoring, and parental difficulties or conflict, and child maltreatment, are also known to contribute to youths' risk of offending. Meanwhile, community factors, such as delinquent peer groups and residing in high crime neighborhoods also increase risk for juvenile offending (Farrington, 2003; Tarolla et al., 2002).

The literature on protective factors, however, is more limited (Hoge, Andrews, & Leschied, 1996). Previous cross-sectional studies on juvenile offending have identified protective influences including strong family and adult mentoring relationships (Browning & Huizinga, 1999; Harper & McLanahan, 2004); prosocial peers (Browning & Huizinga, 1999); academic achievement and reading ability (Christle & Yell, 2008; Hoge et al., 1996); and psychological factors such as positive expectations for the future (Browning & Huizinga, 1999), self-esteem, and empathy (Broidy, Cauffman, Espelage, Mazerolle, & Piquero, 2003; Rael, 2007). The extant literature tends to highlight incarceration-related outcomes, like delinquent behavior or arrest; however, incarceration as a discreet outcome is important to consider. A growing literature suggests that incarceration is a threshold event that carries direct detrimental physical and mental health effects and is associated with subsequent financial

hardship, disrupted social networks, social isolation, stigmatization, and adverse health outcomes (Barnert et al., 2017; N Heard-Garris et al., 2018; Porter, 2014; Schnittker & John, 2007).

More recently, analyses of prospective longitudinal studies have examined risk and protective factors for juvenile offending, demonstrating results that are overall consistent with the broader resiliency literature (Ttofi, Farrington, Piquero, & DeLisi, 2016). The body of literature showed that the relative influence of protective factors differs by youth developmental stage (Fontaine, Brendgen, Vitaro, & Tremblay, 2016; Ttofi et al., 2016), highlighting the importance of examining factors specifically present during adolescence. Additionally, large longitudinal studies, including some that included a nationally representative samples, have elucidated consequences of incarceration as well as determinants of experiences while incarcerated (Barnert et al., 2017; Craig, Piquero, Murray, & Farrington, 2018; Massoglia, 2008). Yet, investigating adolescent protective and risk factors for concurrent and long-term incarceration risk using a nationally representative longitudinal sample represents a gap in the literature. Additionally, studies on predictive factors specific to recidivism among young people using nationally representative data are also lacking. Most studies on predictive characteristics for recidivism focus only on risk factors. Furthermore, the combined influence of risk and protective factors on predicting both adolescent and early adult incarceration risk remains unclear (Lodewijks, de Ruiter, & Doreleijers, 2010). Additionally, no studies have specifically examined racial and ethnic differences in protective and risk factors for juvenile incarceration and recidivism longitudinally, of importance because of the disproportionate confinement of racial/ethnic minority youth in the U.S. justice system (Laub, 2014).

Adolescent Protective and Risk Factors for Incarceration and Recidivism: Racial and Ethnic Differences

Examination of risk and protective factors for incarceration using a nationally representative database can provide a useful picture of adolescent predictive factors for incarceration, including by measuring the relative influence of various protective and risk factors. The resiliency literature, family-systems science, and criminology theories, among others, provide a frame for hypothesizing which factors are likely to increase or decrease incarceration risk—all contributing to a conceptual scaffolding that aligns with empirical studies summarized above. Yet, the relative influence or magnitude of effect of key adolescent factors in predicting longitudinal risk for incarceration and recidivism among a national sample remains unclear. Understanding adolescent protective and risk characteristics for both juvenile incarceration and recidivism is critical to developing successful prevention programs and policies that positively impact the life course trajectories of vulnerable youth. Therefore, to address key gaps in the literature, we used a nationally representative longitudinal dataset of U.S. youth to determine the influence of characteristics in adolescence by measuring their association with age of incarceration and downstream recidivism as juveniles, and to examine these associations by race/ethnicity.

METHODS

Design and Participants

We analyzed data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) waves I and IV. Add Health consists of longitudinal surveys of a nationally representative sample of 7-12 graders, followed from adolescence into adulthood. The wave I in-home survey was administered in 1994 to 20,745 adolescents. The wave IV survey was administered in 2009 to 15,701 early adults between the ages of 24 to 32 years old. Surveys assessed youth health and the social context of youths' lives. Wave IV also included 73 of the 183 individuals known to be incarcerated at the time of the interview, an incarceration prevalence that is consistent with national figures (J. Warren, Gelb, Horowitz, & Riordan, 2008).

We report associations between protective and risk factors present in adolescence (wave I) and incarceration histories by early adulthood (wave IV). We excluded individuals with incomplete data on any of the variables in the models. The final sample includes the 12,136 participants with complete data on all outcome variables and predictors. The UCLA Institutional Review Board approved this study.

Measures

Included variables are summarized below. Appendix A includes additional details on variable construction.

Outcome Variables

We constructed the outcome variables from wave IV of the Add Health study.

Onset of incarceration. We constructed ordinal variables with three categories of incarceration onset: no incarceration, onset of incarceration as a juvenile, and onset of incarceration as an adult. *No incarceration* was defined using responses to the single-item question, “Have you ever spent time in a jail, prison, juvenile detention center or other correctional facility?” Those with a history of incarceration were asked a follow-up question about age at first incarceration. *Onset of incarceration as juvenile* was defined as first incarceration at less than 18 years old. *Onset of incarceration as adult* was defined as first incarceration at 18 years old or greater.

Incarceration frequency. We created three categories of history of recidivism: no incarceration, incarceration without recidivism, and recidivism. Categorization was based on responses to a follow-up question for those with a history of incarceration, which asked about the number of incarceration episodes. *Incarceration without recidivism* was defined by

a history of one incarceration episode. *Recidivism* was defined as two or more episodes of incarceration.

Predictor Variables

We constructed the predictor variables from wave I data. We selected predictor variables based on review of the criminology, delinquency, and youth violence literatures, applying a social-ecological framework to select variables with theoretical relevance (Bernat, Oakes, Pettingell, & Resnick, 2012; Browning & Huizinga, 1999; Farrington, 2003), and validated the approach with a qualitative study (Barnert et al., 2014). We applied validated scales, constructing new scales only in instances when previously used scales were not available to measure items and suing single-item measures only when scales could not be applied. A Cronbach's alpha cut-point of 0.7 or greater was set as criteria for inclusion of a scale in the model.

Youth-level factors:

Behavior

Disruptive behavior was measured by the 12-item Serious Delinquency Scale (Cronbach's alpha, 0.81), which is based on DSM-IV symptoms for conduct disorder (Guo, Roettger, & Cai, 2008). *Inattentiveness* was measured with a single-item response asking about trouble paying attention in school.

Mental Health and Substance Use

Depressive symptoms was measured with an 18-item, modified version of the Center for Epidemiologic Studies Depression scale (Cronbach's alpha, 0.88) (J. T. Warren, Harvey, & Henderson, 2010). *Alcohol users* drank alcohol at least 2 days per month. *Cigarette users* smoked cigarettes at least 1 day during the previous 30 days. *Marijuana users* used

marijuana at least once in the last 30 days. *Other drug users* used "other drugs" such as LSD, ecstasy, or mushrooms at least once in the last 30 days.

Academic Factors

Grade point average was calculated as the grade point average from the most recent available grades in English/ language arts, math, history, and science. *Plans to attend college* was measured from a single-item response that asked youth, "how likely is it that you will go to college?"

Family factors

Drugs at home was measured by a single item, "Are drugs easily available to you in your home?" *Family connectedness* was measured with the sum of the responses to the following 3-items (Cronbach's alpha 0.77). "How much do you feel people in your family understand you?"; "How much do you and your family have fun together?"; and "How much do you feel your family pays attention to you?" (Stevens-Watkins & Rostosky, 2010). *Family structure* was measured using the 7-category family structure variable constructed by Add Health (for details see http://www.cpc.unc.edu/projects/addhealth/data/constructed-variables/family-structure-codebook). *Child abuse* was defined as history of physical or sexual abuse (asked retrospectively in Wave IV). *Parental incarceration* was defined as either biological parent having spent/spending time in jail or prison (asked in Wave IV).

Community factors

Other adult connectedness was measured by the single-item response "How much do you feel that adults care about you?." *School connectedness* was measured using the 5-item school connectedness scale (Cronbach's alpha 0.83), which asked respondents how connected they felt to teachers and peers at school (Furlong, O'Brennan, & You, 2011).

Unsafe neighborhood was measured with a single-item response that asked whether youth usually felt safe in their neighborhoods.

Sociodemographic Variables

These included race/ethnicity with the following categories: White, African-American, Hispanic, Asian, or other; gender; age in years; whether either parent was on public assistance; and highest parental level of education all drawn from Wave I.

Statistical Analyses

We first observed correlations among all predictor variables. Although multicollinearity was a theoretical possibility, no evidence of multicollinearity was found. We then conducted ordinal logistic regression analyses with STATA 13. Our first model tested for associations of predictors of timing of incarceration onset with three ordinal levels: (1) never incarcerated, (2) first incarceration as an adult, and (3) first incarceration as a juvenile. Our second model tested for associations of predictors with incarceration frequency with three ordinal levels. The three levels of outcomes for the second model were: (1) never incarcerated, (2) incarceration without recidivism (i.e., incarcerated only once), and (3) incarceration with recidivism. Both models controlled for the sociodemographic variables listed above and used survey weights to account for study design and clustering at school level (Harris et al., 2009). We also conducted sensitivity analyses to determine whether significance patterns varied when the outcome variables of arrest and conviction rates were modeled. Finally, to examine potential racial/ethnic differences in predictive characteristics for incarceration outcomes, we stratified analyses by racial/ethnic groups for each of the three largest categories (African Americans, Latinos, and Whites).

RESULTS

Sample Characteristics

The average age of participants at Wave I was 16 years old and 55% were from minority racial ethnic backgrounds (Table 1). The analytic sample of 12,136 youth included 2,623 (21.6%) youth who identified as African American, 1,869 (15.4%) Latino youth, and 6,645 (54.8%) White youth. Notably, 2,454 individuals (20.2%) reported a history of child abuse, 2,091 (17.2%) reported any parental incarceration, and 1,273 (10.5%) reported living in an unsafe neighborhood.

Overall, 14.1% of the sample (n=1709) reported ever being incarcerated. Of these, 16.7% (n=285) were first incarcerated as juveniles; 83.3% (n=1424) were first incarcerated as adults. Additionally, 44.1% (n=734) of those with a history of incarceration reported recidivism while 55.9% (n=931) reported only one incarceration episode. This observed recidivism rate is consistent with national figures (Urahn, 2011).

Predictors of Incarceration Onset and Frequency

The youth, family, and community factors associated with age of incarceration onset and frequency demonstrated the same patterns of significance and similar effect sizes across both models (Table 2).

Compared to the reference category of White/Caucasian, identifying as African-American or Native American was associated with increased odds of earlier incarceration onset and frequency, as were male gender, younger age (at Wave I), and lower levels of parent education. Disruptive behavior, alcohol use, and cigarette use emerged as significant youth-level factors associated with increased odds of both earlier incarceration onset and higher frequency of incarceration. With regards to family factors, reporting of history of child abuse, parental incarceration, and living with a biological mother/non-biological father pair (compared to the reference category of living with two biological parents) were also significantly associated with increased odds of earlier incarceration onset and frequency. In

particular, living with a stepfather figure was associated with an increased odds of earlier incarceration onset of 1.57 (95% confidence interval 1.25-1.97) and an increased odds of higher incarceration frequency of 1.52 (95% confidence interval 1.22-1.91). There were no community factors identified that were significantly associated with earlier onset of incarceration or frequency of incarceration.

While there were a host of risk factors, two protective factors emerged in this analysis: having a higher GPA and plans to attend college. Both of these factors were significantly associated with reduced odds of earlier incarceration onset and lower incarceration frequency. These factors are rooted in education, however, there were no other significant family or community protective factors identified. These results were unchanged when arrest and conviction rates were modeled as the outcome variables (results from these sensitivity analyses not reported).

Results for Analyses Stratified by Race/Ethnicity

Stratified analyses revealed some racial/ethnic differences in predictive characteristics for incarceration. African American and White youth shared more similar risk profiles as compared to Latinos. While disruptive behavior was strongly associated with an increased odds of earlier incarceration among African American youth (AOR 2.82, 95% CI 1.61 – 4.92) and White youth (AOR 2.15, 95% CI 1.55 – 2.99), it was not a risk factor for Latinos (AOR 1.32, 95% CI: 0.71 – 2.45). Similarly, while a history of child abuse was associated with an increased odds of earlier incarceration among African American (AOR 1.49, 95% CI 1.08 – 2.04) and White youth (AOR 1.75, 95% CI 1.37 – 2.22), it was not a risk factor for Latinos (AOR 1.09, 95% CI 0.62 – 1.93).

Additionally, the age at Wave I enrollment yielded unique findings for Latinos. When the age variable was categorized as age 12 to 13 years old, age 14 to 15 years, and age 16 to 17

years old, compared to a reference category of 18 years or older, age for African Americans and White youth was not a significant predictor of incarceration outcomes. However, for Latinos, a graded response was observed such that being a Latino youth who was age 12 or 13 years in Wave 1 was associated with significantly increased odds of earlier incarceration onset (AOR 2.24, 95% CI 1.01 – 4.97). Although the age categories of 14 to 15 years (AOR 1.53, 95% CI 0.78 – 3.02) and 16 to 17 years (AOR 0.97, 95% CI 0.54 – 2.27) did not significantly predict earlier incarceration onset, the decreasing magnitude of effect with increasing age suggests that younger Latinos recruited in Wave 1 may have had greater risk of incarceration (i.e., Latino youth at the time experienced a secular trend of increasing incarceration risk). There were no notable differences in protective factors between African-American, Latinos, and White youth. The stratified incarceration frequency models showed similar patterns.

DISCUSSION

Using data from a nationally representative longitudinal sample of youth, we identified a number of potentially modifiable adolescent protective and risk factors for incarceration onset and frequency, with differences observed across racial and ethnic groups. Specifically, this study highlights academic achievement and future-orientation as protective factors against incarceration. These findings suggest that potential target points exist to guide the strategic development and location of tailored interventions. Knowledge of these factors can inform public health practitioners, researchers, educators, and policymakers.

Protective factors identified in our analysis included higher grade point average and plans to attend college. Education might be an important protective gateway for high-risk, socially disadvantaged youth to avoid cycles of incarceration. The finding that plans to attend college independently predicted lowered incarceration outcomes is noteworthy. This finding is consistent with the Denver Youth Study, which demonstrated that having positive

expectations for the future was one of the strongest predictors of success for youth from high-risk neighborhoods (Browning & Huizinga, 1999). Additionally, a higher GPA appeared to be protective from incarceration and recidivism. While Hoge found that school achievement may be a protective factor in youth offending, we have further defined that GPA specifically is associated with lower incarceration onset and frequency (Hoge et al., 1996). This finding could be related to the relationship of higher GPA with high school graduation; high school graduation alone is associated with a 21% reduction in recidivism (Greenwood & Turner, 2011). Alternatively, higher GPA might be a marker of healthier social networks (Wong et al., 2017). Supporting programs that boost educational achievements and aspirations signifies a promising approach to preventing incarceration and the poor health outcomes that follow.

Interestingly, we were not able to identify protective family or community factors. Researchers have identified key family factors (e.g., family meals and sharing ideas) and community factors (e.g., neighborhood cohesion, safety, and amenities) that are associated with resilience (Heard-Garris, Davis, Szilagyi, & Kan, 2018). However, in this study, we were unable to identify family or community factors that mitigate incarceration outcomes. Finally, the finding of no notable difference in protective factors among African American, Latino, and White youth lends support for bolstering the protective effects of education for a diverse set of youth.

Consistent with prior studies on delinquency, the adolescent risk factors associated with increased incarceration risk were disruptive behavior, alcohol or nicotine use, history of child abuse, parental incarceration, and living with a biological mother/non-biological father pair (Browning & Huizinga, 1999; Farrington, 2003; Tarolla et al., 2002). Many of the risk factors we identified have been previously identified in the literature; however, the quantification of the link between incarceration and living with a stepfather figure is notable. The observed

association between living with a stepfather father and increased incarceration risk may in part be due to father absence or may be a marker of other causal risk factors, such as family conflict or overall family environment (Harper & McLanahan, 2004).

The constellation of disruptive behavior, substance use, and history of child abuse as risk factors suggest that incarcerated populations bear substantial unmet mental and behavioral health needs even prior to incarceration. These findings argue for prioritizing access to appropriate mental health care, particularly for high-risk youth, as a means to reducing juvenile and adult incarceration rates. These risk factors may be associated with toxic stress from prior adverse childhood experiences (ACEs) (Shonkoff, Garner, Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, & Section on Developmental and Behavioral Pediatrics, 2012). ACEs have been associated with higher rates of risk-taking behavior among adolescents, ultimately leading to poor health behaviors and outcomes in adulthood and lifelong increased incarceration risks (N. Heard-Garris, T. N. A. Winkelman, et al., 2018; Shonkoff et al., 2012). Health professionals attuned to the mental health needs of youth at risk for incarceration have the potential to help shift the life trajectories of these vulnerable youth.

Adolescents with risk factors for incarceration face distinct challenges when entering adulthood. Many of these individuals must overcome difficulties such as parental incarceration, family dysfunction, poverty, educational disparities, high-crime neighborhoods, and institutionalized racism (Barnert et al., 2014).In particular, the quantification of parental incarceration as a strong risk factor for youth incarceration is especially notable because 54% of U.S. inmates are parents of minor children. Put another way, 2.7 million children—1 in 28 children in the U.S. and 1 in 9 Black children—have a parent currently incarcerated (The Pew Charitable Trusts, 2010). Our study demonstrated

that the known risk factor of history of parental incarceration was stable in strongly predicting incarceration risk longitudinally from adolescence into adulthood. Parental incarceration is associated with worse health outcomes and high-risk health behavior into adulthood (N Heard-Garris et al., 2018). Findings suggest that attentiveness to adolescents with current or prior histories of parental incarceration as an important focal point for intervention.

We found differences in risk factors among racial/ethnic minority groups for incarceration, with Latinos having unique profiles compared to African Americans and Whites. It is unclear why disruptive behavior and history of child abuse did not emerge as risk factors for Latinos. Further research to measure racial/ethnic differences and explore mechanisms for these differences in adolescent pathways to incarceration is warranted.

This study has many strengths including: the use of a nationally representative sample, large sample size, the inclusion of youth that were incarcerated at the time of the study, and the focus on incarceration and recidivism as primary outcomes. However, the study findings should be interpreted within the context of its limitations. The study is limited by the reliance on youth-report survey data, including items that involved single-item responses, gathered at time points that span fourteen years, which may have introduced recall bias, and by potential confounders. Differential attrition may also have biased the study results; however, the wave IV observed incarceration prevalence of roughly 1% is consistent with national figures, suggesting that the number of individuals lost to follow-up due to incarceration is small (J. Warren et al., 2008). Criminal justice system involvement, often associated with social stigma, may be underestimated, artificially decreasing the effects of the tested characteristics. The use of a school sample was a significant limitation that may have biased the sample of older participants towards those with less criminal behavior. The observed protective effect of older age was unexpected. We postulate that this correlation

may have occurred because of the secular trend of increasing incarceration rates in the 1990s (Greenwood & Turner, 2011). The use of a school sample may have led to an underestimate of criminal justice involvement as youth not enrolled in school may be more likely to participate in offending activities. Also, this population may overestimate the observed protective effect of education as adolescents recruited in a school sample may be more likely to report higher educational aspirations compared to youth not in school.

Conclusion

Protective and risk factors for incarceration that emerged from this analysis may be modifiable, either in the short-term or across generations, and attentiveness to racial/ethnic differences is warranted. Potential target areas for intervention span education, mental and behavioral health, and child welfare systems, as well as community-based family support agencies. Targeting resources to develop and refine interventions that promote academic achievement and educational aspirations might be effective in decreasing youths' likelihood of incarceration as they move through the life course. By helping socially vulnerable adolescents to mitigate the effects of incarceration risk factors and boost protective factors, health professionals have the opportunity to potentially improve the life trajectories and health outcomes of individual youth and communities across the course.

Compliance with Ethical Standards: The authors report no conflict of Interest. Add Health participants provided written informed consent in accordance with the University of North Carolina School of Public Health institutional review board guidelines that are based on 45CFR46.

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TABLE 1—Descriptive Statistics for Sociodemographics, Protective/Risk Factors, and Incarceration Outcomes with the Analytic Sample (Add Health, Wave I) (n=12,136)

Sociodemographics	*Mean (SD) or %*
Age in Years – Mean (SD)	16.1 (1.7)
% Female	53.7%
Race/Ethnicity	
White/Caucasian	44.5%
African-American	21.6%
Hispanic	15.3%
Asian	7.1%
Native American	3.2%
Other ethnicity	8.3%
Parent on public assistance	9.1%
Parent education level	
Less than high school	10.3%
High school graduate	29.2%
Some college	21.3%
College graduate or higher	39.2%
Youth-level factors	
Disruptive behavior – Mean (SD)	0.14 (0.3)
Depressive symptoms	10.0%
Inattentiveness – Mean (SD)	1.22 (1.0)
Alcohol use	16.9%
Cigarette use	25.0%
Marijuana use	13.5%
Other drug use	3.6%
Grade point average – Mean (SD)	2.81 (0.8)
Plans to attend college – Mean (SD)	0.81 (0.3)
Family factors	
Drugs in the home	2.8%
Family connectedness – Mean (SD)	3.74 (0.8)
Family structure	
Biological mother, biological father (ref)	58.0%
Biological mother, non-biological father	12.1%
Biological father, non-biological mother	2.8%
Two non-biological parents	1.1%
Single mother	19.7%
Single father	2.9%
Other parents	3.4%
History of child abuse	20.2%
Parental incarceration	17.2%
Community factors	
Other adult connectedness – Mean (SD)	3.41 (0.8)
School connectedness – Mean (SD)	2.71 (0.74)
Unsafe neighborhood	10.5%
Incarceration Outcomes	
Onset of Incarceration	
Never incarcerated	85.9%
First incarceration as juvenile	2.4%

First incarceration as adult	11.7%
Recidivism	
Never incarcerated	86.2%
Incarceration without Recidivism	7.7%
Recidivism	6.1%

Note: SD= standard deviation.

TABLE 2—Multivariate Models of Incarceration Outcomes and Protective/Risk Factors (Add Health, Waves I and IV) (n=12,136)

	Model 1: Incarceration onset	Model 2: Incarceration frequency
Predictors	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Individual Characteristics		
Race/ethnicity		
White/Caucasian (ref)	---	---
African-American	1.61 (1.30, 1.20)***	1.49 (1.21, 1.84)***
Asian	0.77 (0.44, 1.32)	0.76 (0.44, 1.29)
Hispanic	0.90 (0.66, 1.23)	0.95 (0.70, 1.28)
Native American	1.50 (1.01, 2.22)*	1.61 (1.05, 2.47)*
Other ethnicity	1.53 (1.02, 2.28)*	1.38 (0.93, 2.04)
Gender		
Male (ref)	---	---
Female	0.26 (0.21, 0.31)***	0.26 (0.22, 0.32)***
Age	0.92 (0.88, 0.97)**	0.93 (0.89, 0.98)**
Family Characteristics		
Parent on public assistance	1.27 (0.98, 1.65)	1.20 (0.95, 1.52)
Parent education level		
College graduate (ref)	---	---
Some high school or less	1.53 (1.12, 2.11)**	1.55 (1.14, 2.11)**
High school graduate	1.28 (1.02, 1.59)*	1.29 (1.05, 1.59)*
Some college	1.30 (1.04, 1.61)*	1.34 (1.09, 1.65)**
Youth-level factors		
Disruptive behavior	2.16 (1.68, 2.76)***	1.88 (1.49, 2.39)***
Depressive symptoms	1.04 (0.83, 1.31)	0.99 (0.78, 1.26)
Inattentiveness	1.06 (0.97, 1.15)	1.06 (0.98, 1.16)
Alcohol use	1.37 (1.12, 1.68)**	1.33 (1.10, 1.60)**
Cigarette use	1.32 (1.05, 1.65)*	1.31 (1.05, 1.63)*
Marijuana use	1.19 (0.95, 1.50)	1.22 (0.96, 1.54)
Other drug use	1.25 (0.89, 1.75)	1.31 (0.92, 1.87)
Grade point average	0.67 (0.60, 0.75)***	0.67 (0.60, 0.75)***
Plans to attend college	0.65 (0.50, 0.86)**	0.64 (0.48, 0.85)**
Family factors		
Drugs in the home	0.88 (0.60, 1.30)	1.01 (0.67, 1.52)
Family connectedness	1.00 (0.89, 1.11)	0.98 (0.88, 1.09)
Family structure		
Biological mother, biological father (ref)	---	---
Biological mother, non-biological father	1.57 (1.25, 1.97)***	1.52 (1.22, 1.91)***
Biological father, non-biological mother	0.79 (0.50, 1.26)	0.81 (0.51, 1.29)
Single mother	1.11 (0.88, 1.37)	1.09 (0.87, 1.36)
Single father	1.10 (0.70, 1.72)	1.08 (0.69, 1.69)

Two non-biological parents	1.11 (0.47, 2.65)	1.13 (0.50, 2.56)
Other parents	0.92 (0.60, 1.39)	0.86 (0.57, 1.30)
History of child abuse	1.48 (1.21, 1.79)***	1.49 (1.22, 1.81)***
Parental incarceration	2.15 (1.75, 2.64)***	2.08 (1.68, 2.58)***
Community factors		
Other adult connectedness	1.01 (0.91, 1.11)	1.03 (0.94, 1.13)
School connectedness	0.93 (0.84, 1.03)	0.93 (0.84, 1.03)
Unsafe neighborhood	0.97 (0.75, 1.26)	1.03 (0.80, 1.33)

Note: OR= odds ratio; CI= confidence interval; ref=reference.

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