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ABSTRACT

Incarceration has become an increasingly common event in the lives of young adult men and children. While father's history of incarceration (FHI) robustly correlates with delinquency and criminal justice involvement among sons, this research has not been contextualized to racial stratification present in the U.S. Addressing this gap in current literature, this study attempts to examine the effects of FHI on delinquency and adult arrest among national samples of white, African American, and Hispanic males from the National Longitudinal Survey of Adolescent Health. Given the large inequalities or differences in economic resources, family structure, and other conditions observed across these racial groups, this study also examines variation in the role of mediating mechanisms. Across racial groups, FHI remains a robust predictor of son's delinquency and adult arrest, controlling for a wide range of factors and hypothesized mediators. Differences in patterns of mediating effects and probabilities of arrest suggest considerable differences in intergenerational crime and delinquency processes across racial and ethnic groups in the U.S.

INTRODUCTION

Since the 1970s, a variety of federal, state, and local policies have dramatically increased rates of incarceration in the United States. Beginning with the Nixon Administration, the federal "wars" on drugs and crime have imposed mandatory sentencing lengths for federal crimes, dramatically increasing the federal prison population in the process. Similar actions by states have further undermined judicial discretion in favor of mandatory sentences. These changes resulted in a greater than four-fold increase in rates of incarceration, from 110 per 100,000 persons in 1970, to 470 per 100,000 by 2000 (Visher and Travis, 2003). As the population has grown, this rate has translated into more than a 600% increase in the number of persons incarcerated over the same period (Petit and Western, 2004). For comparative purposes, the rate of incarceration in the United States is more than five times higher than in the U.K., the country with the next highest incarceration rate among Western countries (Western and Wildeman, 2009).

Of particular concern is the disproportionate effect of incarceration for African American and Latino men, particularly those with low levels of education. Pettit and Western report that among African American men who did not complete high school in 1999, nearly 60% had been incarcerated by about age 30 compared to only 11.2% of white high school dropouts. Uggen, Manza, and Thompson (2006) have recently estimated that one-third of African American males possess a felony conviction, compared to thirteen percent of all males in the U.S. At present incarceration rates, one-third of all African Americans, 17% of Hispanics, and 5% of all white males will experience incarceration (Bonczar, 2003).

Research and policymakers are increasingly recognizing that the "collateral consequences" of incarceration (Hagan and Dinovitzer, 1999) extend far beyond an individual's time served to children, spouses, and communities (Clear, Rose, Waring, and Scully, 2003; Comfort, 2008; Travis and Waul, 2003). Western and Wildeman (2009) calculate that the number of children with an incarcerated father had increased from 350,000 in 1980 to 2.1 million in 2000. Mumola (2000) calculates that one biological child exists for every jail or prison inmate in the U.S. As with incarceration in general, the risk of having an incarcerated father is concentrated among black children and those whose parents have lower levels of educational attainment. Wildeman (forthcoming) reports that 1 in 4 black children born in 1990 had an imprisoned parent at some time before age 14, compared to just 1 in 25 white children. Moreover, over one-half of black children born to biological fathers who are high school dropouts had an imprisoned father by age 14 (see also Western and Wildeman, 2009). Existing research on the collateral effects of incarceration has found father's incarceration to be associated with family disruption, lower father involvement, and a variety of social psychological outcomes in young children (e.g., Harper and McLanahan, 2002; Waller and Swisher, 2006; Wildeman, forthcoming).

Considerably less well understood are the intergenerational processes linking father's incarceration and children's outcomes in adolescence and early adulthood. Estimates from the National Longitudinal Survey of Adolescent Health (Add Health) suggest that 13% of U.S. males ages 18-24 in 2001-2002 had a biological father with a history of incarceration. This paper uses data from Add Health to examine the

intergenerational relationships between father's history of incarceration and son's serious delinquency and arrest.

Within the context of mass incarceration, a prison record is an increasingly common and salient component of family background (Foster and Hagan, 2007). In the analysis that follows, we test the extent to which socioeconomic status mediates the association of FHI with son's delinquency and arrest. However, given the massive racial disparities in incarceration for the U.S. criminal justice system (Bonczar, 2003), associations between FHI and adult delinquency and arrest may vary significantly across racial and ethnic sub-groups. Most unique are the experiences of African American males, where incarceration is an increasingly normative life course transition among less educated African Americans (Petit and Western, 2004). Thus, the analysis considers the intergenerational transmission of offending separately for nationally-representative subsamples of white, African American, and Hispanic males. In addition, it examines the relative mediating roles of family socioeconomic status, family structure, and youths' pro-social attachments in adolescence, central variables within the status attainment, and life course of crime literatures. The extent to which the effect of FHI both varies by race and is mediated by these processes will help to contextualize the intergenerational phenomenon of incarceration within contemporary American society.

BACKGROUND

Understanding the Intergenerational Transmission of Crime

Gottfredson and Hirschi (1990) note that intergenerational correlations in criminal behavior are among the most robust findings in criminological research. Robins (1966),

Ferguson (1952), and West and Farrington (1977) report strong parent-child and sibling correlations in antisocial behavior and arrest. More recent work by Farrington and colleagues has observed familial incarceration patterns in both European countries and longitudinal panels (Farrington, 1995; Farrington et al., 1975; Farrington et al., 2001; Murray and Farrington, 2005; Murray et al., 2007; Rowe and Farrington, 1997). Similarly, Thornberry and colleagues (Thornberry, 2005; Thornberry et al., 2003) report that father's incarceration is highly predictive of son's delinquent behavior.

Less well established are the mechanisms linking fathers and sons' deviance. One of the most consistent effects of incarceration is diminished employment opportunities and earnings (Holzer, Offner, and Sorenson, 2005; Western, 2002; Western and Beckett, 1999; Western and Petit, 2005). This effect is not only due to interrupted careers and lost time, but also to the stigma or negative mark that a criminal record carries for potential employers (Pager, 2003, 2007; Pager and Quillian, 2005). Combined with the lower educational credentials of the incarcerated (Petit and Western, 2004), father's incarceration places children at a higher risk of growing up within a low socioeconomic status (SES) family. Low family SES, particularly among African Americans, increases risks of living within disadvantaged neighborhood contexts (Massey and Denton, 1993; Wilson, 1996). Consequently, both low family SES and neighborhood poverty may increase the likelihood of future offending (Sampson, Morenoff, and Raudenbush, 2005).

Two other important potential mechanisms linking father's incarceration and son's offending are differences in family structure and family social processes. Recent research on family structure and single-parent relationships has brought increased focus on the social role of the father in improving outcomes of children (Ginther and Pollak,

2004; Lamb and Tamis-Lemonda, 2003; McLanahan and Sandefur, 1994; Mincy, 2006). Incarceration of a father has been found to be associated with declining relationship quality and relationship dissolution and to diminish contact and involvement of fathers with their children (Harper and McLanahan, 2002; Johnson and Waldfogel, 2004; Waller and Swisher, 2006; Western, Lopoo, and McLanahan, 2004). Moreover, many ex-felons face required alimony payments that when paired with employment instability and diminished earnings create legal barriers for visitation rights and father-child involvement (Edelman, Holzer, and Offner, 2006; Holzer, Offner, and Sorenson, 2005). Previous research also suggests that an incarcerated father's access to his children is highly dependent on the mothers who must facilitate visits and other forms of contact (Arditti, Smock, and Parkaman, 2005; Nurse, 2004; Roy and Dyson, 2005).

Father's incarceration may also have more direct effects through its association with early risk factors and child well-being. Existing research suggests parental incarceration negatively affects minor children across developmental stages. In particular, when parental incarceration occurs early in life, attachment relationships are disturbed, and the child has little ability to comprehend and mentally cope with the situation (Johnston and Gabel, 1995; Boswell and Wedge, 2002). While maternal incarceration is often more disruptive to the child (Bloom, 1995), paternal incarceration is also found to have negative effects (Boswell and Wedge, 2002). Children of either an incarcerated mother or father are often found to suffer emotionally and psychologically, have behavioral problems, and in later years, struggle academically (Bloom, 1995; Johnston, 1995; Kampfner, 1995; Wildeman, forthcoming).

Within the study of crime and deviance, a great deal of attention has been paid to the development of self-control, an individual characteristic strongly associated with differences in crime and violence later in life (Hirschi and Gottfredson, 1983; Hay and Forrest, 2006). Thus, father's incarceration might also be expected to influence serious offenses through association with low self-control.

Life course research in adolescence emphasizes the importance of sources of informal social control within the family, at school, and other structured pro-social activities (Sampson and Laub, 1993; Laub and Sampson, 2003). Foster and Hagan (2007) further suggest that the stigma associated with father's incarceration may discourage youth from being involved in school and other community activities, and is part of a larger intergenerational process of social exclusion. At the same time, such a stigma might make unstructured socializing with peers, particularly delinquent ones, more appealing. Such unstructured socializing is argued to be an important proximal mechanism through which crimes occur (Osgood et al., 1996; Osgood and Anderson, 2004). Thus, it will be important to examine attachment to school, academic success, and religious involvement, as well as unstructured socializing as potential mechanisms through which father's incarceration influences future offending.

Variations in the Effects of Incarceration by Race and Ethnicity

As noted earlier, incarceration disproportionately falls on low socioeconomic status African American and Latino men and their families. The magnitude of these inequalities has led some to argue that incarceration has become an almost expected and normative stage within the life courses of low education African American and Latino

men (Pettit and Western, 2004; Swisher and Waller, 2008). As Western and Wildeman (2009) point out, by the start of the 21st century, "over a third of young black noncollege men were incarcerated." Further, they note that African American men under 40 were almost twice as likely to have obtained a prison record as to have received a bachelor's degree. The institution of incarceration now represents a competing life-course event (i.e., with higher education and military service) for less-educated African American men (and to a lesser extent Latinos). At the same time, incarceration remains relatively uncommon for low socioeconomic white men and their families and rare among white middle-class families.

These disparities in incarceration lead to substantial differences in social treatment of incarceration. Within social groups where incarceration becomes increasingly common, group members will perceive incarceration as more normative and less stigmatizing. Swisher and Waller (2008) found suggestive evidence to this effect among African American and Latino mothers in the Fragile Families project. These mothers were more likely to entrust their children with fathers having a history of incarceration than were white mothers. Qualitative research by Hirschfield (2008) similarly suggests that juvenile arrests may carry little stigma within disadvantaged communities where arrest and incarceration have become commonplace. Past research has also discovered that African Americans and Latinos are considerably more likely to mistrust the criminal justice system (Hagan, Shedd, and Payne, 2005; Sampson and Bartusch, 1998). Whereas stigma may be lessened within the group, the mark of incarceration outside of the group may be particularly damaging to the prospects of

African American men and their children in the eyes of community members, school officials, or potential employers (see Pager, 2003).

Such deep differences in rates of incarceration across racial and ethnic groups suggest that the meaning of incarceration, its relationship to other youth risk and protective factors, and its consequence for future offending are likely to vary considerably for white, African American, and Latino youth. Thus, the analyses to follow will separately examine the experiences of each group, allowing us to assess differences in the size of effects and importance of various mediating mechanisms.

DATA

Data are taken from the in-home portion of the National Longitudinal Study of Adolescent Health (Add Health). The Add Health in-home sample consists of approximately 15,000 respondents enrolled in grades 7 through 12 during Wave I in 1995. Follow-ups were conducted in 1996 and 2001. Interviews used in this analysis are from self-reports of respondents and parents. Sensitive questions, including youth offending, were obtained using audio-CASI interview methods (Harris et al., 2003).

For this analysis, males were selected who had completed interviews at Waves I and III. Cases were deleted when responses were missing on the dependent variables, no weight values were given due to non-response, and individuals were older than age 25 at Wave III. These filters yield an analysis sample of 5175 males with valid sample weights. The use of weighting helps to address problems of selection arising from school-based sampling, survey attrition, and incarcerated individuals not interviewed in Wave III. However, this does not eliminate the fact that delinquency, arrest, and father's history of

incarceration are under-represented within the sample. Thus, estimates are likely downwardly biased[2]. For the white, African American, and Hispanic subsamples used in analysis, sample sizes were 2692, 1055, and 830, respectively.

While cases with a missing dependent variable were removed, several predictor variables have missing or incomplete data. To address this problem, we use multiple imputation to replicate the error structure of the observed information matrix; make optimal use of non-missing data (relative to case-wise deletion and missing data dummy variables); and produce unbiased point estimates and standard errors when cases are missing at random (Allison, 2002; Horton and Kleinman, 2007). Using the STATA 'ice' procedure outlined by Royston (2005), median values for cases with observations were taken from seventeen imputed datasets. A comparison of regression output from samples with both imputed data and dummy variables for missing cases (used by Guo et al., 2008 for similar analysis) yielded similar coefficients.

INDEPENDENT VARIABLES

Father's Incarceration. Father's incarceration is measured at Wave III by the question, "Has your biological father ever served time in jail or prison?" Data are not available for the timing of father's incarceration or release. The general findings of reliability for self-report of delinquency and arrest (Farrington et al., 2001; Hindelang, 1981; Hindelang, Hirschi, and Weis, 1979) likely minimize sons falsely reporting father's incarceration.

[2] Chantala, et al. (2004) estimate that selling drugs, carrying a weapon and shooting or stabbing someone are underrepresented by about 5% in the Wave III data relative to the Wave I population. In general, violence measures and criminal activities are underestimated, respectively, in the Wave III sample by an average of 2.5% and 1%. Approximately 110 individuals in Wave III were not interviewed due to incarceration. Sample attrition due to non-response is likely disproportionate for chronic offenders and those incarcerated as adults, causing an age truncation of this population in the sample.

Data where respondents either refused to answer or indicated no knowledge of father's history of incarceration are coded as 'missing.' These factors should downwardly bias correlations between father's history of incarceration and son's delinquent behavior and arrest, reducing chances of 'type II errors.'

Individual, Family and Neighborhood Structural Characteristics. Individual structural variables include the following: (1) age at time of interview; (2) an indicator for being a non-native U.S. immigrant; and (3) mutually-exclusive categories of race and ethnicity, including white, African American, Asian, Native American, and Hispanic men. However, due to relatively small sample sizes, Asian and Native American respondents were dropped from the sample, leaving African American, white, and Hispanic sub-samples of male respondents. Consistent with the crime-age curve, variables for age and age-squared are included. Furthermore, based on Sampson et al., (2005) findings, immigration status is used to distinguish between native and foreign-born respondents.

In examining family structure, variables used include family structure and family socioeconomic status. Initially, to capture family-structure, a five-category set of indicators was used that included male and female-headed single parent families, two-parent families with one biological parent, and non-biological parent households (i.e., foster homes, living with grandparents, etc.) However, due to small cell counts and similarity of effects for households lacking both biological parents, an indicator for two-parent biological parents is used instead. To capture family socioeconomic status, a scale is adopted which combines mothers and fathers' education and employment status at Wave I (Ford, Bearman & Moody, 2004).

Three variables representing neighborhoods' structural characteristics are used: neighborhood racial composition, proportion of families in poverty, and population density. Racial and ethnic composition is assessed by race. Among whites, the indicator variable is when a respondent lives in a census tract with greater than 25% non-whites; among blacks and Hispanics, the indicator variable is when at least 25% of residents share the respondent's racial classification. To measure poverty, an indicator variable is used if at least 30% of families of a respondent's census tract live below the poverty level. As a measure of urbanicity, the number of respondents per square kilometer within the census tract is used. Exploratory analyses considered alternative measures of neighborhood contexts, including indexes of neighborhood disadvantage. These alternatives were found to be no more significant predictors than the more straightforward measures used in the analyses to follow.

Family Process Variables. In addition to family structure, prior research suggested that family process variables may play a role in mediating delinquency. The following variables were included in the analysis: exposure to repeated physical abuse by a respondent or caregiver; a father attachment scale; and a parental strictness scale. Repeated physical abuse is linked by Jaffee et al., (2003) in aggression among children whose parent has been incarcerated. The paternal attachment scale, taken from Harris and Ryan (2003), is used as a measure of how the father's relationship may mitigate effects of FHI. Lastly, parental supervision has been implicated in reducing delinquency among youth (Sampson and Laub, 1993); a measure is adopted from work by Guo et al., (2008).

Adolescent Social Attachments. To measure adolescent social attachments, which may lead to desistance or extend delinquency into young adulthood, a number of variables were examined. In the end, measures were constructed for school attachment, attaining a GPA of 3.0 or higher, respondents' temperament, unstructured time hanging out with peers, and religious attendance.

Based on prior work by Hagan and Foster (2001) and Guo et al., (2008), school attachment is measured by an index of questions of feeling close to others at school, being happy at school, and feeling like being part of the school. During the grading term interviewed, attaining a GPA of 3.0 or higher represents an indicator variable for being academically successful. Extensively used by Hagan and Foster (2003), a parental measure of the respondent having temperament problems is included as a measure of low self-control. Given that unstructured time with peers is associated with increased delinquency (Osgood and Anderson, 2004), a measure of times per week a respondent spent with peers in unstructured environments is included. Lastly, given the negative correlation between delinquency and religious attendance (Sinha, Cnaan, and Gelles, 2007), frequency of religious attendance is also included as a possible mediator. Additional details about the construction of independent predictors and weighted means for each racial and ethnic group are provided in table 1 and table 2, respectively.

Table 1 About Here

Table 2 About Here

DEPENDENT VARIABLES

We analyze two measures of sons' offending based on self-reports of delinquency and arrest. Because official measures reflect not only the behavior of offenders, but also "getting caught" and decisions made by the police and prosecutors in arrest/ prosecution, these measures are traditionally associated with underestimation of delinquency and crime (Hood and Sparks, 1970; Murphy, Shirly, and Witmer, 1946; Robison, 1936; Thornberry and Krohn, 2000). Self-reports of delinquency have been utilized since the late 1970s (Hindelang, 1981; Hindelang, et al., 1979; Thornberry and Krohn, 2000). While generally considered reliable, racial differences in the reliability of self-reports of delinquency and arrest had been observed in studies such as the 1979 National Longitudinal Survey of Youth (Freeman, 2000). This possibility of differential under-reporting by race is a further justification for running models separately across groups, as Hindelang (1981) had argued under-reporting should not bias analyses of factors associated with within-group variation.

Delinquency. To capture longitudinal patterns in delinquent behavior, a 12-item scale developed by Guang Guo and colleagues (Guo, Roettger, Shih, 2007; Guo, Roettger, Cai, 2008) is adopted. This scale is similar to cross sectional measures in Add Health used by Haynie (2001, 2003) and Hagan and Foster (Foster and Hagan, 2007; Hagan and Foster, 2003). This scale is a variation on a widely used set of questions in contemporary research on criminal behavior (Farrington et al.,1996; Hannon, 2003) that includes violent and nonviolent acts. Violent acts include serious physical fighting resulting in injuries requiring medical treatment, using a weapon to get something from someone, physical fighting between groups, shooting or stabbing someone, deliberately damaging

property, and pulling a knife or gun on someone. Non-violent acts include stealing amounts larger or smaller than $50, breaking and entering a home, selling drugs, and holding stolen property. The 12-item scale has Crombach's alpha of 0.81 at Wave I, 0.79 at Wave II, and 0.76 at Wave III.

Propensity for Delinquency. In modeling delinquency with the panel of respondents in Add Health, three major assumptions of linear regression are violated: (1) items in the scale are collapsed frequency counts where right censoring occurs [e.g., '3' represents five times or more in the last twelve months for all items, excluding dichotomous items for shooting/stabbing or pulling a knife/gun on someone]; (2) approximately one-half of delinquency scale reports are '0'; and (3) the panel data are clustered at the individual and school levels. These issues require modification of traditional multivariate analysis to generate a simple random sample. To address these issues, a random effects Tobit model is utilized. The observed delinquency score y_{it} is transformed to the latent propensity to commit delinquency y_{it}*, such that:

$$y_{it} = \begin{cases} y_{it}^* & if\ y_{it}^* > 0 \\ 0 & if\ y_{it}^* \leq 0 \end{cases}$$

In turn, the propensity to commit delinquent acts predicted by the linear model $y_{it}^* = \beta_0 + \boldsymbol{\beta}\mathbf{X}_{it} + \nu_i + e_{it}$, where the ith individual's delinquency score at wave t is estimated by the intercept β_0 and the row vector $\boldsymbol{\beta}\mathbf{X}_{it}$ consisting of covariates for age, father's history of incarceration, structural variables, family-process variables, and adolescent

social attachments. Error is measured by the individual-level random effect ν_i and the random disturbance term e_{it}, where $\nu_i \sim N(0,\sigma_i^2)$ and $e_{it} \sim N(0,\sigma^2)$.

As Osgood et al., (2002) note, Tobit models provide an effective means for modeling non-normal distributions in which high proportions of zeros are reported, adjust for the range of item severity (e.g., shooting someone is weighted more heavily than minor shoplifting), and consider categorical responses of delinquency (i.e., as opposed to raw counts). Haynie and Osgood (2005) use a similar approach to analyzing delinquency in Add Health. By pooling across three waves of data, clustering at the individual level becomes a potential issue. A random effect controls for this clustering at the individual level and generates independent and identically distributed observations. It should be noted that while Tobit models yield consistent and asymptotically normal estimates (Hayashi, 2000), the assumption that the propensity to commit delinquent acts is censored at zero leads to increased uncertainty in regression coefficients and standard errors (Sullivan, McGloin, and Piquero 2008). Accordingly, we perform the following sensitivity analyses: (1) comparisons of regression coefficients and standard errors across various methods of estimation, and (2) comparisons to alternative multilevel models where the dependent variable is assumed to have a Poisson or normally distributed error term. Findings suggest that results are robust to alternative specifications. In addition, multilevel Poisson regression models with random intercepts at both the individual and school level are presented in Supplement 1.

Respondent Arrest. In contrast to delinquency, respondent self-reports of arrest are only available for Wave III. Survey weights are used to model arrest to generate a national

probability sample of adult males. Here, the probability of being arrested as an adult, p_i, is expressed in terms of the independent predictors such that:

$$p_i = \frac{1}{1 + e^{\beta_0 + \beta X_i + \varepsilon_i}}$$

where the ith individual's arrest is predicted by the constant β_0 and the row vector $\mathbf{\beta X}_i$ consisting of covariates for age, father's history of incarceration, structural variables, family-process variables, and adolescent social attachments. The error term ε_i is a random disturbance term such that $\varepsilon_i \sim N(0,\sigma^2)$. In the regression output, the odds ratios for the regression coefficients and linearized standard errors from the estimated row vector $\mathbf{\beta X}_i$ are reported. This regression analysis fits general logistic regression models outlined in Long (1997).

RESULTS

Propensity for Delinquency

Tables 3 through 5 demonstrate the effects of father's history of incarceration on delinquency for white, African American, and Hispanic men. The models estimated for each group examine how family background, family structure and process, and adolescent characteristics mediate the association of father's history of incarceration on respondents' delinquency. A summary of the mediation effects is presented in table 9.

Table 3 About Here

Table 4 About Here

Table 5 About Here

In the baseline model, father's history of incarceration (FHI) is a consistently significant predictor of delinquency across racial groups. Among whites, FHI is associated with a 1.33 point increase ($p<0.001$) in the propensity for delinquency. Among African Americans, FHI is associated with a 1.14 point increase ($p<0.01$) in delinquency. The strongest association is observed among Hispanics, for whom FHI is associated with a 2.34 point increase ($p<0.001$) in delinquency. A *t*-test of regression coefficients indicates this association is significantly larger for Hispanic relative to black ($p<0.001$) and white ($p<0.001$) males. Furthermore, note both age and age-squared as significant predictors consistent with the overall age-crime curve pattern.

With the addition of structural variables to the baseline model, a decline in the magnitude and significance of the FHI effect was observed across all racial groups. However, the mediation effect of structural variables was considerably larger for African Americans (28.4%) relative to Hispanics (1.7%) and whites (6.7%). Likelihood ratio tests indicate that all models have statistically improved fits over the baseline models. For all three groups, living with two biological parents is significantly associated with a decrease in the propensity for delinquency. Foreign born respondents are also found to be significantly and negatively associated with delinquency for all groups, though only marginally so for African Americans ($p<0.10$). This is consistent with the findings of Sampson et al., (2005). Interestingly, neither family socioeconomic status nor neighborhood poverty is a significant predictor of delinquency, though family SES is marginally significant among Hispanics.

The third models introduce measures of family social processes, including attachment to parents, parental supervision, and retrospective reports of repeated abuse

by a parent or caregiver. Likelihood ratio tests again reveal significant improvements in model fit over the baseline estimations. Similar magnitudes of meditation of the associations of FHI (see table 4) were observed across groups, ranging from 28.4% for African Americans to 33.3% for Hispanics. Of the family process measures, reports of child abuse were a consistently strong predictor of delinquency for all three groups (*p<0.001*). For example, among whites, retrospective reports of repeated abuse were associated with a 2.01-point increase ($p<0.001$) in the propensity for delinquency. Other measures of family process were only found to be significant among Hispanics. Among Hispanics, low attachment to fathers was associated with a 1.57 point increase ($p< 0.05$) in propensity for delinquency relative to high attachment youth, whereas a one-unit change in parental supervision was associated with a 0.37 decrease ($p<0.05$) in delinquency. Though not the primary focus, note that the addition of family process variables reduced the direct associations of living with two biological parents to non-significance for both white and Hispanic respondents but had no effect on the coefficient for African Americans.

The fourth model for each group considers whether FHI influences propensities for delinquency through earlier indicators of child problems (i.e., difficult temperament) and adolescent social attachments, including school attachment and grades, hanging out with friends, and attending church. Overall, adolescent social attachments appeared to provide the greatest mediation of father's history of incarceration; however, this mediation was much smaller for African Americans relative to whites and Hispanics. As before, all models represent statistical improvements in model fit over the baseline models. For all three groups, school attachment and grades were associated with

statistically significant decreases in propensity for delinquency, while hanging out with friends was associated with higher propensities of delinquency. The largest difference between groups was observed for the association of parent reports of difficult temperament, which was a significant predictor for whites and Hispanics, but not African Americans. This difference is striking, though consistent with the idea that disadvantage saturation (McLeod 1995; Wilson 1996; Hannon 2003) may negate the effects of self-control.

When structural, family social process, and adolescent attachment variables are considered simultaneously (in the last models), the effect of FHI is significantly mediated for all three groups. The greatest mediation is observed for Hispanics (61.1%), followed by whites (48.1%), and African Americans (29.8%). In terms of standard deviation changes, the FHI effect declined by 2.14 standard deviations ($p<0.02$, one tailed test) among whites, 0.975 standard deviations among African Americans (non-significant), and 2.41 standard deviations ($p<0.01$) among Hispanics. Mediation across models does not appear to be additive, suggesting covariance among the meditational variables. Moreover, father's history of incarceration remains a significant predictor of propensity for delinquency across groups.

Adult Arrest

Tables 6 through 8 examine the same mediational questions regarding the association of FHI with sons' reports of being arrested as an adult for white, African American, and Hispanic respondents respectively. A summary of mediational effects is again presented in table 10.

Table 6 About Here

Table 7 About Here

Table 8 About Here

In the baseline models, FHI is a consistently significant predictor of propensity for violence across all racial groups. Among whites, father's history of incarceration leads to an almost doubled odds (o.r.=1.904) of adult arrest. Among African Americans and Hispanics, FHI is associated with increases of more than 2.5 times the odds of adult arrest.

With the addition of structural variables in the second models, modest overall changes are observed in the significance of FHI for respondents' likelihood of incurring adult arrest. Among white males, the direct effect of FHI actually increased by 16.1% to an odds ratio of 2.09, suggesting a slight suppressor effect. This may be due to the inclusion of family socioeconomic status. Among whites, a one-unit change in family SES is associated with a 6.6% increase (o.r.=1.066) in the odds of arrest. A most striking effect is observed for foreign-born whites who have significantly lower odds of arrest (o.r.=0.03) than do native-born whites. Among African American males, the association of FHI on arrest decreased by 21.4% to an odds ratio of 2.24. As was also the case for serious delinquency, residing in a home with both biological parents reduced the odds of adult arrest significantly compared to those living in other family arrangements in adolescence. Among Hispanics, the effect of FHI is mediated by 52.2% to an odds ratio of 1.738. Living with both biological parents is a similarly significant predictor for Hispanic males, reducing the odds of arrest by 67.2%.

In the third set of models, it is observed that family process variables are insignificant and do virtually nothing to attenuate the association of FHI with arrest between both white and African American males. In contrast, the association of FHI with arrest is attenuated by 25.5% among Hispanic males, and a one-unit change in parental supervision is associated with a 21.4% reduction in the odds of arrest. Surprisingly, reports of repeated child abuse decrease the odds of adult arrest by 65.0% among Hispanic males, possibly explained by differences in intimacy and social support among Hispanic immigrants physically punishing children, relative to native whites and African Americans (Fontes, 2002).

Varying patterns of mediation are also observed across groups with the inclusion of parent reports of difficult temperament and measures of adolescent social attachments. Inclusion of these variables appears to partially mediate the association of FHI with arrest among whites (22.1%) and Hispanics (43.6%), but has virtually no effect on the FHI association among African Americans (i.e., variables actually increase the FHI association by 1.5%). Among whites only, difficult temperament is associated with a 61.5% increase in the odds of arrest. Though varying in magnitude, school attachment is associated with decreased odds of arrest for all groups; whereas time spent hanging out with friends is associated with increased odds of arrest. Consistent with the greater degree of mediation, these associations are strongest for Hispanics. For example, a one-unit increase in school attachment is associated with a halving of the odds (0.496 odds ratio) of arrest, and a one-unit increase in time spent hanging out with friends increases the odds of arrest by1.71. Attending church is a significant predictor of lower odds of arrest among both whites and African Americans.

When all potential mediators are considered simultaneously, quite different patterns of mediation are obtained across groups. Strongest mediation is found for Hispanics, with combined mediators accounting for 64.6% of the overall association between FHI and arrest. Among whites, the full model accounts for a modest 17.1% of the overall association. Among African Americans, the mediation model breaks down altogether. Inclusion of the full set of variables is found to *increase* the association of FHI with arrest by 11.5%.

Table 9 About Here

Table 10 About Here

Predicted Probabilities of Adult Arrest

How does FHI differentially alter the probability that a black, white, or Hispanic respondent will be arrested as an adult? To quantify the magnitude of effects, predicted probabilities are estimated for subpopulations stratified by race and history of incarceration. For each subpopulation (i.e., black, white, and Hispanic men either with or without FHI), using predicted probabilities provides the mean chance that a member of each subpopulation is likely to be arrested as an adult (Long, 1997). To control for mediating effects, predicted probabilities for each subgroup are estimated using the regression coefficients estimated in the full models (i.e., 'Model 5') in tables 6 through 8. Results, along with 95% confidence intervals for the mean chance of being arrested, are presented in figure 1.

Figure 1 About Here

Among whites, those without an incarcerated father have a mean predicted probability of arrest of 13 %. In contrast, white respondents whose biological father was

ever incarcerated have a predicted probability of arrest of 22%. Among African Americans, the predicted probabilities increase from 14% for those without an incarcerated father to 32% with an incarcerated father. Among Hispanics, the comparable percentages are 11% and 19%.

These predicted probabilities indicate three clear results: (1) having a father serve time in jail or prison is associated with a significant increase in the likelihood of becoming entangled in the U.S. criminal justice system; (2) becoming entangled in the criminal justice system is much stronger for African American respondents relative to whites and Hispanics in association with FHI; and (3) with no FHI, predicted probability of arrest is roughly equal across racial groups.. Even when controlling for father's socioeconomic status (through the measure of family SES measuring mothers and fathers' education and work), this suggests that the effect of father's history of incarceration is not a simple transmission of low SES from African American fathers to sons. Effects of FHI, especially for African Americans, are also distinct from general poverty, structural effects, family processes, and influences in adolescence. The fact that probability of arrest is roughly equal across all racial groups for respondents with no FHI suggests that fathers' incarceration is a significant risk factor for being arrested as an adult.

Sensitivity Analyses

A variety of supplemental modeling approaches were performed to test the robustness of the effects of FHI on delinquency and arrest. In modeling delinquency, both count-based and normal regression models yielded similar results. As an alternative

specification, results for a two-level Poisson regression, with random effects at the individual and school level, are presented in a supplemental file as alternatives to Tobit models presented in tables 3 through 5. Similarly, in predicting arrest, logistic regressions with a random effect at the individual level yielded similar results to those presented in tables 6 through 8. Overall, these supplemental analyses suggest that the results presented are not an artifact of the modeling techniques used in analysis.

Similarly, analyses using additional or alternative measures of mediating mechanisms did not significantly alter the pattern of associations between FHI and son's delinquency and arrest. Alternative measures of family social processes (such as paternal closeness and attachment, and alimony support) and adolescent attachments (such as religious values, school activity, and romantic relationships) did not appreciably change the pattern of mediation observed. .

DISCUSSION

Racial disparities in the U.S. criminal justice system place African American and Hispanic children at an increased risk for having an incarcerated parent. In this analysis, we found father's history of incarceration to be robustly associated with son's delinquency and arrest for young males in the U.S. At the same time, we observe considerable variation in the effects of incarceration on delinquency and arrest across racial and ethnic groups and different patterns of mediation.

The results are particularly striking for African Americans with respect to self-reported adult arrests. Though the association of father's incarceration with delinquency

is quite similar for the white, black, and Hispanic sub-samples, father's history of incarceration increases African Americans' likelihood of arrest by a factor of three, with probability of arrest at one-third given father's incarceration history. Moreover, controlling for structural, familial, and social attachments typically associated with arrest does nothing to attenuate this relationship. Among whites and Hispanics, in contrast, these variables were significant mediators. Hence, father's incarceration places African American youth at a disproportionate risk of becoming involved in the U.S. criminal justice system

As a whole, mediation of the FHI effect was strongest among Hispanics, where the effect of FHI dropped by a full 60% (and to statistical non-significance) in models predicting delinquency and arrest. Among whites, mediation effects were strongest for delinquency. These results broadly suggest that race-specific patterns of mediation should be taken into account by future research on intergenerational patterns of delinquency and arrest.

As results suggest, father's history of incarceration is a much stronger predictor of adult delinquency and arrest than family socio-economic status. Moreover, family socioeconomic status did little, if anything, to mediate the association between FHI and delinquency or arrest. Rather than suggest that family socioeconomic status no longer matters, we interpret this finding to indicate that father's incarceration is increasingly becoming an important component of family social background, particularly among sub-groups that are disproportionately affected (Foster and Hagan, 2007).

Family structure and a history of repeated abuse were consistently observed to account for the association between FHI and delinquency and arrest. These patterns make

sense given that most children with an incarcerated parent live in homes without both biological parents (Western, Loopo, and McLanahan, 2004). Future research that targets family formation and events occurring in the lives of children with incarcerated parents might yield additional insights into the role of father's incarceration.

One unexpected set of findings was racial differences in the effect of child temperament on delinquency and arrest. Hagan and Foster (2001, 2003) have utilized child temperament as a measure of low self-control. Here, child temperament was found to be a strong predictor among whites and Hispanics ($p<0.01$), yet absolutely non-significant among African Americans. This non-significance among African Americans is consistent with empirical work by McLeod (1995) and Hannon (2003) who argue that overwhelming cultural disadvantage suppresses individual outcomes among African Americans. In the context of mediating the effect of father's incarceration, child temperament may make little difference when societal conditions have made incarceration an almost expected event or transition within the life course for disadvantaged African-Americans.

This study is not without limitations. The school-based sampling design, and the fact that individuals in jail or prison were not interviewed at Wave III, excludes individuals most likely to be caught up in the criminal justice system. Though use of sample weights partially addresses these issues, we recognize that our estimates of the effect of FHI on delinquency and arrest are likely downwardly biased. At the same time, however, it is quite noteworthy that FHI has such a robust association with son's delinquency and arrest among nationally representative sub-samples of youth who had not dropped out of the school system.

An additional limitation is lack of information about the timing of father's incarceration. This undoubtedly creates some uncertainty about the temporal ordering of independent, mediating, and dependent variables. Though not ideal, we believe that the problem is minimized by several factors. Reverse causation is not likely to be a strong threat given the logical implausibility (though not impossibility) that son's adult arrest or delinquency causes a father's incarceration. Moreover, the fact that incarceration is most common between ages 18 and 30 (Bonczar, 2003) suggests that most biological fathers would have been incarcerated prior to Wave I, at which point their children were of middle and high school ages. Nevertheless, we would expect recent incarcerations to have stronger effects than more distal experiences. Future research with Add Health will be able to examine these temporal issues when the fourth wave of data is released.

Though we are not completely able to rule out that patterns of racial and ethnic differences may reflect unobserved heterogeneity, or genetic or biological factors, prior work by Duncan, Boisjoly, and Harris (2001) suggests that general heritability is not present in the Add Health sample. Nor, would it be possible to examine given that specific-gene data linked to delinquency (i.e., Guo *et al.,* 2008) are currently unavailable for Add Health. Furthermore, the robustness of the association between FHI and son's delinquency and arrest to mediation effects, along with greatest significance being observed among the group reporting the highest percentage of incarcerated fathers (i.e., African Americans), suggest that effects of FHI are not simply due to selection effects. Presently, data collection is underway for the fourth wave of Add Health. These new data will provide additional information on the timing of father's incarceration, the experiences of those in jail or prison at the time of interview, DNA data, and

incarceration histories for individuals ages 25 through 32. Future research using this data would help to elaborate upon the findings presented here and partially address some of these limitations.

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Table 1: Variable Descriptions

Variable	Description
Dependent Variables	
Delinquency Scale	Twelve Item Scale based on longitudinal analysis of Add Health by Guang Guo and colleagues (Guo et al., 2008; Guo et al., 2007). See Guo et al., (2008, pp. 549-550) for constructed components.
Arrested As Adult	Self-Report of Respondent's' history of arrest. Coded: '1'=Arrested, '0'=Not Arrested.
Independent Variables	
Father'sFather's History of Incarceration	Wave III Response to "Has your biological father ever served time in jail or prison?" Coded '1'" for positive response, '0' otherwise.
Age	Age at each wave when respondent was interviewed.
Structural Variables	
Family Socioeconomic Status	Socioeconomic Scale based on Ford, Moody, and Bearman (2004). Composite of Occupation and Education for mother and/or father living in household, with data gathered from questions asked in school and home respondents of interviews. and interviews
Lives with two biological parents	Respondent resides in home with both biological parents. Coded: '1'=Yes, '0'=No.
Foreign-born	Respondent is non-native U.S. citizen born outside of the United States. Coded: '1'=Yes, '0'=No.
Greater than 30% non-white in census Tract tract	Dichotomous coding indicating that 30% or more of residents of respondent's census tract are non-white. Coded: '1'=Yes, '0'=No.
Greater than 30% African American in census tract	Dichotomous coding indicating that 30% or more of residents of respondent's' census tract are African American. Coded: '1'=Yes, '0'=No.
Greater than 30% Hispanic/Latino Origin origin in census tract	Dichotomous coding indicating that 30% or more of residents of respondent's' census tract are of Hispanic/Latino Origin. Coded: '1'=Yes, '0'=No.
Greater than 30% of families below poverty in census tract	Dichotomous coding indicating that more than 30% or more of families in respondent's census tract have incomes below poverty level. Coded: '1'=Yes, '0'=No.
Density in census tract.	Respondent's' census tract density [individuals per square kilometer]
Familial Process Variables	
Father Closeness	Respondent's' Wave I response of "How close do you feel towards your biological father?" Father's Closeness is coded as: '1'=Not close at all, '2'=not very close, '3'=Somewhat close, '4'=Quite Close, '5'=Fairly close
Father Involvement	Respondent's' Wave I Report report of activity with father during the past month for the following activities: (1) gone shopping, (2) played a sport, (3) attended church service or activity, (4) talked about relationship issues, and (5) attended concert, sporting event, movie, play, or museum. Coded as: '1'= Yes, '0'=No.
Father Attachment Scale	Scale created by Harris and Ryan (2003) for measuring father attachment. Scale sums respondent's' report of closeness to biological father's and participation in daily activities.
Low Attachment	Score values between '1' & '3'
Medium Attachment	Score values between '4' & '6'
High Attachment	Score values between '7' & '10'
Parental Supervision	Wave 1 summary score of whether or not respondent's' parents

	set weekend curfews, controlled friends respondent hung out with, set bedtime, set limits on TV viewing, and set limits on clothes worn.
Repeated Abuse by Parent or Caregiver	Dichotomous variable indicating history of being slapped, kicked, or hit by parent or caregiver more than five times before 6th grade .grade. Coded '1' if event occurred more than five times, '0' otherwise
Difficult child temperament	Parent's' response to "Does your child have a temper?" Coded: '1'=Yes, '0'=No.
School Attachment Scale	Attachment scale used by Hagan and Foster (2001), averaging responses to questions of agreeing or disagreeing with the following questions: (1) You feel close to others at school (2) You are happy at school (3) You feel like you are part of your school. Coded responses were: '1'= Strongly disagree, '2'=Disagree, '3'=Neither agree nor disagree, '4'=Agree, '5'=Strongly Agree
GPA Above 3.0	Respondent made all A's or B's on last report card. Coded: '1'=Yes, '0'=No.
Time Spent 'Hanging Out' with Friends	Response to question, "During the past week, how often did you just hang out with friends?". '0'=zero times, '1'=one or two times, '2'=three or four times, '3'=five or more times.
Religious Attendance	Religious attendance of respondent at Wave I. Coding is for "How often have you attended religious services in the past 12 months?" '1'=Never, '2'=A few times per year, '3'= At least once per month, '4'= One or more times per week

Table 2: Descriptive Statistics for National Probability Samples

Variables	Full Sample	White	African American	Hispanic/ Latino
Dependent Variables				
Delinquency Scale				
Wave 1	2.22	2.10	2.44	2.42
	(3.85)	(3.64)	(3.82)	(4.34)
Wave 2	1.59	1.48	1.66	1.97
	(3.02)	(2.74)	(3.03)	(3.70)
Wave 3	1.25	1.23	1.44	1.23
	(2.49)	(2.36)	(2.85)	(2.69)
Ever Arrested As Adult	0.14	0.14	0.16	0.11
	(0.34)	(0.35)	(0.35)	(0.34)
Independent Variables				
Father's History of Incarceration	0.12	0.10	0.17	0.16
	(0.33)	(0.31)	(0.37)	(0.36)
Age at Each Interview Wave of Add Health				
Wave 1	15.35	15.34	15.51	15.36
	(1.69)	(1.66)	(1.74)	(1.68)
Wave 2	16.27	16.26	16.46	16.30
	(1.70)	(1.67)	(1.75)	(1.69)
Wave 3	21.74	21.72	21.92	21.76
	(1.72)	(1.69)	(1.78)	(1.72)
Structural Variables				
Family Socioeconomic Status	6.49	6.73	6.21	5.17
	(2.53)	(2.37)	(2.49)	(2.62)
Father High School Dropout	0.12	0.10	0.08	0.33
	(0.33)	(0.29)	(0.26)	(0..46)
Resides with Both Biological Parents	0.60	0.64	0.33	0.61
	(0.49)	(0.49)	(0.48)	(0.49)
Foreign-Born	0.05	0.01	0.01	0.19
	(0.27)	(0.07)	(0.14)	(0.42)
Greater than 30% Non-White in Census Tract	0.25	0.08	-	-
	(0.40)	(0.27)		
Greater than 30% African American in Tract	0.18	-	0.70	-
	(0.38)		(0.46)	
Greater than 30% Hispanic/Latino Origin in Tract	0.06	-	-	0.38
	(0.34)			(0.50)
Greater than 30% of Families in Poverty in Tract	0.10	0.04	0.30	0.15
	(0.29)	(0.37)	(0.49)	(0.22)
Census Tract Density	1.59	0.92	2.61	4.12
	(3.32)	(1.47)	(3.16)	(5.64)
Familial Process and Other Variables				
Father Attachment Scale				
Low Attachment	0.15	0.12	0.28	0.16
	(0.38)	(0.34)	(0.45)	(0.39)
Medium Attachment	0.60	0.58	0.65	0.64
	(0.50)	(0.50)	(0.50)	(0.50)
High Attachment	0.25	0.30	0.07	0.20
	(0.40)	(0.48)	(0.27)	(0.37)
Parental Supervision	1.48	1.38	1.59	1.57
	(1.21)	(1.15)	(1.27)	(1.28)
Repeated Abuse by Parent or Caregiver	0.13	0.10	0.16	0.22
	(0.35)	(0.31)	(0.38)	(0.39)
Parent Report of problems in child temperament	0.28	0.29	0.24	0.27
	(0.44)	(0.45)	(0.41)	(0.44)
School Attachment Scale	3.95	3.94	4.01	3.90
	(0.63)	(0.65)	(0.58)	(0.65)
GPA Above 3.0	0.45	0.49	0.28	0.33
	(0.49)	(0.50)	(0.46)	(0.45)
Time Spent 'Hanging Out' with Friends	2.04	2.08	1.95	1.92
	(0.97)	(0.96)	(1.00)	(0.98)
Religious Attendance	2.74	2.63	2.95	2.81
	(1.21)	(1.20)	(1.13)	(1.22)
Sample Sizes	5119	2692	1055	830

Table 3: Tobit Models of Serious Delinquency, White Sample

Variables	(1)	(2)	(3)	(4)	(5)
Intercept	-10.12***	-10.14***	-9.61***	-4.85*	-5.39**
	(1.97)	(2.00)	(2.01)	(2.03)	(2.06)
Father's History of Incarceration	1.33***	1.24***	0.91**	0.78**	0.69**
	(0.27)	(0.28)	(0.28)	(0.26)	(0.26)
Age	1.32***	1.28***	1.25***	1.26***	1.23***
	(0.22)	(0.22)	(0.22)	(0.21)	(0.21)
Age-Squared	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Structural Variables					
Family Socioeconomic Status		0.03	0.04		0.11**
		(0.04)	(0.04)		(0.04)
Resides with Both Biological parents		-0.48**	-0.25		0.01
		(0.18)	(0.19)		(0.18)
Foreign-Born		-2.93*			-3.10*
		(1.28)			(1.21)
Proportion Non-Whites in Tract		-0.14			0.45
		(0.26)			(0.31)
Greater than 30% Families in Poverty in Tract		-0.44			-0.36
		(0.27)			(0.26)
Census Tract Density		0.11+			0.00
		(0.06)			(0.06)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			0.34		-0.20
			(0.37)		(0.36)
Medium Attachment			0.32		0.13
			(0.46)		(0.45)
High Attachment [Reference]					
Parental Supervision			-0.12		-0.07
			(0.08)		(0.07)
Repeated Abuse by Parent or Caregiver			2.01***		1.62***
			(0.32)		(0.30)
Adolescent Social Attachments					
Difficult Child Temperament				0.99***	0.99***
				(0.18)	(0.18)
School Attachment				-1.39***	-1.32***
				(0.13)	(0.13)
GPA Above 3.0				-0.78***	-0.85***
				(0.17)	(0.17)
Time Spent 'Hanging Out' with Friends				0.57***	0.54***
				(0.09)	(0.09)
Religious Attendance				-0.08	-0.10
				(0.07)	(0.07)
$\sigma_{\text{Individual}}$	3.29***	3.27***	3.23***	2.99***	2.93***
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
$\sigma_{\text{Random Error}}$	4.07***	4.07***	4.07***	4.05***	4.05***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Number of Individuals	2684	2684	2684	2684	2684
Number of Observations	7405	7405	7405	7405	7405
Log Likelihood	-12793.3	-12784.6	-12758.6	-12661.2	-12631.6

Notes:
Random effects coefficients with standard errors in parentheses.
*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test].

Table 4: Tobit Models of Serious Delinquency, African American Sample

Variables	(1)	(2)	(3)	(4)	(5)
Intercept	-11.39***	-10.98**	-11.17**	-6.26+	-7.12+
	(3.44)	(3.46)	(3.48)	(3.57)	(3.61)
Father's History of Incarceration	1.14**	0.92 *	0.81*	1.00**	0.80 *
	(0.40)	(0.40)	(0.40)	(0.37)	(0.38)
Age	1.42***	1.44***	1.43***	1.41***	1.45***
	(0.38)	(0.38)	(0.38)	(0.37)	(0.37)
Age-Squared	-0.05***	-0.05***	-0.05***	-0.05***	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Structural Variables					
Family Socioeconomic Status		-0.06	-0.05		0.02
		(0.06)	(0.06)		(0.06)
Resides with Both Biological Parents		-0.88**	-0.93**		-0.76*
		(0.32)	(0.34)		(0.33)
Foreign Born		-2.15+			-1.32
		(1.16)			(1.12)
Greater than 30% African American in Tract		0.21			0.23
		(0.36)			(0.34)
Greater than 30% Families in Poverty in Tract		-0.78			0.21
		(0.49)			(0.33)
Census Tract Density		0.02			0.01
		(0.05)			(0.05)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			-0.44		-0.79+
			(0.48)		(0.44)
Medium Attachment			0.53		0.44
			(0.58)		(0.55)
High Attachment [Reference]					
Parental Supervision			-0.09		-0.07
			(0.12)		(0.11)
Repeated Abuse by Parent or Caregiver			1.61***		1.43***
			(0.41)		(0.38)
Adolescent Social Attachments					
Difficult Child Temperament				0.35	0.33
				(0.35)	(0.34)
School Attachment				-1.34***	-1.25***
				(0.25)	(0.25)
GPA Above 3.0				-1.66***	-1.64***
				(0.33)	(0.33)
Time Spent 'Hanging Out' with Friends				0.78***	0.78***
				(0.15)	(0.14)
Religious Attendance				-0.25+	-0.20
				(0.13)	(0.13)
$\sigma_{\text{Individual}}$	3.46***	3.43***	3.37***	3.12***	3.03***
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
$\sigma_{\text{Random Error}}$	4.70***	4.69***	4.69***	4.69***	4.69***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Number of Individuals	1055	1055	1055	1055	1055
Number of Observations	2869	2869	2869	2869	2869
Log Likelihood	-5094.9	-5088.4	-5082.0	-5041.5	-5030.7

Notes:
Random effects coefficients, with standard errors in parentheses.
*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test]

Table 5: Tobit Models of Serious Delinquency, Hispanic Sample

Variables	(1)	(2)	(3)	(4)	(5)
Intercept	-11.38*	-12.14**	-11.05*	-3.01	-4.42
	(4.44)	(4.46)	(4.47)	(4.50)	(4.52)
Father's History of Incarceration	2.34***	2.30***	1.56**	1.28**	0.91+
	(0.52)	(0.52)	(0.52)	(0.47)	(0.47)
Age	1.55**	1.64***	1.48**	1.53**	1.53**
	(0.48)	(0.48)	(0.48)	(0.47)	(0.47)
Age-Squared	-0.05***	-0.06***	-0.05***	-0.05***	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Structural Variables					
Family Socioeconomic Status		0.14+	0.17*		0.11
		(0.07)	(0.07)		(0.07)
Resides with Both Biological Parents		-0.94*	-0.56		-0.22
		(0.38)	(0.40)		(0.36)
Foreign Born		-1.93***			-1.22**
		(0.48)			(0.44)
Greater than 30% Hispanic in Tract		0.62			0.21
		(0.39)			(0.37)
Greater than 30% Families in Poverty in Tract		-0.10			-0.05
		(0.53)			(0.48)
Census Tract Density		0.02			0.00
		(0.04)			(0.03)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			1.57*		0.85
			(0.69)		(0.63)
Medium Attachment			-0.89		-0.82
			(0.87)		(0.78)
High Attachment [Reference]					
Parental Supervision			-0.37*		-0..28*
			(0.15)		(0.14)
Repeated Abuse by Parent or Caregiver			2.21***		1.85***
			(0.47)		(0.44)
Adolescent Social Attachments					
Difficult Child Temperament				1.22***	1.00**
				(0.38)	(0.37)
School Attachment Scale				-2.50***	-2.18***
				(0.26)	(0.26)
GPA Above 3.0				-1.05***	-1.24***
				(0.39)	(0.39)
Time Spent 'Hanging Out' with Friends				1.07***	1.00***
				(0.18)	(0.18)
Religious Attendance				-0.16	-0.04
				(0.14)	(0.14)
$\sigma_{\text{Individual}}$	4.06***	3.92***	3.80***	3.25***	3.06***
	(0..21)	(0.20)	(0.20)	(0.20)	(0.20)
$\sigma_{\text{Random Error}}$	4.91***	4.91***	4.90***	4.89***	4.89***
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Number of Individuals	830	830	830	830	830
Number of Observations	2260	2260	2260	2260	2260
Log Likelihood	-4105.9	-4091.7	-4080.5	-4018.7	-4000.0

Notes:
Random effects coefficients, with standard errors in parentheses.
*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test]

Table 6: Logistic Models of Adult Arrest, White Sample

Variables	(1)	(2)	(3)	(4)	(5)
Father's History of Incarceration	1.904**	2.085***	1.894**	1.674*	1.749**
	(0.38)	(0.43)	(0.42)	(0.34)	(0.38)
Age	1.040	1.043	0.990	1.025	0.993
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Structural Variables					
Family Socioeconomic Status		1.066*	1.052+		1.088*
		(0.03)	(0.03)		(0.04)
Resides with Both Biological Parents		1.118	1.246		1.317+
		(0.16)	(0.21)		(0.22)
Foreign Born		0.030**			0.025**
		(0.03)			(0.03)
Greater than 30% Non-white in Tract		1.137			1.237+
		(0.27)			(0.27)
Greater than 30% Families in Poverty in Tract		1.425			1.237
		(0.41)			(0.27)
Census Tract Density		1.050			1.016
		(0.04)			(0.09)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			1.551		1.445
			(0.45)		(0.40)
Medium Attachment			0.782		0.640
			(0.26)		(0.22)
High Attachment [Reference]					
Parental Supervision			0.889+		0.915
			(0.06)		(0.06)
Repeated Abuse by Parent or Caregiver			1.602+		1.448
			(0.31)		(0.30)
Adolescent Social Attachments					
Difficult Child Temperament				1.615**	1.657**
				(0.26)	(0.26)
School Attachment Scale				0.750*	0.765*
				(0.09)	(0.10)
GPA Above 3.0				1.179	1.043
				(0.17)	(0.16)
Time Spent 'Hanging Out' with Friends				1.187*	1.176*
				(0.08)	(0.08)
Religious Attendance				0.866*	0.839*
				(0.06)	(0.06)
Number of Individuals	2602	2602	2602	2602	2602

Notes:
Odds ratios, with linearized standard errors in parentheses.
*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test]

Table 7: Logistic Models of Adult Arrest, African American Sample

Variables	(1)	(2)	(3)	(4)	(5)
Father's History of Incarceration	2.572***	2.238**	2.506***	2.595***	2.753***
	(0.62)	(0.58)	(0.59)	(0.67)	(0.64)
Age	1.055	1.062	1.070	1.033	1.087
	(0.08)	(0.08)	(0.10)	(0.08)	(0.12)
Structural Variables					
Family Socioeconomic Status		1.077	1.077		1.087+
		(0.06)	(0.06)		(0.06)
Resides with Both Biological Parents		0.370***	0.322***		0.356***
		(0.10)	(0.09)		(0.10)
Foreign Born		0.236			0.322
		(0.32)			(0.49)
Greater than 30% African American in Tract		0.762			0.836
		(0.23)			(0.27)
Greater than 30% Families in Poverty in Tract		1.119			1.184
		(0.30)			(0.36)
Census Tract Density		1.050+			1.054*
		(0.03)			(0.02)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			1.027		0.950
			(0.31)		(0.25)
Medium Attachment			0.518		0.377*
			(0.24)		(0.18)
High Attachment [Reference]					
Parental Supervision			1.004		1.041
			(0.10)		(0.13)
Repeated Abuse by Parent or Caregiver			1.351		1.462
			(0.55)		(0.68)
Adolescent Social Attachments					
Difficult Child Temperament				1.069	1.148
				(0.31)	(0.33)
School Attachment Scale				0.669*	0.602*
				(0.13)	(0.19)
GPA Above 3.0				0.382*	0.370*
				(0.15)	(0.15)
Time Spent 'Hanging Out' with Friends				1.330*	1.346*
				(0.18)	(0.19)
Religious Attendance				0.824	0.868
				(0.11)	(0.11)
Number of Individuals	1001	1001	1001	1001	1001

Notes:
Odds ratios, with linearized standard errors in parentheses.
*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test]

Table 8: Logistic Models of Adult Arrest, Hispanic Sample

Variables	(1)	(2)	(3)	(4)	(5)
Father's History of Incarceration	2.543*	1.738	2.149*	1.870	1.546
	(1.04)	(0.65)	(0.75)	(0.756	(0.39)
Age	1.024	1.040	0.914	0.994	0.928
	(0.10)	(0.11)	(0.10)	(0.10)	(0.12)
Structural Variables					
Family Socioeconomic Status		1.000	0.989		0.984
		(0.08)	(0.06)		(0.09)
Resides with Both Biological Parents		0.328*	0.387*		0.288**
		(0.14)	(0.17)		(0.13)
Foreign Born		0.505			0.701
		(0.26)			(0.50)
Greater than 30% Hispanic in Tract		1.063			1.483
		(0.40)			(0.43)
Greater than 30% Families in Poverty in Tract		1.068			0.701
		(0.63)			(0.55)
Census Tract Density		0.957			0.811**
		(0.03)			(0.07)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			1.087		0.694
			(0.74)		(0.45)
Medium Attachment			2.151		1.809
			(1.84)		(1.65)
High Attachment [Reference]					
Parental Supervision			0.786*		0.839
			(0.09)		(0.12)
Repeated Abuse by Parent or Caregiver			0.350**		0.237**
			(0.14)		(0.10)
Adolescent Social Attachments					
Difficult Child Temperament				1.157	0.368
				(0.43)	(0.08)
School Attachment Scale				0.496***	0.368***
				(0.10)	(0.080)
GPA Above 3.0				0.691	0.620
				(0.24)	(0.23)
Time Spent 'Hanging Out' with Friends				1.714**	1.677*
				(0.35)	(0.38)
Religious Attendance				1.053	1.158
				(0.17)	(0.20)
Number of Individuals	809	809	809	809	809

Notes:
Odds ratios, with linearized standard errors in parentheses.
*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test]

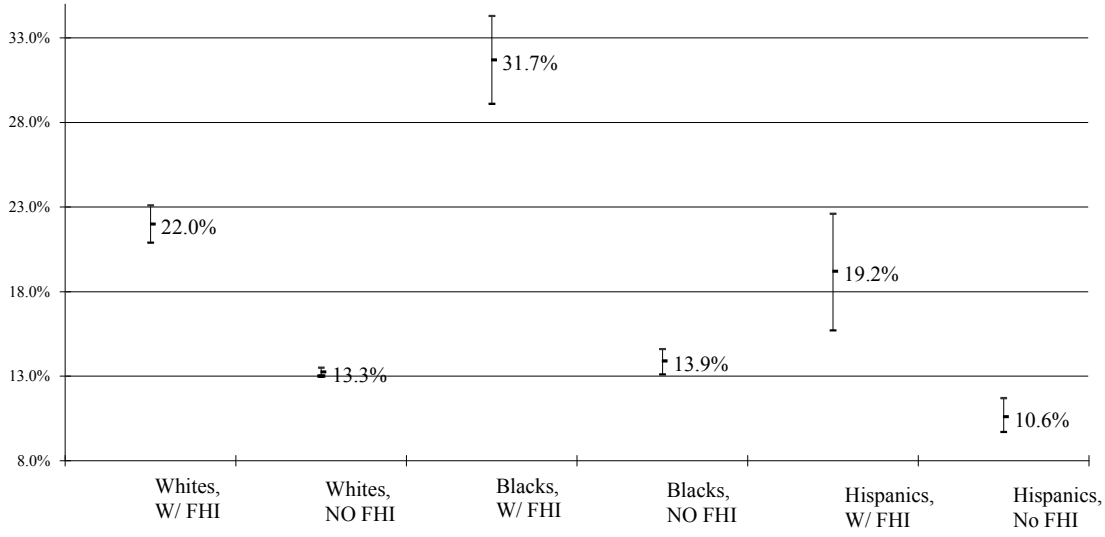
Table 9: Summary of Mediational Effects of Father's History of Incarceration on Son's Serious Delinquency

	(1)	(2)	(3)	(4)	(5)
White Sample					
Regression Coefficients	1.33***	1.24***	0.91**	0.78**	0.69**
[from Table 3]	(0.27)	(0.28)	(0.28)	(0.26)	(0.26)
Percentage Mediated	-	6.7%	31.6%	41.4%	48.1%
African American Sample					
Regression Coefficients	1.14**	0.92 *	0.81*	1.00**	0.80 *
[from Table 4]	(0.40)	(0.40)	(0.40)	(0.37)	(0.38)
Percentage Mediated	-	19.3%	28.4%	12.3%	29.8%
Hispanic Sample					
Regression Coefficients	2.34***	2.30***	1.56**	1.28**	0.91+
[from Table 5]	(0.52)	(0.52)	(0.52)	(0.47)	(0.47)
Percentage Mediated	-	1.4%	33.3%	45.9%	61.1%

Table 10: Summary of Mediational Effects of Father's History of Incarceration on Son's Adult Arrest

	(1)	(2)	(3)	(4)	(5)
White Sample					
Odds Ratios	1.904**	2.085***	1.894**	1.674*	1.749**
[from Table 6]	(0.38)	(0.43)	(0.42)	(0.34)	(0.38)
Percentage Mediated	-	-16.2%	1.1%	22.1%	17.1%
African American Sample					
Odds Ratios	2.572***	2.238**	2.506***	2.595***	2.753***
[from Table 7]	(0.62)	(0.58)	(0.59)	(0.67)	(0.64)
Percentage Mediated	-	21.4%	4.2%	-1.5%	-11.5%
Hispanic Sample					
Odds Ratios	2.543*	1.738	2.149*	1.870	1.546
[from Table 8]	(1.04)	(0.65)	(0.75)	(0.756	(0.54)
Percentage Mediated	-	52.2%	25.5%	43.6%	64.6%

Figure 1: Predicted Group Probability of Arrest and 95% Confidence Interval, By Race and Father's History of Incarceration
(mean predicted probability of arrest and 95% CI)



Poisson Regression Estimates

In this supplemental file, multilevel Poisson regression model results are provided to compare with results from the random effects Tobits models presented in Tables 3-5. The multilevel random effects Poisson may be written as:

$y_{ist} = (\beta_0 + \nu_i + \omega_s) + \mathbf{\beta X}_{ist} + e_{ist}$,

where i represents the ith individual , t represents wave t of interview, and s represents the respondent's school attended at Wave I interview. The ith individual's delinquency score at wave t and originating at school s is estimated by the intercept $(\beta_0 + \nu_i + \omega_s)$ and the row vector $\mathbf{\beta X}_{ist}$, consisting of covariates for age, father's history of incarceration, structural variables, family-process variables, and adolescent social attachments. The intercept $(\beta_0 + \nu_i + \omega_s)$ is used to control for clustering, where ν_i represents a row vector for the individual-level random intercept, β_0 represents the general intercept for $\mathbf{\beta X}_{ist}$, and ω_s represents a row vector for the school-level random intercept. The random disturbance term e_{ist} represents measures error such that $e_{ist} \sim N(0,\sigma^2)$. The delinquency score is measured by y_{ist} and is assumed to be independent and identically distributed when accounting for individual and school effects through the random intercepts.

The Tables S1-S3 provide output for the mediation effects of structural, family, and adolescent social attachments for the effect of father's history of incarceration on son's delinquency. Table format is similar to the output provided in Tables 3-5, with random effects reported instead of general error terms.

Generally, the results are similar to those found in the estimated Tobit models. The strength for the effect of father's history of incarceration, however, is generally weaker than is observed in the Tobit models, with the effects of FHI on delinquency even becoming non-significant among African Americans when controls are added. Two factors work against significance of delinquency. The first is the Poisson model assumes that zero-values are observed counts of non-delinquent acts instead of a censored propensity for delinquency. In a censored regression model, where the propensity for delinquency is assumed to have negative values censored at zero, a negative delinquent propensity may be estimated for the fitted regression model, with measurement error accounting for '0' observations. Consequently, the Poisson regression may underestimate the effect of father's history of incarceration in engaging in delinquent behaviors.

A second issue results from the assumption that the dependent variable is a Poisson model. As Long (1997) notes, the Poisson regression is not robust to zero-inflation counts and is a specific case of general negative binomial regression models. Consequently, the Poisson regression model does not provide an optimal fit to the delinquency scale's distribution. Unfortunately, multilevel negative binomial regression models fitting panel data are currently unavailable in STATA 10.

Despite these limitations, given delinquency scores are non-normally distributed and stratified by schools and individuals, the estimated Poisson models may be considered as alternatives to the models presented in Tables S1-S3. The school and individual random intercepts estimated in all Poisson are highly significant ($p<0.001$), suggesting that stratification of schools and individuals are important considerations for regression

models. However, the general consistency of general results in the Poisson and Tobit models suggest that the effect of FHI and mediating mechanisms of the FHI on respondent's delinquency are not spurious results arising from Tobit regression models used in analysis.

Table S1: Poisson Regression Examining Mediating Effects for Father's History of Incarceration with Adult Son's Delinquency, White Sub-Sample

Variables	Random Effects Poisson Regression Coefficients and Standard Errors Predicting Serious Delinquency				
	Baseline Model	Structural Model	Family Model, Structural and Process	Adolescent Social Attachments	Full Model
Intercept	-3.23***	-3.20***	-3.24***	-1.74***	-1.95***
	(0.36)	(0.38)	(0.38)	(0.40)	(0.42)
Father's History of Incarceration	0.42***	0.39***	0.28**	0.24**	0.22*
	(0.09)	(0.09)	(0.09)	(0.08)	(0.09)
Age	0.41***	0.41***	0.40***	0.40***	0.40***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Age-Squared	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Structural Variables					
Wave I Family Socioeconomic Status		0.01	0.01		0.03*
		(0.01)	(0.01)		(0.01)
Respondent Resides in household with both biological parents		-0.16**	-0.07		-0.01
		(0.06)	(0.06)		(0.06)
Respondent Foreign-Born Immigrant		-0.98*			-1.04*
		(0.43)			(0.41)
Proportion of Non-Whites in Census Tract		0.12			0.12
		(0.11)			(0.10)
Greater than 30% of families in census tract below poverty line		-0.09			-0.14+
		(0.09)			(0.08)
Census Tract Urban Density (Individuals per square mile		0.02			-0.01
		(0.02)			(0.02)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			0.23+		0.11
			(0.12)		(0.11)
Medium Attachment			-0.09		-0.25+
			(0.15)		(0.14)
High Attachment [Reference]					
Parental Supervision			-0.01		0.00
			(0.03)		(0.02)
Repeated Abuse by Parent or Caregiver			0.58***		0.46***
			(0.09)		(0.09)
Adolescent Social Attachments					
Parent Report of problems in child temperament				0.34***	0.35***
				(0.06)	(0.06)
School Attachment Scale				-0.43***	-0.41***
				(0.04)	(0.04)
GPA Above 3.0				-0.32***	-0.34***
				(0.06)	(0.06)
Weekly times Spent 'Hanging Out' with Friends				0.18***	0.18***
				(0.03)	(0.03)
Frequency of Religious Attendance				-0.01	-0.03
				(0.02)	(0.02)
$\nu_{Individual}$	-1.30***	-1.45***	-1.47***	-1.43***	-1.65***
	(0.18)	(0.23)	(0.23)	(0.20)	(0.27)
ν_{School}	0.23***	0.23***	0.21***	0.15***	0.14***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Number of Individuals	2684	2684	2684	2684	2684
Number of schools	123	123	123	123	123
Number of Observations	7405	7405	7405	7405	7405
Log Likelihood	-13075.5	-13067.9	-13048.2	-12944.7	-12920.9

*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test].

Table S2: Poisson Regression Examining Mediating Effects for Father's History of Incarceration with Adult Son's Delinquency and Arrest, African American Sub-Sample

Variables	Random Effects Poisson Regression Coefficients and Standard Errors Predicting Serious Delinquency				
	Baseline Model	Structural Model	Family Model, Structural and Process	Adolescent Social Attachments	Full Model
Intercept	-2.93***	-2.80***	-2.65***	-1.61*	-1.76**
	(0.53)	(0.56)	(0.56)	(0.63)	(0.66)
Father's History of Incarceration	0.28*	0.21+	0.19	0.25*	0.19
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Age	0.37***	0.37***	0.37***	0.37***	0.37***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Age-Squared	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Structural Variables					
Wave I Family Socioeconomic Status		-0.02	-0.02		0.00
		(0.02)	(0.02)		(0.02)
Respondent Resides in household with both biological parents		-0.31**	-0.33**		-0.28**
		(0.10)	(0.11)		(0.10)
Respondent Foreign Born		-0.73+			-0.48
		(0.38)			(0.37)
Greater than 30% of census tract African American		0.26*			0.16
		(0.12)			(0.12)
Greater than 30% of families in census tract below poverty line		-0.10			0.02
		(0.12)			(0.11)
Census Tract Urban Density (Individuals per square mile		-0.00			-0.00
		(0.02)			(0.02)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			-0.12		-0.21
			(0.15)		(0.14)
Medium Attachment			0.15		0.12
			(0.18)		(0.17)
High Attachment [Reference]					
Parental Supervision					-0.02
			-0.02		(0.04)
			(0.04)		
Repeated Abuse by Parent or Caregiver			0.42***		0.37**
			(0.13)		(0.12)
Adolescent Social Attachments					
Parent Report of problems in child temperament				0.20+	0.20+
				(0.11)	(0.11)
School Attachment Scale				-0.35***	-0.33***
				(0.08)	(0.08)
GPA Above 3.0				-0.53***	-0.51***
				(0.10)	(0.10)
Weekly times Spent 'Hanging Out' with Friends				0.23***	0.23***
				(0.05)	(0.05)
Frequency of Religious Attendance				-0.08*	-0.06
				(0.04)	(0.04)
$\nu_{Individual}$	-1.39***	-1.37***	-1.54***	-1.72***	-1.74***
	(0.31)	(0.32)	(0.36)	(0.49)	(0.51)
ν_{School}	0.27***	0.26***	0.25***	0.21***	0.19***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Number of Individuals	1055	1055	1055	1055	1055
Number of Observations	2869	2869	2869	2869	2869
Number of Schools	86	86	86	86	86
Log Likelihood	-5458.1	-5447.5	-5445.8	-5408.1	-5397.3

*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test]

Table S3: Poisson Regression Examining Mediating Effects for Father's History of Incarceration with Adult Son's Delinquency, Hispanic Sub-Sample

Variables	Random Effects Poisson Regression Coefficients and Standard Errors Predicting Serious Delinquency				
	Baseline Model	Structural Model	Family Model, Structural and Process	Adolescent Social Attachments	Full Model
Intercept	-3.28***	-3.27***	-3.33***	-1.21+	-1.57*
	(0.66)	(0.68)	(0.68)	(0.73)	(0.75)
Father's History of Incarceration	0.65***	0.63***	0.43**	0.35**	0.25+
	(0.15)	(0.15)	(0.15)	(0.13)	(0.14)
Age	0.44***	0.45***	0.43***	0.44***	0.44***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Age-Squared	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Structural Variables					
Wave I Family Socioeconomic Status		0.04+	0.05**	-0.65***	0.03
		(0.02)	(0.02)	(0.07)	(0.02)
Respondent Resides in household with both biological parents		-0.30**	-0.21+		-0.07
		(0.11)	(0.12)		(0.11)
Respondent Born Outside United States		-0.58***			-0.38**
		(0.15)			(0.13)
Greater than 30% of census tract of Hispanic/Latino origin		0.04			0.01
		(0.13)			(0.11)
Greater than 30% of families in census tract below poverty line		-0.08			0.03
		(0.15)			(0.13)
Census Tract Urban Density (Individuals per square mile		0.00			-0.00
		(0.01)			(0.01)
Familial Process Variables					
Father Attachment Scale					
Low Attachment			0.44*		0.21
			(0.20)		(0.18)
Medium Attachment			-0.18		-0.14
			(0.24)		(0.22)
High Attachment [Reference]					
Parental Supervision			-0.09*		-0.06
			(0.04)		(0.04)
Repeated Abuse by Parent or Caregiver			0.56***		0.45***
			(0.14)		(0.13)
Adolescent Social Attachments					
Parent Report of problems in child temperament				0.45***	0.39***
				(0.11)	(0.11)
School Attachment Scale				-0.65***	-0.57***
				(0.07)	(0.07)
GPA Above 3.0				-0.31**	-0.38***
				(0.11)	(0.11)
Weekly times Spent 'Hanging Out' with Friends				0.35***	0.33***
				(0.05)	(0.05)
Frequency of Religious Attendance				-0.08+	-0.04
				(0.04)	(0.04)
$\nu_{Individual}$	-1.95***	-2.28**	-1.74***	-2.41**	-2.74+
	(0.51)	(0.88)	(0.38)	(0.89)	(1.60)
ν_{School}	0.34***	0.31***	0.28***	0.18***	0.14***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Number of Individuals	830	830	830	830	830
Number of Observations	2260	2260	2260	2260	2260
Number of Schools	86	86	86	86	86
Log Likelihood	-4312.5	-4297.4	-4289.4	-4222.5	-4206.6

*p<.05 **p<.01 ***p<.001 [two-tailed test], + p<0.05 [one-tailed test]