ASSOCIATIONS OF FATHERS' HISTORY OF INCARCERATION WITH SONS' DELINQUENCY AND ARREST AMONG BLACK, WHITE, AND HISPANIC MALES IN THE UNITED STATES*

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Nearly 13 percent of young adult men report that their biological father has served time in jail or prison; yet surprisingly little research has examined how a father's incarceration is associated with delinquency and arrest in the contemporary United States. Using a national panel of

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Black, White, and Hispanic males, this study examines whether experiencing paternal incarceration is associated with increased delinquency in adolescence and young adulthood. We find a positive association with paternal incarceration that is robust to controls for several structural, familial, and adolescent characteristics. Relative to males not experiencing a father's incarceration, our results show that those experiencing a father's incarceration have an increased propensity for delinquency that persists into young adulthood. Using a national probability sample, we also find that a father's incarceration is highly and significantly associated with an increased risk of incurring an adult arrest before 25 years of age. These observed associations are similar across groups of Black, White, and Hispanic males. Taken as a whole, our findings suggest benefits from public policies that focus on male youth "at risk" as a result of having an incarcerated father.

Since the 1970s, a range of socioeconomic, public policy, and demographic factors have resulted in incarceration rates increasing exponentially in the United States. During this period, a fivefold increase in rates of incarceration in state and federal prisons occurred, rising from 100 per 100,000 persons in 1970 to more than 500 per 100,000 by 2009 (Sabol and West, 2010; Visher and Travis, 2003). In 2009, ~2.29 million individuals were serving time in jail or prison and 3.1 percent of all adults were either incarcerated or on probation or parole (Glaze, 2010). For comparative purposes, the rate of incarceration in the United States is more than five times higher than in the United Kingdom, the country with the next highest incarceration rate among Western countries (Western and Wildeman, 2009). Some legal theorists, such as Simon (2007) and Garland (2001), have described this shift as part of a "culture of control" that emerged in response to fear of crime, and that the United States has now become a "carceral" or "punitive" welfare state. Of additional concern is the disproportionate effect of incarceration by race and ethnicity. At current incarceration rates, 33 percent of all African American, 17 percent of all Hispanic, and 5 percent of all Caucasian males will experience incarceration at some time in their lives (Bonczar, 2003). Black males of low socioeconomic status (SES) have been particularly impacted. Among Black male high-school dropouts in 1999, nearly 60.0 percent had been incarcerated by their early 30s, compared with only 11.2 percent of comparable Whites (Pettit and Western, 2004).

Researchers and policy makers have been increasingly recognizing the "collateral consequences" of incarceration (Hagan and Dinovitzer, 1999), which extend beyond an individual's time served, to children, spouses, and communities (Clear et al., 2003; Comfort, 2008; Travis and Waul, 2003). Western and Wildeman (2009) calculated that the number of children with an incarcerated father had increased from 350,000 in 1980 to 2.1 million in

2000. As with incarceration in general, growing up with a father in prison is concentrated among Black children in low SES households. Wildeman (2009) reported that one in four Black children born in 1990 had an imprisoned parent at some time before 14 years of age (vs. only 1 in 25 White children), with the percentage greater than 50 percent for Black children whose father was a high-school dropout. Research on the collateral effects of incarceration has found a father's incarceration is associated with family disruption, lower father involvement, and a variety of negative psychological and behavioral outcomes in children (e.g., Harper and McLanahan, 2002; Waller and Swisher, 2006; Wildeman, 2010).

Although numerous studies note intergenerational patterns in delinquency and arrest, studies of a father's incarceration within general populations remain rare. In a systematic review and meta-analysis on this topic, Murray et al. (2009) noted that very few quantitative studies have analyzed general (i.e., noninstitutionalized) population samples. Most of these studies focus on a single-city or region (Murray and Farrington, 2008; Wakefield, 2009), international samples (Johanson, 1974; Kinner et al., 2007; Murray, Janson, and Farrington, 2007), or maternal incarceration (Huebner and Gustafson, 2007), or they study young children (Wildeman, 2010). With incarceration rates five to ten times higher than in other nations (Western and Wildeman, 2009) and the 1.7 million children that have a father incarcerated in state or federal prison (Glaze and Maruschak, 2008), U.S. society is highly unique in the extent to which fathers and children experience incarceration. As far as we know, no national studies in the United States currently link a father's incarceration with delinquency and criminal justice involvement in adolescence and young adulthood.

Additionally, disparities in incarceration rates among Blacks, Whites, and Hispanics suggest that incarceration has become a common event within the life-courses of some minorities, while remaining relatively rare among Whites. Research is needed to determine whether such disparities lead to differences in associations across racial groups. To date, although ethnographic research by Giordano (2010) has shown similar effects among Blacks and Whites, this issue has not been directly examined in a nationally representative sample (Murray and Farrington, 2008; Murray et al., 2009). Thus, by analyzing Black, White, and Hispanic males, our study provides insight into whether a father's incarceration in early childhood or adolescence is associated with differential effects on delinquency and arrest among these groups.

A particular methodological challenge posed by this research is disentangling the effects of a father's incarceration itself from the effects of his criminality or general antisocial behavior. It is rare to observe (particularly in a random sample) a seriously violent criminal who has not been incarcerated, or a person incarcerated for a long period of time who did not engage in

criminal behavior. Given this difficulty, and data constraints in the National Longitudinal Study of Adolescent Health (Add Health), we recognize that the associations observed in our analysis originate from a mixture of the influences of paternal incarceration and criminal behavior. To the extent possible, we will control for a wide array of background factors that place fathers at risk of incarceration (e.g., SES, family structure, race and ethnicity), factors that place children at risk of delinquency and arrest (e.g., difficult temperament or poor grades), as well as possible mediators of the association between a father's incarceration and adolescent delinquency and arrest. The goal is to produce estimates of these associations that are robust to a variety of controls and model specifications. Recognizing in the end that the relationships remain associations, and not causal, it is hoped that the findings will contribute to a better understanding of a father's incarceration as a "risk factor" for an increasingly large number of adolescents within the context of mass incarceration in the United States.

BACKGROUND

THE INTERGENERATIONAL EFFECTS OF INCARCERATION

In recent reviews of the literature, Murray and Farrington (2008: 135) and Murray et al. (2009) concluded that parental incarceration is a "strong risk factor" for a variety of negative outcomes, from antisocial behavior and offending, to psychological well-being and even socioeconomic attainments in adulthood. Most relevant to this research are previous studies linking a father's incarceration to his children's antisocial behavior and/or arrest. As one of the only large-scale or general-population studies in the United States, Huebner and Gustafson (2007) found a *mother's* incarceration to predict strongly her children's risk of conviction as adults. Using a longitudinal Swedish sample, Murray, Jenson, and Farrington (2007) similarly observed an association between parental imprisonment and child criminal behavior. Using data from the Cambridge Study in Delinquent Development, Murray and Farrington (2008) found parental imprisonment to predict children's antisocial behavior throughout the life-course, from as early as 10 years of age to as late as 48 years of age. Associations between parental imprisonment and child antisocial behavior also have been observed using Australian (Bor, McGee, and Fagan, 2004; Kinner et al., 2007) and Danish samples (Kandel et al., 1988). Although ethnographic research (Braman, 2004; Giordano, 2010), and single-city studies (Thornberry, 2005; Wakefield, 2009), provide evidence linking parental incarceration with delinquency in the United States, we are not aware of a study examining the association between a *father's* incarceration and a son's delinquency and arrest using a contemporary and general sample of the U.S. population. Although it is possible the findings from studies set in other countries may

generalize to the United States, the fact that incarceration rates are so much higher and that inequalities are so pronounced across racial and ethnic lines in the United States makes this empirical question important to examine.

What factors place children at risk of parental incarceration? In the United States, low SES and race significantly increase the likelihood of having an incarcerated parent (Western and Wildeman, 2009; Wildeman, 2009). The incarcerated also tend to be disproportionately drawn from neighborhoods with low SES (Clear, 2007; Clear et al., 2003). Thus, it is important to control for a father's education, race and ethnicity, foreign-born status, and neighborhood poverty, so as to remove their confounding with our focal associations among a father's incarceration, delinquency, and arrest.

How is a father's incarceration theorized to influence youth outcomes? Murray and Farrington (2008) and Murray et al. (2009) identified no shortage of potential mediators—economic strain, the trauma of separation, stigma, and diminished parenting—but also a lack of empirical tests of these various mechanisms. That economic strain is a likely mediator is suggested by previous findings that incarceration diminishes employment opportunities and earnings (Western, 2002; Western and Petit, 2005). In addition to the interruption of careers during incarceration, a record of incarceration represents a stigma or negative "mark" for future potential employers (Pager, 2007; Pager and Quillian, 2005; Pager, Western, and Bonikowski, 2009). Combined with the lower educational credentials of the incarcerated (Petit and Western, 2004), a father's incarceration places children at a higher risk of growing up within a low SES family. Low family SES, particularly among African Americans, also increases the risks of living in a disadvantaged neighborhood (Massey and Denton, 1993; Wilson, 1996), further increasing the likelihood of future offending (Sampson, Morenoff, and Raudenbush, 2005). As the discussion so far suggests, low family SES and neighborhood poverty are potentially both background factors placing fathers at risk for incarceration, as well as mediators of the relationship between a father's incarceration and child outcomes. Disentangling the relative roles of these two influences is not a focus of the study.

A father's incarceration also may influence adolescents through its associations with family structure and family processes. A father's incarceration is associated with diminished relationship quality and with higher rates of relationship dissolution with mothers, as well as with lessened contact and involvement with 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 create legal barriers to visitation (Edelman, Holzer, and Offner, 2006; Holzer, Offner, and Sorensen, 2005). Research also has suggested that access to children is dependent on mothers who facilitate visits and other

contacts with children (Arditti, Smock, and Parkaman, 2005; Nurse, 2004; Roy and Dyson, 2005; Waller and Swisher, 2006). That the dynamics of a father's incarceration, and its consequences for involvement with children, play a unique role beyond that of a mother's involvement is suggested by previous research on resident and nonresident father involvement and youth problem behavior and well-being (Amato, 1998; Amato and Riviera, 1999; Cabrera et al., 2000; Coley and Medeiros, 2007).

A father's incarceration also may influence youth offending through its effects on child well-being and other early risk factors for antisocial behavior. When a father's incarceration occurs early in a child's life, attachment to the parent is likely to be disrupted (Boswell and Wedge, 2002; Johnston and Gabel, 1995). If the father has no contact with the child, incarceration may have little effect at all. Although maternal incarceration may be most disruptive, previous research has found parental incarceration (i.e., either a mother's or a father's) to be associated with negative emotional outcomes, behavioral problems, and academic struggles (Bloom, 1995; Johnston, 1995; Kampfner, 1995; Wildeman, 2010). Given the range of negative outcomes in childhood associated with a father's incarceration, it is plausible that it also may influence the development of low self-control (Hay and Forrest, 2006; Hirschi and Gottfredson, 1983), a well-known risk factor for antisocial behavior.

Life-course theories emphasize sources of informal control within the family, at school, and that is provided by other structured prosocial activities (Laub and Sampson, 2003; Sampson and Laub, 1993; Thornberry, 2005). Petts (2009), for example, found religious involvement to be associated with trajectories of delinquency in adolescence and young adulthood. Foster and Hagan (2007, 2009) suggested that the stigma associated with a father's incarceration may discourage youth from being involved in school and other community activities, and it may be related to a larger process of intergenerational 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 facilitating delinquency and crime (Osgood and Anderson, 2004; Osgood et al., 1995).

VARIATIONS BY RACE, ETHNICITY, AND AGE

As noted, incarceration disproportionately falls on poorly educated Black and Hispanic men. As Western and Wildeman (2009) have pointed out, by the start of the twenty-first century, more than one third of non-college-educated Black males in the United States were incarcerated in jails and prisons. Furthermore, they note that African American men younger than 40 years of age are almost twice as likely to have obtained a prison

record as to have received a bachelor's degree. The magnitude of these inequalities has made incarceration a common and often expected transition within the life-courses of these men (Pettit and Western, 2004; Swisher and Waller, 2008).

Although racial and ethnic disparities in incarceration are well documented, we find little consensus regarding variations in the consequences of a father's incarceration for children across racial and ethnic groups. On the one hand, as incarceration becomes increasingly common, group members might perceive it as more normative and less stigmatizing. Swisher and Waller (2008) found suggestive evidence to this effect among unmarried Black and Hispanic mothers in the Fragile Families Project, who were more likely to entrust their children to fathers with a history of incarceration than were comparable White mothers. Qualitative research by Hirschfield (2008) similarly suggested that juvenile arrests may carry little stigma within disadvantaged communities where arrest and incarceration have become commonplace. Greater distrust of the criminal justice system (Hagan, Shedd, and Payne, 2005; Sampson and Bartusch, 1998) also may contribute to external attributions of blame. The decline in stigma associated with incarceration may lead to a lessened or null association between a father's incarceration and a son's delinquency and arrest.

Other research has suggested that the effects of parental incarceration will be similar across racial groups. In ethnographic research of families in Washington, D.C., who were dealing with incarceration, Braman (2004) found that the stigma of incarceration remained strong within high incarceration communities, creating complications in relationships with extended relatives and friends, in schools, at work, and within their religious communities. In a longitudinal study of Ohio juvenile delinquents, Giordano (2010) found that a "constellation of risk factors" associated with incarceration leads to similar intergenerational patterns of persistent delinquency and arrest across racial groups.

Finally, research based on theories of racial discrimination has suggested that the consequences of paternal incarceration may be greatest for Black and other minority families. Studies of employment outcomes for persons with a history of incarceration suggest that the associations of a father's history of incarceration (FHI) with delinquency and arrest may be highest for disadvantaged racial groups. Pager (2007) found a criminal record to carry a strong "mark" in the minds of potential employers, particularly for African Americans. Pager's research suggests that the stigma of incarceration is accentuated for African Americans by its generalization with other negative racial stereotypes. The criminal justice system also may disproportionately incarcerate children of minorities. Within the juvenile justice system, research has suggested that African American juvenile offenders are more likely to be treated more harshly than Whites (Bishop and Frazier, 1988;

Bridges and Steen, 1998); incarceration of a minority father may result in harsher treatment by the criminal justice system. Additionally, some social theorists, such as Wacquant (2001) and Collins (2005), have argued that the U.S. criminal justice system is a mechanism for suppression of minorities, where minority children of incarcerated parents are disproportionately arrested and incarcerated as a result of subjugation by a White majority.

Given these mixed findings and a lack of studies explicitly examining racial variation, our hypotheses regarding differences in the overall associations among a father's incarceration, delinquency, and arrest across racial and ethnic groups are necessarily tentative. To the extent that youth violence and arrest result from stigma and negative interactions between youth and the wider community, we would expect at least as strong, if not stronger, associations for Black and Hispanic youth relative to Whites. Similarly, Black and Hispanic children of incarcerated parents may face increased risk of arrest as a result of disparate treatment by the criminal justice system and society. However, stigma and racial bias are just one of many potential mechanisms linking a father's incarceration and youth delinquency and arrest. In the absence of strong evidence to the contrary, we would expect all youth to be negatively affected by economic strains, parent relationship dissolution, and diminished parenting originating from a father's incarceration in early childhood or adolescence. Thus, overall we tentatively predict that a father's incarceration will be positively associated with delinquency and arrest for all groups.

INCARCERATION VERSUS A FATHER'S OFFENDING OR OTHER UNOBSERVED FACTORS

As noted, disentangling the effects of a father's incarceration from those of a father's criminality or antisocial behavior is a methodological problem facing all research in this area. At issue is whether incarceration produces negative outcomes for children, or whether a father's deviant behavior or some other unobserved intergenerational factors[1] account for both a father's incarceration and his child's subsequent behavior. As Gottfredson and Hirschi (1990) noted, intergenerational patterns of delinquency and arrest are well documented. Robins (1966), Ferguson (1952), and West and Farrington (1977) all reported strong parent–child and sibling correlations in antisocial behavior and arrest. Although these studies acknowledge a possible direct link (i.e., not associated with incarceration) between parent

1. As discussed later in the text, the Add Health core sample does not contain measures of genetic propensities for antisocial behavior, processes of social labeling, or parental criminality. These measures are hence possible unobserved causal factors that may link a father's incarceration with a son's delinquency and arrest.

and child antisocial behavior (see also Rowe and Farrington, 1997), much of the influence of parents' offending or antisocial behavior is posited to occur indirectly through parent SES and parenting and other social processes (Thornberry et al., 2003), which are variables that we control for in the analyses to follow.

As a first study of its kind, our analysis limits itself to examining associations between a father's incarceration and violence and arrest, using a general sample of adolescents and young adults in the United States. The associations observed will reflect a mixture of the effects of a father's unobserved characteristics and incarceration, making causality impossible to determine. To the extent possible, we will control for the background factors discussed previously that are likely associated with both risk of a father's incarceration and subsequent delinquency and arrest. The analysis also will control for a wide variety of potential mediators of the association between a father's incarceration and negative youth outcomes to produce conservative and robust estimates of these associations.

Finally, we can take advantage of new data within the Add Health project regarding the timing of a father's incarceration. Previous studies using Add Health were limited to a single question regarding whether a respondent's biological father had ever been incarcerated. Thus, a father's incarceration could have happened before the father knew the mother, between this time and the birth of the child, in early childhood and early adolescence, and between waves of the study. The latest wave of data collection asked respondents what age they were when their biological father was first incarcerated, including before birth. We use this information in several ways. First we limit our primary attention to incarcerations that occurred between the child's birth and the first wave of data collection to establish proper temporal ordering among a father's incarceration, independent variables, and our outcomes. Second, we create a control for respondents whose biological fathers were incarcerated prior to their birth. Murray and Farrington (2005) used a father's incarceration before birth as a control group of respondents who share similar background factors but who did not experience a father's incarceration during their lifetimes.

DATA

Data are taken from the in-home portion of Add Health. The Add Health in-home sample consists of 20,700 respondents enrolled in grades 7–12 at wave I. Follow-up interviews were conducted in the years 1996, 2001–2002, and 2007–2008, with approximately 14,700 (71.0 percent), 15,200 (73.0 percent), and 15,700 (75.5 percent) of respondents, respectively, completing interviews at waves II, III, and IV. Answers to sensitive questions in Add

Health, including youth offending and arrest, were obtained using audio-CASI technology to increase the reliability of self-reports (Harris et al., 2009).

For this study, we examine White, Black, and Hispanic males who had completed interviews at waves I and IV and who were younger than 25 years of age at the time of the wave III interviews. Our requirement of completion of the wave I and IV interviews originates from using multiple items from the waves I and IV questionnaires, including the timing of a father's incarceration and the availability of survey weights.[2] Sample sizes differ slightly by outcome. In the case of delinquency, a sample containing 6,602 males is used.[3] For arrest, use of longitudinal sample weights reduces the sample sizes slightly to 6,217 males (consisting of 3,724 White, 1,383 Black, and 1,110 Hispanic males) with valid and nonzero weights. Use of the longitudinal weights addresses sample selection issues originating from the differential probabilities of sampling and survey attrition. Nonetheless, the school-based sampling frame likely leads to delinquency, arrest, and an FHI being somewhat underrepresented within Add Health. Thus, estimates of overall prevalence are likely downwardly biased.[4]

To make optimal use of nonmissing data for respondents in our sample, we use multiple imputation to replicate the error structure of the observed information matrix and produce unbiased point estimates and standard errors when cases are missing at random, given the variables included in the imputations (Allison, 2001; Horton and Kleinman, 2007). Using the Stata (StataCorp, College Station, TX) "ice" procedure outlined by Royston (2005), median values for cases with observations were taken from 25 imputed data sets. To check for bias originating from imputation, the regression results presented in tables 2–4 were compared with 1) the subsample of observations containing no missing data and 2) regressions using dummy variables for missing cases, which is an approach used by Guo, Roettger,

2. Fewer than 20 White, Black, and Hispanic males were older than 25 years of age at the time of wave III interviews. These respondents were 19–21 years of age at wave I and, hence, not representative of the general school population. The results presented in tables 2–4 do not substantively change with the inclusion of these respondents, and they are representative of a general population in school at wave I.

3. Approximately 900 respondents self-identified as Asian, Native American, or "other race" are excluded from analysis. Lack of sample size precludes analysis using these racial groups in our study. For example, only 19 of 494 Asian males report their biological father served time in jail or prison.

4. Chantala, Kalsbeek, and Andraca (2004) estimated that the percentage of persons selling drugs, carrying a weapon, and shooting or stabbing someone are underrepresented by between .1 and .7 percentage points in the wave III data relative to the wave I population.

and Cai (2008). The results from these alternative approaches, which are available upon request, yielded similar coefficients to those presented in the next few sections.

INDEPENDENT VARIABLES

A FATHER'S INCARCERATION

A father's incarceration is measured by a respondent's retrospective reports at wave IV. We use reports at wave IV (instead of at wave III) because they provide information, for the first time, regarding the timing of a father's incarceration. Respondents were first asked, "Has your biological father ever spent time in jail or prison?" If "yes," they were next asked, "How old were you when your biological father went to jail or prison (the first time)?" Responses range from "not yet born" and "less than 1 year" all the way up to "31 years." To address issues of temporal ordering, and to allow a focus on incarcerations occurring in childhood and early adolescence, three mutually exclusive categories for timing of fathers' incarceration were created: 1) first occurring before the respondent's birth, 2) first occurred after birth but prior to the respondent's age at wave I, and 3) a reference category of respondents whose fathers were not incarcerated prior to wave I. Cases where respondents either refused to answer or indicated no knowledge of a father's incarceration are coded as missing. Alternative coding schemes (e.g., incarceration before 10 years of age) yielded substantively similar patterns of results.

INDIVIDUAL, FAMILY, AND NEIGHBORHOOD STRUCTURAL CHARACTERISTICS

Individual 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 non-Hispanic White, African American, Asian, and Native American, as well as persons of Hispanic origin. As a result of small sample sizes, Asian and Native American respondents are excluded from the analysis. To capture the general age–crime curve relationship, age, age-squared, and age-cubed are included. Family structure is measured by an indicator for living with two biological parents at wave I.[5] Family SES is measured as a scale combining mothers' and fathers' education and employment status at wave I (Ford, Bearman, and Moody, 1999).

5. Similar results were also obtained using a five-category set of indicators that included male and female-headed single parent families, two-parent families with one biological parent, and nonbiological parent households (i.e., foster homes, living with grandparents, etc.).

Three variables representing the structural characteristics of neighborhoods are measured at the census tract level: neighborhood racial composition, proportion of families in poverty, and population density. Neighborhood racial composition is measured by an indicator variable denoting that 30 percent or more of a neighborhood's population is non-White. To measure neighborhood poverty, an indicator variable denotes if at least 30 percent of families live below the poverty level. Population density is measured as the number of persons per square kilometer. Exploratory analyses considering alternative neighborhood measures (e.g., an index of neighborhood disadvantage) yielded similar results.

FAMILY PROCESS VARIABLES

The following measures of family process and parent characteristics were included in the analysis: the biological mother's history of binge drinking/alcoholism; wave I contact with the biological father; father closeness and involvement (Cookson and Finlay, 2007; Harris and Ryan, 2003; Lamb and Tamis-Lemonda, 2003); exposure to repeated physical abuse by a respondent or caregiver (Jaffee et al., 2003); daily family meals (Guo, Roettger, and Cai, 2008); and a parental strictness scale (Guo, Roettger, and Cai, 2008).

ADOLESCENT SOCIAL ATTACHMENTS

Based on prior work by Hagan and Foster (2003) and Guo, Roettger, and Cai (2008), school attachment is measured by questions of feeling close to others at school, being happy at school, and feeling a part of the school. During the grading term interviewed, a variable indicating attaining a grade point average (GPA) of 3.0 or higher also is used. Following Hagan and Foster (2003), a parent report that the respondent had a difficult temperament as a child is included as a measure of low self-control. Given that hanging out with peers is associated with increased delinquency (Haynie and Osgood, 2005; Osgood and Anderson, 2004), a measure of unstructured time with friends is included. Lastly, given the negative correlation between delinquency and religious attendance (Sinha, Cnaan, and Gelles, 2007), frequency of religious attendance also is included. Additional details about the construction of independent predictors and weighted means for each racial and ethnic group are provided in table 1.

DEPENDENT VARIABLES

We analyze two measures of sons' offending based on self-reports of delinquency and arrest. In addition to delinquency, official measures reflect

Table 1. Definitions and Descriptive Statistics (Means and Standard Errors) for Variables Used in Analysis

Variables	Description	Respondents Reporting No History of a Father's Incarceration	Respondents Reporting History of a Father's Incarceration
Dependent Variables			
Delinquency scale	Twelve-item scale based on longitudinal analysis of Add Health by Guo and colleagues (Guo et al., 2007; Guo et al., 2008)		
	Delinquency Score at wave I	2.43 (4.01)	3.76 (5.23)
	Delinquency Score at wave II	1.73 (3.15)	2.81 (4.21)
	Delinquency Score at wave III	1.20 (2.39)	1.78 (2.87)
Young adult arrest	Self-report of respondent's history of adult arrest through 25 years of age at wave IV interviews. Coded 1 = arrested, 0 = not arrested.	.12 (.33)	.27 (.45)
Independent Variables			
Father's history of incarceration	Wave IV response to "How old were you when your biological father went to jail or prison (the first time)?" Coded so that risk periods occurs from before birth to 1 year younger than age at wave I interviews.		
Father incarcerated before birth	Biological father's first incarceration occurred prior to respondent's birth. Coded 1 = yes, 0 = no.	0	.17 (.37)
Father incarcerated after birth	Biological father's first incarceration occurred after respondent's birth and 1 year prior to wave I interviews. Coded 1 = yes, 0 = no.	0	.83 (.37)
Father not incarcerated	Biological father not incarcerated prior to wave I interviews.	1	0
Respondent age			
Wave I	Age at wave I	15.69 (1.73)	15.57 (1.71)
Wave II	Age at wave II	16.67 (1.79)	16.54 (1.74)
Wave III	Age at wave III	22.07 (1.76)	21.97 (1.73)
Race	Respondent's racial phenotype at wave I		
White		.60 (.49)	.55 (.49)
Black		.22 (.42)	.27 (.44)
Hispanic		.18 (.38)	.18 (.39)

Table 1. Continued

Variables	Description	Respondents Reporting No History of a Father's Incarceration	Respondents Reporting History of a Father's Incarceration
Family socioeconomic status	Socioeconomic scale based on Ford, Bearman, and Moody (1999). Composite of occupation and education for mother and/or father living in household.	6.35 (2.55)	5.18 (2.53)
Resides with both biological parents	Respondent resides in home with both biological parents. Coded 1 = yes, 0 = no.	.55 (.49)	.26 (.47)
Father unknown	Respondent knew no information about biological father at wave I interviews.	.09 (.29)	.09 (.28)
Foreign-born	Respondent is non-native, U.S. citizen born outside of the United States. Coded 1 = yes, 0 = no.	.05 (.21)	.03 (.17)
Greater than 30 percent non-White	30% + of residents of respondent's census tract non-White. Coded 1 = yes, 0 = no.	.30 (.46)	.35 (.48)
Greater than 30 percent below poverty	30% + of families in census tract below poverty level. Coded 1 = yes, 0 = no.	.10 (.30)	.13 (.34)
Census tract density	Individuals per square kilometer.	1.85 (3.40)	2.07 (3.43)
Father closeness scale	Respondent's wave I response to "How close do you feel towards your biological father?" Coded 1 = not close at all, 2 = not very close, 3 = somewhat close, 4 = quite close, 5 = fairly close.	3.94 (1.23)	3.42 (1.39)
Father involvement scale	Respondent's wave I 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 1 = yes, 0 = no.	1.30 (1.33)	.95 (1.23)

Table 1. Continued

Variables	Description	Respondents Reporting No History of a Father's Incarceration	Respondents Reporting History of a Father's Incarceration
Biological mother's binge drinking/alcoholism	Wave 1 measure indicating biological mother either reported (1) a history of alcoholism or (2) in month prior to interview, having five or more alcoholic drinks at once. Coded 1 = yes, 0 = no.	.05 (.23)	.09 (.29)
Daily family meals	Respondent reported eating a meal with parent or caregiver on at least six days per week. Coded 1 = yes, 0 = no.	.46 (.49)	.39 (.49)
Parental supervision	Wave I summary score of whether 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	1.43 (1.22)	1.41 (1.28)
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 10 years of age. Coded 1 = occurred more than five times, 0 = otherwise.	.09 (.27)	.20 (.40)
Parent report of problems in child temperament	Parent's response to "Does your child have a temper?" Coded 1 = yes, 0 = no.	.27 (.45)	.36 (.48)
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, and 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.	3.90 (.66)	3.78 (.73)
GPA above 3.0	Respondent made all A's or B's on last report card. Coded 1 = yes, 0 = no.	.59 (.49)	.47 (.50)
Time spent "hanging out" with friends	Response to question, "During the past week, how often did you just hang out with friends?" Coded 0 = zero times, 1 = one or two times, 2 = three or four times, 3 = five or more times.	2.03 (.97)	2.11 (.98)
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.	2.69 (1.21)	2.83 (1.16)
Sample size	Number of male respondents	5,923	679
Panel observations	Number of observations in panel	15,096	1,634

"getting caught" and decisions made by the police and prosecutors in arrest/ prosecution. Consequently, these measures are traditionally associated with underestimation of delinquency and crime (Hood and Sparks, 1970; Robison, 1936; Thornberry and Krohn, 2000). Self-reports of delinquency have been used since the late 1970s and are generally considered reliable (Hindelang, 1981; Hindelang, Hirschi, and Weis, 1979; Thornberry and Krohn, 2000), although slight racial differences in self-reports of delinquency and arrest have been observed in prior research (Freeman, 2000).

DELINQUENCY

To capture longitudinal patterns in delinquent behavior, a 12-item scale developed by Guang Guo and colleagues (Guo, Roettger, and Cai, 2008; Guo, Roettger, and Shih, 2007) is adopted that incorporates a similar set of items across three waves of Add Health data. This scale is similar to cross-sectional measures with the Add Health data used by Haynie (2001, 2003) and Hagan and Foster (Foster and Hagan, 2007; Hagan and Foster, 2003), including both violent and nonviolent acts that may lead to arrest and incarceration. At each wave, respondents are asked how frequently they have engaged in acts during the prior 12 months. 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. Nonviolent acts include stealing amounts larger or smaller than $50, breaking and entering a home, selling drugs, and holding stolen property. All items are coded for frequency ranging from 0 (no occurrences) to 3 (five or more occurrences), except for armed robbery and shooting or stabbing someone, which are coded 3 if they occurred at all. The scale has a Cronbach's alpha of .81 at wave I, .79 at wave II, and .76 at wave III.

In modeling delinquency with the panel of respondents in Add Health, three major assumptions of basic linear regression are violated: 1) Items in the scale are collapsed frequency counts where right censoring occurs, 2) approximately one half of delinquency scale values are "0," and 3) the panel data contain repeated measures for individuals. As Osgood, Finken, and McMorris (2002) noted, tobit models are an effective way of dealing with these issues, and they allow consideration of categorical responses (i.e., as opposed to raw counts). In the tobit model, the observed delinquency score y_{it} is transformed into the latent propensity to commit delinquency y^*_{it}, such that

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

In turn, the propensity to commit delinquent acts predicted by the linear model $y_{it}^{*} = \beta_0 + \boldsymbol{\beta} X_{it} + v_i + e_{it}$, 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, FHI, structural variables, family-process variables, and adolescent social attachments. Error is measured by the individual-level random effect v_i and the random disturbance term e_{it}, where $\mathrm{v}_i \sim N(0, \sigma_i^2)$ and $e_{it} \sim N(0, \sigma^2)$. By using a tobit model with an individual-level random effect, we assume that observations are independent and identically distributed.[6]

RESPONDENT ARREST

Respondent self-reports of arrest from 18 to 25 years of age are taken from wave IV interviews. Survey weights are used to generate a national probability sample. Here, the probability of adult arrest, p_i, is expressed by 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 $\boldsymbol{\beta}\mathbf{X}_i$ consisting of covariates for age, FHI, structural variables, family-process variables, and adolescent social attachments. ε_i is a random disturbance term such that $\varepsilon_i \sim \mathrm{N}(0, \sigma^2)$. In table 3, the odds ratios and linearized standard errors from the estimated row vector $\boldsymbol{\beta}\mathbf{X}_{\mathrm{i}}$ are reported. This regression analysis fits the general logistic regression models outlined by Long (1997).

RESULTS

PROPENSITY FOR DELINQUENCY

The results provided in table 2 examine the association of an FHI with delinquency among a pooled panel of White, Black, and Hispanic men.

6. It should be noted that although 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 with alternative multilevel models where the dependent variable is assumed to have a Poisson or normally distributed error term. The findings suggest that results are robust to alternative specifications. For comparative purposes, the results for a two-level Poisson regression, with random effects at the individual and school level, are available, upon request, as alternatives to the tobit models presented in tables 2 and 4.

Table 2. Tobit Models of Serious Delinquency

Variables	(1)		(2)		(3)		(4)		(5)		(6)	
Independent Variables												
Father's history of incarceration												
Father incarcerated before birth	1.49**	(.48)	1.39**	(.48)	1.20*	(.47)	1.06*	(.45)	.99*	(.44)	21.43	(52.07)
Father incarcerated after birth	1.90***	(.22)	1.63***	(.23)	1.43***	(.23)	1.36***	(.21)	1.21***	(.21)	−6.30*	(26.55)
Interactions												
Age × Father incarcerated before birth											−3.42	(8.72)
Age-squared × Father incarcerated before birth											.19	(.48)
Age-cubed × Father incarcerated before birth											−.003	(.01)
Age × Father incarcerated after birth											10.47*	(4.46)
Age-squared × Father incarcerated after birth											−.58*	(.25)
Age-cubed × Father incarcerated after birth											.010*	(.00)
Race												
White [Reference]												
Black	.29†	(.16)	−.32	(.20)	−.11	(.16)	.45**	(.15)	−.15	(.20)	−.15	(.20)
Hispanic	.46**	(.17)	.58**	(.21)	.44*	(.17)	.41*	(.16)	.61**	(.20)	.62**	(.20)
Age	7.62***	(1.37)	7.61***	(1.37)	5.45***	(1.38)	6.27***	(1.34)	5.32***	(1.36)	4.34**	(1.45)
Age-squared	−.39***	(.08)	−.39***	(.08)	−.27***	(.08)	−.32***	(.07)	−.27***	(.07)	−.21**	(.08)
Age-cubed	.01***	(.00)	.006***	(.00)	.004**	(.00)	.005***	(.00)	.004**	(.00)	.003*	(.00)

Table 2. Continued

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Structural Variables						
Family socioeconomic status		.03 (.03)	.03 (.03)		.10*** (.03)	.10*** (.03)
Resides with both biological parents		−.85*** (.14)	−.12 (.15)		.02 (.14)	.02 (.14)
Biological father unknown		.06 (.23)	−.16 (.24)		.18 (.23)	.18 (.23)
Foreign-born		−2.17*** (.35)			−1.55*** (.33)	−1.55*** (.33)
Proportion of non-Whites in tract		.56** (.18)			.59*** (.17)	.10 (.22)
Greater than 30% of families in poverty in tract		−.02 (.23)			.09 (.22)	.59*** (.17)
Census tract density		.03 (.02)			.00 (.02)	.00 (.02)
Familial Process Variables						
Father closeness			−.56*** (.06)		−.38*** (.06)	−.38*** (.06)
Father involvement			.10† (.06)		.23*** (.05)	.23*** (.05)
Biological mother's history of binge drinking/alcoholism			.53* (.27)		.36 (.25)	.35 (.25)
Daily family meals			−.78*** (.13)		−.41** (.13)	−.41** (.13)
Parental supervision			−.12* (.05)		−.07 (.05)	−.07 (.05)
Repeated abuse by parent or caregiver			1.05*** (.22)		.78*** (.21)	.78*** (.21)
Adolescent Social Attachments						
Difficult child temperament				.99*** (.13)	.92*** (.13)	.92*** (.13)
School attachment				−1.58*** (.09)	−1.45*** (.09)	−1.45*** (.09)
GPA above 3.0				−.94*** (.13)	−.99*** (.13)	−.99*** (.13)
Time spent "hanging out" with friends				.72*** (.06)	.67*** (.06)	.67*** (.06)
Religious attendance				−.18*** (.05)	−.20*** (.05)	−.20*** (.05)
Intercept	−47.69*** (8.19)	−47.41*** (8.18)	−31.65*** (8.31)	−33.85*** (8.05)	−27.51*** (8.17)	−21.72* (8.71)
σ Individual	3.79*** (.07)	3.74*** (.07)	3.68*** (.07)	3.40*** (.07)	3.32*** (.07)	3.32*** (.07)
σ Random Error	4.57*** (.05)	4.57*** (.05)	4.56*** (.05)	4.55*** (.05)	4.55*** (.05)	4.55*** (.05)
Number of individuals	6,602	6,602	6,602	6,602	6,602	6,602
Number of observations	16,796	16,796	16,796	16,796	16,796	16,796
Log likelihood	−31,120.2	−31,071.3	−31,012.9	−30,758.31	−30,684.7	−30,680.9

NOTE: Random-effects coefficients with standard errors in parentheses.
†$p < .05$ (one-tailed test); *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test).

Models 1–5 examine whether the associations between a father's incarceration and delinquency are robust to controls for structural, familial, and adolescent characteristics. By interacting incarceration with age variables, model 6 investigates whether an FHI sets youth on a different trajectory of delinquency in the transition to early adulthood. In all models, an FHI is distinguished as occurring 1) before birth and 2) between birth but prior to wave I. We denote these periods, respectively, as "prebirth FHI" and "postbirth FHI."

In the baseline model controlling for race and age, an FHI was positively and significantly associated with delinquency. Prebirth FHI was associated with an increased propensity of delinquency of 1.49 ($p < .01$), and postbirth FHI was associated with an increased propensity of delinquency of 1.90 ($p < .001$). That both of these variables are significant predictors of delinquency lends support to our general hypothesis that a father's incarceration is a risk factor for serious delinquency. Relative to Whites, Blacks and Hispanics had marginally greater propensities for delinquency. All age variables were significant predictors, which is consistent with the overall age–crime curve.

With the addition of family background, family structure, and neighborhood variables in model 2, associations of both prebirth FHI and postbirth FHI declined slightly, to 1.39 ($p < .01$) and 1.63 ($p < .001$), respectively. With the addition of structural variables, Blacks became indistinguishable from Whites, whereas the association for Hispanics increased in magnitude ($p < .01$). Living with two biological parents was significantly associated with a decrease in the propensity for delinquency ($p < .001$), whereas living in a neighborhood with 30 percent or more minorities was associated with a .56 ($p < .01$) increase in delinquency. Consistent with the findings of Sampson, Morenoff, and Raudenbush (2005), foreign-born respondents had a significantly smaller propensity for delinquency ($p < .001$).

In model 3, measures of family social processes are introduced (e.g., father closeness and involvement, parental supervision, and structured family meals), along with family SES and family structure. Model 3 also includes measures of the biological mother's history of binge drinking/alcoholism, as well as retrospective reports of repeated abuse by a parent or caregiver. The association of prebirth FHI with delinquency was attenuated further to 1.20 ($p < .05$). Although the association of postbirth FHI with delinquency also declined to 1.43, this association remained highly significant ($p < .001$). Of the family process measures, reports of child abuse ($p < .001$) and a mother's history of binge drinking/alcoholism ($p < .05$) were associated with increased delinquency, whereas daily family meals ($p < .001$), father closeness ($p < .001$), and parental supervision ($p < .05$) were associated with reduced delinquency.

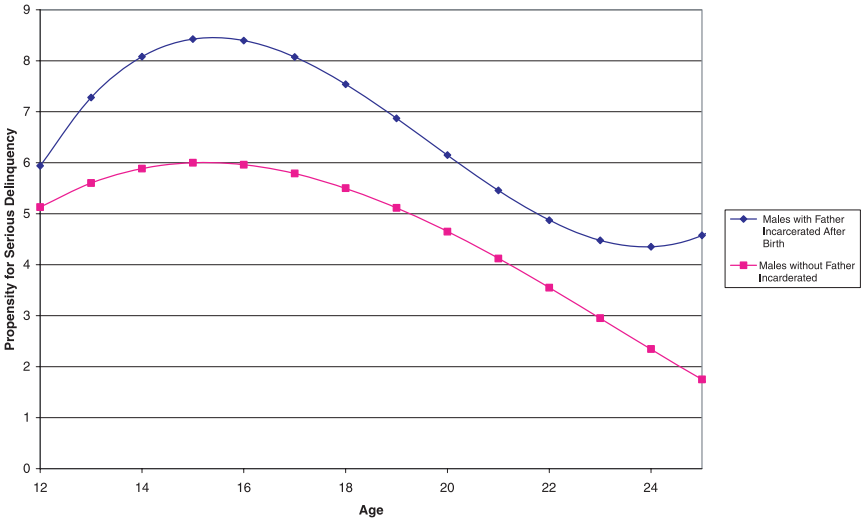
Model 4 considers whether the associations of FHI with delinquency are mediated by early indicators of child problems (i.e., difficult temperament) and adolescent social attachments, including school attachment and grades, hanging out with friends, and attending church. Prebirth FHI and postbirth FHI were associated, respectively, with 1.06 ($p < .05$) and 1.36 ($p < .001$) greater propensities for delinquency compared with respondents whose fathers were not incarcerated prior to wave I. School attachment, having a 3.0 or better GPA, and frequency of religious attendance were all highly significant predictors for a lesser ($p < .001$) propensity for delinquency. Consistent with previous studies, low self-control and hanging out with friends were associated with significantly greater propensities for delinquency ($p < .001$).

When all covariates are considered simultaneously in model 5, both measures of an FHI are significantly reduced in magnitude relative to model 1. The coefficient for prebirth FHI declined by one third to .99 ($p < .05$), whereas the coefficient for postbirth FHI declined by two fifths to 1.21 ($p < .001$). Although this result suggests that some association of an FHI with delinquency is a function of background factors and potential mediators, at the same time, these results suggest that an FHI is a robust predictor of propensity for delinquency during the transition to young adulthood.

Finally, in model 6, we test whether an FHI is associated with differing age–delinquency trajectories, by interacting measures of FHI with the age variables. Postbirth FHI interacts significantly with age ($p < .05$), which suggests that this group follows a different age–delinquency trajectory relative to respondents whose fathers did not experience incarceration. The results for postbirth FHI are robust to controls for demographic, structural, familial, and adolescent social process variables examined in previous models. No statistically significant difference in interactions was observed for respondents whose biological father was incarcerated before birth; although a potentially important variation from our general findings, the 1) relatively large standard errors for the interaction terms for age and prebirth FHI and 2) the small number of respondents experiencing prebirth FHI ($n = 116$) make us cautious in making any substantive interpretation of this finding.

Using the regression coefficients in model 1, figure 1 plots the age-graded propensities for delinquency for 1) respondents who report postbirth FHI and 2) respondents who do not report their biological father as ever having been incarcerated. Although both groups experience a classic age–delinquency curve that peaks around 15 years of age, the postbirth FHI group has two notable differences. First, the postbirth FHI group's propensity for delinquency is heightened at all ages. Second, the postbirth FHI group's propensity for delinquency rises much more rapidly between 12 and 15 years of age, declines between 15 and 22 years of age, and then plateaus in the early 20s. Through this increased propensity for delinquent

Figure 1. Age-Graded Propensity for Delinquency Among Males



behaviors in early adulthood, those experiencing a father's incarceration in childhood or early adolescence are more likely to engage in behavior that heightens the risk for arrest and incarceration as adults for all respondents in our panel.

ADULT ARREST

Given that paternal incarceration is associated with increased delinquency between 18 and 25 years of age, we next examine whether paternal incarceration is associated with an increased risk of arrest as an adult. The same sequence of models is employed. The results are presented in table 3.

In the baseline model, both prebirth FHI and postbirth FHI are associated with higher risks of arrest. Prebirth FHI increases the risk of arrest by 2.34 ($p < .01$), whereas postbirth FHI increases the risk of arrest by a factor of 2.94 ($p < .001$). Relative to Whites, Blacks and Hispanics are, respectively, 39.2 percent and 46.7 percent more likely to be arrested. Risk of arrest also significantly declines with age. As all arrests occur in adulthood, and likely after the peak of the age–crime curve, we would not expect a curvilinear relationship and, hence, do not include terms for age-squared or age-cubed. In supplemental models, not shown, higher order terms for age were insignificant.

With the addition of structural variables in model 2, associations between arrest and prebirth FHI and postbirth FHI decrease to 2.13 ($p < .05$) and

Table 3. Logistic Models of Adult Arrest

Variables	(1)	(2)	(3)	(4)	(5)
Independent Variables					
Father's history of incarceration					
Father incarcerated before birth	2.337** (.73)	2.128* (.68)	2.107* (.67)	2.115* (.69)	2.027* (.66)
Father incarcerated after birth	2.937*** (.36)	2.538*** (.34)	2.502*** (.33)	2.475*** (.30)	2.356*** (.31)
Race					
White [Reference]					
Black	1.392** (.17)	1.219 (.22)	1.196 (.16)	1.398** (.17)	1.270 (.23)
Hispanic	1.467** (.18)	1.534*** (.19)	1.434** (.18)	1.477** (.19)	1.616*** (.21)
Age	.839*** (.03)	.837*** (.03)	.829*** (.03)	.820*** (.03)	.825*** (.03)
Structural Variables					
Family socioeconomic status		.987 (.02)	.995 (.02)		1.021 (.03)
Resides with both biological parents		.658*** (.08)	.734* (.09)		.792* (.09)
Biological father unknown		.891 (.16)	.826 (.16)		.935 (.18)
Foreign-born		.673 (.26)			.800 (.32)
Proportion of non-Whites in tract		1.046 (.15)			1.053 (.16)
Greater than 30% of families in poverty in tract		.975 (.16)			.964 (.16)
Census tract density		.991 (.01)			.986 (.01)
Familial Process Variables					
Father closeness			.926 (.04)		.945 (.05)
Father involvement			.983 (.04)		1.032 (.05)
Biological mother's history of binge drinking/alcoholism			1.448† (.28)		1.375 (.28)
Daily family meals			.908 (.10)		.957 (.11)
Parental supervision			1.038 (.04)		1.055 (.05)
Repeated abuse by parent or caregiver			.942 (.16)		.886 (.16)
Adolescent Social Attachments					
Difficult child temperament				1.282* (.15)	1.256† (.15)
School attachment				.812** (.06)	.817* (.06)
GPA above 3.0				.580*** (.07)	.586*** (.07)
Time spent "hanging out" with friends				1.132* (.06)	1.132* (.06)
Religious attendance				.926† (.04)	.928 (.04)
Number of individuals	6,217	6,217	6,217	6,217	6,217

NOTE: Odds ratios, with linearized standard errors in parentheses.
†$p < .05$ (one-tailed test); *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test).

2.54 ($p < .001$), respectively. Blacks become statistically indistinguishable from Whites, whereas Hispanics remain 1.53 times more likely ($p < .001$) to be arrested. Among structural variables, living with both biological parents was significantly associated ($p < .001$) with decreased odds of arrest.

In model 3, family process variables are added to the baseline model, along with family structure and SES. Prebirth FHI is associated with a 2.11 ($p < .05$) increased odds of arrest, whereas postbirth FHI is associated with a 2.50 ($p < .001$) increased likelihood of arrest. Among familial variables, living with both biological parents ($p < .05$) and a mother's history of binge drinking/alcoholism ($p < .05$, one-tailed) are marginally significant in predicting arrest.

In model 4, the addition of adolescent social attachments again slightly attenuates associations between an FHI and arrest. Prebirth FHI was associated with a 2.12 ($p < .05$) increased odds of arrest, whereas postbirth FHI was associated with an increased odds of arrest of 2.48 ($p < .001$). Difficult temperament ($p < .05$) and hanging out with friends ($p < .05$) were associated with an increased risk of arrest, whereas school attachment ($p < .01$) and having higher grades ($p < .001$) were associated with decreased odds of arrest.

When all potential mediators are considered simultaneously in model 5, a slight attenuation of the association between an FHI and adult arrest were observed. Relative to the baseline in model 1, the association between prebirth FHI and arrest declined by approximately 15 percent to an odds ratio of 2.03 ($p < .05$), whereas the association between postbirth FHI and arrest declined by 33 percent to an odds ratio of 2.36 ($p < .001$). Relative to Whites, Hispanics were approximately two thirds more likely to be arrested as adults, whereas no statistical difference was observed between Blacks and Whites. Among control variables, living with both biological parents ($p < .05$), school attachment ($p < .01$), and having a 3.0 GPA ($p < .001$) were associated with declines in arrest; hanging out with friends and difficult temperament were associated with an increased risk of arrest.

VARIATIONS BY RACE AND ETHNICITY

To examine whether the associations of paternal incarceration with delinquency and arrest vary by race and ethnicity, we interact indicators for Black and Hispanic respondents with the two measures of a father's incarceration in the models. The results of these models appear in table 4. For comparative purposes, we present only variables for a father's incarceration, race, and race by a father's incarceration interactions. No major differences in the magnitude of control variables presented in tables 2 and 3 were observed with the introduction of these interactions.

Table 4. Race and a Father's Incarceration Interactions for Delinquency and Arrest

	Propensity for Delinquency[a]				Arrest[b]			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
Father's history of incarceration								
Father incarcerated before birth	1.49**	1.52**	.99*	.67	2.337**	1.783	2.027*	1.474
	(.48)	(.58)	(.44)	(.54)	(.73)	(.71)	(.66)	(.64)
Father incarcerated after birth	1.90***	1.90***	1.21***	1.03***	2.937***	2.962***	2.356***	2.220***
	(.22)	(.30)	(.21)	(.29)	(.36)	(.49)	(.31)	(.38)
Race								
White [Reference]								
Black	.29†	.33†	−.15	−.16	1.392**	1.417*	1.398**	1.246
	(.16)	(.17)	(.20)	(.20)	(.17)	(.19)	(.17)	(.26)
Hispanic	.46**	.41*	.61**	.51*	1.467**	1.381*	1.477**	1.474**
	(.17)	(.18)	(.20)	(.21)	(.18)	(.18)	(.19)	(.21)
Interactions								
Black × Father incarcerated before birth	—	−.56	—	.50	—	2.119	—	2.891
		(1.37)		(1.27)		(2.26)		(3.18)
Black × Father incarcerated after birth	—	−.27	—	.11	—	.827	—	.976
		(.52)		(.48)		(.30)		(.37)
Hispanic × Father incarcerated before birth	—	.31	—	1.37	—	2.502		2.646
		(1.27)		(1.19)		(2.04)		(2.41)
Hispanic × Father incarcerated after birth	—	.45	—	.78	—	1.247		1.493
		(.60)		(.56)		(.42)		(.53)

NOTES: Propensity for delinquency and arrest are measured consistently with results reported, respectively, in tables 2 and 3. Control variables are omitted. When race and a father's incarceration interactions were introduced in models 2 and 4 for delinquency and arrest, these control variables were consistent with those reported in tables 2 and 3.

[a] Coefficients with standard errors in parentheses.

[b] Odds ratios, with linearized standard errors in parentheses.

†$p < .05$ (one-tailed test); *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed test).

For delinquency, models 1 and 3 correspond, respectively, to the baseline (model 1) and combined (model 5) models presented in table 2. When we add the race–FHI interactions presented in models 2 and 4, we observe no significant interaction effects. In model 2, we do note that the main effects of minority racial status and a father's incarceration remain significant and positively correlated with delinquency. As in model 2, we observe no statistically significant race–FHI interactions in the combined model (model 4), with structural, familial, and adolescent social attachment measures partially mediating the direct effects of race and a father's incarceration. These results suggest that the associations between paternal incarceration and delinquency are similar across racial and ethnic groups.

In modeling arrest in table 4, models 1 and 3 correspond, respectively, to the baseline (model 1) and combined (model 5) models presented in table 3. As with delinquency, the addition of race–FHI interactions in models 2 and 4 remain insignificant, whereas similar significance patterns for race and paternal incarceration variables are observed. These results thus similarly suggest that the associations between paternal incarceration and arrest do not vary across groups.

In sensitivity analyses (available upon request), we found that interactions do not differ significantly 1) when using alternative age categories for paternal incarceration, and 2) when associations of a father's incarceration with the outcomes are estimated by running models separately for each group. The robustness of these findings suggests that the effects of paternal incarceration in early childhood and adolescence on delinquency and arrest do not substantively differ among Black, White, and Hispanic males.

Although the associations of paternal incarceration for delinquency and arrest may not substantially differ across racial groups, this does not imply that paternal incarceration does not differentially impact racial and ethnic groups. Our results suggest that African Americans and Hispanics are, respectively, 39.8 percent and 47.7 percent more likely to be arrested as young adults than Whites. Given the large disparities in paternal incarceration among Blacks and Whites estimated by Wildeman (2009), our results apply to nearly 25 percent of Black males currently living in the United States in their early 20s, compared with 4 percent of Whites.

SENSITIVITY ANALYSES

A variety of supplemental modeling approaches were performed to test the robustness of associations between FHI and delinquency and arrest. In modeling delinquency, both count-based and normal regression models yielded similar results. Similarly, in predicting arrest, logistic regressions with a random effect at the individual level yielded similar results. Use of 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 significantly alter the pattern of meditational results observed.

In separate analysis, the associations for FHI were examined for alternative age categories (i.e., occurring before or after early childhood or before and after 10 years of age). These alternative categories yielded similar results to the models presented in tables 2–4, which suggests that the associations between FHI and a son's delinquency and arrest do not vary substantially by age.

DISCUSSION

Using nationally representative and longitudinal panel data, we have shown that a father's incarceration is associated with a greater average propensity for delinquency during adolescence and early adulthood, as well as with an increased risk of arrest in young adulthood. These associations are robust to several controls, including family structure and SES, neighborhood characteristics, father closeness and involvement, other family processes, and adolescent social attachments. In terms of timing, a father's incarceration that occurs during a child's life seems to put the youth at greatest risk, but we find that a father's incarceration prior to the child's birth also is associated with a greater propensity for delinquency and risk of adult arrest.

Consistent with the work of Braman (2004) and Giordano (2010), we find a father's incarceration to have similar associations with both delinquency and arrest across groups of White, Black, and Hispanic males. Thus, our findings suggest that a father's incarceration places adolescents and young adults similarly "at risk" for increased delinquency and likelihood of arrest, regardless of race and ethnic classification. We caution against interpreting this result to mean that a father's incarceration impacts all racial and ethnic groups equally. Black and Hispanic youth remain much more likely to have an incarcerated father; thus, the heightened risks of delinquency and arrest observed here are of a disproportionate concern for a large number of Black and Hispanic males entering adolescence and young adulthood who have experienced a father in prison (Glaze and Maruschak, 2008; Wildeman, 2009).

As the associations observed here between FHI and a son's delinquency and subsequent arrest were robust to controls for a wide range of background factors and potential mediators, this begs the question: What are the mechanisms explaining these connections? Research drawing on symbolic interactionist and labeling perspectives suggests the need for studies of concepts such as identity transformation, labeling, stigma, and other exclusionary practices (Foster and Hagan, 2007; Giordano, 2010; Hagan

and Palloni, 1990; Pager, 2007). Unfortunately, these particularly social-psychological and interactional processes are not adequately assessable within Add Health.

As Wakefield and Uggen (2010) pointed out in their recent review, greater attention to the life-course issues surrounding a father's incarceration also is needed. For example, future studies, building on prior ethnographic research by Braman (2004) and Giordano (2010), could examine how a father's incarceration fits within the larger family system in which it is embedded. In addition to the role of a father's incarceration examined here, studies could consider the independent and joint roles of a mother's and a father's incarceration, as well as those of other persons within the immediate and extended family. Although we could control for family structure and a father's involvement with his children at wave I of Add Health, future research also might examine how the associations of parental incarceration with outcomes varies by family structure, and how it relates to family instability. Although we could broadly differentiate the timing of a father's incarceration (e.g., before birth or between birth and wave I), research with more detailed paternal incarceration data is needed to distinguish finer gradations of timing, as well as durations and sequences of incarceration, recidivism, and reentry.

The life-course perspective also draws attention to how experiences and trajectories within one role domain influence, and are influenced by, other life-course trajectories. As Pettit and Western (2004) noted, much research has focused on the consequences of incarceration in the United States, but understanding why incarceration has become a life-course event in the United States, particularly among less-educated men and minorities, remains an understudied area. In this study, we have contributed to this gap in current research by examining the intergenerational stability of criminality and criminal justice system involvement among young Black, White, and Hispanic males in the United States. However, future research needs to focus on several areas. For instance, future studies should consider how criminal justice system involvement relates to status attainment and stratification processes more generally (Wakefield and Uggen, 2010), as work by Foster and Hagan (2007) with Add Health has shown a father's incarceration to be associated with lower educational attainment and social exclusion. Building on the ethnographic research of Giordano (2010), more research is needed to examine the interplay among a father's incarceration, a family's SES, a youth's educational achievements, and his or her criminal justice system involvement. Additional research also is needed to examine the consequences, later in the life-course, of the serious delinquency and arrest observed in our study among the sons of current and formerly incarcerated fathers. Finally, in examining the consequences of a father's

incarceration across other domains of the life-course, greater research attention should focus on the experiences of daughters and mothers who have experienced a father undergoing incarceration in the United States.

LIMITATIONS

This study is not without limitations. Although work by Chantala, Kalsbeek, and Andraca (2004) suggested a general reliability of the Add Health data, the school-based sampling design and nonrandom attrition of respondents likely leads to an undersampling of those most likely to have an incarcerated father, be delinquent, or be arrested. Thus, our estimates of the associations of FHI with delinquency and arrest are likely downwardly biased. These issues also may affect our estimation of differences in associations across White, Black, and Hispanic subsamples.

The retrospective nature of respondents' reports of their biological fathers' incarcerations is an additional limitation. This limitation, in part, contributed to the choice of our coding scheme regarding the age of the respondent when the biological father was first incarcerated. Rather than attempting very fine-grained age breakdowns (e.g., incarcerated at 0–4 years of age, 5–9 years of age, 10–12 years of age, etc.), we chose broader age categorizations of before birth and between birth and their age at wave I. Supplemental analyses using alternative age categories produced a substantively similar pattern of results. We also control for whether the child knows the biological father, which should partially capture this source of measurement error. Nonetheless, future research on the reliability of these reports would be helpful, as well as research examining how the strength of associations is moderated by various measures of closeness between the father and the child.

As a result of data constraints in Add Health, associations of FHI with respondent delinquency and arrest cannot be uniquely attributed to parental incarceration, and they likely reflect, at least in part, the unmeasured influence of parental criminality. As a result, we have been careful to refer to the findings solely as associations, and we do not make causal claims. As discussed, future research, extending the work of Wildeman (2010) to contemporary adults, may help to yield additional insights into this question. We also cannot completely eliminate the possibility that other sources of unobserved heterogeneity may create the observed differences, including factors such as childhood traumas, family instability, and the exact duration and sequencing of a father's incarceration history. Simultaneous measurement of incarcerated parents and children, as proposed by Thornberry (2009), also would help to disentangle the myriad issues (i.e., poverty, family instability, and exposure to violence and criminality) that likely underlie our observed associations among FHI, delinquency, and arrest.

Although Add Health analysis by Duncan, Boisjoly, and Harris (2001) suggests that general heritability does not correlate with delinquency, we cannot eliminate the possibility that observed group differences may reflect a genetic propensity for delinquency transmitted from fathers to sons. However, the robustness of the association of FHI with a son's delinquency and arrest to controls for background factors and potential mediators, coupled with the fact that the association was significant across all groups examined, are suggestive of a nonspurious relationship.

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