

Beyond Absenteeism: Father Incarceration and Child Development

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Abstract

High rates of incarceration among American men, coupled with high rates of fatherhood among men in prison, have motivated recent research on the effects of parental imprisonment on children's development. We contribute to this literature using data from the Fragile Families and Child Wellbeing Study to examine the relationship between paternal incarceration and developmental outcomes for approximately 3,000 urban children. We estimate cross-sectional and longitudinal regression models that control not only for fathers' basic demographic characteristics and a rich set of potential confounders, but also for several measures of pre-incarceration child development and family fixed effects. We find that paternal incarceration is associated with significant increases in children's aggressive behavior at age five, and some evidence of increased attention problems. The estimated effects of paternal incarceration are stronger than those of other forms of father absence, suggesting that children with incarcerated fathers may require specialized support from caretakers, teachers, and social service providers. The estimated effects are also stronger for children who lived with their fathers prior to incarceration, but are significant for children of nonresident fathers, suggesting that incarceration places children at risk through family hardships including and beyond parent-child separation.

Beyond Absenteeism: Father Incarceration and Child Development

INTRODUCTION

By the end of 2008, over 1.5 million individuals were incarcerated in Federal or State prisons in the United States, with hundreds of thousands more in local jails (Glaze and Maruschak 2009; Harrison and Beck 2005). An overwhelming majority of these individuals were male, and most had children under the age of 18 (Glaze and Maruschak 2009). The large and growing number of incarcerated parents has made understanding the effects of paternal imprisonment on children's well-being, especially in relation to other forms of father absence, an important and timely goal for social science researchers. High rates of fatherhood among prisoners have also led to policy initiatives designed to reduce the risks posed to children and families by parental incarceration. In 2006, for example, the department of Health and Human Services issued 13 grants for programs focused on family strengthening and responsible fatherhood for men in correctional settings (Lindquist and Bir 2008).

Although a substantial literature exists on the intergenerational transmission of criminality, this research focuses on adolescent and adult children of formerly incarcerated parents (Murray and Farrington 2008b). Less is known about the extent to which parental incarceration impacts young children. Moreover, most studies investigating parent incarceration and early development are limited by small convenience samples and cross-sectional or short-term design. The present study extends previous research using a longitudinal survey of urban families and a

series of statistical models to assess the relationship between fathers' incarceration and a broad set of child development indicators at age five. We use cross-sectional and longitudinal regression models that control not only for a rich set of potential confounders, but also for several measures of pre-incarceration child development and family fixed effects.

We use data from the Fragile Families and Child Wellbeing Study, a population-based sample of urban children. The Fragile Families data include multiple indicators of both incarceration history and child development, as well as a wide range of demographic, socioeconomic, and parent behavioral measures, which help to address omitted variable biases. As a population-based study of families, rather than a sample of inmates or offenders, Fragile Families also provides a large comparison sample of children whose fathers have not been incarcerated. Further, its focus on unmarried parents allows a unique comparison: that of children whose fathers become incarcerated and those whose fathers become absent for other reasons.

BACKGROUND

Prior research identifies several mechanisms through which parental incarceration may impact young children. First, research drawing on attachment theory (Bowlby 1973) suggests that forced separation can disrupt parent-child bonds, harming children's social and emotional well-being (Solomon and Zweig 2006; Sroufe 1988). Separation as a result of parent incarceration may be even more detrimental than

divorce and other forms of parent-child separation. Most unmarried, nonresident fathers maintain contact with their children (Argys et al. 2006; Tach, Mincy, and Edin 2010), and many are involved with daily activities such as household chores, playing games, and bedtime routines (Waller and Swisher 2006). In contrast, less than one-third of fathers in prison see their children on a regular basis (Hairston 1998). Transportation to prisons can be difficult for families (Arditti, Lambert-Shute and Joest 2003; Comfort 2008) and mothers may limit contact between incarcerated fathers and children (Arditti, Smock and Parkman 2005; Edin, Nelson and Paranal 2004; Roy and Dyson 2005). Thus, children's interactions with incarcerated fathers are limited in both quantity and quality, which likely has negative consequences for development (Swisher and Waller 2008).

Second, fathers' incarceration may impact children through family economic circumstances. The incarceration of a father, even when parents are no longer romantically involved, often leads to decreases in household resources. Pay for work done in prison is meager, and returning offenders are often unable to find work or relegated to low-paying jobs or the informal economy (Lewis, Garfinkel and Gao 2007; Western, Kling and Weiman 2001). Families suffer from the loss of fathers' financial support (Geller, Garfinkel and Western Forthcoming; Swisher and Waller 2008) and are at greater risk for material hardship (Schwartz-Soicher, Geller and Garfinkel 2009). Resource deprivation, and any resulting instability, are detrimental to family and child well-being (McLoyd 1998).

Third, incarceration may affect children by compromising their parents' relationship. The economic strain created by incarceration may undermine the father's traditional role as a provider, straining parents' relationships (Hairston 1998). The social stigma often associated with incarceration may also disrupt dating relationships, especially among low-income parents (Braman 2004). The ethnographic research of Edin (2000) and Anderson (1999) suggests that poor women weigh heavily the respectability of prospective husbands, and perceive that formerly incarcerated men may threaten family reputation, put mothers' and children's safety at risk, and fail to provide a "respectable" middle-class lifestyle. Mothers may also form new relationships while their child's father is incarcerated, further complicating their relationship with the biological father upon his release (Braman 2004). These qualitative findings reinforce quantitative research reporting that married incarcerated men are more likely than their never-incarcerated counterparts to separate, and single incarcerated men, especially African-Americans, have few marriage prospects upon re-entry (Western 2006). The extent to which incarceration places couples at risk for conflict, separation, or divorce may harm children's development (Amato 2006).

Alternatively, a father's incarceration may have little or no impact on children. Approximately half of fathers behind bars were not living with their children before their incarceration (Johnson and Waldfogel 2002), and the effects of incarceration might be attenuated for children whose contact with their fathers was

limited. Additionally, fathers' incarceration may be less detrimental to female children, given that fathers are typically less involved with daughters than sons (Lundberg, McLanahan and Rose 2007). There are also reasons to suspect that the incarceration of some fathers may improve child well-being by removing a destabilizing influence. For example, if a father is abusive or if his illegal activities disrupt family relationships or undermine family safety, children may benefit from his incarceration (Whitaker, Orzol and Kahn 2006). Jail or prison time may also serve as a "turning point" for some men, in which they resolve to redirect their lives and become better spouses and fathers upon release (Edin et al. 2004). Fathers' jail or prison experiences may also have a deterrent effect, reducing their or their children's likelihood of future imprisonment (Edin et al. 2004).

Although research suggests several mechanisms through which fathers' incarceration may influence children's development, empirical evidence on the developmental effects of paternal incarceration is limited. The incarcerated population is overwhelmingly young, minority, and poorly-educated (Petersilia 2003; Western 2006), and their children face substantial challenges even in the absence of incarceration. Little data is available to isolate the causal effects of incarceration from the confounding effects of family disadvantage. Moreover, many studies are limited by small convenience samples and cross-sectional or short-term design. They therefore provide descriptive information about a sample of children whose parents have been incarcerated but cannot distinguish the challenges faced

by these children from those faced by disadvantaged children more generally (see Parke and Clarke-Stewart 2002, Wilbur et al. 2007).

The handful of studies that examine parental incarceration and child well-being in the context of representative urban and rural populations find children with incarcerated parents to be at serious risk. Children exposed to parental incarceration are more likely to experience financial strain and economic and residential instability (Geller et al. 2009; Phillips et al. 2006), and they are more likely to display aggressive behaviors than their peers (Geller et al. 2009). Although these studies control for a wide range of observable characteristics, they do not account for unobserved characteristics nor assess the role of selection bias (Murray et al. 2009). The recent work of Wildeman (forthcoming) provides greater evidence of causality by focusing on within-family changes to examine the effects of incarceration on child aggression. This research, and that of Wakefield (2009) offers support for the argument that paternal incarceration increases children's physical aggression. These population-based findings suggest that children of incarcerated fathers are at significant risk for problems during early childhood.

This study grows out of and extends the literature in several ways. First, we go beyond prior Fragile Families research on parental incarceration (Geller et al. 2009; Wildeman forthcoming) by providing detailed comparisons of children whose fathers were absent due to incarceration and those whose fathers were absent for other reasons. Second, we examine a broader range of child development outcomes

than most studies, including not only behavioral problems, but also physical health, verbal ability, and attention problems. Third, we base our analysis on a comprehensive measure of incarceration history, and examine the sensitivity of our results to varying measurement assumptions. Finally, we employ several statistical methods to assess the role of selection, observed and unobserved, in the relationship between paternal incarceration and child development.

DATA

The analysis is based on data from the Fragile Families study, which follows a cohort of nearly 5,000 couples with children born between 1998 and 2000 in twenty large U.S. cities (Reichman et al. 2001). The study systematically oversamples unmarried parents, but when weighted or regression-adjusted is nationally representative of urban families with children. Both mothers and fathers are surveyed at the time of their child's birth, with follow-up surveys conducted when the children are one, three, and five years old.

Measures

Paternal incarceration. It is well known that individuals under-report illegal and stigmatizing behavior (Groves 2004). There is also some direct evidence of under-reporting of incarceration (Golub et al. 2002). A unique strength of the Fragile Families data is the use of multiple sources to identify incarceration. Our measure of fathers' incarceration includes not only father reports, but also mother reports, and these direct reports are supplemented by disposition data and by indirect

reports. Fathers are asked to self-report whether they have been charged with a crime in the years leading up to the interview; if so, they are asked if they have been convicted, and if so, they are asked if they have been incarcerated. Due to an error in survey development, parents are asked to self-report whether they have been charged and convicted between years three and five, but are not asked to self-report incarceration. The vast majority (2,930) of fathers report not being charged or convicted, implying a report of no incarceration. Of the 209 men indicating a conviction, 165 are confirmed as having been incarcerated by a partner report, disposition data, or an indirect report, and another 30 are confirmed as not having been incarcerated by a partner report. Only 14 are left with ambiguous incarceration status.

Father self-reports are enhanced by “disposition data” recorded by the survey subcontractors, indicating whether a father was incarcerated at the time that they contacted him for follow-up¹. The disposition data identify 121 additional incarcerated fathers between baseline and year 3, and another 122 incarcerated fathers at year 5.

Mothers report at years one and three whether the father has ever been incarcerated, and at year five whether he has been incarcerated in the past two years. Finally, parents’ direct reports and disposition data are supplemented with “indirect reports” of incarceration, in which they cite incarceration as a reason the

¹ Further details on the disposition data are available from the authors upon request.

father was separated from their child or unable to find a job, or other ways that incarceration affected their lives. Few fathers with incarceration histories were identified from indirect reports alone (6% of those reporting any incarceration before year 5, and 19% of those reporting incarceration between years 3 and 5).

In total, 2,043 fathers are reported as having been incarcerated at some point before their child's fifth birthday, including 821 reported as incarcerated between the third and fifth-year surveys. The source for each report is provided in Table 1.

[Table 1 about here]

Of the 2,295 couples in which both partners are asked about the father's criminal history, their reports coincide more than 80% of the time. (In 25% both parents report incarceration, in 56% both report no incarceration.) As expected, most discrepancies between mother and father report are cases where she reports incarceration but he does not. This discrepancy could result from either deliberate under-reporting, or from the survey skip pattern. Fathers are asked to self-report arrest and conviction, and are only asked about incarceration if they report having been convicted. Mothers, on the other hand, are simply asked if the father has spent time in jail or prison. As a result, they might include time spent in jail awaiting trial, which would not be included in fathers' reports if he were not ultimately convicted. Because even short incarceration spells have the potential to compromise labor market performance or destabilize family relationships, we consider fathers to have been incarcerated if either parent reports his incarceration. We measure whether a

father was ever incarcerated and whether he was incarcerated between years 3 and 5.

Child development. Children's behavioral problems are measured using the Child Behavioral Checklist (Achenbach and Rescorla 2000). For each checklist item, mothers reported the extent to which statements about the child's behavior are true (0=not true, 1=sometimes or somewhat true, 2=often or very true). The aggression subscale ($\alpha=0.82$) is the sum of mother responses to statements about children's aggressive behavior (e.g., attacks others, screams, sulks, is suspicious, teases, argues, bullies, is disobedient at school, is disobedient at home, destroys others' things, destroys own things, fights, threatens, and is unusually loud). Internalizing behavior problems ($\alpha=0.68$) are the sum of children's scores on the anxious/depressive and withdrawn behavior subscales, with the anxious/depressive subscale measuring whether children feel overly guilty, self-conscious, worried that no one loves them, worried that they might think or do something bad, worried that they have to be perfect, and worried in general, and the withdrawn subscale measuring whether children are uninvolved in social activities, are secretive, are shy, are underactive, prefer to be alone, and refuse to talk. Attention problems include five items that assess whether children do poor schoolwork, stare blankly, are confused, daydream, and act without thinking ($\alpha=0.56$). We retained this composite despite its low reliability to maintain consistency with recent Fragile Families research on child behavior (e.g., Meadows,

McLanahan and Brooks-Gunn 2007) and because the items were designed to be used together. Children's verbal ability is measured with age-standardized scores on the Peabody Picture Vocabulary Test-Revised (PPVT-R). The PPVT-R, a measure of receptive vocabulary, assesses the size and range of words that children understand. Finally, child health is a dichotomous variable based on mother reports: 1= "excellent" or "very good" health, 0= "good", "fair", or "poor" health.

Table 2 presents the outcomes at age five for children whose fathers have been incarcerated and their counterparts whose parents have never been incarcerated. We find that children of incarcerated fathers score significantly higher on measures of aggression and attention problems, and significantly lower on the verbal ability measure than their peers. In contrast, the two groups are statistically indistinguishable on measures of health and internalizing problems.

[Table 2 about here]

Confounding covariates. Although the observed challenges experienced by children whose parents have been incarcerated are pronounced and statistically significant, these children's families also differ on many other dimensions that may influence parental incarceration and child development. First, in all analyses, we include a control for maternal incarceration in the time period of interest. Men with incarceration histories are significantly more likely to partner with women who have also been to jail or prison (Geller et al. 2009), and the incarceration of a mother may also have significant implications for child wellbeing (Murray et al. 2009; Parke

and Clarke-Stewart 2002). While we leave a detailed examination of maternal incarceration for future research, controlling for this history helps to isolate the effects of fathers' experiences. We identify a number of other demographic and socioeconomic factors, listed in Table 3, that are related to both incarceration risk and child well-being, and assess differences on these measures between families with and without paternal incarceration. The first set of covariates are those established early in the lives of both parents and include demographic characteristics such as race, immigrant background, and family history, as well as behavioral traits such as cognitive ability and impulsivity, which are linked by control theorists to criminal activity (Farrington 1998; Gottfredson and Hirschi 1990), and also have the potential to compromise family processes tied to child development (Dickman 1990). We define family history as whether each parent was living with their two biological parents at age 15, and whether each parent's own mother had a history of mental health problems. Each parent's cognitive ability is measured with the Wechsler Adult Intelligence Scale-Revised (Wechsler 1981), and impulsivity is measured with the Dickman (1990) scale of dysfunctional impulsivity. Although the measures were administered during follow-up data collections, they are considered stable constructs, unlikely to be affected by previous incarceration spells (Moeller et al, 2001; Deary et al, 2004). If, however, impulsivity and cognitive ability are altered by the incarceration experience, including them in the analyses will underestimate the effects of incarceration.

The second set of covariates contains those observed at or around the time of the focal child's birth. These include parents' age and education, and a rich set of employment, behavioral, and family characteristics. We control for parents' relationship status at the time of the child's birth (married, cohabiting, or nonresident), since unmarried men are at greater risk for criminal behavior (Sampson and Laub 1990), and children born to unmarried parents tend to face developmental disadvantages (Wu and Wolfe 2001). We also control for whether the mother was living in poverty at the time of the birth, because economic disadvantage is associated with incarceration risk and developmental problems (Crosnoe and Cooper Forthcoming; Geller et al. 2009; McLoyd 1998). In addition, we control for several factors reflecting parents' labor market potential, health, and substance use patterns. Each is associated with incarceration risk (Western 2006) and with parenting capacity (Eiden, Edwards and Leonard 2007; Kahn et al. 2002), which in turn has implications for child well-being. Finally, because child gender, birth order and low birth weight have been tied to several child development indicators (Aarnoudse-Moens et al. 2009; McHale et al. 2009), we include dummy variables for whether the focal child is male, whether he or she is a first-born or low birth weight.

[Table 3 about here]

The covariates in our models are valuable given that few surveys of incarceration include such a wide array of descriptors. Circumstances at the time of

the focal child's birth, however, may be endogenous to incarceration. Men enter our sample upon the birth of a child, but among those men who have been to jail or prison, their median reported age of first incarceration is 20, an average of six years before the focal child's birth. To the extent that earlier incarceration precludes men from fatherhood or education, or affects their relationship or other characteristics at the child's birth, models including these covariates may underestimate the true effect of having been to jail or prison. To guard against this endogeneity, several of our analyses focus on incarceration spells that follow the focal child's first birthday.

Table 3 also presents family socioeconomic differences by fathers' incarceration history. As the table shows, children whose fathers have been incarcerated are significantly more likely to be racial and ethnic minorities (though less likely to have immigrant parents), and their parents are more impulsive, score lower on tests of cognitive ability, are less likely to have grown up with both of their parents, and more likely to have a family history of mental health problems. Children of ever-incarcerated fathers are also born to younger, and less educated mothers, and their parents are less likely to be married or coresident. They are also more likely to be born into economic hardship: their mothers are more likely to be in poverty at the time of the birth, both parents are less likely to be employed, and fathers earn significantly less. Their mothers are less likely to be in good health, more likely to have histories of incarceration, and more likely to report domestic violence. Both their parents engage in significantly more risky behaviors. These

circumstances are likely to place their children at risk of developmental challenges, and the differences observed in Table 2 thus cannot, on their face, be attributed to the incarceration experience itself. In the sections that follow, we work to isolate the effect of paternal incarceration from the confounding effects of other factors.

[Table 3 about here]

MODELING STRATEGY

We begin our analysis by examining differences between children whose fathers have been incarcerated and those whose fathers have not, and progressively reducing the likelihood that these differences are caused by other family characteristics, observed or unobserved. We then test whether the estimated effects of incarceration are significantly worse for children than the effects of other father absence. In each wave, behavioral outcomes are standardized to a mean of zero and variance of one.

Incarceration and Child Wellbeing

Each outcome is first examined using four multiple regression models. The first model is cross-sectional and assesses the association between fathers' lifetime incarceration history (i.e., whether they have ever been incarcerated) and each outcome, controlling for the family background characteristics noted in Table 3. The controls isolate the relationship between incarceration and child wellbeing from the confounding effects of family structure, socioeconomic status, and other observable

parental characteristics, including mothers' incarceration². Recalling the "early-life" and "established in adulthood" covariate classifications in Table 3, the first model takes the form:

$$DEV5 = \beta_0 + \beta_1 INCARC5 + \beta_2 EARLYLIFE + \beta_3 ADULTCHAR + \varepsilon \quad (1)$$

To the extent that the covariates established in adulthood might be affected by earlier incarceration (if, for example, a juvenile incarceration limits educational attainment or delays childbearing) the estimates of the "incarceration effect" in Model 1 are likely to be underestimated. On the other hand, if early incarceration and these covariates are caused by personal characteristics not captured in the data, the Model 1 estimates might be overestimated.

To resolve this ambiguity, we estimate a second model, which controls for the same covariates as Model 1, but focuses on fathers' incarceration between the third and fifth year surveys. This model assures that all covariates were measured before the period of incarceration; any remaining relationship between incarceration and child wellbeing is unlikely to be confounded by these observed characteristics.

$$DEV5 = \beta_0 + \beta_1 INCARC3_5 + \beta_2 EARLYLIFE + \beta_3 ADULTCHAR + \varepsilon \quad (2)$$

To further isolate the effects of paternal incarceration, we estimate a third model, examining the relationship between child wellbeing and parental

² Missing data on individual survey items is modeled using a series of dummy variables.

incarceration between years 3 and 5, net of observed socioeconomic controls, but also controlling for levels of child wellbeing at year 3, prior to the period of incarceration. Examining child development before and after a parental incarceration, particularly compared to the wellbeing measures of children whose parents were not incarcerated, increases our confidence that changes in child wellbeing are caused by the incarceration experience, rather than pre-incarceration circumstances.

$$DEV5 = \beta_0 + \beta_1 INCARC3_5 + \beta_2 EARLYLIFE + \beta_3 ADULTCHAR + \beta_4 DEV3 + \varepsilon \quad (3)$$

Nonetheless, the possibility remains that some unmeasured change in circumstances between years 3 and 5 may have caused both an incarceration and a decline in child wellbeing or that some unmeasured difference between families may account for the change in child well-being. To account for these possibilities, we estimate a fourth model, using individual fixed effects to control for time-invariant family characteristics, and for both parents' incarceration between years three and five. The possibility remains that an unobserved change in family wellbeing drives the observed relationship – for example, an improvement in maternal stress may reduce the likelihood that she reports her partner as incarcerated, and improve her perception of her child's behavior. However, the focus on within-family changes limits the influence of cross-sectional heterogeneity.

$$DEV_{i,t} = \beta_1 INCARC3_5_{i,t} + \beta_2 MINCARC3_5_{i,t} + \alpha_i + \varepsilon \quad (4)$$

Incarceration and father absence

To assess the extent to which a father’s incarceration creates more risks for his children than other forms of father absence, we re-estimate Models 3 and 4 to examine the relationships between our child wellbeing measures and both father incarceration and other forms of father absence. Specifically, we identify families where the father is not reported as having been incarcerated between years three and five, but the parents are living apart at year five. A father is also considered to be absent if he reports at year five that the child spends no time with him, or the mother reports that they are not living together even “some of the time”. In addition to the 821 fathers we identify as incarcerated between years 3 and 5, we identify 1,339 fathers absent for reasons other than incarceration.

Replicating Model 3, we estimate:

$$DEV5 = \beta_0 + \beta_1 INCARC3_5 + \beta_2 ABSENCE3_5 + \beta_3 EARLYLIFE + \beta_4 ADULTCHAR + \beta_5 DEV3 + \varepsilon$$

(5)

and replicating Model 4 we estimate:

$$DEV_{i,t} = \beta_1 INCARC3_5_{i,t} + \beta_2 ABSENCE3_5_{i,t} + \beta_3 MINCARC3_5_{i,t} + \alpha_i + \varepsilon \quad (6)$$

We take the “incarceration” and “other absence” coefficients β_1 and β_2 as the estimated effects of each experience. The reference group in these models now consists of families experiencing neither an incarceration nor other absence, and is thus less disadvantaged than the reference group in the earlier models; we

anticipate that the β_1 coefficient will therefore be of larger magnitude. We then test for the equality of the β_1 and β_2 coefficients; rejection of the null hypothesis in these tests suggests that the effect of fathers' incarceration differs significantly from that of other forms of absence.

Differential effects of paternal incarceration

As noted by Western and Wildeman (2009), the effects of a father's incarceration on his child's wellbeing likely depend on the relationship that the father and his family had prior to his incarceration. We thus re-estimate Models 3 and 4, dividing our sample by two key indicators of the relationship between children and their fathers. First, we estimate the models separately for those fathers living with their partner and child at year 3 and those who were nonresident. We anticipate that any damaging effects of fathers' incarceration will be stronger for children living with their fathers before his incarceration. Second, we estimate the models separately for those families where the mother reports domestic violence (i.e. that the father has hit, slapped, or injured her) at any time by the three-year survey, and those families with no indication of domestic violence. We anticipate that children of abusive fathers experience less harm from their incarceration.

Further, we examine the extent to which the effects of fathers' incarceration on children differ by child gender. Fathers are typically less involved with daughters than sons (Lundberg et al. 2007), and examinations of paternal incarceration and young children (Geller et al. 2009; Wildeman forthcoming)

suggest that the effects of incarceration on children’s aggressive behavior are limited to boys. In this analysis we examine whether observed effects are stronger for boys (or girls), replicating Models 3 and 4 with the sample divided by child gender. For each set of comparisons, we perform Chow tests (Greene 2003) to assess the differences in the predictors of child wellbeing across subgroups.

Sensitivity Analysis

Finally, we test the robustness of our findings to our choice of incarceration measure, and to alternative model specifications. As shown in Table 1, we take our measure of incarceration from a mixture of fathers’ self-reports, mothers’ reports about him, disposition data from the survey subcontractors, and indirect indicators of incarceration. To examine the importance of supplementing father reports with mother reports, we re-estimate Models 3 and 4, but limit our measure of incarceration to those directly reported by fathers, or indicated in his disposition records. This approach identifies far fewer fathers as having been incarcerated: 956 at any time before the year 5 survey (as opposed to 2,043 in the main measure) and 240 between years 3 and 5 (versus 821 in the main measure.) Others identified as incarcerated in the main measure are either considered to not be incarcerated in this analysis (417 in the “ever incarcerated” measure, and 362 in the “incarcerated Y3-Y5” measure), or considered to have unknown incarceration status (670 in the “ever-incarcerated” measure, and 219 in the “incarcerated Y3-Y5” measure). The vast majority of men with unknown status are not interviewed in at least one wave.

To further assess the value of partner reports, we also estimate a model that separately examines the effects of father-indicated incarcerations and incarcerations only indicated by mother or indirect reports.

Finally, for those outcomes where our models suggest a significant effect of incarceration, we perform a falsification test (a variation on Kaushal 2007) to ensure that the observed relationships are not the result of unobserved selection. We run regression models using incarceration between years 3 and 5 to predict child wellbeing at year 3. Due to the temporal ordering of the variables, incarceration between years 3 and 5 could not feasibly cause an outcome difference at the third-year survey, before the focal incarceration. A significant relationship in these models would therefore suggest that some unobserved characteristic of families experiencing incarceration is driving the observed relationships. A null relationship, on the other hand, would increase confidence that the observed relationship between incarceration and child development at age five is due to a causal effect.

RESULTS

Effects of Incarceration

Table 4 presents our regression results examining the relationship between paternal incarceration and the first of our child outcomes, aggressive behavior. Model 1 indicates that children of fathers with incarceration histories display

significantly more aggression than their counterparts whose fathers were never incarcerated, above and beyond those associated with other family circumstances. As shown in Model 2, this relationship remains significant, and in fact increases in magnitude, when focusing on recent incarcerations (i.e., between the three and five year surveys). Models 3 and 4 provide more stringent tests, in turn, by controlling for pre-incarceration levels of child behavior, and by focusing exclusively on within-child changes in behavior problems following their father's incarceration. Model 3 suggests that children whose fathers become incarcerated display significantly more aggressive behaviors following his incarceration, above and beyond that predicted by their prior behavior. Likewise, Model 4 shows significant increases in aggression following a father's incarceration, net of all time-invariant family characteristics.

Models 1-3 also suggest a number of other family circumstances that are significantly tied to children's aggression. Many of these circumstances are closely linked, and collinearity between our covariates complicates their substantive interpretation. For example, children born to mothers in poverty display more aggressive behaviors at age 5 ($P < .05$ in Models 2 and 3, $P < .10$ in Model 1). However, children whose fathers earned higher wages at baseline also display significantly more aggression at age five. While a detailed discussion of the economic predictors of child behavior is beyond the scope of this analysis, the significant effects of paternal incarceration on aggression are robust to their inclusion. Likewise, children's aggression problems are significantly predicted by parental impulsivity;

however, Table 4 suggests that fathers' incarceration increases aggression above and beyond the level that the covariates would predict.

Maternal incarceration, on the other hand, is not significantly related to child aggression at age five, above and beyond the increase in behavior problems associated with fathers' incarceration. This finding likely reflects the relative rarity of maternal incarceration, and the fact that most children whose mothers become incarcerated also have fathers with incarceration histories. The insignificant effect of mother incarceration, when father incarceration is controlled for, is consistent with that found in Geller et al (2009).

[Table 4 about here]

Table 5 presents the paternal incarceration coefficients detailed in Table 4, as well as coefficients summarizing the effects of paternal incarceration on children's internalizing behaviors, attention problems, mother-reported health, and verbal ability. The columns again represent the findings of Models 1-4, each representing a progressively stricter test of causality.

As in Table 4, the first row of Table 5 suggests a robust effect of paternal incarceration on child aggression. Internalizing behaviors, on the other hand, show no significant effect of fathers' incarceration. Children's attention problems are not significantly related to their fathers' lifetime incarceration (as shown in Model 1); however, fathers' recent incarceration is significantly associated with increases in

children's attention problems, shown in Models 2 and 3. This increase is robust to controls for children's pre-incarceration attention problems; however, the fixed effects control in Model 4 suggests no within-individual change in attention problems following a father's incarceration.

Verbal ability, which Table 2 suggests is lower among children of ever-incarcerated fathers, is not significantly related to paternal incarceration after other family covariates are controlled for. Finally, mother's reports of child health are statistically indistinguishable between children whose fathers were and were not incarcerated.

[Table 5 about here]

Incarceration and Other Father Absence

Table 6 compares the estimated effects of incarceration to the effects of other father absence, using a lagged dependent variable (Model 5) and fixed effects framework (Model 6). Like the results of Table 5, Table 6 suggests significant damaging effects of incarceration on child aggression and, in Model 5, on children's attention problems.

Model 5 also suggests that children who lived apart from their fathers for other reasons were also harmed by the experience, scoring significantly higher than the reference group on scales of aggression and attention problems. In addition, Model 5 suggests that father absence reduces children's scores on the PPVT. Model

6, on the other hand, suggests no significant effect of father absence on any outcomes of interest.

[Table 6 about here]

Comparing the two disadvantaged groups, Model 5 suggests that the effects of fathers' incarceration on child aggression and attention problems differ significantly from the effects of father absence. Model 6 also suggests that the effects of incarceration on children's aggression are worse than the effects of other father absence, though the difference in coefficients is only marginally significant ($P < .10$), but also suggests no significant effects of incarceration or absence on children's attention problems.

Differential effects of paternal incarceration

While Tables 4 through 6 suggest strong and robust effects of incarceration on children's aggression, and provides some evidence of effects on children's attention problems, Table 7 tests the extent to which the effects may be moderated by families' pre-incarceration relationships or child gender. The top panel shows differential effects by fathers' pre-incarceration residence, the middle panel shows differential effects by domestic violence history, and the bottom panel shows differential effects by child gender.

The top panel of Table 7 suggests that the effects are strongest for those who lived with their fathers in the period leading up to his incarceration. Incarceration's

effects on aggressive behavior are stronger and more significant for children whose fathers were resident at the three-year follow-up survey. Likewise, Model 3 suggests that the attention problems associated with incarceration are greater for children whose fathers were resident prior to his incarceration, though effects are not significant among either group in Model 4. In each model, Chow tests suggest significant differences in the predictors of child wellbeing between fathers who were and were not resident prior to incarceration.

The second panel of Table 7 suggests that while incarceration, on average, has damaging consequences for child development, these consequences are not consistently observed in families where the father was violent before his incarceration. Model 3 suggests significant effects of incarceration on children's aggression and attention problems if their fathers were not violent in the years before his incarceration, but no effects in families where the mother reported domestic violence. Model 4, on the other hand, suggests significant effects on aggression for both groups, but no significant effects on attention for either. The structure of each model varies significantly by domestic violence history. Finally, the third panel of table 7 shows that, as found by Wildeman (forthcoming), the effects of paternal incarceration are stronger for sons than they are for daughters. The effects on aggression are nearly twice as large in magnitude for boys than for girls, and effects on attention problems are limited to boys. Chow tests again suggest structural differences in the predictors of wellbeing by child gender.

However, even limiting the analysis to girls, Model 3 indicates a significant damaging effect of incarceration on aggression, suggesting that a policy focus limited to sons of incarcerated fathers would be misguided.

[Table 7 about here]

Sensitivity Analyses

Our sensitivity analyses examine the robustness of our conclusions to our choice of incarceration measure, and to alternative modeling strategies. Table 8 replicates Models 3 and 4, both using our more limited measure of fathers' incarceration, based predominantly on self-reports, and examining the limited measure in conjunction with the incarceration measures based on maternal and indirect reports. The top panel reproduces our results from Table 5. The center panel presents incarceration coefficients from the same models, but using only the father-based report³. As expected, our findings are quite sensitive to our choice of incarceration measure, and two of the three significant relationships observed in Table 5 are not present using the more limited measure of father incarceration. The bottom panel of Table 8 presents model results based on both the father-based incarceration report, and the supplemental reports of incarceration, based on

³ As noted on page 9 fathers are not asked about incarceration at year 5, though they are asked about criminal charges and convictions. The father-based report in Table 1 therefore notes any disposition reports of incarceration, indirect reports of incarceration, or, in cases where the fathers report conviction, reports of incarceration by their partners. We consider these reports as part of the fathers' measure under the assumption that their self-reported conviction suggests willingness to report antisocial activity. These reports therefore reduce any bias created by the error in the survey questionnaire.

mother and indirect reports. The effects of mother-reported incarceration more closely resemble the estimates based on the more comprehensive measure: we observe increased levels of aggression problems in families where the mother reports father incarceration, controlling for fathers' self-reported incarceration. The converse is not the case; we see no significant relationship between self-reported incarceration and child aggression. In view of the fact that the mother reports identify nearly three quarters of the incarcerations in the three to five year period, this is not surprising. Both father and mother reports of incarceration predict children's attention problems in Model 3, but neither does in Model 4.

In sum, we find that self reported incarceration is under-reported, that relying solely upon self reports would seriously underestimate the negative effects of incarceration on children, and that partner reports ameliorate both the under-reporting and the underestimate of negative effects. Because partners are also likely to under-report incarcerations (Caspi et al. 2001), it is likely that we are underestimating the prevalence of incarceration in our sample and the ill effects of incarceration on children. On the other hand, it is possible that some mothers who believe their partners are bad parents incorrectly identify them as having been incarcerated. This could lead to an overestimate of the incarceration's ill effects. Given the well-documented under-reporting of illegal and stigmatizing behaviors, we expect that supplementing self-reports with partner reports gets us closer to the truth; however, official incarceration data would help to adjudicate the issue.

[Table 8 about here]

Finally, we run falsification tests for children's aggression and attention problems, the outcomes where Table 5 indicates significant effects in Model 3. The first row of numbers in Table 9 replicates the Table 5 results, and the second row provides the results of the falsification test. The temporal ordering of incarceration and behavior in this model suggests that there could not be a causal effect of later incarceration on year 3 behavior; a significant relationship in these models would therefore suggest that the relationship between incarceration and child behavior was driven by unobserved selection.

[Table 9 about here]

As Table 9 shows, neither aggression nor attention problems at year 3 are significantly predicted by paternal incarceration in the two years that follow. This is consistent with the idea that the relationship between incarceration and these problems is causal, since the effects on child behavior are evident in the period following the incarceration of interest, but not in the period preceding it. If, on the other hand, unobserved family characteristics were behind the relationship, they would also have likely induced a relationship in Table 9.

DISCUSSION AND CONCLUSIONS

Summary of Findings and Implications for Policy and Practice

The increased use of incarceration in the U.S. since the 1970s has led to an unprecedented number of parents in the nation's prisons and jails (Mumola 2006; Murray et al. 2009). The prevalence of paternal incarceration, in particular, has raised concerns about how children fare when separated from their imprisoned fathers. Given the importance of early experiences for developmental trajectories (Lindquist and Bir 2008; Pianta, Cox and Snow 2007), understanding the ways in which paternal incarceration affects young children's health and well-being can inform prevention and intervention efforts. The present study addresses this issue by assessing the relationship between fathers' incarceration and a broad set of child development indicators at age five, and eliminating several selection-driven explanations for observed relationships.

Overall, our results suggest that paternal incarceration has significant and damaging consequences for the socioemotional wellbeing of young children. In a series of cross-sectional, longitudinal, and fixed-effects regression models, we find a robust relationship between incarceration and child aggression. Although the estimates range in magnitude across models, they are consistently significant, robust to controls for several indicators of observable and unobservable heterogeneity, and are of sizes comparable to or larger than those of other socioeconomic factors, including maternal education and parents' baseline

relationship status. Moreover, we find some evidence that incarceration has a stronger effect on children's aggressive behaviors than other forms of father absence. These findings are in line with prior research (Wildeman forthcoming; Wakefield 2009), and provide additional support for an effect of incarceration on child aggression.

Our analyses also suggest that fathers' incarceration is significantly associated with increases in children's attention problems, although these relationships are more sensitive to model specification. After controlling for attention problems at age 3, children exposed to paternal incarceration display more attention problems at age 5 than those whose fathers do not become incarcerated. A placebo test suggests that this relationship is not driven by unobserved selection; however, fixed effects models show virtually no relationship between incarceration and attention problems, suggesting fragility in our estimates.

We find no relationship between incarceration and children's internalizing problems, verbal ability, or mother-reported health. The findings for internalizing problems run counter to those reported by Wakefield (2009), but our findings are based on a younger sample of children. Additionally, our measures of children's cognitive development and health are limited. Future research should therefore examine the developmental consequences of incarceration across various states of the early life course and using a more comprehensive set of outcome measures.

Supplemental analyses indicate that the effects of incarceration are not evenly distributed across families. Consistent with research on the developmental importance of father contact (Swisher and Waller 2008), our results suggest that incarceration elevates behavior problems substantially more for children who had been living with their fathers prior to his imprisonment. Yet, incarceration significantly increases attention and aggression problems among children whose fathers were nonresident, suggesting that effects operate at least partially through channels unrelated to father-child contact (e.g., maternal mental health, family economic well-being, or genetic transmission). We also find that estimates of the effects of incarceration on aggression are almost twice as large for boys as for girls, although the effects are significant for both genders. The results for incarceration in contexts of domestic violence are less clear. Although the effect of incarceration is not significant in the lagged model for children exposed to domestic violence, the coefficient is large and similar in magnitude to that for children in non-violent homes.

These findings suggest the need for a nuanced treatment of paternal incarceration by policymakers and children's caregivers. If, for example, a father has a history of domestic violence, his children's greatest challenges may stem from circumstances that preceded the incarceration, and resources may be best spent helping the family recover from abuse. In contrast, problems faced by children in nonviolent homes may relate more directly to their father's incarceration.

Caregivers and service providers working with these children may need to address issues related to diminished father-child contact during his sentence and family stresses that can continue after his release.

A variety of proposals and programs have been developed with the potential to address each of these challenges. Advocates have proposed family-friendly visitation policies, and suggested reductions in the cost of contact between incarcerated individuals and their families (Editorial 2009). Parenting programs, sometimes combined with services such as job training or drug treatment, have also been designed to strengthen family bonds after incarceration (Lindquist and Bir 2008). Additionally, transitional jobs programs may increase earnings and reduce recidivism among formerly incarcerated men (Bloom 2006; Jacobs and Western 2007).

Limitations and Directions for Future Research

The results of this study suggest significant negative consequences of paternal incarceration for children's development, but we interpret our findings with caution. First, while we control for a wide range of potential confounders of the relationship between incarceration and child development, challenges remain in inferring causal effects from observational data. Unobserved changes in mothers' or families' circumstances may have driven both reports of fathers' incarceration and changes in child aggression. Second, despite the population-based nature of the Fragile Families data, generalizability may be limited by sample attrition. Families

observed at the year five survey likely differ in unobserved ways from those families who could not be contacted for follow-up. Nonetheless, response rates are high, and given the prevalence of paternal incarceration, we anticipate that our findings have serious implications for children of incarcerated fathers.

In addition, robustness checks suggest that our findings are sensitive to measurement choice, and that observed effects are driven by men whose incarceration histories are reported by their partners. However, because we rely on mother reports of the primary independent (paternal incarceration) and dependent variables (child behavior problems), our results may be affected by shared method variance (Bank, Dishion, Skinner and Patterson 1990). If so, the observed effects of fathers' incarceration on behavior problems are potentially inflated. We therefore examined independent ratings of child temperament and behavior by interviewers during in-home interviews, and found that interviewer ratings corroborated maternal reports of child behavior. Consistent with prior Fragile Families research (Meadows, McLanahan and Brooks-Gunn 2007), children rated by interviewers as least cooperative had higher problem behavior scores. These findings do not rule out shared method variance but increase our confidence in mothers' appraisals of child behavior.

Our analysis, and the study of parental incarceration more generally, would benefit greatly from supplementing survey data on criminal history with administrative reports of respondents' criminal records, as done in several studies

reviewed by Murray and colleagues (2009), such as the Cambridge Study in Delinquent Development (Murray and Farrington 2005, 2008a, 2008b). These studies, however, are largely conducted outside of the United States. An administrative supplement to an American dataset examining parental incarceration would greatly advance our understanding not only of the effects of parental involvement in the criminal justice system, but of the reliability of criminal history survey data more broadly.

Future research is also needed to understand the mechanisms governing incarceration effects. Our results suggest that at least a portion of incarceration's damage is tied to the separation of fathers from their families. It is also well-established that incarceration compromises families' economic stability and parents' romantic relationships (Western 2006), but the extent to which these factors explain observed effects is not clear. Additionally, research should examine whether fathers' incarceration elevates mothers' stress levels or negatively affects parenting practices, how these effects might be mediated by mothers' repartnering, and whether these challenges are transmitted to children.

At a time when paternal incarceration is on the rise, this study takes important steps to examine the effects of paternal incarceration on children's early development. Our findings suggest that when fathers spend time in prison or jail, they place their young children at risk for behavioral problems at the start of school. Boys and children who lived in the same household as their fathers prior to the

incarceration, in particular, may have difficulty meeting behavioral demands at home and at school. Finding ways to minimize this risk by helping children exposed to paternal incarceration and their caregivers and teachers should be of utmost importance to researchers and policymakers.

Tables

Table 1: Construction of Incarceration Variable by Survey Wave and Data Source

Report	Before Year 3	Year 3- Year 5	Total By Year 5
Total Incarcerated	1,906	821	2,043
Father directly reports	737	165	826
Disposition data	121	122	152
Father indirectly reports	76	122	98
Mother directly reports (father not interviewed)	306	145	241
Mother directly reports (father interviewed at least once, does not report)	632	236	705
Mother indirectly reports (father does not report)	34	31	21

Fathers are considered to directly report between years 3 and 5 if they indicate having been convicted and their disposition data, indirect reports, or partners indicate that they were incarcerated. They are considered “not interviewed” if they were not interviewed in any of the relevant survey waves.

Table 2: Child Wellbeing Indicators, Year 5
 Full sample, and by Parental incarceration history

Outcome	Full sample	Incarc. history	No incarceration history	Sig. Different?
Aggressive Behavior (N=1,321 with incarceration history 1,341 without incarceration history)	5.30 (4.26)	6.08 (4.60)	4.65 (3.76)	***
Internalizing behavior (N=1,333 with incarceration history 1,360 without incarceration history)	3.57 (2.93)	3.59 (2.92)	3.53 (2.91)	
Attention problems (N=1,329 with incarceration history 1,366 without incarceration history)	1.07 (1.34)	1.21 (1.41)	0.95 (1.25)	***
Child rated as "excellent" or "very good" health (N=1,772 with incarceration history 1,857 without incarceration history)	88.5% (0.319)	88.5% (0.319)	89.2% (0.310)	
Verbal ability (PPVT-R) (N=1,109 with incarceration history 1,047 without incarceration history)	93.19 (15.41)	91.33 (14.44)	95.80 (15.85)	***

*P<.05, **P<.01, ***P<.001, in comparison of children with and without parental incarceration.

Table 3: Demographic and Socioeconomic Background, Fragile Families

Background Characteristic	Incarceration history	No incarceration history	Significantly different?
Early-Life Covariates			
Mother's race			***
White non-Hispanic	16.0%	28.5%	
Black non-Hispanic	57.8%	38.8%	
Hispanic	23.5%	27.9%	
Other	2.4%	4.8%	
Parents not same race	17.3%	13.8%	**
Mother immigrant (or unknown national origin)	7.8%	20.3%	***
Father immigrant status	6.6%	19.3%	***
Mother's impulsivity score (scored from 0-6)	1.84 (1.83)	1.22 (1.54)	***
Father's impulsivity score (scored from 0-6)	2.03 (1.97)	1.18 (1.58)	***
Mother's cognitive score (scored from 0-16)	6.56 (2.53)	7.04 (2.73)	***
Father's cognitive score	6.32 (2.60)	6.80 (2.82)	***
Mother lived with both parents at age 15	33.0%	51.6%	***
Father lived with both parents at age 15	26.7%	49.8%	***
Maternal grandmother experienced depression	30.7%	26.8%	**
Paternal grandmother experienced depression	27.4%	20.9%	***
Covariates established in adulthood			
Mother's age at child's birth	23.4 (5.4)	26.8 (6.2)	***
Father 5+ years older	27.5%	23.6%	*
Mother's education			***
High school dropout	43.5%	23.6%	
High school	33.6%	28.2%	
Some college	20.8%	28.1%	
College or more	2.0%	20.0%	
Father more educated	23.6%	24.0%	
Relationship at child's birth			***

Married	8.0%	41.6%	
Cohabiting	40.5%	34.1%	
Nonresident	51.5%	24.3%	
Mother in poverty at child's birth	47.0%	24.9%	***
Mother employed (baseline)	33.2%	44.6%	***
Father employed (baseline)	69.4%	89.7%	***
Father's hourly wages (baseline)	9.48 (7.22)	14.37 (11.80)	***
Mother in good health (baseline)	64.1%	69.5%	***
Mother ever incarcerated	15%	5%	***
Mother reports domestic violence at baseline	5.5%	2.0%	***
Mother smoked while pregnant	28.7%	11.7%	***
Mother used hard drugs (Y1)	0.5%	0.1%	*
Father used hard drugs (Y1)	0.8%	0.4%	
Mother reported drinking problem (Y1)	8.8%	4.6%	***
Father reported drinking problem (Y1)	27.8%	24.6%	*
Male Child	52.4%	51.9%	
Child born at low birthweight	12.1%	7.5%	***
Child mother's firstborn	35.8%	40.3%	**

*P<.05, **P<.01, ***P<.001

Table 4: Four Regression Estimates of Incarceration and Socioeconomic Factors Predicting Aggressive Behavior

	Model 1: Cross-section	Model 2: Incarceration Y3-Y5	Model 3: Lagged DV	Model 4: Individual Fixed Effects
Father ever incarcerated	0.131** (0.045)			
Father Incarcerated between Y3-Y5		0.225*** (0.057)	0.247*** (0.056)	0.238*** (0.061)
Aggressive at Year 3			0.477*** (0.024)	
Mother ever incarcerated	0.034 (0.071)			
Mother incarcerated between Y3 and Y5		-0.068 (0.106)	-0.099 (0.121)	-0.079 (0.142)
Early-Life Covariates				
Mother's race				
Black non-Hispanic	-0.058 (0.055)	-0.059 (0.055)	-0.011 (0.059)	
Hispanic	-0.014 (0.063)	-0.010 (0.063)	-0.025 (0.067)	
Other	0.077 (0.109)	0.073 (0.110)	-0.035 (0.121)	
Parents not same race	-0.101 (0.054)	-0.101 (0.054)	-0.039 (0.056)	
Mother immigrant (or unknown national origin)	-0.037 (0.073)	-0.031 (0.073)	0.029 (0.081)	
Father immigrant status	-0.041 (0.071)	-0.055 (0.070)	0.033 (0.076)	
Mother's impulsivity score (scored from 0-6)	0.069*** (0.012)	0.070*** (0.012)	0.031* (0.013)	
Father's impulsivity score (scored from 0-6)	0.045*** (0.013)	0.045** (0.013)	0.041** (0.013)	
Mother's cognitive score (scored from 0-16)	0.004 (0.008)	0.005 (0.008)	0.005 (0.008)	
Father's cognitive score	-0.003 (0.008)	-0.003 (0.008)	-0.001 (0.008)	
Mother lived with both parents at age 15	-0.021 (0.040)	-0.019 (0.040)	-0.048 (0.044)	

Father lived with both parents at age 15	-0.047 (0.043)	-0.047 (0.043)	-0.012 (0.046)
Maternal grandmother experienced depression	0.170*** (0.046)	0.163*** (0.046)	0.031 (0.046)
Paternal grandmother experienced depression	0.038 (0.047)	0.031 (0.048)	0.014 (0.048)
Covariates established in adulthood			
Mother's age at child's birth	-0.010* (0.004)	-0.010* (0.004)	-0.006 (0.004)
Father 5+ years older	-0.083 (0.045)	-0.078 (0.045)	-0.066 (0.048)
Mother's education			
High school dropout	0.004 (0.052)	0.009 (0.052)	0.011 (0.056)
Some college	-0.063 (0.051)	-0.060 (0.051)	-0.089 (0.052)
College or more	-0.153* (0.072)	-0.160* (0.072)	-0.173* (0.075)
Father more educated	-0.036 (0.050)	-0.036 (0.050)	-0.012 (0.052)
Relationship at child's birth			
Cohabiting	0.016 (0.053)	0.028 (0.053)	-0.009 (0.058)
Nonresident	0.094 (0.061)	0.097 (0.061)	-0.016 (0.065)
Mother in poverty at child's birth	0.098* (0.045)	0.098* (0.045)	0.110* (0.048)
Mother employed (baseline)	0.040 (0.040)	0.042 (0.040)	0.055 (0.042)
Father employed (baseline)	-0.012 (0.058)	-0.016 (0.057)	0.018 (0.059)
Log of father's hourly wages (baseline)	0.078* (0.035)	0.081* (0.035)	0.087* (0.035)
Mother in good health at baseline?	-0.083* (0.041)	-0.085* (0.041)	-0.020 (0.043)
Mother reports domestic violence at baseline	0.074 (0.103)	0.063 (0.101)	0.052 (0.102)
Mother smoked while pregnant	0.111* (0.052)	0.119* (0.052)	0.032 (0.053)
Mother used hard drugs (Y1)	-0.672** (0.321)	-0.680* (0.306)	-0.730*** (0.182)
Father used hard drugs (Y1)	-0.308	-0.338	-0.304

	(0.381)	(0.370)	(0.452)
Mother reported alcohol use (Y1)	0.068 (0.084)	0.064 (0.084)	0.067 (0.085)
Father reported alcohol use (Y1)	0.009 (0.048)	0.022 (0.048)	0.045 (0.051)
Male Child	0.150*** (0.036)	0.142*** (0.036)	0.066 (0.038)
Child born at low birthweight	0.083 (0.068)	0.084 (0.068)	0.054 (0.072)
Child mother's firstborn	-0.195*** (0.041)	-0.205*** (0.041)	-0.117** (0.044)

Standard Errors in parentheses. Missing data indicators included in models, but not in table.

*P<.05, **P<.01, ***P<.001

Table 5: Four Estimates of the Effects of Fathers' Incarceration on Child Wellbeing

	Model 1: Cross-section	Model 2: Incarceration Y3-Y5	Model 3: Lagged DV	Model 4: Individual Fixed Effects
Aggressive Behavior	0.131 ** (0.044)	0.225*** (0.057)	0.247 *** (0.059)	0.239 *** (0.061)
Internalizing Behavior	-0.075 (0.046)	-0.028 (0.050)	0.002 (0.055)	-0.053 (0.069)
Attention problems	0.029 (0.045)	0.201*** (0.056)	0.182 ** (0.063)	0.037 (0.074)
Child Health	0.096 (0.129)	-0.035 (0.143)	-0.026 (0.158)	0.067 (0.248)
Verbal ability (PPVT-R)	0.159 (0.688)	0.164 (0.770)	0.801 (0.810)	-0.455 (1.044)

PPVT Models also control for child's age (in months) at the time test was administered.
Standard Errors in Parentheses. *P<.05, **P<.01, ***P<.001

Table 6: Comparing the effects of incarceration and other father absence (reference group: father consistently resident between years 3 and 5)

Model	Model 5: Lagged DV			Model 6: Individual Fixed Effects		
Coefficient	Father Incarceration	Other Father Absence	Coefficient comparison (P-value)	Father Incarceration	Other Father Absence	Coefficient comparison (P-value)
Aggressive Behavior	0.304*** (0.064)	0.107* (0.047)	P=0.001 **	0.187* (0.077)	0.033 (0.045)	P=0.083
Internalizing Behavior	0.051 (0.062)	0.075 (0.050)	P=0.688	-0.142 (0.085)	-0.072 (0.051)	P=0.481
Attention problems	0.241*** (0.068)	0.105* (0.052)	P=0.040 *	-0.022 (0.093)	-0.005 (0.054)	P=0.879
Child Health	-0.175 (0.178)	-0.232 (0.151)	P=0.734	0.010 (0.284)	-0.015 (0.178)	P=0.940
Verbal Ability	0.156 (0.887)	-1.538* (0.728)	P=0.049 *	-1.603 (2.288)	-2.174 (2.050)	P=0.678

Standard Errors in parentheses.

*P<.05, **P<.01, ***P<.001

Coefficients and odds ratios estimate effects of incarceration and absence between years 3 and 5 on child outcomes, compared to children whose fathers were neither incarcerated nor absent. Models control for full set of covariates, and child development at age 3.

Table 7: Estimated Incarceration Effects by Pre-Incarceration Family Circumstances and Child Gender, Models 3 and 4

Resident Vs. Non-Resident Fathers (N=1,397 Resident Fathers, 1,378 Nonresident)				
Model	Model 3: Lagged DV		Model 4: Individual Fixed Effects	
Pre-Incarceration Residence	Non-Resident Father	Resident Father	Non-Resident Father	Resident Father
Aggressive Behavior	0.231** (0.075)	0.330** (0.106)	0.193* (0.078)	0.317** (0.102)
Internalizing Behavior	-0.018 (0.067)	0.041 (0.102)	-0.114 (0.085)	0.039 (0.121)
Attention problems	0.129 (0.076)	0.267* (0.120)	-0.044 (0.094)	0.206 (0.126)
Child Health	-0.061 (0.185)	0.082 (0.332)	0.035 (0.300)	0.201 (0.449)
Verbal Ability	1.616 (1.018)	-1.035 (1.388)	0.368 (1.359)	-0.872 (1.724)

Continued on Following Page.

Domestic Violence Vs. Non-Domestic Violence (N=448 with Domestic Violence, 2,466 with no Domestic Violence)				
Model	Model 3: Lagged DV		Model 4: Individual Fixed Effects	
Domestic Violence History	Domestic Violence	No Domestic Violence	Domestic Violence	Non-Domestic Violence
Aggressive Behavior	0.210 (0.131)	0.287*** (0.068)	0.288* (0.127)	0.221** (0.070)
Internalizing Behavior	-0.178 (0.126)	0.007 (0.063)	-0.138 (0.151)	-0.026 (0.079)
Attention problems	0.084 (0.136)	0.185* (0.073)	0.016 (0.149)	0.048 (0.086)
Child Health	-0.055 (0.330)	-0.026 (0.187)	0.172 (0.416)	-0.000 (0.310)
Verbal Ability	1.654 (1.808)	0.339 (0.939)	3.235 (2.237)	-1.079 (1.192)
Boy Vs. Girl Child (N=1,520 Boys, 1,398 Girls)				
Model	Model 3: Lagged DV		Model 4: Individual Fixed Effects	
Aggressive Behavior	0.354*** (0.086)	0.181* (0.081)	0.299*** (0.083)	0.131 (0.089)
Internalizing Behavior	0.059 (0.078)	-0.035 (0.078)	-0.129 (0.096)	0.043 (0.100)
Attention problems	0.192* (0.092)	0.133 (0.088)	-0.005 (0.099)	0.075 (0.113)
Child Health	0.154 (0.202)	-0.183 (0.270)	0.125 (0.355)	0.125 (0.354)
Verbal Ability	0.959 (1.150)	0.311 (1.184)	-1.224 (1.415)	0.507 (1.573)

Standard Errors in parentheses.

*P<.05, **P<.01, ***P<.001

Subgroup sample sizes provided are samples of families for whom aggressive behavior is reported. Samples sizes vary slightly depending on response rates for the outcome of interest, as detailed in Table 2.

**Table 8: Testing Sensitivity to Measurement Choice
Lagged DV and FE Estimates of the Effects of Fathers' Incarceration on Child Wellbeing**

Outcome	Lagged DV	Individual FE model
Based on Comprehensive Incarceration Measure (Replicating Table 5)		
Aggressive Behavior	0.247 *** (0.059)	0.239 *** (0.061)
Internalizing Behavior Problems	0.002 (0.055)	-0.053 (0.069)
Attention Problems	0.182 ** (0.063)	0.037 (0.074)
Child Health	-0.026 (0.158)	0.067 (0.248)
Verbal Ability	0.801 (0.810)	-0.455 (1.044)
Based on Father Reports and Dispositions		
Aggressive Behavior	0.069 (0.072)	0.154 (0.095)
Internalizing Behavior Problems	-0.034 (0.069)	-0.106 (0.110)
Attention Problems	0.155 * (0.077)	0.045 (0.118)
Child Health	0.126 (0.222)	-0.112 (0.381)
Verbal Ability	0.923 (1.012)	-1.329 (1.569)
Based on Father Reports and Dispositions, Compared to Mother and Indirect Reports		
Aggressive: Father-based	0.137 (0.074)	0.158 (0.095)
Aggressive: Mother-based	0.355*** (0.078)	0.293*** (0.078)
Internalizing: Father-based	-0.028 (0.070)	-0.106 (0.110)
Internalizing: Mother-based	0.031 (0.074)	-0.019 (0.089)
Attention: Father-based	0.189* (0.078)	0.045 (0.118)
Attention: Mother-based	0.175* (0.087)	0.032 (0.095)
Child Health: Father-based	0.102 (0.225)	-0.101 (0.381)
Child Health: Mother-based	-0.125 (0.193)	0.180 (0.315)
Verbal: Father-based	1.039 (1.035)	-1.317 (1.576)
Verbal: Mother-based	0.562 (1.053)	0.107 (1.298)

Standard Errors in Parentheses.

*P<.05, **P<.01, ***P<.001

Table 9: Results of Falsification Tests

	Aggression	Attention problems
Model 3 results (Predicting Y5 behavior)	0.247 *** (0.059)	0.182 ** (0.063)
Falsification test results (Predicting Y3 behavior)	0.005 (0.055)	0.036 (0.054)

Predictor of interest = incarceration between years 3 and 5

*P<.05, **P<.01, ***P<.001

Standard Errors in parentheses.

Both Model 5 and the falsification test control for full set of covariates listed in Table 3.

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