

Paternal Incarceration and Children's Physically Aggressive Behaviors:
Evidence from the Fragile Families and Child Wellbeing Study

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ABSTRACT

This study extends research on the consequences of mass imprisonment and the causes of children's behavior problems by considering the effects of paternal incarceration on children's physically aggressive behaviors at age 5 using data from the Fragile Families and Child Wellbeing Study. Results suggest that paternal incarceration is associated with increased physical aggression for boys and that effects are concentrated among boys whose fathers were neither incarcerated for a violent offense nor abusive to the boys' mother. Results also suggest that paternal incarceration does not increase – and may even diminish – girls' physical aggression, although this finding is not robust. Taken together, results imply that mass imprisonment may contribute to a system of stratification in which crime and incarceration are passed down from fathers to sons.

Over the course of the American prison boom, paternal imprisonment has emerged as a common event in the life-course of disadvantaged children (Wildeman 2009). Estimates suggest that black children born in 1990 had a 25 percent chance of experiencing paternal imprisonment; for black children of high school dropouts, this event was modal (Wildeman 2009:271-273). That parental incarceration has become so common is troubling given research suggesting that it compromises child wellbeing. Seeing a father arrested and visiting him in prison may be traumatic for children (Comfort 2007), as may be the cycle of imprisonment and release that often follows (Braman 20004; Goffman 2009). The stigma and strain that accompany parental imprisonment may also undermine the wellbeing of children (Comfort 2007).

In light of the growing risk of parental imprisonment and the negative effects of imprisonment on families, researchers have begun considering the effects of parental imprisonment on children's behavioral problems (Hagan and Dinovitzer 1999; Murray and Farrington 2008). But, with few exceptions, research in this area has been plagued by small samples, dated data, and a host of other problems challenging efforts to establish the robustness of this association (but see Wakefield n.d.). Moreover, even where these problems have been less evident, research has provided little insight into why effects may differ by child gender or tested mechanisms and moderators influencing the relationship between paternal incarceration and children's behavior problems (Murray and Farrington 2008).

This article contributes to research on the consequences of mass imprisonment and the causes of children's behavior problems by examining the effects of paternal incarceration on children's physically aggressive behaviors at age five using data from the Fragile Families and Child Wellbeing Study. By focusing on physically aggressive behaviors, it considers the outcome most strongly associated with later behavioral problems, including crime (Moffitt 1993; Nagin and Tremblay 2001). This article improves upon prior research in three ways. First, it considers how and why the effects of paternal incarceration on children may differ by their *gender*. Second, it considers mechanisms and moderators, lending insight into *how* paternal incarceration affects children and *which* children are most affected. Finally, it uses the best data available to test these hypotheses. In addition to generalizing to the children of the prison boom,

these data also contain multiple observations on the dependent and independent variables, a large sample of children of ever-incarcerated fathers, and various controls not available in other surveys.

Background

Paternal Incarceration and Child Wellbeing

Research on the effects of imprisonment on family life points to many pathways by which paternal incarceration may affect child wellbeing. I consider three ways in which paternal incarceration may compromise child wellbeing, paying special attention to variations in effects by paternal characteristics.

Perhaps most importantly, paternal incarceration is likely to traumatize children. This holds even for children who do not see their father get arrested (Comfort 2007). Over the duration of a parent's incarceration, children must deal with the brute fact of paternal absence, make sense of either conflicting or nonexistent explanations for his absence, and visit foreboding institutions such as prisons and jails (Comfort 2007; Murray and Farrington 2008). Once a father has been released, integrating him back into a household may also be traumatic. Children of fathers who find themselves on the run from the law for minor infractions such as technical violations of parole may suffer most, as their fathers must be unpredictable in order to avoid contact with the police (Goffman 2009). In addition, childhood trauma may be compounded by the fact this trauma is *repeated* over the cycle of incarceration and release. This is a key way in which paternal incarceration differs from parental divorce, which generally happens once.

But paternal incarceration may be consequential for children not solely because it is traumatic. Strain caused by diminished financial resources and altered family life may also be crucial. While the financial effects of paternal incarceration on children are greatest during incarceration (Comfort 2007), research on the effects of incarceration on men's employment prospects (Pager 2003; Western 2006) and resources available to their families (Geller, Garfinkel, and Western 2008) suggests that the financial consequences of paternal incarceration are long-lasting. Since incarceration elevates the risk of divorce and separation (Lopoo and Western 2005), children's family structure may change as a result of paternal incarceration. And since many women find new partners when their partners are incarcerated (Nurse

2002), paternal incarceration could also be associated with the presence of a social father, which tends to change care arrangements. Finally, paternal incarceration may increase the strain to which children are exposed by altering the way their parents discipline them. Since having a family member incarcerated increases stress (Braman 2004) and depression (Green et al. 2006), caretakers might resort to less effective parenting practices. Changes in paternal involvement may also be crucial, as prison forces men to change their behavior in ways that make them more violent and unpredictable (Nurse 2002:52-54).

The stigma of having a father incarcerated may also compromise child wellbeing. Although young children may not be cognizant of the stigma of having a father incarcerated (Braman 2004: 173), the indirect effects of stigma should take root immediately. Since the stigma of incarceration leads the partners of incarcerated men to withdraw from social networks (Braman 2004:171), this should diminish the number of alternative ties children can draw upon for support. The stigma of incarceration may also affect children by leading those *outside* of the family – especially teachers and other children’s parents – to respond differently to children, even labeling them deviant or criminal (Hagan and Palloni 1990).

Based on existing research, it appears that paternal incarceration compromises child wellbeing both in the short-term and the long-term. It also appears that while children exposed to paternal incarceration for the first time suffer primarily when the father is incarcerated, recovering quickly upon his return to the community, children whose fathers get caught in a cycle of imprisonment and release suffer from trauma even after their fathers return. Of course, paternal incarceration may be good for some children. Since removing violent, abusive men from households enhances family functioning in nearly all cases (Murray and Farrington 2008; Western and Wildeman 2009; see also Jaffee et al. 2003), parental incarceration likely enhances the wellbeing of children of abusive, or otherwise violent, fathers.

Paternal Incarceration and Children’s Behavior Problems

By exposing children to trauma, strain, and stigma, paternal incarceration compromises child wellbeing. Since research links all of these forms of childhood disadvantage with children’s behavior problems (Duncan and Brooks-Gunn 1997), paternal incarceration may increase children’s behavior problems no

matter which of these mechanisms are at work. Previous research on children's behavior problems provides vital insight into how these problems behaviors will manifest themselves, how their manifestations may differ by children's gender, and if the effects vary by paternal characteristics.

Existing research suggests that parental incarceration will exacerbate the problem behaviors of boys and girls but that these behavior problems will manifest themselves differently depending on the child's gender (Cummings, Davies, and Campbell 2000). Studies conclude, for instance, that boys respond to paternal absence and other stressors with increased externalizing behaviors (see especially Malone et al. 2004). As such, boys will be more likely to respond to paternal incarceration with increases in externalizing, and maybe even physically aggressive, behaviors. While it is likely that boys will respond to this event with greater externalizing behaviors, it is unlikely that girls will respond in the same way. Rather, they are more likely to respond to paternal incarceration with greater internalizing behaviors, as they do to a host of other stressors (see especially Cummings et al. 2000; see also Malone et al. 2004).

While understanding average effects of paternal incarceration on children's behavior problems is crucial, it is also useful to consider potential variations in effects. This is especially so since research shows that removing antisocial fathers from the home enhances child wellbeing (Jaffee et al. 2003). This can be tested by examining variations in the effects of paternal incarceration on children by whether the father was engaged in domestic violence or was a violent offender. Considering these variations is not a strictly academic exercise since policy implications differ if the removal of violent or abusive men from homes could enhance child wellbeing. Based on existing research, I expect that paternal incarceration will *increase* children's behavior problems if the father is not violent or abusive and will either *decrease* children's behavior problems or have *no effect* on them if the father is violent or abusive.

Previous Research on the Effects of Paternal Incarceration on Children's Behavior Problems

Research on the effects of paternal incarceration on children's behavioral problems has two main strands (see Foster and Hagan 2007, 2009 for parallel research). One considers effects on delinquency, criminality, and risk of incarceration among boys (Hagan and Palloni 1990; Murray and Farrington 2005;

Murray et al. 2007; Roettger and Swisher 2009); the other considers effects on the behavior problems of boys and girls using current data and a range of outcomes (Geller et al. *Forthcoming*; Wakefield n.d.).

Most research on the consequences of paternal incarceration for boys' delinquency, criminality, and incarceration is based on data from the Cambridge Study in Delinquent Development (CSDD), which is a longitudinal study of 411 boys from working-class London who entered adulthood in the early 1970s (Hagan and Palloni 1990; Murray and Farrington 2005; Murray et al. 2007). Research based on the CSDD support the hypothesis that having a father with a history of incarceration increases boys' risks of delinquency, criminality, incarceration, and other problem behaviors (Murray and Farrington 2008). Although much of the research in this area comes from analyses using the CSDD, one recent study using the Add Health data also demonstrates an association between having a father with a history of incarceration and boys' delinquency and criminality in early adulthood (Roettger and Swisher 2009).

Studies using data from the CSDD have long formed the vanguard of research in this area, but they are limited in at least three ways. First, the data are from an era (the baby boom) and a place (England) with much lower imprisonment rates than the contemporary United States. It therefore seems unlikely that their results generalize to the children of the prison boom. Second, since the data do not contain repeated observations of both paternal incarceration and boys' criminality, it is not possible to run models accounting for stable but unobserved characteristics using these data. Since families in which a father has been incarcerated may differ from other families in unobserved ways, the fact that the data do not support these models is a limitation. Finally, none of the studies using these data are able to consider gender differences in effects, or the mechanisms and moderators that may produce those effects. Although only the second of these issues applies to the Add Health data, the lack of a repeated measure of paternal incarceration (and possibly substantial recall bias) should limit our confidence in whether this association is driven by a real effect of paternal incarceration or unobserved characteristics of fathers or children.

A second strand of research considers the effects of paternal incarceration on children's behavior problems more broadly using contemporary data. Using the Fragile Families and Child Wellbeing Study, Geller and colleagues (*Forthcoming*) find that having a father with a history of incarceration is associated

with higher risks of externalizing and internalizing behaviors. Although the results from this study are provocative and generalize to children of the prison boom, they do not provide insight into mechanisms and moderators and should be considered primarily descriptive since they do not control for pre-existing behavior problems or stable but unobserved traits. Another recent study uses data from the Project on Human Development in Chicago Neighborhoods and a host of modeling strategies to show that recent bouts of paternal incarceration increase internalizing and externalizing behaviors (Wakefield n.d.). Effect sizes are not huge, but Wakefield (n.d.) aptly demonstrates that the effects of paternal incarceration on children are comparable to the effects of divorce. Although this analysis is the most rigorous to date, it still has three shortcomings. First, the analysis yields no insight into gender differences in the consequences of paternal incarceration for children's behavior problems and does not test mechanisms and moderators. Second, the number of children experiencing paternal incarceration is small, leaving the author unable to limit the sample to children of ever-incarcerated fathers. Since the data contain no other measure of criminality, not being able to limit the sample to children whose fathers are known to have ever been criminally active is a major limitation. Third, the dataset does not include measures of paternal or maternal self-control, which are essential for diminishing omitted variable bias in these analyses.

I extend research on the consequences of paternal incarceration on children's behaviors in four ways. First, by focusing on physical aggression, I consider the outcome most strongly associated with a host of later behavior problems, including crime (Moffitt 1993; Nagin and Tremblay 2001). Second, I provide a more complete discussion and analysis of why effects of paternal incarceration on children may differ by a child's *gender*. Third, by considering mechanisms and moderators, I lend insight into *how* paternal incarceration affects child behavior problems and *which* children are affected. Finally, I use the best dataset available to test these hypotheses, the Fragile Families and Child Wellbeing Study. Despite these improvements, however, I cannot dismiss the possibility that any observed association could be due to unobserved changes in fathers, genetic transmission, or gene-environment interactions. Therefore, even though this article provides the strongest test to date, my results must still be considered only tentative.

Data, Measures, and Method

Data

The Fragile Families and Child Wellbeing Study is a longitudinal birth cohort study following 5,000 children born between 1998 and 2000 in 20 cities with populations in excess of 200,000 – the majority of whom were born to unmarried parents (Reichman et al. 2001). Initial interviews were conducted with mothers in hospitals shortly after they gave birth. Mothers were interviewed again 12, 30, and 60 months later. By 60 months, 85 percent of mothers were still in the sample, with 80 percent of those agreeing to participate in the in-home assessments that took place 36 and 60 months after the child's birth. Fathers were also contacted around the same time as mothers, but their response rates were much lower.

I used data from the first four waves of core data collection and both in-home assessments. Since fathers were much more likely to drop out of the sample than were mothers, I relied primarily on information gleaned from core interviews with mothers and from caretaker interviews, which were with mothers 98 percent of the time. The only exception to this rule is that I also relied on paternal reports of incarceration. Since I needed repeated measures of children's physically aggressive behaviors, I included only children whose mothers completed the last two core interviews and both in-home interviews. This yielded a large sample of boys (N=1190) and girls (N=1085), but it represents slightly less than half of the families initially interviewed, a substantial loss of data that may limit the generalizability of results.

Missing data is one major concern with this data analysis. Another concern is common reporter bias, which occurs in this study because mothers were asked to report on both paternal incarceration and children's physically aggressive behaviors. A third concern is that the data do not allow me to consider the alternative hypotheses that genetic transmission or gene-environment interactions may be driving any observed association. Since research shows strong direct genetic transmission of aggression (see the review of Guo et al. 2008), this is a major limitation. The fact that the sample is exclusively urban is also a drawback, although a minor one. A final concern is the lack of good measures of changes in criminal activity and severity of addiction, making it difficult for me to decipher whether it is changes in criminal activity or addiction or recent paternal incarceration that is driving any observed association.

Despite these concerns, the Fragile Families data are ideal for a number of reasons. First, mothers were asked a host of questions about fathers. Since disadvantaged fathers are underrepresented in surveys, maternal reports provide information unavailable in other surveys (Hernandez and Brandon 2002). Second, the data have repeated measures of both paternal incarceration and children's behaviors, allowing me to use fixed effects models, which control for unobserved heterogeneity. Third, the data are based on the experiences of contemporary children, meaning that results are generalizable to children of the prison boom. Fourth, although the data do not include genetic information, they do include information on parental self-control, which should diminish omitted variable bias. Finally, because disadvantaged men are overrepresented in the criminal justice system, many of the fathers had been incarcerated.

Measures

Children's Physically Aggressive Behaviors. The dependent variable for this study is a standardized measure of children's physically aggressive behaviors at age five. This measure is based on whether the caregiver interviewed in the in-home segment at 60 months thought the following statements about the child were not true (0), somewhat or sometimes true (1) or very or often true (2): the child destroys things belonging to family or others; the child gets in many fights; and the child physically attacks people. Cronbach's alpha for this scale was .59 at 36 months and .64 at 60 months.

Paternal Incarceration. I broke paternal incarceration into two categories, both of which are based on maternal and paternal reports. The first measure, whether the father had ever been incarcerated by 30 months, is based on maternal and paternal responses to questions asking if the father was currently incarcerated (baseline, 12, and 30 months) or had ever been incarcerated (12 and 30 months). If either parent answered yes to either question, then I considered the father to have been incarcerated by 30 months. I used this measure in two ways. In most models, I used this measure to consider the long-term consequences of paternal incarceration for children's physically aggressive behaviors. In some models, I used this variable as a way to diminish unobserved heterogeneity. Since fathers who have ever been incarcerated had been criminally active at some point, limiting the sample to children of ever-incarcerated

fathers diminishes unobserved heterogeneity in fathers. Slightly less than 40 percent of boys and girls had biological fathers who had ever been incarcerated by the 30 month interview (Table 1).

I also considered a measure of recent paternal incarceration. This variable allowed me to consider whether there was an association between new paternal incarceration and a change in children's physical aggression. I considered fathers recently incarcerated if either parent said at 60 months that the father had been incarcerated since the last interview or that he was currently incarcerated. Based on this coding, 19 percent of boys and 15 percent of girls had recently incarcerated fathers. Although these risks are astoundingly high in comparative-historical perspective, they fall roughly in line with recent estimates (Wildeman 2009). Since this measure is drawn from interviews at 60 months but covers the period between 30 and 60 months, and since measures of children's physical aggression are drawn from 36 and 60 months, analyses presented here may underestimate the effects of recent paternal incarceration on children's physical aggression at 60 months. This may occur because recent paternal incarceration, which should influence only physically aggressive behaviors at 60 months, could also influence physically aggressive behaviors at 36 months since some fathers were likely incarcerated between 30 and 36 months.

An additional 67 children experienced paternal incarceration, but I dropped these cases because their mothers had also been incarcerated by 60 months. Another 115 cases were dropped because they experienced maternal incarceration only. I dropped cases in which the mother had ever been incarcerated in order to gain an uncontaminated estimate of the effects of paternal incarceration on children's physically aggressive behaviors. Including these cases increased levels of statistical significance and pushed point estimates away from zero. Results therefore are robust to my decision to exclude them.

Some models relied on additional measures of paternal incarceration. Since a paternal absence perspective suggests that current paternal incarceration could exert a greater influence on children's physical aggression than recent incarceration, I differentiated between current (at 60 months) and recent (31-59 months) incarceration. Since the consequences of paternal incarceration on children may vary by how violent the father is, I differentiated between fathers incarcerated for violent and nonviolent offenses. Children were coded as having a father incarcerated for a nonviolent offense if the mother reported at 60

months that he had been incarcerated for possession, use, or sale of drugs; a major traffic offense; a parole or probation violation; nonpayment of child support; traffic tickets; or an alcohol-related offense. I relied on maternal reports because fathers were not asked about their offense type. Children were coded as having a father incarcerated for a violent offense if the mother reported that he had been incarcerated for aggravated assault, rape, or murder; robbery, theft, or larceny; simple assault; or domestic violence. Some mothers did not respond to questions about offense type or provided a response that could not be categorized. If this was the case at 60 months, the 30 month report was used. This did not alter point estimates but diminished the share incarcerated for an offense that could not be categorized.

[Insert Table 1 about here.]

Control Variables. Because parental characteristics likely associate with both children's aggression and their risk of experiencing paternal incarceration, I controlled for parental age, education, and self-control (Bradley and Corwyn 2002; Dodge et al. 2006:745; Gottfredson and Hirschi 1990; Nagin and Tremblay 2001). Maternal age was centered at 25, paternal age at 28. Parents were coded as having completed less than high school (1), high school only (2), a bachelor's degree only (3), or a graduate degree (4). Parental self-control was based on whether mothers strongly agreed (1) to strongly disagreed (4) with six questions about their behavior and the father's behavior at 60 months (Table A1). Measures of self-control are crucial because genetic transmission arguments of aggression and criminality speculate that the primary indicator of this genetic predisposition is self-control (Gottfredson and Hirschi 1990).

Parental behaviors and home environments also associate with the dependent and independent variables, so I controlled for the number of children in the household, whether the child was living in poverty, the number of days the child spent with the father in the last month, parental relationship quality, the presence of a social father, and maternal mastery at 30 months (Bradley and Corwyn 2002; Dodge et al. 2006:744-745; Sampson and Laub 1993). Parental relationship quality was based on whether the mother thought her relationship with the father was excellent (1) to poor (5). Maternal mastery was based on whether the mother strongly agreed (1) to strongly disagreed (4) with four statements (Table A1). Since neighborhood characteristics influence child development and risk of paternal incarceration, I

included information about neighborhoods (Sampson and Raudenbush 1999). Social disorder was based on whether the caretaker interviewed at 36 months thought four situations took place or saw four other things occur never (1) to frequently (4) in their neighborhood (Table A1). Low collective efficacy was based on whether the respondent at 36 months thought five situations were very likely (1) to very unlikely (5) or strongly agreed (1) to strongly disagreed (5) with five statements (Table A1).

Three other facets of children's home lives may be important to understanding their levels of physical aggression: exposure to (1) domestic violence; (2) excessive corporal punishment; and (3) harsh or erratic parenting (Dodge et al. 2006:748-749; Jaffee et al. 2002; Sampson and Laub 1993). Children were coded as exposed to domestic violence if the mother reported that she had ever been slapped, kicked, or hit by the father or that he had seriously hurt her in a fight. The scales of corporal punishment and harsh or erratic parenting ranged from 0 to 6 and were based on whether the caregiver said they engaged in three forms of punishment never (0) to more than 20 times (6) in the last year (Table A1).

Finally, the characteristics of children may influence their levels of aggression, so I controlled for children's race, in utero nicotine exposure, whether the child was low birth weight, and the child's physical aggression at age three (Dodge et al 2006). Children were coded as white if both parents were white, black if either parent was black, Hispanic if the child was not black and either parent was Hispanic, and other if none of the above. The analysis presented here would ideally have included a measure of the child's Peabody Picture Vocabulary Test (PPVT) score because of the negative association between PPVT scores and aggression (Lynam and Henry 2001). Adding this control resulted in many lost cases for boys and girls and did not change point estimates substantially, so these models were not included.

Method

I relied on four modeling strategies to consider the association between paternal incarceration and children's physically aggressive behaviors. Two-sided t-tests were used throughout, and analyses were conducted separately for boys and girls. In addition to testing the robustness of the association using a host of modeling strategies (Tables 2-5), I also considered mechanisms and moderators (Table 6).

In the first stage of the data analysis (Table 2), I used OLS regression models to consider the association between recent paternal incarceration, prior paternal incarceration, and children's physically aggressive behaviors at 60 months, adjusting for covariates likely associated with both paternal incarceration and children's physical aggression. These four models were the only ones that considered the effects of prior paternal incarceration on children's physical aggression, as the other models presented focused on isolating effects of a new incarceration on change in physical aggression. In some models, I limited the sample to children whose fathers had been incarcerated by 30 months. By restricting the sample to children of fathers who were known to have ever been criminally active, I diminish unobserved heterogeneity, thereby strengthening inference (LaLonde 1986). All OLS regression models used robust standard errors to account for the clustering of observations on cities.

In the second stage of the data analysis (Table 3), I used three types of propensity score models to test the relationship between recent paternal incarceration and a change in children's physical aggression. Propensity score models are not new, but they are still used infrequently in sociology (Massoglia 2008; Morgan and Winship 2007; Rosenbaum and Rubin 1983). Propensity score models estimate the average effects of a treatment in a two stage-process. In the first stage, propensity scores were generated using a logistic regression model predicting recent paternal incarceration. In the next stage, individuals were matched on the probability of experiencing recent paternal incarceration given their characteristics and coefficients generated using the logistic regression model. The model upon which the propensity scores were estimated included the following covariates: paternal age and self-control (including squared and cubed terms); whether the father finished high school; whether the father was black; whether the father had ever been incarcerated by 30 months; and all possible two- and three-way interactions.

Once propensity scores have been generated, covariate balance must be checked, since balance is essential for replicating a natural experiment. After checking for covariate balance, I restricted the sample to the region of common support and estimated average treatment effects using three types of matching. Radius matching compares the change in physically aggressive behaviors of any treated and control observations that have propensity scores within a certain distance of each other. For this analysis, I relied

on a caliper on .005. Nearest neighbor matching estimates the average treatment effect by comparing the change in physical aggression of the closest treated and control observations. For this analysis, I used nearest neighbor matching with replacement, which allows control observations to be used for more than one treated observation. Kernel matching uses all control cases but weights them according to their distance from treated cases. This has the benefit of using all information but giving more weight to observations that are more similar to treated cases. I used a bandwidth of .006 and a Gaussian kernel. All analyses were conducted using STATA-compatible software designed by Becker and Ichino (2002).

Spuriousness is one crucial threat to causal inference. One method used to test for spuriousness is a placebo regression. The basic logic of a placebo regression involves looking for “effects” somewhere that there should not be (or could not be) a causal pathway. In order to diminish concerns that the relationship between paternal incarceration and children’s physically aggressive behaviors is spurious, I relied on placebo regressions using the models shown in Tables 2 and 3 but predicting children’s physically aggressive behaviors at 36 months instead of 60 months. Since the dependent variable was measured *before* the independent variable, the independent variable could not possibly affect it.

Another threat to causal inference is unobserved heterogeneity. Since both OLS regression models and propensity score models rely on observed differences to estimate effects, they may produce biased estimates of the relationship between the dependent and independent variables if there are unobserved characteristics associated with both paternal incarceration and children’s physical aggression. In order to deal with this threat to inference, I used fixed effects models (Table 5), which take data from multiple points in time to control for all bias due to unobserved characteristics. Provided these fixed characteristics do not change over time or interact with the treatment, this method produces estimates that are not biased by stable but unobserved traits. While these models may diminish concerns about direct genetic transmission, they do not diminish concerns about gene-environment interactions. In some fixed effects models, I also introduced time-varying covariates, which allowed me to provide a superior test of the role of strain in mediating the relationship between paternal incarceration and children’s physical aggression than any previous study because it allowed me control for *change* in disadvantage associated

with this event. Considering change in children's risk factors for physical aggression as a result of recent paternal incarceration is essential for considering whether increased strain is a mechanism through which paternal incarceration affects children's physical aggression because considering only pre-existing levels of strain leaves the estimates vulnerable to conflating pre-existing disadvantage with new disadvantage.

In addition to testing the robustness of the association between paternal incarceration and children's physical aggression to a host of different modeling strategies, I also tested a number of mechanisms and moderators using the same basic models presented in Table 2 (Table 6). In these models, I considered if paternal absence and stigma were important mechanisms, paying attention to differences in effects for first and subsequent incarcerations. I then considered whether effects differed based on if there was domestic violence in the household or the father was incarcerated for committing a violent offense.

Results

Results from OLS Regression Models

The first method I used to consider the relationship between paternal incarceration and children's physically aggressive behaviors was a series of OLS regression models. In Models 1-3 in Table 2, I considered the relationship for boys; in Models 4-6, I considered the relationship for girls.

Model 1 in Table 2 considered the association between paternal incarceration and boys' physically aggressive behaviors, adjusting for basic characteristics of parents and children, including parental self-control and boys' prior physical aggression. Results from Model 1 suggest that both recent paternal incarceration and having an ever-incarcerated father are associated with significantly higher levels of physically aggressive behaviors for boys at 60 months. Boys of recently incarcerated fathers were .25 standard deviations more physically aggressive than comparable boys not experiencing this event; boys of ever-incarcerated fathers were .21 standard deviations more physically aggressive than comparable boys not experiencing this event. Both associations are significant at the .01 level. Thus, Model 1 suggests that both recent and prior paternal incarceration increase boys' physical aggression.

Model 1 in Table 2 adjusted for only a few covariates. Model 2 in Table 2 adjusted for the full set of covariates, thus potentially providing a more rigorous test of the association between paternal incarceration and boys' physically aggressive behaviors. Results from Model 2 were similar to results from Model 1. Boys of recently incarcerated fathers (.25) and ever-incarcerated fathers (.20) were significantly more physically aggressive than other boys not experiencing that event. Based on these models, the only other covariates that significantly predict boys' physically aggressive behaviors at 60 months were prior aggression and living in a neighborhood with low collective efficacy. This suggests not only that paternal incarceration may influence boys' physically aggressive behaviors, but also that it may be an important predictor of boys' physical aggression relative to other sources of disadvantage.

Covariate adjustment is one method for limiting selection bias. Another method for limiting selection bias is to limit the sample to individuals who may be different from others in unobserved ways (LaLonde 1986). This analysis must deal with the possibility that men who go to prison are simply different from men who do not and that it is these differences that drive any statistically significant differences in physical aggression between boys of recently incarcerated fathers and other boys. Since ever-incarcerated men may differ from never-incarcerated men in unobserved ways, I diminished unobserved heterogeneity by restricting the sample to boys of ever-incarcerated fathers in Model 3 in Table 2. Results from this model showed that boys of newly incarcerated fathers were .29 standard deviations more physically aggressive than other boys, a difference that was significant at the .05 level. This test provides additional evidence that paternal incarceration may increase boys' physical aggression.

[Insert Table 2 about here.]

Results from Models 1-3 in Table 2 report that recent and prior bouts of paternal incarceration increase boys' physically aggressive behaviors. I hypothesized that effects would be nonexistent for girls. In Models 4-6, I considered the relationship between paternal incarceration and girls' physically aggressive behaviors using the same modeling strategies used in Models 1-3. Results from Model 4, which considered this relationship with limited controls, found no evidence that recent or prior paternal incarceration influence girls' physically aggressive behaviors. The association was either negative (-.13)

or small (.01), and nonsignificant in both cases. The same was true in Model 5, which included the more expansive set of controls. In this more rigorous model, the associations were again not statistically significant at the conventional .05 level, and point estimates were virtually identical.

Interestingly, the relationship between recent paternal incarceration and girls' physically aggressive behaviors was significant at the .05 level in models adjusting for all covariates and limiting the sample to girls of ever-incarcerated fathers. Based on results from Model 6, girls of recently incarcerated fathers were .18 standard deviations less physically aggressive than comparable girls not experiencing this event. Although this model may provide the most rigorous test of the association by diminishing unobserved heterogeneity, results from these three models provided only mixed evidence of an association between recent paternal incarceration and girls' physically aggressive behaviors. Results provided no evidence of an association between having an ever-incarcerated father and girls' physical aggression. Based on results from these models, it seems unlikely that this association is robust.

Results from Propensity Score Models

OLS regression models suggested that paternal incarceration may be associated with significant increases in physical aggression for boys and negative changes for girls. Since propensity score models should yield less biased estimates than OLS regression models (Morgan and Winship 2007:113), I present these estimates in Table 3. The first column presents estimates using radius, nearest neighbor, and kernel matching to predict the effects of recent paternal incarceration on change in boys' physically aggressive behaviors between 36 and 60 months. The second column presents results for girls. I used change in physically aggressive behaviors as the dependent variable because looking at change in physical aggression allowed me to provide a more rigorous test by adjusting for prior aggression.

Results from the first column of Table 3 suggest that recent paternal incarceration is associated with increases in boys' physically aggressive behaviors in all three types of matching models. Point estimates ranged from .27 (for kernel) to .36 (for radius), and results were statistically significant at the .01 level in two of the three models. The model in which the relationship was not statistically significant

(nearest neighbor matching) only used about one-third as many cases as did the other models, which explains the large standard error. Although the lack of a significant relationship in one of these models may cause concern that the relationship is not robust, point estimates were larger in these models than in models shown in Table 2 (Models 1-3), and the relationship was significant at the .01 level in the other two models, suggesting that recent paternal incarceration likely increases boys' physical aggression.

[Table 3 about here.]

Results from propensity score models suggest that the association between paternal incarceration and boys' physically aggressive behaviors is robust and that OLS regression models may provide deflated estimates of the relationship. In the second column of Table 3, I present estimates of the effects of recent paternal incarceration on girls' physically aggressive behaviors using the three propensity score models presented previously for boys. Like the results for boys, results for girls suggest that OLS regression models may underestimate the magnitude of the association between paternal incarceration and children's physically aggressive behaviors. Point estimates for girls ranged from -.16 to -.22, with the higher end of the range being slightly larger than the largest estimate presented in Table 2 (-.18). Although point estimates were comparable – and in some cases larger – the results again suggest that the relationship between paternal incarceration and girls' physically aggressive behaviors is not robust.

Results from Placebo Regression Models

Although these results provide support for my hypotheses, they cannot account for the fact that the relationship may be spurious. In Table 4, I used one test to rule out spuriousness. In these models, I predicted boys' and girls' physically aggressive behaviors at 36 months by later paternal incarceration using the same controls, sample limitations, and propensity score models as those used in Tables 2 and 3.

Results from the first column, which tested for spuriousness for boys, provide no indication that spuriousness is driving the association between paternal incarceration and boys' physically aggressive behaviors at 60 months shown in Tables 2 and 3. In four of the six models presented, the coefficients were negative, and the coefficients were very small (.02 and .04) in the two models producing a positive

point estimate. According to this test, therefore, it appears unlikely that spuriousness is responsible for substantial bias in the point estimates presented in Tables 2 and 3.

[Insert Table 4 about here.]

Based on results from the first column, we can feel more confident that the relationship between paternal incarceration and physically aggressive behaviors is not spurious for boys. Will the same be the case for girls? Since evidence suggests that paternal incarceration may decrease girls' physically aggressive behaviors, a negative coefficient in the placebo regressions would indicate that current estimates are too different from zero, a positive coefficient that they are too conservative. Results from the placebo regressions for girls provide consistent evidence of a spurious relationship between paternal incarceration and girls' physically aggressive behaviors – although not in the direction generally found. These large (.14 to .25 standard deviations), positive, statistically significant coefficients would make us concerned were they found for boys, but they make it seem more plausible that we are *underestimating* the magnitude of the protective effects of paternal incarceration on girls' physically aggressive behaviors. Although this suggests that results may be somewhat stronger than previously thought for girls, the lack of a significant association for boys provides further evidence that the relationship between recent paternal incarceration and increases in boys' physically aggressive behaviors is unlikely to be spurious.

Results from Fixed Effects Models

Results up to this point have stemmed from models that rely on observed characteristics to consider effects of paternal incarceration on children's physical aggression. Yet it could be some stable trait rather than paternal incarceration that is driving any observed association. In order to address the concern that it is some stable, unobserved trait driving the association, I used a fixed effects model. By holding fixed but potentially unobserved characteristics constant, these models control all bias due to stable differences between children of recently incarcerated fathers and other children. For such a select population as the children of recently incarcerated parents, the ability to control for fixed characteristics is crucial.

In Models 1-3 in Table 5, I considered the association between a change in paternal incarceration and a change in boys' physically aggressive behaviors. Results from Model 1, which controlled only for stable characteristics of children, suggested a positive, statistically significant (at the .01 level) association between a new paternal incarceration and boys' physically aggressive behaviors. Experiencing a new paternal incarceration was associated with a .33 standard deviation increase in physical aggression. This suggests, albeit tentatively, that stable but unobserved characteristics are not driving the association between paternal incarceration and boys' physically aggressive behaviors demonstrated to this point.

Models 2 and 3 provided more rigorous tests by adjusting for time-varying covariates. In addition to providing a more rigorous test of this association, these models also provided a test of strain theory, which suggests that paternal incarceration increases boys' physically aggressive behaviors by changing their family lives, their parents' behaviors, or the financial resources they have available to them. Results from Model 2, which used the full sample, and Model 3, which was limited to children of ever-incarcerated fathers, provide two insights. First, both models indicated that paternal incarceration increases boys' physically aggressive behaviors, even after adjusting for time-varying covariates and stable characteristics of children. In both cases, the associations were positive and statistically significant. Second, the models provide no evidence that strain is a mechanism through which paternal incarceration increases boys' physically aggressive behaviors, as the association did not diminish when time-varying covariates were introduced into the model. Although previous research provides some support for the role of strain as a mechanism (Foster and Hagan 2007 provides one example), results from these models suggest that prior results supporting the strain hypothesis may be driven more by pre-existing disadvantage than by changes in disadvantage resulting from paternal incarceration.

[Insert Table 5 about here.]

In the second set of models in Table 5, I used a fixed effects model to consider the association between paternal incarceration and girls' physically aggressive behaviors. Results from Model 4, which considers the relationship controlling only for stable characteristics, find a small, nonsignificant association between paternal incarceration and girls' physically aggressive behaviors. Results from

Models 5 and 6, which provided a more rigorous test of the association, provided little evidence of a significant association. Taken together, results from models presented in Table 5 again suggest that if there is an association for girls, it is not terribly robust.

Results from OLS Regression Models Considering Mechanisms and Moderators

Thus far, results using a variety of modeling strategies have pointed to a robust association between paternal incarceration and boys' physically aggressive behaviors and an inconsistent association between paternal incarceration and girls' physically aggressive behaviors. Since the association has been more robust for boys than for girls, models considering mechanisms and moderators included only boys.

In Models 1-3 in Table 6, I tested whether paternal absence is a mechanism through which paternal incarceration increases boys' physical aggression. In order to do so, I distinguished between currently incarcerated fathers and fathers who were not currently incarcerated but experienced incarceration some time after the 30 month interview. Model 1 considered the full sample, Model 2 was limited to boys whose fathers had never been incarcerated by 30 months, and Model 3 was limited to boys whose fathers had ever been incarcerated by 30 months. I limited the sample this way because I expect paternal absence to have different effects on children experiencing it for the first time and for subsequent times. Results from Model 1 provided little support for the paternal absence hypothesis. The difference in the associations of current, recent, and prior paternal incarceration were small: .28, .24, and .20. Based on this model, it would be difficult to conclude that paternal absence is a crucial mechanism.

In Model 2, I considered this association in a sample limited to children who had never experienced paternal incarceration by 30 months in order to see if paternal absence is the primary mechanism through which *first* paternal incarcerations increase boys' physical aggression. Results from this model suggested that paternal absence may be the primary mechanism through which first paternal incarcerations increase boys' physical aggression, as boys of currently incarcerated fathers were .36 standard deviations more physically aggressive than expected, while boys of recently incarcerated fathers were only .08 standard deviations more physically aggressive than expected. Results from Model 3

provided additional evidence that the paternal absence imposed by incarceration affects boys differently the first time and subsequent times. Boys of currently (.26) and recently (.30) incarcerated fathers who had already experienced paternal incarceration before experienced comparable increases in physical aggression. Results from these models indicate that the first time boys experience paternal incarceration, they experience it as they would experience the separation of parents – with increasing aggression while the father is gone that dissipates when he returns. For boys who have already experienced paternal incarceration, a new bout of incarceration has large effects both during the incarceration and after it.

[Insert Table 6 about here.]

Results from Table 6 provided some evidence that paternal absence is an important mechanism driving the relationship between paternal incarceration and boys' physically aggressive behaviors. Another mechanism that may be important is stigma. Although as for trauma, there is no perfect way to test for this mechanism, one way to do so would be to see if effects differ for groups at high and low risk of experiencing this event. In Model 4, I constructed interactions between paternal incarceration and children at high risk of experiencing this event – black children whose fathers did not complete high school. Although there are competing views on whether the stigma of incarceration decreases as the risk of experiencing it increases (Braman 2004; Comfort 2007), this nonetheless provides one possible test of stigma. Results provided no evidence that stigma is the primary mechanism linking paternal incarceration to boys' physically aggressive behaviors. The coefficients for the interactions were small (.00 and .07) and nonsignificant in both cases, suggesting either that stigma is not a crucial mechanism, that stigma does not change based on the risk of experiencing the event, that this test hasn't captured the mechanism considered, or that the lower level of stigma is offset by higher levels of disadvantage.

Thus far, results have provided evidence of a robust association between paternal incarceration and boys' physically aggressive behaviors and provided tests of numerous mechanisms potentially linking them. I have not yet considered moderators, however. In Models 5 and 6 of Table 6, I considered two moderators: (1) that effects may be smallest for violent offenders; and (2) that effects of paternal incarceration may vary by whether the father is abusive. Results from Model 5, which differentiates

between violent and nonviolent offenders, indicated that the effects of paternal incarceration on boys' physical aggression are concentrated among boys of nonviolent offenders. Boys of nonviolent offenders were .36 standard deviations more aggressive than expected, while boys of violent offenders were .07 standard deviations *less* aggressive than expected. Offense type, therefore, appears to be a moderator.

In Model 6, I considered another potential moderator: whether the father had abused the mother. In order to consider this mechanism, I included an interaction between paternal incarceration and exposure to domestic violence. Results from this model suggested that domestic violence is an important moderator of this relationship. The coefficient for the interaction between paternal incarceration and domestic violence was nearly twice the size of the coefficient for paternal incarceration, suggesting that the benefits of having an abusive father removed from the household may well outweigh the costs – at least for this outcome. Based on results from Models 5 and 6, it appears that the negative effects of paternal incarceration on boys' physical aggression are concentrated among boys of nonviolent fathers.

Discussion

Results from a host of modeling strategies support four conclusions. First, the positive association between paternal incarceration and boys' physical aggression is robust and does not appear to be spurious. Second, while results sometimes suggest a negative association between paternal incarceration and girls' physical aggression, this relationship is not robust. Since researchers have long noted that we do not know whether there is an association between a new bout of paternal incarceration and a change in children's behavior problems (Hagan and Dinovitzer 1999:128), these findings provide vital insight into the consequences of mass imprisonment for children. Third, strain and stigma do not appear to be crucial mechanisms linking paternal incarceration and boys' physical aggression, but trauma and paternal absence do seem likely mechanisms. Although this is surprising since research shows that strain is an important mechanism (Foster and Hagan 2007), it may be because prior studies include a measure of paternal incarceration at one point in time, leading them to conflate pre-existing disadvantage with strain caused by paternal incarceration. Finally, while paternal incarceration is associated with increases in

boys' physical aggression on average, results suggest that removing violent offenders from the household has little influence on boys' physical aggression and that removing abusive fathers diminishes boys' physical aggression. This is the first quantitative evidence of variation in the effect of paternal incarceration on children by whether the father was violent or abusive.

Despite providing the strongest evidence to date on this topic, the analysis herein still has a number of limitations. One major limitation concerns the measurement of paternal incarceration. Since paternal incarceration is based on retrospective reports, there is likely substantial bias in these reports. A better measure of paternal incarceration would use administrative data and would have more information on the timing and duration of paternal incarceration. Additional bias may be introduced by using only mother reports of children's aggression. In addition, these findings are based on only about 50 percent of the initial sample, making it difficult to know how representative these cases are of the original sample. Findings are also limited by the fact that the sample is not nationally representative and that the children are all five years old, making it unclear whether the results generalize to all children.

Although none of these limitations are minor, they *are* minor compared to two alternative hypotheses. The first alternative hypothesis suggests that direct genetic transmission or gene-environment interactions may be responsible for the observed association between paternal incarceration and boys' physical aggression (see the review of Guo et al. 2008; see also Dodge et al. 2006:731-734). Although this analysis was able to consider changes in boys' aggression associated with paternal incarceration, control for covariates associated with genetic propensities for aggression, and demonstrate that effects were concentrated among boys of nonviolent fathers, it could be the case that it is genetic transmission or gene-environment interactions that are driving the association. Although both of these are serious threats to causal inference, the genetic transmission argument may be most important from a policy perspective since it suggests that diminished rates of paternal incarceration would not diminish the physical aggression of these boys. A second alternative hypothesis suggests that something else changed around the time of the father's incarceration that was responsible for both the change in physically aggressive behaviors and paternal incarceration. Since some share of these fathers may have experienced other

changes around the same time as they were incarcerated – a relapse to drug addiction, for instance – it is possible that the association could be due to this change rather than paternal incarceration.

Although I cannot ultimately rule out these two alternative hypotheses, if the robust associations presented here are indeed causal, they have at least two important policy implications. First, since American children experience high risks of paternal incarceration and paternal incarceration contributes to high levels of physical aggression among boys, it is possible that high levels of paternal incarceration, by increasing the criminality of boys, may undo some of the benefits of incarceration for public safety. In so doing, paternal incarceration may perpetuate a system of stratification in which crime and incarceration are passed down from fathers to sons. Whether high levels of physically aggressive behaviors among boys of incarcerated fathers will translate into high levels of criminal activity and incarceration for them as they come of age is unknown. Nonetheless, this finding augurs that we might expect continued high levels of crime and incarceration in the future. Second, the lion's share of the benefits of diminished incarceration rates for public safety in the long term would likely come from lower rates of incarceration for nonviolent offenders. Since incarcerating nonviolent offenders may increase their sons' risks of criminality in adulthood and nonviolent offenders (by definition) do not contribute to the violent crime rate, diminished rates of incarceration among that group may have small social costs in the short-term – especially in terms of violent crime – and lead to substantial reductions in crime in the long-term.

High levels of parental imprisonment are not only consequential for the future criminality of male children, of course, and focusing only on the implications of the prison boom for the criminal justice system and public safety is likely shortsighted – especially since it suggests that the consequences of mass imprisonment for girls are irrelevant, which is clearly not the case. Mass parental imprisonment may also be important for inequality – especially inequality in extreme forms of childhood disadvantage. By further disrupting the lives of already-disadvantaged children, mass parental imprisonment could exacerbate inequalities in infant and child mortality, foster care placement, and homelessness, to name but a few forms of severe disadvantage (Foster and Hagan 2007; Swann and Sylvester 2006). Therefore, even though researchers of the penal state should continue considering the effects of parental incarceration on

traditionally studied measures of stratification such as educational attainment, they should also consider effects on more severe forms of childhood disadvantage from which children may never recover.

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Table 1: Descriptive Statistics by Child Sex

Variables	Boys		Girls	
	Mean	SD	Mean	SD
<i>Dependent Variable</i>				
Physical Aggression (60 Months)	.08	(1.09)	-.09	(.89)
<i>Independent Variables</i>				
Recent Incarceration	.19	(.39)	.15	(.36)
Prior Incarceration	.38	(.49)	.39	(.49)
Incarcerated at 60 Months	.07	(.26)	.07	(.25)
Incarcerated at 31-59 Months	.12	(.32)	.09	(.28)
Violent Offense	.04	(.20)	.04	(.19)
Nonviolent Offense	.09	(.29)	.07	(.26)
Unknown Offense Type	.06	(.23)	.04	(.20)
<i>Controls</i>				
Maternal Age (Centered)	.18	(6.10)	.28	(6.04)
Paternal Age (Centered)	-.50	(7.05)	.13	(7.34)
Maternal Education	1.85	(.72)	1.82	(.73)
Paternal Education	1.81	(.76)	1.80	(.74)
Child's Race				
White	.18	(.38)	.16	(.37)
Black	.55	(.50)	.55	(.50)
Hispanic	.24	(.43)	.27	(.44)
Other	.03	(.17)	.02	(.14)
Number of Siblings	1.07	(1.26)	1.14	(1.30)
Maternal Smoking	.19	(.45)	.21	(.46)
Child Low BW	.09	(.28)	.11	(.31)
Maternal Self-Control	3.49	(.47)	3.51	(.47)
Paternal Self-Control	3.25	(.81)	3.32	(.75)
Physical Aggression (30 Months)	.03	(.98)	-.09	(.89)
Lack of Collective Efficacy	1.25	(.96)	1.24	(.91)
Neighborhood Disorder	1.85	(.88)	1.85	(.89)
Paternal Days with Child	19.33	(13.36)	19.56	(13.34)
Maternal Stress	2.71	(.67)	2.76	(.69)
Living in Poverty	.42	(.49)	.41	(.49)
Domestic Violence	.08	(.27)	.08	(.27)
Parental Relationship Quality	2.85	(1.43)	2.89	(1.43)
Social Father Present	.09	(.29)	.08	(.26)
Corporal Punishment	2.04	(1.58)	1.83	(1.49)
Harsh/Erratic Punishment	2.65	(1.50)	2.46	(1.45)
N	1190		1085	

Source: Fragile Families and Child Wellbeing Study

Table 2: Results from OLS Regression Models Predicting Physical Aggression at 60 Months

Covariates	Boys								Girls			
	M1		M2		M3 ^a		M4		M5		M6 ^a	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Recent Incarceration	.25**	(.07)	.25**	(.07)	.29*	(.13)	-.13	(.08)	-.13	(.08)	-.18*	(.08)
Prior Incarceration	.21**	(.07)	.20**	(.07)	---	---	.01	(.06)	.01	(.07)	---	---
Maternal Age	.01	(.01)	.01	(.01)	.01	(.03)	.00	(.01)	.00	(.01)	.02	(.01)
Paternal Age	-.01	(.01)	-.01	(.01)	-.01	(.02)	-.00	(.00)	-.00	(.00)	-.00	(.01)
Maternal Education	-.04	(.04)	-.05	(.04)	-.16	(.09)	-.04	(.05)	-.03	(.05)	-.12	(.07)
Paternal Education	-.03	(.05)	-.02	(.05)	-.00	(.10)	-.04	(.06)	-.03	(.07)	-.03	(.11)
Child's Race (White=Ref.)												
Black	-.10	(.06)	-.12	(.08)	-.30	(.18)	.06	(.06)	.01	(.06)	.20	(.14)
Hispanic	-.17	(.09)	-.15	(.10)	-.21	(.18)	-.14*	(.06)	-.14*	(.06)	-.02	(.12)
Other	.08	(.13)	.07	(.15)	.04	(.30)	-.06	(.13)	-.06	(.13)	.39	(.23)
Number of Siblings	.04	(.02)	.05	(.03)	.11	(.07)	.03	(.03)	.02	(.03)	-.02	(.05)
Maternal Smoking	.08	(.11)	.09	(.11)	.12	(.18)	.00	(.09)	-.00	(.09)	.09	(.14)
Child Low BW	.12	(.15)	.13	(.15)	-.02	(.23)	.06	(.08)	.09	(.07)	.26	(.14)
Maternal Self-Control	-.03	(.10)	-.05	(.10)	-.24	(.18)	-.07	(.04)	-.04	(.05)	.03	(.07)
Paternal Self-Control	-.08	(.04)	-.08	(.05)	-.13	(.09)	-.14**	(.03)	-.14**	(.04)	-.13*	(.06)
Prior Physical Aggression	.37**	(.05)	.35**	(.05)	.44**	(.08)	.40**	(.07)	.38**	(.07)	.43**	(.07)
Lack of Collective Efficacy	---	---	.07*	(.03)	.11	(.07)	---	---	.00	(.02)	.01	(.06)
Neighborhood Disorder	---	---	-.03	(.05)	.02	(.09)	---	---	.04	(.03)	-.03	(.05)
Paternal Days with Child	---	---	-.00	(.00)	-.00	(.01)	---	---	.01	(.00)	.01	(.00)
Maternal Stress	---	---	.04	(.05)	.13	(.10)	---	---	.00	(.06)	.01	(.09)
Living in Poverty	---	---	-.07	(.10)	-.19	(.16)	---	---	.11**	(.04)	.13	(.09)
Domestic Violence	---	---	.05	(.14)	-.14	(.22)	---	---	-.11	(.09)	-.14	(.12)

Parental Relationship Quality	---	---	-.03	(.03)	.01	(.05)	---	---	.03	(.03)	.04	(.04)
Social Father Present	---	---	-.03	(.14)	-.05	(.17)	---	---	.26*	(.11)	.26	(.14)
Corporal Punishment	---	---	.03	(.02)	.04	(.04)	---	---	.02	(.03)	.05	(.04)
Harsh/Erratic Punishment	---	---	.03	(.03)	-.01	(.06)	---	---	.02	(.02)	.01	(.04)
Intercept	.48	(.39)	.45	(.39)	1.23	(.91)	.79**	(.18)	.27	(.37)	.05	(.55)
R ²	.19		.20		.21		.20		.22		.25	
N	1190		1190		450		1085		1085		420	

Source: Fragile Families and Child Wellbeing Study (1998-2005).

Note: All t-tests are two-sided. All models include robust standard errors.

^a Sample is limited to children whose fathers had ever been incarcerated by the 30 month interview.

*p < .05 **p < .01

**Table 3: Results from Propensity Score (Matching) Models Predicting
Change in Physical Aggression between 36 and 60 Months**

Effect of Recent Incarceration	Boys		Girls	
	b	s.e.	B	s.e.
Radius Matching ^a	.36**	(.11)	-.16	(.09)
Nearest Neighbor Matching ^b	.30	(.16)	-.22	(.15)
Kernel Matching ^c	.27**	(.12)	-.19	(.10)

Source: Fragile Families and Child Wellbeing Study.

Note: All t-tests are two-sided. The propensity score model included paternal age (including squared/cubed terms), whether the father was black, paternal self-control (including squared/cubed terms), whether the father finished high school, whether the father had ever been incarcerated by the 30 month interview, and all two- and three-way interactions.

^a Boys: 195 treated and 839 controls. Girls: 156 treated and 774 controls.

^b Boys: 226 treated and 141 controls. Girls: 166 treated and 141 controls.

^c Boys: 226 treated and 954 controls. Girls: 166 treated and 842 controls.

*p < .05 **p < .01

Table 4: Results from Placebo Regressions Predicting Physical Aggression at 36 Months by Later Paternal Incarceration

Effect of Later Paternal Incarceration	Boys		Girls	
	b	s.e.	b	s.e.
OLS Regression Models ^a				
Limited Controls in Full Sample	-.06	(.05)	.19*	(.08)
Full Controls in Full Sample	-.06	(.05)	.18*	(.08)
Full Controls in Limited Sample	.02	(.06)	.14	(.09)
Propensity Score Models ^b				
Radius Matching	.04	(.08)	.20*	(.09)
Nearest Neighbor Matching	-.05	(.16)	.17	(.14)
Kernel Matching	-.05	(.11)	.25*	(.12)

Source: Fragile Families and Child Wellbeing Study.

Note: All t-tests are two-sided. All OLS regression models include robust standard errors.

^a OLS regression models correspond to models presented in Table 2.

^b Propensity score models correspond to models presented in Table 3.

*p < .05 **p < .01

Table 5: Results from Fixed Effects Models Predicting Change in Physical Aggression between 36 and 60 Months

Covariates	Boys						Girls					
	M1		M2		M3 ^a		M4		M5		M6 ^a	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Recent Incarceration	.33**	(.08)	.34**	(.08)	.31**	(.11)	-.08	(.08)	-.05	(.08)	-.05	(.10)
Paternal Days with Child	---	---	.01	(.00)	.00	(.01)	---	---	.00	(.00)	.00	(.01)
Maternal Stress	---	---	-.11*	(.05)	-.06	(.10)	---	---	-.02	(.05)	-.14	(.08)
Living in Poverty	---	---	.05	(.07)	.07	(.12)	---	---	-.03	(.06)	-.04	(.10)
Domestic Violence	---	---	.17	(.12)	.21	(.20)	---	---	.11	(.11)	.03	(.15)
Parental Relationship Quality	---	---	.02	(.03)	.05	(.05)	---	---	.00	(.03)	-.00	(.04)
Social Father Present	---	---	.06	(.09)	.07	(.14)	---	---	-.14	(.09)	-.09	(.12)
Corporal Punishment	---	---	.01	(.02)	-.09	(.05)	---	---	.05*	(.02)	.00	(.04)
Harsh/Erratic Punishment	---	---	.06*	(.03)	.15**	(.05)	---	---	.03	(.02)	-.00	(.04)
Intercept	.02	(.02)	-.08	(.03)	-.18	(.38)	-.08**	(.02)	-.18	(.18)	.37	(.31)
R ²	.69		.69		.450		.71		.71		.72	
N	1190		1190		.70		1085		1085		420	

Source: Fragile Families and Child Wellbeing Study.

Note: All t-tests are two-sided. All models include robust standard errors. Controls limited to time-varying covariates.

^a Sample is limited to children whose fathers had ever been incarcerated by the 30 month interview.

*p < .05 **p < .01

Table 6: Results from OLS Regression Models Considering Mechanisms and Moderators (Boys Only)

Covariates	M1		M2		M3 ^a		M4		M5		M6 ^a	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Inc. at 60 Months	.28	(.17)	.36	(.38)	.26	(.23)	---	---	---	---	---	---
Inc. at 31-59 Months	.24**	(.07)	.08	(.12)	.30*	(.11)	---	---	---	---	---	---
Recent Inc. (31-60 Months)	---	---	---	---	---	---	.24*	(.11)	---	---	.35**	(.09)
Prior Inc. (<31 Months)	.20**	(.07)	---	---	---	---	.18**	(.06)	.19**	(.07)	.21**	(.07)
Violent Offense	---	---	---	---	---	---	---	---	.36**	(.12)	---	---
Nonviolent Offense	---	---	---	---	---	---	---	---	-.07	(.19)	---	---
Unidentified Offense	---	---	---	---	---	---	---	---	.28*	(.13)	---	---
Recent Inc. * High Risk ^c	---	---	---	---	---	---	.00	(.29)	---	---	---	---
Prior Inc. * High Risk	---	---	---	---	---	---	.07	(.18)	---	---	---	---
Recent Inc. * Dom. Violence	---	---	---	---	---	---	---	---	---	---	-.60	(.30)
Prior Inc. * Dom. Violence	---	---	---	---	---	---	---	---	---	---	-.16	(.23)
Maternal Age	.01	(.01)	.02**	(.01)	.01	(.03)	.01	(.01)	.01	(.01)	.01	(.01)
Paternal Age	-.01	(.01)	-.01**	(.00)	-.01	(.02)	-.01	(.01)	-.01	(.01)	-.01	(.01)
Maternal Education	-.05	(.04)	-.01	(.04)	-.16	(.09)	-.05	(.04)	-.05	(.04)	-.05	(.04)
Paternal Education	-.02	(.05)	-.05	(.05)	-.00	(.10)	-.01	(.05)	-.02	(.05)	-.03	(.05)
Child's Race (White=Ref.)												
Black	-.12	(.08)	.01	(.08)	-.29	(.19)	-.13	(.08)	-.12	(.08)	-.14	(.08)
Hispanic	-.15	(.10)	-.05	(.09)	-.21	(.18)	-.14	(.10)	-.14	(.10)	-.15	(.10)
Other	.07	(.15)	.12	(.18)	.04	(.30)	.06	(.14)	.05	(.15)	.07	(.15)
Number of Siblings	.05	(.03)	.02	(.02)	.11	(.07)	.05*	(.02)	.05	(.02)	.05*	(.03)
Maternal Smoking	.09	(.11)	.06	(.09)	.12	(.18)	.09	(.11)	.08	(.11)	.08	(.11)
Child Low BW	.13	(.15)	.24	(.13)	-.03	(.24)	.13	(.15)	.12	(.16)	.14	(.15)
Maternal Self-Control	-.05	(.10)	.06	(.09)	-.24	(.18)	-.05	(.09)	-.06	(.10)	-.05	(.09)

Paternal Self-Control	-.08	(.05)	-.07	(.07)	-.13	(.10)	-.08	(.05)	-.10	(.06)	-.07	(.05)
Prior Physical Aggression	.36**	(.05)	.27**	(.07)	.44**	(.08)	.35**	(.05)	.36**	(.05)	.36**	(.05)
Collective	.07*	(.03)	.03	(.04)	.11	(.07)	.07*	(.03)	.07*	(.03)	.06*	(.03)
Disorder	-.03	(.05)	-.09*	(.04)	.02	(.09)	-.04	(.05)	-.03	(.05)	-.04	(.05)
Paternal Days with Child	-.00	(.00)	-.01*	(.00)	-.00	(.01)	-.00	(.00)	-.00	(.00)	-.00	(.00)
Maternal Stress	.04	(.05)	-.03	(.06)	.13	(.10)	.04	(.05)	.03	(.05)	.04	(.05)
Living in Poverty	-.07	(.10)	-.00	(.07)	-.19	(.16)	-.07	(.09)	-.07	(.09)	-.06	(.09)
Domestic Violence	.05	(.14)	.38**	(.13)	-.14	(.22)	.05	(.15)	.06	(.14)	.40**	(.12)
Parental Relationship Quality	-.03	(.03)	-.07**	(.02)	.01	(.05)	-.03	(.03)	-.03	(.03)	-.02	(.03)
Social Father Present	-.03	(.14)	-.02	(.16)	-.05	(.18)	-.03	(.14)	-.03	(.15)	-.04	(.14)
Corporal Punishment	.03	(.02)	.04	(.03)	.04	(.04)	.03	(.02)	.03	(.02)	.03	(.03)
Harsh/Erratic Punishment	.03	(.03)	.04	(.03)	-.01	(.06)	.03	(.03)	.03	(.03)	.03	(.03)
Intercept	.44	(.40)	.34	(.39)	1.24	(.95)	.42	(.39)	.52	(.43)	.38	(.39)
R ²		.20		.16		.21		.20		.20		.20
N		1190		740		450		1190		1190		1190

Source: Fragile Families and Child Wellbeing Study.

Note: All t-tests are two-sided. All models include robust standard errors.

^a Sample is limited to children whose fathers had never been incarcerated by the 30 month interview.

^b Sample is limited to children whose fathers had ever been incarcerated by the 30 month interview.

^c Children are coded as at high risk of paternal incarceration if they were black and their fathers did not complete high school.

*p < .05 **p < .01

Tables A1: Components and Cronbach's Alpha for Select Scales

Scale Name (Alpha)	Components
Self-Control (.88, .86)	I say and do things without considering consequences. I often get into trouble because I don't think before acting. I do things that may cause trouble with the law. I lie or cheat. I frequently get into fights. I don't feel guilty when I misbehave.
Maternal Mastery (.66)	Being a parent is harder than I thought it would be. I feel trapped by my responsibilities as a parent. Taking care of my children is more work than pleasure. I often feel exhausted by raising a family
Social Disorder (.92)	Drug dealers or users hang out. Drunks hang out. Unemployed adults loiter. Young people loiter. Gang activity takes place. Misbehaving groups of children. Misbehaving groups of teens. Misbehaving groups of adults.
Corporal (.66)	Spanked him/her on the bottom with your bare hand. Hit him/her on the bottom with something like a belt. Slapped him/her on the hand, arm, or leg.
Harsh/Erratic (.65)	Shouted, yelled, or screamed at him/her. Swore or cursed at him/her. Threatened to spank him/her but did not do it.

Source: Fragile Families and Child Wellbeing Study.