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

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ABSTRACT

Incarceration diminishes the life-chances of adults, but little is known about how paternal incarceration affects children. Effects on early childhood aggressive behaviors are especially significant because of connections between early childhood aggression and future criminality. Using data from the Fragile Families and Child Wellbeing Study, a longitudinal birth cohort study of children born in urban centers at the close of the 20th century, this paper considers the effects of paternal incarceration on children's aggressive behaviors at age 5. Results show strong effects of paternal incarceration on aggressive behaviors for boys but not girls. Results also show that effects are concentrated among boys living with a father at the time of his incarceration. The use of various modeling strategies and alternate dependent and independent variables demonstrates the robustness of the finding – and shows that effects are largest on physically aggressive acts, precisely the acts most strongly connected with future criminal activity. By increasing boy's aggression, paternal incarceration may promote the intergenerational transmission of crime and incarceration. In so doing, high levels of paternal incarceration could not only compromise public safety but also provide the groundwork for a permanently disadvantaged class for whom contact with the criminal justice system is normal.

As the lifetime risk of imprisonment has soared for black men and men with little education (Pettit and Western 2004), so also has the risk of paternal imprisonment grown for children. Black children born 1990 had a 1 in 4 chance of having a father imprisoned by their 14th birthday; the risk was 1 in 2 for black children of high school dropouts (Wildeman *Forthcoming*). While the consequences of incarceration for adult men are well-established (Massoglia 2008; Pager 2003; Western 2006), it is unclear how paternal imprisonment effects children. Some speculate that effects are negative (Hagan and Dinovitzer 1999:125), but paternal incarceration might help children by removing violent, criminally active men from households. Alternatively, paternal incarceration may have no effect at all. Effects of paternal imprisonment on children are interesting not only because paternal imprisonment is now common; they are also interesting because if paternal imprisonment disadvantages children, then it exacerbates childhood inequality.

Consequences of paternal incarceration are especially important for understanding the future criminality of children. Despite interest in the intergenerational transmission of crime and incarceration (Farrington 1992; Glueck and Glueck 1950; Hagan and Palloni 1990; Murray, Janson, and Farrington 2007; Sampson and Laub 1993; Shaw 1987), few studies examine contemporary data that accurately reflect the risks and consequences of paternal incarceration for recent birth cohorts of American children. Since aggressive behaviors early in childhood are predictive of later crime (Blumstein and Cohen 1987; Campbell et al. 2006; Moffitt 1993; Parker and Asher 1987; Sampson and Laub 1993), strong effects of paternal incarceration on young children's aggression may provide an early warning sign for the intergenerational transmission of crime and incarceration.

This paper extends research on the consequences of mass incarceration by considering the effects of paternal incarceration on early childhood aggressive behaviors using data from the Fragile Families and Child Wellbeing Study, a longitudinal birth cohort study representative of births in major urban areas of the United States at the close of the 20th century. Results show strong, consistent effects of paternal incarceration on aggressive behaviors for boys but not girls. Furthermore, these effects are concentrated among boys living with their fathers at the time of incarceration. For children not living with their fathers at the time of his incarceration, effects are small and do not attain statistical significance. Alternate modeling strategies and dependent and independent variables demonstrate the robustness of this finding and shows that effects are largest on physically aggressive acts, precisely the acts most strongly connected with future crime (see especially the review in Alink et al. 2006; Moffitt 1993). This suggests that paternal incarceration, rather than improving the lot of disadvantaged children or leaving their life-chances unaltered, contributes to social inequality by increasing the aggressive behaviors of children of incarcerated fathers. It also suggests that high rates of incarceration may be criminogenic in the long run, compromising public safety.

BACKGROUND

EARLY CHILDHOOD AGGRESSIVE BEHAVIORS

Researchers disagree about what exactly constitutes aggressive behavior among young children (see Alink et al. 2006:956 for a discussion), so the measurement of aggressive behavior varies across studies. Inclusive definitions include not only physically harming a human, animal, or object but also a range of other behaviors like throwing tantrums,

demanding attention, and having angry moods. More restrictive definitions (see Alink et al. 2006) include only behaviors that harm a person, animal, or object. This definition – often referred to as physical aggression – focuses on behaviors such as destroying things, hitting, biting, and getting into fights. Although both definitions measures types of aggression, those interested in criminal activity focus on physical aggression because it is a better predictor of criminality (see Broidy et al. 2003).

Whatever the measure used, early childhood aggression follows a common pattern: it typically appears around age one, peaks around age two, and recedes from then on. Substantial sex differences in aggressive behaviors exist; boys are more physically aggressive, while girls are more relationally aggressive (see Alink et al. 2006). It also seems possible that aggressive behaviors follow a different developmental trajectory for boys and girls (Alink et al. 2006:961), and the effects of predictors of early childhood aggressive behaviors may differ by sex (Morales and Gueraa 2006:909-910). In light of differences in the frequency of aggression – and possibly differences in development – by child sex, many researchers interested in aggression consider girls and boys separately.

Even though the predictors of early childhood aggressive behaviors may differ depending on child sex, many of the factors that influence child development also influence children's aggressive behaviors: growing up poor, growing up with a single parent, and being exposed to domestic violence and harsh and erratic parenting all promote aggressive behavior (Dodge et al. 2006 provides a recent review). Although little research considers effects of paternal incarceration on children's aggressive behaviors, research on the effects of incarceration suggests that paternal incarceration might increase, decrease, or have no effect on childhood aggression.

PATERNAL INCARCERATION AND CHILDREN'S AGGRESSIVE BEHAVIORS

Research on incarceration typically focused on its effects on crime until the 1990s (Western 2006:184-186 provides a review), at which point other consequences of mass incarceration started receiving attention. Much of this research considers the effects of incarceration on men's earnings and employment, typically finding negative effects on labor market outcomes – though findings are sometimes not statistically significant (Kling 2006; Pager 2003; Western 2002, 2006; Western, Kling, and Weiman 2001). Similar studies looking at the effects of incarceration on an individual's risk of divorce (Lopoo and Western 2005; Western 2006), health (Massoglia 2008), and ability to vote (Manza and Uggen 2006) also find negative effects of incarceration.

Although research suggests that incarceration diminishes adult's life-chances, selection bias remains a substantial obstacle to establishing a causal relationship between incarceration and later outcomes. Since incarcerated adults are already disadvantaged before entering the criminal justice system, it may be the factors that lead people into prison – crime, poverty, chronic unemployment, drug addiction, and poor mental health, to mention but a few – rather than being incarcerated, that are responsible for their poor outcomes. Although some studies provide experimental evidence (Pager 2003) or rely on natural variation (Fagan 1996) to isolate causal effects of penal policy on individual outcomes, most studies rely on non-experimental data, making it difficult to be sure whether the relationship between incarceration and poor outcomes is indeed causal.

Despite obstacles to causal inference, research consistently shows that incarceration diminishes men's life-chances. How incarceration effects those connected

to these men, however, is a more complicated question. One possibility is that the incarceration of a loved one helps family members – especially children – by removing a destructive force from the family. The logic of this argument is simple; incapacitating criminally active men diminishes not only their capacity for committing crimes but also their capacity for harming those around them. Consider the example of a romantic partner, for instance, consistently abused, threatened, and stolen from by her drug-addicted partner (see Comfort *Forthcoming*). In this situation, the wellbeing of the romantic partner improves while her partner is incarcerated. Romantic partners are not the only ones whose lives may improve as a result of the incarceration of a loved one. Child wellbeing may also improve. Fathers promote child development only when the relationship between the parents is low-conflict (Amato, Loomis, and Booth 1995) and the father is not antisocial (Jaffee et al. 2003), so removing a father may improve child wellbeing if it diminishes conflict in the home or removes an antisocial man from it. Effects may be especially strong for aggression since removing a violent man from the household also removes one parent upon which children may model their behavior.

Paternal incarceration may help some children, especially children whose fathers are violent and abusive to mother and child. But paternal incarceration could increase children's aggressive behaviors by exposing them to further disadvantage. Some of the ways in which paternal incarceration may disadvantage children are obvious: by diminishing economic resources (Braman 2004; Grinstead et al. 2001; Pager 2003; Western et al. 2001; Western 2006); and by increasing the risk of growing up with a single parent (Lopoo and Western 2005; Western 2006). Elevated risk of divorce may be

crucial since it may increase the chance of having a social father, which could increase the risk of abuse (Foster and Hagan 2007 discuss; Phillips et al. 2006).

While diminished economic resources and elevated risk of growing up with a single parent are obvious disadvantages caused by paternal incarceration, other changes that occur as a result of paternal incarceration may also promote higher levels of aggressive behaviors. The removal of a father may increase maternal stress and depression, for example (Braman 2004); the same likely happens to other potential caretakers, like mothers of incarcerated men (Green et al. 2006). Negative effects on caretakers are important for a number of reasons. First, poor caretaker mental health may lead to parenting techniques – harsh and erratic discipline and reliance on corporal punishment – that promote childhood aggression (see Sampson and Laub 1993, 1994). Second, poor caretaker mental health may lead to neglect. Since unsupervised children may be more likely to be abused, this could increase aggressive behaviors. Change in the quality of mothering is an important mechanism through which paternal incarceration increases children's aggressive behaviors, but the trauma of seeing a father arrested may also harm children – as may other aspects of the "secondary prisonization" that come along with having a loved one incarcerated (Braman 2004; Comfort 2003, 2007).

To this point, the discussion of consequences of paternal incarceration has proceeded as though incarcerated men never return home. The majority of incarcerated fathers eventually return home, however, and those who are in jail generally return within one year. Some might think that the father's return would solve many of the problems his absence caused: economic resources will increase; another caretaker will be present; and maternal depression will diminish. If fathers returned the same as they left, this might be

the case. Research reveals that many of the coping techniques fathers use to survive in prison may lead them to being less capable of taking care of their children when they return home, however (Nurse 2002:52-54). Since incarceration may diminish the quality of father-child interaction after release – especially by increasing paternal reliance on violence to solve problems – paternal incarceration may increase children's aggression.

Although paternal incarceration could help or harm children, one might also expect it to make no difference because fathers who go to jail or prison may be less involved with their children than other fathers. Inmate surveys show that half of fathers were not living with their children before being incarcerated (Mumola 2000). If these nonresident fathers were uninvolved with their children before being incarcerated, then their absence likely exerts little influence on child development.

Research on the consequences of incarceration suggests that paternal incarceration may increase or decrease children's aggressive behaviors – or have no effect at all. Multiple recent reviews suggest negative effects but are far from conclusive (Comfort 2007; Hagan and Dinovitzer 1999; Murray and Farrington *Forthcoming*). These reviews are also quick to note that the same caution in interpreting effects of incarceration on adults needs to be used when interpreting findings about effects of paternal incarceration on children since obstacles to causal inference are substantial.

DATA, MEASURES, AND METHOD

DATA

I rely on data from the Fragile Families and Child Wellbeing Study, which is a longitudinal birth cohort study that follows approximately 5,000 children born in urban

areas between 1998 and 2000 – the majority of whom were born to unmarried parents (Reichman et al. 2001). I use data from the first four waves of core data collection and in-home assessments that took place at 36 and 60 months. The Fragile Families data are ideal for a number of reasons. First, mothers are 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 are longitudinal and have low attrition rates for mothers; this allows me to make more plausible causal arguments than would be possible using cross-sectional data or data with more missing data. Finally, because disadvantaged men are overrepresented in the criminal justice system, many of the fathers have been incarcerated.

Results are based on a sample of all children whose mothers completed the 30 and 60 month core interviews and whose caretakers completed the 36 and 60 month in-home segments. This yields a large sample for boys (N=1253) and girls (N=1133). For some analyses, the samples are limited to boys of ever-incarcerated fathers (N=475) and boys of treatments and matched controls (N=347; Controls=161; Treatment=186).[1]

MEASURES

EARLY CHILDHOOD AGGRESSIVE BEHAVIORS. The dependent variable is early childhood aggressive behaviors, which is measured using four scales, all of which are standardized with a mean of 0 and a standard deviation of 1. (See Table 1 for item-test correlations for all components, which show the correlation between one measure

[1] The analysis presented here would have ideally included a measure of the child's Peabody Picture Vocabulary Test (PPVT) score because of the negative association between PPVT scores and aggressive behaviors (see especially Lynam and Henry 2001). Since adding this variable resulted in many lost observations for boys (N=289) and girls (N=264), did not improve model fit, and had only a small effect on the results, these models are not included in the results presented in the body of this paper.

and the full scale.) The first part of the first scale of childhood aggressive behavior is based on whether the parent interviewed said that 19 statements about their child were not true (0), somewhat or sometimes true (1), or very or often true (2) at 36 months. Cronbach's alpha for this scale was .88. The second part of the first scale of aggressive behaviors is based on how parents responded to 19 similar statements about their child at 60 months. Cronbach's alpha for this scale was .86. The second scale uses only items measured at 36 and 60 months. Cronbach's alpha for this scale was lower – .67 at 36 months and .70 at 60 months – but this is not surprising since it has fewer components. I also consider effects of paternal incarceration on physically aggressive behaviors. These scales include fewer components and have smaller values for Cronbach's alpha, ranging from .59 to .73. Alpha is highest using the full scale for all aggressive behaviors, so results presented here use the full scale.

[Insert Table 1 about here.]

Table 2 presents measures of the dependent variables for boys and girls by whether they experienced a new paternal incarceration between 30 and 60 months. Boys of incarcerated fathers were typically about .50 standard deviations more aggressive than other boys. Differences are less pronounced for girls; girls of incarcerated fathers were between .18 and .30 standard deviations more aggressive than other girls. This suggests that paternal incarceration may have larger effects on boys' aggressive behaviors.

[Insert Table 2 about here.]

PATERNAL INCARCERATION. Paternal incarceration is coded using maternal reports at 30 and 60 months. Paternal reports introduce additional error because many fathers do not complete one or more of the interviews – and ever-incarcerated fathers are especially likely to drop out of the sample. Fathers are coded as having been incarcerated between 30 and 60 months if the mother reports that the father is currently incarcerated at 60 months or had been incarcerated between 30 and 60 months and was not incarcerated at 30 months. Many children experienced paternal incarceration; 14.8 percent of boys, and 10.6 percent of girls. Although an additional 26 children – 15 boys and 11 girls – had their father incarcerated between 30 and 60 months, these cases are dropped because they also had their mother incarcerated, making it difficult to differentiate between effects of paternal and maternal incarceration. Another 44 children – 19 boys and 25 girls – are dropped because they experienced maternal incarceration only. Although it is important to distinguish between paternal and maternal incarceration's effects, I focus only on paternal incarceration because of the much larger risk of paternal incarceration.

CONTROL VARIABLES. The Fragile Families data contain a wealth of information about mothers and fathers, so I include a number of control variables in my analysis. Table 3 presents descriptive statistics for all independent variables used in the analysis by child's sex and whether they experienced a new paternal incarceration.

Research links parental characteristics to children's behaviors and the risk of experiencing paternal incarceration, so I control for parental characteristics. Since maternal age is negatively associated with childhood aggression (Morash and Rucker 1989), I control for maternal age (centered at 25). I also control for paternal age because

of the elevated risk of incarceration for young men (Hirschi and Gottfredson 1983:556-557); this measure is centered at 28. Since socioeconomic status influences child development and the risk of paternal imprisonment, I control for parental education (Bradley and Corwyn 2002; Nagin and Tremblay 2001; Wildeman *Forthcoming*). Parents are coded as having not completed high school (1), completed high school (2), completed a bachelor's degree (3), or completed a graduate degree (4). Parental self-control influences the risk of incarceration (Gottfredson and Hirschi 1990), but it may also influence kids. Parental self-control is based on a scale using six questions. Mothers were asked at 60 months if they strongly agreed (1), agreed (2), disagreed (3), or strongly disagreed (4) with six questions about themselves: (1) I often say and do things without considering the consequences; (2) I often get into trouble because I don't think before I act; (3) I do things that may cause trouble with the law; (4) I lie or cheat; (5) I frequently get into fights; and (6) I don't feel guilty when I misbehave. They were also asked how true these statements were about the father. Cronbach's alpha is high for both scales (.88, .86). I also control for the number of relationships the mother had before the birth.

[Insert Table 3 about here.]

Parental behaviors and home environments are also important. The number of children in the household predicts childhood aggression, so I control for the number of other children the mother has (Sampson and Laub 1993, 1994:535). I also control for the number of days the father spent with the child in the last month at 30 months and whether the family was living in poverty at 30 months because of connections between growing

up with a single parent, growing up poor, and children's aggressive behaviors (Blum et al. 1988; Bradley and Corwyn 2002; but see Jaffee et al. 2003). Since the quality of the relationship between the parents, having a social father present, and maternal mastery likely also influence children, I control for these variables. Parental relationship quality is coded based on whether the mother thought her relationship with the father was excellent (1), very good (2), good (3), fair (4), or poor (5) at 30 months. Maternal mastery is based on whether the mother strongly agreed (1), agreed (2) disagreed (3), or strongly disagreed with the following statements at 30 months: (1) being a parent is harder than I thought it would be; (2) I feel trapped by my responsibilities as a parent; (3) taking care of my children is much more work than pleasure; and (4) I often feel exhausted from raising a family. Cronbach's alpha for the scale of maternal mastery was .66.

Since neighborhood characteristics influence child development, I include information about neighborhoods (see Sampson and Raudenbush 1999). Social disorder is based on whether the caretaker interviewed at 36 months thought the following took place or they saw the following never (1), rarely (2), sometimes (3), or frequently (4) in their neighborhood: (1) drug dealers or users hang out; (2) drunks hang out; (3) unemployed adults loiter; (4) young people loiter; (5) gang activity takes place; (6) misbehaving groups of young children; (7) misbehaving groups of teens; and (8) misbehaving groups of adults. Low collective efficacy is based on whether the respondent at 36 months thought the following was very likely (1), somewhat likely (2), neither likely nor unlikely (3), somewhat unlikely (4), or very unlikely (5) or whether they strongly agreed (1), agreed (2), neither agreed nor disagreed (3), disagreed (4), or strongly disagreed (5) with the following statements: (1) neighbors intervene if children

are skipping school; (2) neighbors intervene if children spray-painting graffiti; (3) neighbors intervene if child showed disrespect to an adult; (4) neighbors intervene if a fight broke out in front of their house; (5) neighbors intervene if nearby fire station threatened with budget cuts; (6) people around here are willing to help their neighbors; (7) this is a close knit neighborhood; (8) people in this neighborhood can be trusted; (9) people in this neighborhood generally don't get along with each other (reverse coded); and (10) people in this neighborhood do not share the same values (reverse coded).

Although many facets of children's situations influence their aggressive behaviors, three may be especially important: (1) witnessing domestic violence or being abused; (2) experiencing excessive corporal punishment; and (3) experiencing harsh or erratic parenting (Dodge et al. 2006: 748-749; Glueck and Glueck 1950; Jaffee et al. 2002; Parker and Deur 1972; Sampson and Laub 1993, 1994). Children were coded as witnessing domestic violence if mothers reported that they had been abused when the child was present. The scale of corporal punishment ranges from 0 to 6 and is based on whether the caregiver said they did the following never (0), once (1), twice (2), 3 to 5 times (3), 6 to 10 times (4), 10 to 20 times (5), or more than 20 times (6) in the last year: (1) spanked him on the bottom with your bare hand; (2) hit him on the bottom with something like a belt; or (3) slapped him on the hand, arm, or leg. Cronbach's alpha for this scale was .66. The scale of erratic and verbally abusive parenting ranges from 0 to 6 and is based on how often the caregiver interviewed at 36 months said they did the following: (1) shouted, yelled, or screamed at him; (2) swore or cursed at him; and (3) threatened to spank or hit him but did not actually do it. Cronbach's alpha was .65.

Finally, the characteristics of children may influence their levels of aggressive behaviors. Since children's race and risk of paternal incarceration are tightly connected, I control for child's race (Wildeman *Forthcoming*). Children are coded as white if both parents are white, black if either parent is black, Hispanic if the child is not black and either parent is Hispanic, and other if none of the above. Being low birth weight and being exposed to nicotine in utero influence childhood aggressive behaviors, so I control for these experiences (Maughan et al. 2004). Children's aggressive behaviors are a strong predictor of future aggression, so I control for aggressive behaviors at 36 months.

METHOD

This paper uses four methods to consider the relationship between paternal incarceration and children's aggressive behaviors. First, I use OLS regression models to control for observed differences between children of incarcerated fathers and other children. Second, I limit the sample to children of ever-incarcerated fathers to limit unobserved differences (LaLonde 1986). Third, I use fixed-effects models in a sample restricted to children of ever-incarcerated fathers in an attempt to account for heterogeneity in stable characteristics. Some fixed effects models are limited to children living or not living with their father at 30 months. Finally, I use propensity scores to isolate matched treatment and control children to estimate effects of paternal incarceration on children's aggressive behaviors (Morgan and Winship 2007; Rosenbeum and Rubin 1983). By matching fathers, propensity score models provide better comparisons between those receiving the treatment and those not receiving it.

RESULTS

RESULTS FROM OLS REGRESSION ANALYSES

Descriptive statistics show that children of incarcerated fathers are much more likely to exhibit aggressive behaviors than are other children – scoring between .18 and .49 standard deviations higher than other children (see Table 2). For the full scale of all aggressive behaviors, the difference between boys of incarcerated fathers and other boys is .46; for girls, the difference is .30 (Table 4, Models 1 and 3). Although differences between boys of incarcerated fathers and other boys are about 50 percent larger than differences between girls of incarcerated fathers and other girls, the bivariate relationship is strong and statistically significant for both groups. Because of other disadvantages faced by children of incarcerated fathers, it would come as a surprise if the bivariate relationship between paternal incarceration and children's aggressive behaviors were not positive, however, so further investigation is needed.

One method for seeing if the relationship between paternal incarceration and children's aggressive behaviors is due to paternal incarceration or other factors is covariate adjustment, and Models 2 and 4 in Table 4 present results from OLS regression analyses that adjust for covariates. Model 2, which considers effects of paternal incarceration on boys' aggressive behaviors, provides strong evidence of the association between paternal incarceration and boys' aggressive behaviors. The coefficient for paternal incarceration is large – the effects are larger than they are for every other dichotomous predictor except exposure to domestic violence – and the relationship is statistically significant at the .05 level. For girls, effects of paternal incarceration on aggressive behaviors are small and nonsignificant. Differences in aggression among girls

appear to be due to selection. Since there appears to be no association between paternal incarceration and girls' aggressive behaviors, I focus on boys in subsequent analyses.

[Insert Table 4 about here.]

Covariate adjustment provides one method for limiting selection bias. Another method for dealing with selection bias is to limit the sample to individuals who may be different from others in unobservable ways (see LaLonde 1986). This analysis must deal with the possibility that men who go to prison are "just different" from men who do not – they are more likely to be criminally active or addicted to drugs, for example – and that it is these differences, not incarceration, that is driving differences between their children and other children. I deal with this concern by limiting the sample to all children of ever-incarcerated fathers, some of whom were incarcerated only before their son's birth.

Model 1 in Table 5 presents results from OLS regression models considering the effects of paternal incarceration in the last 30 months on boys' aggressive behaviors. Once again, the relationship between paternal incarceration and boys' aggressive behaviors is large and statistically significant – this time at the .01 level. Furthermore, boys of recently incarcerated fathers are about one-third of a standard deviation more aggressive than boys of fathers not incarcerated since their birth, a substantial difference. Since there are likely still differences between boys whose fathers have been recently incarcerated and other boys, I adjust for observed covariates among boys of ever-incarcerated fathers in Model 2 in Table 5. Introducing covariates diminishes the size of the effect by 40 percent, but the coefficient continues to be significant at the .10 level.

Furthermore, the coefficient is still larger in this more rigorous specification than it was in the full sample (.21 to .17), which suggests that the change in statistical significance is attributable to changes in sample size, not coefficient size. This provides further support for the association between paternal incarceration and children's aggressive behaviors.

RESULTS FROM FIXED EFFECTS MODELS

Fixed effects models rely on multiple observations of one individual. By holding fixed characteristics constant, these models control all selection bias due to stable differences between children of inmates and non-inmates. Models 3 and 4 in Table 5 estimate the effects of paternal incarceration on boy's aggressive behaviors using data from 36 and 60 months. These samples are again limited to children of ever-incarcerated fathers to further account for selection bias. Results from Model 3, which does not include covariates, support the positive association between paternal incarceration and boys' aggressive behaviors. The coefficient changes little in size from some of the earlier models; in fact, the coefficient is almost exactly the same size as the coefficient for the OLS model with all covariates that relies on the sample restricted to children of ever-incarcerated fathers. The robustness of the coefficient provides support for the association between paternal incarceration and boys' aggressive behaviors, as does the fact that the coefficient continues to be statistically significant at the .05 level.

A more rigorous test would also consider factors that vary over time. In Model 4, I present estimates from fixed effects models that control for time-varying covariates – exposure to domestic violence, living in poverty, days spent with the father in the last month, parental relationship quality, whether a social father was present, the level of

corporal punishment, and the level of harsh/erratic parenting. In this model, the coefficient for paternal incarceration diminishes somewhat – down from .22 to .18 – and the coefficient now is significant only at the .10 level. While the size and statistical significance of the coefficient are modest, it is possible that this model, by including other aspects of family life that influence childhood aggression and change at the same time as paternal incarceration, may underestimate effects of paternal incarceration. Since this model is likely too conservative, the continued statistical significance of the finding and similarly sized coefficient provide further support for the hypothesis that paternal incarceration increases boys' aggressive behaviors in fragile families.

[Insert Table 5 about here.]

Thus far, results suggest that paternal incarceration increases children's aggressive behaviors. The models upon which these results are based limited the sample to children of ex-offenders, controlled for stable characteristics by using fixed effects models, and adjusted for covariates. Another method for detecting selection bias is to compare coefficients for two different sub-samples, one of which would be expected to experience large effects and the other of which would be expected to experience small effects. If coefficients are comparable, that provides evidence of selection; if coefficients are different, however, that suggests a causal relationship. Models 5 and 6 in Table 5 provide such a test. Model 5 is restricted to a group that we would expect to experience large effects of paternal incarceration: boys living with their fathers at the time of his incarceration. Model 6 is restricted to a group that we would expect to experience small

effects of paternal incarceration: boys of non-resident fathers. Both models use fixed effects and adjust for covariates. Results for boys with resident fathers suggest strong negative effects of paternal incarceration on boys' aggressive behaviors. Having a father incarcerated is associated with a .42 standard deviation increase in aggressive behaviors, and this change is statistically significant at the .05 level even though the sample is very small (N=139). For boys of non-resident fathers, effects of paternal incarceration are small – a .12 standard deviation increase – and nonsignificant. This suggests that paternal incarceration matters little for boys not living with their fathers but a great deal for boys with resident fathers. This finding supports a causal explanation of the differences between boys of incarcerated fathers and other boys.

RESULTS FROM PROPENSITY SCORE MODELS

Another method for testing the relationship between paternal incarceration and boys' aggressive behaviors is to use propensity score (matching) models. By considering treatment effects among matched treatment and control groups, these models provide another method for demonstrating causality. In Model 7, which uses the full scale of boys' aggressive behaviors at age 5 as the dependent variable, there is strong evidence that paternal incarceration is positively associated with boys' aggressive behaviors. The coefficient suggests that having received the treatment – paternal incarceration – is associated with an increase of .34 standard deviations in boys' aggressive behaviors. The coefficient for paternal incarceration is also statistically significant at the .05 level.

The evidence presented in Model 7 provides support for the positive association between paternal incarceration and boys' aggressive behaviors, but the strength of this

finding is limited by the fact that it does not account for pre-existing differences in boys' aggressive behaviors. Since boys experiencing paternal incarceration exhibited higher levels of aggressive behaviors at age 3, a more rigorous test of the relationship would incorporate information about boys' pre-existing aggressive behaviors. Model 8 in Table 5 uses the change in aggressive behaviors between ages 3 and 5 as the dependent variable. Although the relationship between paternal incarceration and boys' aggressive behaviors is rendered significant at only the .10 level, the coefficient is still larger than it has been in many of the models (.26). Thus, this model provides moderate evidence of the effects of paternal incarceration on boys' aggressive behaviors.

ROBUSTNESS CHECKS

Although this analysis includes multiple robustness checks, it has not yet analyzed how the conclusions may have changed had the repeated scale been chosen as the dependent variable rather than the full scale. Likewise, I have not considered how looking only at physically aggressive behaviors instead of all aggressive behaviors would have altered my findings. I also have not considered how including father reports on incarceration would alter my findings. Figure 1 includes four plots showing how changing the dependent and independent variables influences results for each of the models run for boys in Tables 4 and 5. In each plot, the x-axis is the dependent variable used in results presented here: the full scale of all aggressive behaviors using only maternal reports. The y-axis is labeled for each of the figures. Values above the line show an increase in the estimated incarceration effect, due to using another variable.

The first plot, located in the top left corner of the figure, plots the full and repeated scales of all aggressive behaviors against one another. As the plot shows, the differences between the coefficients are consistently small, indicating that using the repeated scale would have had a small effect on the results. Not only does the size of the coefficient differ little, but the level of statistical significance also differs rarely. This indicates that using the repeated scale of aggressive behaviors instead of the full scale of all aggressive behaviors would have negligibly altered results.

The second plot, located in the top right corner of the figure, shows the relationship for the full scale of all aggressive behaviors and the full scale of physically aggressive behaviors. Although differences are not always small in this plot, when differences are large, they generally suggest that using the full scale of physically aggressive behaviors would have provided stronger results. And the level of statistical significance changes only rarely. Although using the full scale of physically aggressive behaviors would have produced somewhat different results, it is likely that these results would have been stronger, not weaker, than the results presented in Tables 4 and 5.

[Insert Figure 1 about here.]

The third plot, shown in the bottom left corner, compares the coefficient for paternal incarceration using the full scale of all aggressive behaviors with the repeated scale for physically aggressive behaviors. Although differences in the first two plots were relatively modest, differences in this plot are more pronounced. Using the repeated scale of physically aggressive behaviors produces larger coefficients in almost every case, and

the only notably different coefficients are larger. Although the level of statistical significance rarely differs, this plot suggests that the effects of paternal incarceration on children's aggressive behaviors would be larger had I used the repeated scale of physically aggressive behaviors.

The final plot, shown in the bottom right-hand corner, compares results derived using only mother reports to results derived using mother and father reports. Using the alternate independent variable would have contributed to smaller (and less statistically significant) estimates of the effects of paternal incarceration most of the time. Even though using the alternate independent variable would have made the results somewhat more conservative, it would not have substantially altered conclusions. And given the increased bias that would have come along with including paternal reports of incarceration, the independent variable used throughout the analysis is still preferable.

DISCUSSION

This paper considers how paternal incarceration influences the aggressive behaviors of children aged 5 years using data from the Fragile Families and Child Wellbeing Study. Results indicate that paternal incarceration increases aggressive behaviors among boys but not girls. Furthermore, this effect is substantial, accounting for around half of the difference between boys of incarcerated fathers and other boys. Additional analyses using samples limited to children of ever-incarcerated fathers, fixed effects models, and propensity score models demonstrate the robustness of the effects of paternal incarceration on children's aggressive behaviors to model type and specification. Additional analyses using alternate measures demonstrate that dependent and

independent variable choice did not heavily influence the results, although it may have understated the effects of paternal incarceration on boys' aggressive behaviors. Taken together, results show that paternal incarceration has large effects on boys' aggressive behaviors and that effects are concentrated among boys living with their fathers.

The positive relationship between paternal incarceration and boys' aggressive behaviors may have profound implications not only for the life-chances of children of incarcerated fathers but also for the criminal justice system. Since American children experience high risks of paternal imprisonment (see Wildeman *Forthcoming*) and paternal incarceration contributes to high levels of aggressive behaviors, it is possible that high levels of paternal incarceration, by increasing the criminality of their children, may diminish some of the benefits of incarceration for public safety. In so doing, paternal incarceration not only compromises public safety but also leads to a system of stratification in which incarceration is passed down from one generation to the next.

Like any analysis, this study has limitations. The most serious limitation is that paternal incarceration is not randomly assigned, making causal inference difficult. Were incarceration randomly assigned among criminally active parents, I could more confidently isolate causal relationships. A further difficulty has to do with the measurement of paternal incarceration. Since paternal incarceration is based on retrospective maternal reports, it is likely that there is substantial bias in these reports. A better measure of paternal incarceration would use administrative data and would also have more precise estimates of the timing of paternal incarceration. Finally, additional bias is introduced by using only mother reports on incarceration and behavior problems. It would be preferable to have multiple reports on both the dependent and independent

variables (see Glueck and Glueck 1950; Sampson and Laub 1993), but high attrition among fathers makes using father reports problematic. Despite these limitations, these data are still by far the strongest data upon which to make causal claims about the relationship between paternal incarceration and child wellbeing.

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Table 1: Components, Item Test Correlations, and Cronbach's Alpha for Full and Repeated Scales of All Childhood Aggressive Behaviors and Physically Aggressive Behaviors Only at Three and Five Years

	Item Test Correlation							
	All Aggressive Behaviors				Physically Aggressive Behaviors Only			
Component	Full (3)	Full (5)	Repeated (3)	Repeated (5)	Full (3)	Full (5)	Repeated (3)	Repeated (5)
Destroys others' things	.58	.64	.68	.70	.67	.79	.72	.74
Disobedient (at home)	.59	.59	.65	.63	--	--	--	--
Fights	.50	.59	.69	.70	.71	.66	.81	.77
Attacks others	.50	.57	.66	.68	.69	.68	.76	.78
Screams	.58	.60	.65	.67	--	--	--	--
Impatient	.61	--	--	--	--	--	--	--
Defiant	.57	--	--	--	--	--	--	--
Demanding	.63	--	--	--	--	--	--	--
No guilt after misbehaving	.47	--	--	--	--	--	--	--
Easily frustrated	.56	--	--	--	--	--	--	--
Hits	.60	--	--	--	.72	--	--	--
Hurts without meaning to	.42	--	--	--	.59	--	--	--
Angry moods	.63	--	--	--	--	--	--	--
Punishment has no effect	.52	--	--	--	--	--	--	--
Selfish	.54	--	--	--	--	--	--	--
Stubborn	.60	--	--	--	--	--	--	--
Tantrums	.67	--	--	--	--	--	--	--
Uncooperative	.59	--	--	--	--	--	--	--
Wants a lot of attention	.47	--	--	--	--	--	--	--
Argues	--	.55	--	--	--	--	--	--
Brags	--	.40	--	--	--	--	--	--
Disobedient (at school)	--	.47	--	--	--	--	--	--
Sulks	--	.44	--	--	--	--	--	--
Threatens	--	.54	--	--	--	--	--	--

Cruel	--	.62	--	--	--	--	--	--
Destroys own things	--	.62	--	--	--	.73	--	--
Lies	--	.57	--	--	--	--	--	--
Jealous	--	.45	--	--	--	--	--	--
Delinquent friends	--	.41	--	--	--	--	--	--
Impulsive	--	.58	--	--	--	--	--	--
Swears	--	.46	--	--	--	--	--	--
Vandalizes	--	.46	--	--	--	.62	--	--
Unusually loud	--	.52	--	--	--	--	--	--
Cronbach's Alpha	.88	.86	.67	.70	.68	.73	.59	.64

Table 2: Means and Standard Deviations for Dependent Variables by Child Gender and Paternal Incarceration between Age Three and Five

	Boys		Girls	
Variable Name	Father Incarcerated	Father Not Incarcerated	Father Incarcerated	Father Not Incarcerated
All Aggression				
Full	.48 (1.20)	.02 (1.02)	.20 (1.00)	-.10 (.94)
Repeated	.42 (1.19)	.04 (1.01)	.10 (1.09)	-.08 (.92)
Physical Aggression				
Full	.52 (1.32)	.03 (1.02)	.06 (.97)	-.13 (.88)
Repeated	.45 (1.33)	.02 (1.02)	.08 (1.05)	-.11 (.87)
N	186	1067	120	1013

Source: Fragile Families and Child Wellbeing Study.

Table 3: Means and Standard Deviations for Independent Variables by Child Gender and Paternal Incarceration between Age Three and Five

	Boys		Girls	
Variable Name	Father Incarcerated	Father Not Incarcerated	Father Incarcerated	Father Not Incarcerated
Maternal Age (Centered)	-2.73 (4.53)	.60 (6.20)	-1.74 (5.77)	.47 (6.00)
Paternal Age (Centered)	-3.59 (6.57)	-.02 (7.02)	-2.25 (6.34)	.32 (7.36)
Maternal Education (1-4)	1.66 (.51)	1.86 (.75)	1.56 (.51)	1.84 (.73)
Paternal Education (1-4)	1.47 (.50)	1.84 (.78)	1.51 (.50)	1.82 (.75)
Child's Race				
Black	.69 (.46)	.54 (.50)	.67 (.47)	.53 (.50)
White	.11 (.32)	.19 (.39)	.08 (.28)	.18 (.38)
Hispanic	.18 (.38)	.25 (.43)	.24 (.43)	.27 (.44)
Other	.02 (.15)	.03 (.18)	.01 (.09)	.02 (.15)
Total Kids	1.04 (1.22)	1.10 (1.30)	1.21 (1.36)	1.14 (1.30)
In Utero Nicotine (0-2)	.26 (.45)	.19 (.45)	.23 (.47)	.23 (.49)
Low Birth Weight	.09 (.28)	.09 (.29)	.12 (.32)	.10 (.30)
Maternal Self-Control (1-4)	3.44 (.48)	3.49 (.47)	3.41 (.47)	3.51 (.48)
Paternal Self-Control (1-4)	2.38 (.82)	3.37 (.73)	2.47 (.85)	3.40 (.69)
Days with Father at 3	15.17(13.37)	19.86 (13.22)	16.56 (13.36)	19.82 (13.32)
Living in Poverty at 3	.61 (.49)	.40 (.50)	.58 (.50)	.41 (.49)
Maternal Mastery at 3	2.61 (.64)	2.71 (.68)	2.65 (.70)	2.76 (.68)
Witnessed Domestic Abuse	.11 (.31)	.03 (.17)	.09 (.25)	.04 (.20)
Parent Relationship (1-5)	3.40 (1.32)	2.79 (1.44)	3.43 (1.43)	2.83 (1.42)
Social Father at 3	.14 (.35)	.09 (.29)	.13 (.34)	.08 (.27)
Mom's Prior Relationships	1.94 (2.25)	2.09 (2.10)	2.18 (2.43)	2.18 (2.54)
Corporal Punishment (1-6)	2.33 (1.57)	2.01 (1.58)	1.97 (1.69)	1.81 (1.47)
Erratic Punishment (1-6)	2.96 (1.56)	2.62 (1.50)	2.69 (1.51)	2.44 (1.44)
Low Collective Efficacy (1-5)	1.53 (.98)	1.22 (.96)	1.37 (.84)	1.23 (.92)
Social Disorder (1-4)	2.14 (.92)	1.83 (.87)	2.09 (.93)	1.83 (.87)
All Aggression at 3				
Full	.27 (1.10)	.01 (1.00)	.04 (1.10)	-.06 (.94)
Repeated	.17 (1.10)	.00 (1.00)	.09 (1.14)	-.06 (.92)
Physical Aggression at 3				
Full	.25 (1.07)	.00 (.99)	.06 (1.08)	-.09 (.81)
Repeated	.15 (1.02)	.01 (.98)	.15 (1.12)	-.08 (.85)
N	186	1067	120	1013

Source: Fragile Families and Child Wellbeing Study.

Table 4: Results from OLS Regression Models Predicting All Childhood Aggressive Behaviors Using the Full Scale for Boys and Girls Aged Five Years

	Boys		Girls	
Variable Name	Model 1	Model 2	Model 3	Model 4
Paternal Incarceration	.46*** (.08)	.17* (.08)	.30** (.09)	.05 (.08)
Maternal Age	---	-.00 (.01)	---	-.00 (.01)
Paternal Age	---	-.00 (.01)	---	.00 (.00)
Maternal Education	---	.00 (.05)	---	-.01 (.05)
Paternal Education	---	-.11* (.04)	---	-.02 (.04)
Child's Race				
Black	---	-.15# (.08)	---	.01 (.08)
Hispanic	---	-.09 (.09)	---	.12 (.08)
Other	---	.08 (.16)	---	-.00 (.18)
Total Children	---	-.00 (.02)	---	.01 (.02)
In Utero Nicotine	---	.06 (.06)	---	.11* (.05)
Low Birth Weight	---	-.07 (.09)	---	.06 (.08)
Maternal Self-Control	---	-.09 (.06)	---	-.05 (.05)
Paternal Self-Control	---	-.06 (.04)	---	-.14*** (.04)
Days with Father	---	-.00 (.00)	---	.00 (.00)
Living in Poverty	---	.02 (.06)	---	-.02 (.06)
Maternal Mastery	---	-.02 (.04)	---	.01 (.04)
Witnesses Domestic Abuse	---	.40** (.13)	---	-.00 (.12)
Parent Relationship Quality	---	-.02 (.03)	---	-.00 (.03)
Social Father	---	-.12 (.09)	---	.20* (.10)
Mom's Prior Relationships	---	.03* (.01)	---	.00 (.01)
Corporal Punishment	---	.01 (.02)	---	.05* (.02)
Erratic Punishment	---	-.00 (.02)	---	-.00 (.02)
Little Collective Efficacy	---	.03 (.03)	---	.08** (.03)
Social Disorder	---	.00 (.03)	---	.02 (.03)
Aggression at Age 3	---	.49*** (.03)	---	.44*** (.03)
N	1253	1253	1133	1133
R-Squared	.02	.31	.01	.31

Source: Fragile Families and Child Wellbeing Study.
Note: Significance levels are the following: *** < .001; ** <.01; * <.05; # <.10.

Table 5: Results from OLS Regression Models Limited to Boys of Ever-Incarcerated Fathers, Fixed Effects Models Limited to Boys of Ever-Incarcerated Fathers, and Propensity Score Models Predicting All Aggressive Behaviors for Boys Only

	OLS: Boys of Ever-Incarcerated Fathers		Fixed Effects Models: Boys of Ever-Incarcerated Fathers				Propensity Score Model (Matching)	
Variable Name	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
New Paternal Incarceration	.36** (.12)	.21# (.11)	.22* (.09)	.18# (.09)	.42* (.04)	.12 (.11)	.34* (.15)	.26# (.14)
Model Specification								
Covariate Adjustment	NO	YES	NO	YES	YES	YES	NO	NO
DV: Five Year Aggression	YES	YES	NO	NO	NO	NO	YES	NO
DV: Change in Aggression	NO	NO	NO	NO	NO	NO	NO	YES
DV: Level of Aggression	NO	NO	YES	YES	YES	YES	NO	NO
Resident Father: 36 Months	---	---	---	---	YES	NO	---	---
N	475	475	475	475	139	336	347^	347^
R-Squared	.02	.34	.77	.79	.80	.78	---	---

Source: Fragile Families and Child Wellbeing Study.

Notes: Significance levels are the following: *** <.001; **<.01; * <.05; #<.10. Fixed effects models with covariates adjust for exposure to domestic violence, living in poverty, days the father spent with the child, parental relationship quality, social father presence, and corporal and harsh/erratic parenting. Model 5 includes only children residing with their fathers at the 30 month interview; Model 6 includes only children not residing with their father at the 30 month interview. Propensity score models are based on a balancing equation including paternal age, race (black or not), education (high school dropout or not), and self-control. Models also include quadratics when possible (second and third order) and all possible two- and three-way interactions. ^ indicates that models are based on nearest neighbor matches that have 186 treated individuals and 161 controls.

Figure 1: Effects of Paternal Incarceration on Boys' Aggressive Behaviors