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Reconsidering the Relationship between Paternal Incarceration and Delinquency*

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Abstract: Research finds that children who have experienced the incarceration of a parent exhibit higher levels of antisocial behavior. Yet there are reasons to question whether this association is in fact causal, and research that empirically pins down mechanisms that explain any observed association is in high demand. We attempt to better account for unobserved heterogeneity by using children with fathers who will be incarcerated as a strategic comparison group. In addition, we look at two different outcomes in an effort to make inferences about why paternal incarceration may influence delinquency. Results suggest that the association between paternal incarceration and instrumental forms of crime (e.g., theft) is entirely spurious, although paternal incarceration retains a significant effect on expressive crimes (e.g., destruction of property, fighting).

The number of children separated from a parent because of incarceration is near an all-time high. Over 800,000 incarcerated men and women are parents of children under the age of 18, and nearly 1.75 million children (2.3% of all children in the United States) have a parent in a state or federal prison (Glaze and Maruschak, 2010). The latter figure represents the highpoint of a two-decade increase, as inmates in state and federal prisons with children increased 79% between 1991 and 2007. The sheer number of children separated from a parent due to incarceration, combined with research suggesting an association between children's cognitive, emotional, and developmental problems and parental imprisonment (Wakefield and Wildeman, 2011; Wildeman, 2010; Hagan and Dinovitzer, 1999; Roettger et al., 2011), implies that this issue constitutes a ripe area of empirical research for scholars of crime and the family alike. And indeed, social scientists have undertaken this task in recent years and quickly amassed a record of research that points to an intuitive but by no means taken for granted conclusion – children of incarcerated parents are worse off on a number of dimensions compared to similarly situated peers.

Hagan and Dinovitzer (1999) in many ways set the stage for such a research agenda by suggesting a number of ways in which the incarceration of a parent could have deleterious consequences for children. Empirical work since that time has increasingly applied a range of methods to multiple samples and finds much support for Hagan and Dinovitzer's predictions. Van de Rakt et al. (2008) find an association between a father's conviction and later convictions by their children, Roettger and Swisher (2011) show that delinquency is higher for those with an ever-incarcerated father, Murray, Loeber and Pardini (2012) show that theft is associated with parental incarceration, and Wildeman (2010; see also Wakefield and Wildeman, 2011) shows that physical aggression in young children exhibits a robust correlation with father's

incarceration. Also noteworthy is that studies in this vein have made use of multiple datasets frequently employed in the study of families and crime, such as the National Longitudinal Study of Adolescent Health (Add Health), Fragile Families, the Pittsburgh Youth Study, and the Project on Human Development in Chicago Neighborhoods (PHDCN). The general finding is therefore consistent across datasets, methods, and outcome variables.

Although a firm evidentiary basis has been established with respect to the association between the incarceration of a parent and various measures of child wellbeing, a few questions about the nature of the association remain unsettled, and we think the application of different methods may help resolve thorny questions concerning unobserved heterogeneity and the possibility of selection effects. Specifically, research to date has struggled to rule out the possibility that any association between paternal incarceration and various indicators of child wellbeing is spurious or otherwise biased by variables omitted from the analysis (Johnson and Easterling 2012). As Sampson (2011) recently noted in his response to a rigorous analysis of paternal incarceration and childhood behavior problems by Wakefield and Wildeman (2011), "as the authors forthrightly note, their method of analysis cannot overcome what is missing – …omitted variable bias. I worry most about the omission of parental *behavior*…, in particular parental violence or more generally what developmental psychologists label "antisocial behavior"" (Sampson, 2011, p.821, emphasis in original).[1] Sampson is right, although this does not imply that Wakefield and Wildeman (or others) are wrong. For instance, if the unobserved variables do not change over time, prior research has effectively dealt with this issue through fixed effects modeling. For us, the question about omitted variable bias broached by Sampson is particularly relevant when studies rely only on covariate adjustment, which does not account for

unobserved factors, or when the unobserved factors are likely to change over time, in which case fixed effects modeling is not a sufficient remedy.

Although it is a tall order to fully account for what has not been directly observed and recorded in surveys, we think the issue can at least be partly addressed by using strategically chosen comparison groups. Prior work has taken steps in this direction, for instance by using children whose parents were incarcerated *prior* to birth as a comparison group (Murray et al. 2007), although a potential issue with this method is that both groups experienced the 'treatment' (parental incarceration) prior to the outcome. In addition, Wildeman (2010) has made skillful use of placebo regression to show that there is no correlation between the predictor variable at 't+1' and the outcome at time t, as one would expect given the preconditions for a causal association. In the present work we build on prior work by taking advantage of the longitudinal nature of the Add Health data. We use children of fathers *who will be incarcerated* as a strategic comparison group, which is a known quantity because of the longitudinal design. We presume that respondents with fathers on the verge of being incarcerated share similarities (e.g., with respect to prior record, violence, other behavioral tendencies) with survey respondents whose fathers have recently been incarcerated. Accordingly, this comparison group may prove useful in netting out some, although we cannot claim all, omitted variable influence. While much longitudinal research uses fixed effects modeling to control for unobserved characteristics, researchers less often exploit panel data to make use of events that, unbeknownst to respondents at the first wave of data collection, will happen to them in the future. We show the utility of doing so in the present work.

In addition, and to the extent that an association exists whereby the incarceration of a father leads to more delinquency by his children, it is not entirely clear *why* the association exists

(Wakefield and Wildeman, 2011). Partly building on the work of Hagan and Dinovitzer (1999), we suggest some possible conduits linking paternal incarceration and delinquency that generally coalesce around the concepts of separation, attachment, and strain. These concepts are imperfectly measured in household surveys, and thus we consider alternative ways of making inferences about theoretical mechanisms beyond direct measurement of key indicators. For instance, prior work has made inferences about the etiology of crime by examining different classifications of offending (Maxfield, 1989; Cohn and Rotton, 2003), for instance, whether crimes are expressive or instrumental in nature. We follow suit by looking at the association between paternal incarceration and two forms of delinquency – violent, destructive or aggressive behavior ('expressive' delinquency or 'acting out') and offending that has the potential to result in monetary gain ('instrumental' delinquency). Comparing the associations across crime types can help winnow down the likely mechanisms that explain any observed association between father's incarceration and the delinquency of his child.

In short, we advance this area of inquiry by utilizing a strategic comparison group to account for unobserved heterogeneity in the paternal incarceration-delinquency nexus and by taking a fresh approach to identifying the mechanisms that account for any observed association. With these objectives in mind, we next put the issue in theoretical context before describing the data and measures used in our analysis. We then turn to the results and their implications for the study of incarceration and childhood behavior problems.

Perspectives on the Consequences of Paternal Incarceration

Our inquiry is guided by three general perspectives on the association between paternal incarceration and child's delinquency. The first of these suggest a potential protective effect of having a father incarcerated, while the latter two imply adverse consequences for children.

First, and in some respects consistent with a differential association (Sutherland 1947) perspective, incarcerating a father may be beneficial for the child. To the extent that fathers with a criminal history condone or at least fail to punish delinquent behavior, and assuming that some fathers with a criminal history are abusive towards their children, we might expect an inverse association between paternal incarceration and a child's delinquency.[2] Imprisoning a father may remove a source of stress and perhaps a delinquent influence from the household. Consistent with this perspective, some prior research suggests that removing criminal fathers from households improves child wellbeing, at least under certain conditions. For instance, Wildeman (2010) draws on a sample of young children from the Fragile Families and Child Wellbeing Study to show that incarcerating a father who was abusive towards the mother decreases boys' aggression.

Although we think it prudent to leave the door open to such a possibility, we must also acknowledge that the majority of research finds a positive association between parental incarceration and delinquency. Yet the association may not be causal, and hence we investigate a second perspective that implies a spurious association. Incarcerated fathers likely have a criminal history, which may be associated with poor supervision of children or lack of discipline, which in turn can be correlated with a child's increased propensity toward delinquency. Prior work has repeatedly shown evidence of intergenerational transmission of crime, particularly the impact of a crime-prone father (Sampson and Laub, 1993; Farrington et al., 2001; Van de Rakt, 2008). It is

entirely plausible that characteristics of the father that accompany his bout of incarceration – or perhaps the very behavior that led to the incarceration – are driving any association between a father's history of doing time and his child's delinquent conduct. To this end, Murray and colleagues (2009, p.60) suggest a "great need for more research on the causal effects of parental imprisonment on children," and Massoglia and Warner (2011, p.855) note that "a particular concern [with research on parental incarceration] is the inability to definitively rule out bias due to unobservable variables." Our analysis attempts to minimize this problem by employing a method that appears under-utilized in extant work on the deleterious effects of incarceration.

A third general perspective, and one that is certainly dominant in prior published work on the topic, suggests that the association is likely causal (Roettger et al., 2011; Roettger and Swisher, 2011; Wildeman, 2010; Wakefield and Wildeman, 2011; Craigie, 2011). However, identifying the mechanisms that link parental incarceration and child wellbeing remains a work in progress. Here we give attention to two plausible intervening factors.

Intervening Mechanisms

Separation and Attachment

We first consider the consequences of separation. Having an incarcerated father necessarily entails the separation of family members for some period of time, which can have a number of negative consequences for those left behind. For instance, lengthy episodes of separation, including time behind bars, have been cited as a key determinant of marital dissolution (Rindfuss and Stephen, 1990; Massoglia et al., 2011). The absence of a father can also weaken children's attachments to their fathers (Murray et al., 2009; Nurse, 2004) and limit supervision, each of which is associated with delinquency. Although some children likely had

poor relationships with their fathers prior to incarceration, research indicates that approximately half of inmates previously lived with their children, and that fathers "frequently maintain some kind of supportive relationship with children" (Western and Wildeman, 2009, p.240).

Hirschi (1969) suggested that even parents with a criminal history look unfavorably upon their children's delinquent conduct. From the perspective of classic control theory, time spent with parents is of primary importance not because of direct supervision, but because of affective attachments. As Hirschi (1969 [2002], p.88) states, "The important consideration is whether the parent is psychologically present when temptation to commit a crime appears. If, in the situation of temptation, no thought is given to parental reaction, the child is to this extent free to commit the act." In line with Hirschi's idea of attachment, the separation of a father may sever the bond between father and child, at least for a period of time. This line of research suggests that a pair of relationships should emerge in our analysis. First, we would expect a positive association between paternal incarceration and child's delinquency. Second, control theory implies that that a substantial portion of the association between delinquency and paternal incarceration should be explained by a measure of subjective attachment to the father.

Stigma and Strain

Although hypotheses stemming from a control theory perspective appear tenable, prior work indicates that other factors may be at play. For instance, in their work on sons with a history of parental incarceration, Murray and Farrington (2005, p.1277) conclude that "separation *per se* did not appear to be an important explanatory factor for antisocial behavior of children." Their analysis compares sons with a history of parental incarceration with four control groups: (1) sons who were not separated from either parent, (2) sons who had a parent in the

hospital or deceased, (3) sons whose parents separated due to marital dissolution and (4) sons who had a father incarcerated before birth. Their results indicated that males with an incarcerated parent were more likely than males who experienced separation due to other reasons (groups 2-3) to self-report delinquent behavior and to be convicted of crimes as juveniles and adults. Murray and Farrington (2005, p.1276) argue that it is "unlikely that the additional effects of parental imprisonment were explained by relationship breakdowns, changes in children's care arrangements, or loss of family income, which also tend to follow parental separation and divorce."

Others have drawn attention to the stigma and strain associated with a relative being incarcerated (Comfort, 2007), and a classic line of sociological theory suggests that the stigma of incarceration can also be contagious and have an impact on those in the (former) inmates' social network (Goffman, 1963). Research in this tradition finds that families of incarcerated men struggle with the stereotypes that accompany incarceration (Braman, 2004), and Goffman (2009) reveals how fear of arrest by those with a history of incarceration can cause fathers to disengage from the family, for instance by missing celebrations such as birthdays. All in all, there is evidence that stigma is "sticky" (Braman, 2004, p.173) and hence has implications beyond the incarcerated offender.

This notion of stickiness is important in the present context because it suggests that children with incarcerated fathers may have negative emotional reactions to paternal incarceration. As Hagan and Dinovitzer (1999, e.g., p.127) argue, the imprisonment of a parent is a traumatic experience and is laden with emotion for the children left behind. For example, Bocknek and colleagues (2009, p.324) describe paternal incarceration as an "ambiguous loss" for children, since there is typically a lack of family communication about the reasons surrounding

the father's absence. The authors interviewed school-aged children of incarcerated parents and found that many voiced feelings of anger and confusion over the loss and resultant family dynamics in the household.

These empirical findings from prior work in many ways resonate with frustration-aggression approaches, which argue that crime, and aggression in particular, is a reactive response to aversive stimuli (Dollard et al., 1939; Berkowitz, 1989). The underlying argument is that people who experience an event that causes pain or stress will lash out at others in response to these emotions. Further, Berkowitz (1989, p.71) argued that "any kind of negative affect, sadness as well as depression and agitated irritability, will produce aggressive inclinations and the primitive experience of anger before the higher order processing goes into operation." In other words, Berkowitz (1989) proposed that any negative emotion resulting from an aversive event is likely to lead to aggression and that this response is reactive, rather than instrumental.

Similarly, Agnew's general strain theory (GST; Agnew, 1992) posits that delinquency is often a means of coping with negative emotions. Agnew suggests that the removal of positively-valued stimuli leads to negative emotions (e.g., anger), which in turn increases the likelihood of delinquency. He further argues that strains resulting in anger are most conducive to crime; it reduces an individual's capacity for problem solving, creates a desire for revenge, and "energizes the individual for action" (Agnew, 2008, p.104). Finally, he also argues that strains resulting in anger are more likely to provoke violence and aggression, whereas feelings of envy are most relevant to property crime and fear to "escape attempts," such as running away from home (2008, p.105).[3]

Insofar as the incarceration of a father represents the removal of a positively-valued stimulus, which we think is a tenable assumption, GST predicts higher rates of delinquent

involvement among children with incarcerated fathers. Following Agnew, individuals who experience such strain are likely to experience negative emotions, such as anger and frustration, which in turn leads delinquency as a means of coping with these negative emotions. Consistent with strain and frustration-aggression approaches, we argue that paternal incarceration induces feelings that are related to certain types of crime (e.g., violence), but which should *not* be associated with instrumental crimes such as robbery and theft. This hypothesis essentially marries arguments that the incarceration of a parent is a traumatic event leading to feelings of anger and confusion (Hagan and Dinovitzer, 1999, p.127) and strain/frustration-aggression theories that posit a distinct association between emotions such as anger and subsequent aggression or violence. Recent work by Geller and colleagues (2009) offers some preliminary support for this proposition. They find that parental incarceration is associated with aggression among children, but that it is not associated with elevated levels of depressive or withdrawn behavior. Figure 1 summarizes the relationships between paternal incarceration and delinquency as detailed above.

[Figure 1 about here]

Analytic Strategy

As noted above, we endeavor to minimize the related problems of unobserved heterogeneity and omitted variable bias in our analysis while at the same time garnering a more complete understanding of why paternal incarceration might affect delinquency. We attempt to fulfill these objectives, in part, through the use of strategically chosen comparison groups and by assessing the effect of paternal incarceration on instrumental and expressive forms of delinquency. Each of these aspects of our analytic strategy warrants attention before we describe our data and variables in greater detail.

The association between paternal incarceration and adverse childhood outcomes could reflect pre-existing disadvantage or unobserved circumstances that caused both (1) a parent to be incarcerated and (2) child antisocial behavior. For example, a greater likelihood of delinquency in children of incarcerated fathers could be caused by the tendency for these children to grow up in similar environments as their fathers, or by a father's criminal behavior and poor parenting practices. Prior work has most often tried to minimize the possibility that an association between paternal incarceration and a children's problem behaviors is due to selection by controlling for characteristics of the child, and in some cases the father, which might be associated with poor parenting and child delinquency (Murray et al., 2012). Work in this area has employed multi-level models, OLS, and other regression models (tobit, logistic regression, propensity score matching) to estimate the effect of paternal incarceration on various aspects of child wellbeing while controlling for observable indicators that were asked in the respective surveys (Roettger et al., 2011; Roettger and Swisher, 2011; Wildeman, 2010; Wakefield and Wildeman, 2011; Graigie, 2011; Foster and Hagan, 2009). The degree of consistency in this body of work is impressive, yet covariate adjustment models are only as good as the variables available in the surveys, and more often than not these surveys do not have information on parenting behavior (Sampson, 2011). Others have accounted for unobservable heterogeneity by employing fixed effects models (Wildeman, 2010; Wakefield and Wildeman, 2011), although this method is limited because it only controls for time invariant characteristics of respondents, while parenting behavior and other potential confounding factors may change over time. In short, this area of inquiry warrants additional attention to selection bias (Johnson and Easterling 2012, p.342; Murray et al. 2009).

It is one thing to call for more attention to selection effects, yet it remains a tall order for even the grandest of surveys to include detailed measures of impulsivity, parenting and disciplinary practices, criminal history, and incarceration history of parents along with a battery of dispositional and relational measures for their young. The problem is identified and well known, but survey data simply do not include the full gamut of desired measures. In the absence of ideal data to firm up the evidentiary basis for establishing causality, we see utility in an alternative approach that has not yet been exploited in prior research on incarceration and its consequences for individuals or their kin.

We attempt to minimize the issue of unobserved heterogeneity by using a comparison group that we think complements prior work while at the same time adds an important dimension. We exploit the longitudinal nature of the data and use children whose fathers *will be* incarcerated as a strategic comparison group.[4] Specifically, we show the results of two models for each outcome variable, the first of which includes a set of dummy variables capturing whether a respondent's father is or has been incarcerated, with respondents whose fathers had not been incarcerated by that point in time as the reference category. We follow this with a second model that adds a new dummy variable to the model – fathers who were never incarcerated throughout the duration of the four waves of the Add Health survey. Adding the latter variable to the model changes the (omitted) reference group in an important way. The reference category now consists of respondents with fathers who were *not* incarcerated by wave 1, *but will be incarcerated* by the time of the wave IV interview. The latter category is a known quantity because it is asked during the most recent interview, and we think this category serves as an important comparison group because respondents with fathers who will soon be incarcerated (which is unknown to respondents at the time of the wave 1 interview) likely share

behavioral tendencies with previously or currently incarcerated fathers (e.g., a probable criminal record; parenting practices). Accordingly, we make use of father's future incarceration to create a more suitable comparison group than respondents whose parents had no history of incarceration, and respondents whose parents had an incarceration history which preceded their births. [5]

If we find that children with previously or currently incarcerated fathers differ significantly on our outcome variables from children with fathers who will later be incarcerated, then we can more confidently claim that paternal incarceration, and not unobserved factors associated with father's incarceration, has a causal effect on delinquency. However, if we find a significant effect in the first model, but the effect washes away when we change the reference category in the second model, then we can more confidently suggest that omitted variable bias is at play.

A second point requiring elaboration concerns the coding of our outcome variable. As described in more detail below, we divide our measure of delinquency into 'expressive' and 'instrumental' forms of conduct. This dichotomy has informed much prior research, particularly the literature on homicide (e.g., Maxfield, 1989; Decker, 1996), but is also applicable for non-lethal forms of crime. As noted by Decker (1996, p.428), "motives have been conceptualized as instrumental (in pursuit of gain) or expressive (an expression of outrage or emotion)." We cannot measure emotions directly in the Add Health data, but we suggest that much can be learned about the association between paternal incarceration and children's delinquency by examining the types of conduct that are, or are not, associated with a father's bout of incarceration. If the effects of incarceration on aggressive and violent behavior (expressive) are essentially identical to more instrumental types of offending, then we think this presents a

challenge to strain theory with its heavy emphasis on emotions as being tied to particular types of crime. But if sizeable differences in the coefficients are found, then we can more confidently implicate strain as a probable mechanism.

Data and Methods

The National Longitudinal Study of Adolescent Health (Add Health) is a nationally representative survey of students in grades 7-12 during the 1993-1994 academic year.[6] At wave I, data were collected from respondents as well as from parents and school administrators. Respondents were asked questions covering a wide array of topics including demographics, neighborhood characteristics, sexual behavior, family dynamics, delinquency, and health. Three follow-up interviews have been conducted, the first of which occurred approximately one year after the initial data collection. The current study primarily utilizes data from wave I, although data for our focal predictor variables are taken from wave IV, when respondents were between 24 and 34 years old. During the wave IV interview, respondents were asked detailed questions about parental incarceration, including questions about the timing. As such, we can discern whether a father's incarceration happened prior to or after our measures of delinquency.

Outcome Variables

During the wave I interview respondents were asked how many times during the past 12 months they had engaged in a variety of criminal activities. Response options for each item included never, one or two times, three or four times, and five or more times. We operationalize delinquency using two indexes that were constructed by summing responses across these items, where one or two times=1, three or four times=2 and five or more times=3. *Expressive*

delinquency includes crimes that are often recognized as 'acting out' or resulting from anger and frustration. These items include getting into fights, seriously harming someone, and deliberately damaging property ($\alpha = .73$).[7] Our second measure is *instrumental delinquency,* which consists of crimes that have the potential to result in material or monetary gain. These items include shoplifting, robbery, and selling drugs ($\alpha = .75$).[8]

Independent Variables

As of wave IV, 2,283 respondents (18.5% of the sample) indicated that their biological fathers had been incarcerated at some point during their lives. These respondents were asked at what age their biological fathers were admitted to and released from jail or prison. For respondents whose fathers were imprisoned more than once, they were asked to provide the age when their father first went to prison and the age when he was most recently released.

Based on this set of questions we classified a father's incarceration status as falling into one of seven categories. The first five categories are as follows: (1) never incarcerated during the entire span of the Add Health study; (2) incarcerated and released prior to the respondents' birth; (3) incarcerated and released prior to the wave I interview, but after the respondent was born; (4) incarcerated prior to the wave I interview and released afterwards (i.e., currently incarcerated at wave 1); or (5) never incarcerated by wave I, but *will be* incarcerated by the time of the wave IV interview.[9] Some cases could not be coded into one of these categories with absolute certainty, typically for one of three reasons: respondents could not recall their age at father's admission to or release from jail or prison; age at father's admission or release was the same as the respondent's age; or there were multiple incarcerations and we could not definitively determine, for instance, whether a father was incarcerated at wave I or had been released prior to

the wave and then re-incarcerated after the interview. We thus include a sixth category capturing (6) cases in which we can determine that the father was either released or currently incarcerated at wave 1 (but we can't distinguish any further), and a final category (7) consisting of those whose fathers had been incarcerated at some point, but the timing cannot be determined because of missing data. [10]

In some cases that initially appeared difficult to code (e.g., if age of father's admission was equal to the respondent's age), we were able to use other questions in the wave I interview to determine the proper category for the respondent. Namely, respondents were asked to list household members and were also asked about activities they had recently engaged in with their parents. If, for example, respondents indicated living with their biological fathers at the time of the wave I interview, we could use this information to determine that the father was not incarcerated at that time. [11]

Control Variables

We control for several demographic factors. Race is coded as a set of dummy variables with black, Hispanic, and an 'other non-white' indicator in the model and white omitted as the reference category. We also control for sex (male=1), age (continuous), and a quadratic term for age to capture nonlinearity. In addition, the paternal incarceration-delinquency link may be spurious due to socioeconomic status, which we measure using parental education. This indicator captures the highest educational attainment of parents living in a respondent's household, where 0=no high school, 1=high school graduate, 2=trade school, 3=some college, 4=college graduate, and 5=post-graduate education.

We also include a pair of relational measures. For instance, attachment to father is a scale ranging 0-5 that reflects the degree to which respondents "feel close to" their biological fathers. Respondents indicating that they did not know anything about their biological fathers were not asked this question, but were coded as 0 here. Additionally, for those respondents who had a deceased father at wave I, their attachments to father-figures, if they named any, were used instead.[12] Some models also control for a dichotomous measure of family disruption, for which a value of 1 signifies that the respondent lives in a single-parent household. Respondents living with two parent-figures, even if one or both are not biological, are considered to be living in two-parent homes by this definition.

Finally, we control for school performance and school attachment, each of which is associated with delinquency and could be affected by the incarceration of a father. School attachment is computed based on questions about the degree to which respondents felt close to other people at their school, felt happy at their school, and felt like they were a part of their school. Answers were reverse-coded and then summed, resulting in a scale ranging from 3-15 (15 indicates high levels of attachment). We also controlled for grade point average (GPA), which was calculated on a 4-point scale using respondent self-reports of grades for the previous semester. Respondents were asked to report their most recent grades for history, English, math, and science. GPA was calculated as the average of grades reported for each class.[13] Descriptive statistics for all variables are provided in Table 1.

[Table 1 about here]

Results

Each of our outcome variables are counts of criminal involvement. As such, the variables consist of integers greater than or equal to zero and the distributions are right skewed and entail

overdispersion. We thus employ a set of negative binomial regression models to estimate the effect of paternal incarceration on the two types of delinquency.

We first consider the association between paternal incarceration and our measure of instrumental crime. In Model 1 of Table 2 we include our slate of dummy variables that capture the incarceration of a father, with the reference category in this model consisting of all respondents who did not have a father incarcerated as of the wave I interview (i.e., the combined 'never' and 'future categories'). In line with prior work, the results reveal a significant association. Each coefficient is positive in direction, and only the 'incarcerated before birth' group is not significantly different than the reference category.

[Table 2 about here]

In Model 2 we change the equation in a small but meaningful way. Whereas the reference category in model 1 consisted of all respondents not experiencing a bout of paternal incarceration by wave 1, we split this group in model 2 so that respondents who *will* have a father incarcerated in the near future constitute the reference category. Again, our objective is to have a comparison group that is similar to the treatment group (i.e., father incarcerated) on a number of unobserved characteristics, but who had not yet experienced paternal incarceration. The results are striking. When changing the reference category in this manner none of the coefficients remain statistically significant at the $p<.05$ alpha level. Perhaps more noteworthy is the change in the magnitude of the coefficients between models. The coefficient for the 'currently incarcerated' category is reduced by a sizeable 33% and the 'released' category by 40%. When adding additional control variables in model 3 the conclusion remains the same – paternal incarceration has no significant effect on instrumental forms of juvenile crime when compared to respondents whose fathers will be incarcerated in the near future.[14]

Table 3 shows the coefficients for our measure of expressive crime, which is akin to measures of aggressiveness used in priori work (Aseltine et al., 2000). Similar to the results in Table 2, we see a significant effect of paternal incarceration on expressive forms of delinquency in Model 1, which again omits the 'never' and 'future' categories as the reference group. Each coefficient with the exception of 'incarcerated before birth' is positive in direction and the standard errors are far less than half the value of the coefficients. In Model 2 we again make one change to the model – we include the never category, and by doing so the respondents whose fathers will be incarcerated after wave I become the comparison group. The results are similar to those in Table 2 in that the coefficients are substantially reduced in magnitude. For instance, the coefficient for 'currently incarcerated' is reduced by 40% and the coefficient for the 'released' group is reduced by approximately 43%. These are by no means trivial reductions in the magnitudes of the coefficients, and we again stress that the comparison group still consists of respondents whose fathers had not been incarcerated as of the wave 1 survey, even if we know with the benefit of hindsight that they will be.

Yet there is an important difference in Model 2 of Table 2 when compared to the results for instrumental crimes. For expressive crimes, the effect of having a father 'incarcerated but released' remains statistically significant ($b = .260$; $p < .05$, two-tailed). Moreover, when we control for our slate of demographic and relational control variables we see practically no change in the coefficient for the 'incarcerated but released' group, even with a smaller N (because of missing data on controls). We thus see the effect of having a father incarcerated but released as having a robust association with expressive forms of delinquency, which we define as types of behavior that reflect 'acting out' or aggressiveness among the respondents. Yet our results point

to no association with instrumental crimes that entail a greater degree of calculation and generally have the objective of monetary gain.

[Table 3 about here]

Before discussing these results in greater detail and with reference to extant theory and research, we first address a potentially thorny issue with our methodology. We argued that using respondents whose fathers will be incarcerated in the future was an effective strategy for minimizing the problem of unobserved heterogeneity. Yet we must also acknowledge that there is some heterogeneity within this group, and one potentially consequential dimension on which individuals in this group vary is the timing of the paternal incarceration. For some respondents their father was incarcerated shortly after the wave I survey was administered, while for a few respondents their father's first incarceration occurred as much as thirteen years later. Therein sits a potential problem – those with a longer time until first paternal incarceration could differ in meaningful ways from respondents who will soon experience this event in the very near future. In Appendix A (Table A.1) we replicate Model 2 of Table 3 by restricting this comparison group to those with a father who will be incarcerated in less than ten years, and then less than five years (i.e., within four years). By reducing the numbers in this group we expect the standard errors to increase, but if our results are robust we should see consistency with respect to the coefficient and only modest changes in t-values. This is indeed the case. When restricting the analysis to respondents who will experience paternal incarceration within less than ten years the coefficient for 'incarcerated but released' changes from .260 (Table 3, Model 2) to .232 ($t= 2.10$; $p<.05$, two-tailed) and then to .250 when restricted to those who will experience the event in less than five years ($t=1.85$; $p<.10$, two-tailed). The key finding from Table 3 thus appears robust when restricting the comparison group to those experiencing paternal incarceration in the near future.[15]

Discussion

Our findings can be summarized rather succinctly. First, we find an association between paternal incarceration and instrumental forms of delinquency, but this association appears to be spurious. When we compare those with a father currently incarcerated or incarcerated since the respondent was born to those with a father who will be incarcerated in the future – a strategy we think helps account for omitted variable bias – the coefficient sizes are reduced considerably and were no longer statistically significant. This finding is particularly notable in light of recent work suggesting that parental incarceration is associated with theft (Murray, Loeber, and Pardini, 2012). We think the propensity score analysis employed by Murray and colleagues in their analysis of the Pittsburgh Youth Study was carefully constructed and may indeed represent a valid estimate of the effect. Yet our work clearly provides a counterargument. We note that when employing a covariate adjustment model in Table 2 – i.e., controlling for all variables in Model 3 but using the reference category from Model 1 – the effect of paternal incarceration is indeed significant (result not shown in the table but available upon request). Yet the effect disappears in our analysis when the 'future paternal incarceration' group is used as the reference category, and hence we think any observed association is unlikely to be causal. We do not claim to be the last word on this, but our results are clearly at odds with the findings from that research.

Second, the effect sizes for expressive forms of delinquency were also reduced, although the coefficient for respondents with a formerly incarcerated father remained positive and statistically significant for this outcome variable. We thus conclude that a robust correlation exists between those with a father incarcerated since birth but released by the wave I interview for expressive forms of delinquency. Finally, it appears that having a father incarcerated *but*

released is a significant determinant of expressive delinquency, but in neither table did the 'currently incarcerated category' prove to be robust. This pattern of findings has implications for answering the question of why paternal incarceration influences delinquency.

We see the findings as generally consistent with facets of strain theory, particularly strain theory's emphasis on emotional stress and acting out in the face of adverse life circumstances. The type of crime for which paternal incarceration appeared most salient was aggressive types of behavior, such as fighting and destroying property. Our work supports this argument, particularly when considered in tandem with work of a more theoretical bent that suggests a similar channel connecting paternal incarceration and crime (Hagan and Dinovitzer 199, e.g., p.127) and empirical research showing a robust association with aggressive behavior in children (Geller et al., 2009, 2012; Wakefield and Wildeman, 2011; Wildeman 2010).

We also draw attention to a finding that we did not anticipate and that may be an important topic for future work on this issue. The effect of paternal incarceration on expressive forms of delinquency was largely driven by respondents with a father who was incarcerated *and* had been released. We can only speculate as to the likely reason for this finding, but a viable explanation revolves around the problem of rekindling relationships when released. Research on marriage has long argued that separation, for instance because of military deployment, job related duties, or incarceration, often leads to family disruption such as divorce (Rindfuss and Stephen, 1990). A related body of family research also points to problems of reentry into the lives of family members following an absence (Hill 1988; see Nurse 2002 on incarcerated fathers). A similar dynamic may be at play for children, although this claim remains suggestive. Among the ways future research could test this hypothesis is by assessing measures of duration of father's incarceration, a task we could not accomplish with the Add Health data. [16]

We have highlighted some advantages of using the Add Health data, yet we must also acknowledge some limitations. One potential source of measurement error relates to recall problems. Respondents were asked to report about their father's incarceration, and some respondents may not vividly recall the time when the father was locked up. At present there is no sure way to assess whether there is indeed substantial recall error, although given that incarceration is a major life event, we would expect more accurate recall than, for instance, remembering if a father was present on a holiday several years ago. Further, respondents had the opportunity to simply not answer the question (some did, and were coded as such). Since many *did* answer the question, it may imply that they remembered with a fair degree of accuracy. Second, unlike other datasets (e.g., the Pittsburgh Youth Study) we did not have information on other types of contact with the criminal justice system. We also could not account for the criminal history of the father; indeed it was the omission of such variables that led us to consider the comparison group utilized in this research.

We close on a methodological note. Research using panel data frequently employs fixed effects models to account for unobserved characteristics that are stable over time, yet rarely do researchers exploit longitudinal data to create suitable comparison groups. In the present work we took advantage of the fact that many respondents did not have a father incarcerated by the first wave of data collection, but we learned through subsequent interviews that this experience will eventually occur. This enabled us to compare groups that experienced the treatment with those who likely share many similarities with respect to their family life, but had not yet experienced the treatment. This strategy accounted for a sizeable proportion of the association between paternal incarceration and juvenile delinquency. We see this technique as a complement to other models that maximize the use of observables (e.g., propensity score

models) or try to account for unobservables (e.g., fixed effects) to account for the thorny problem of omitted variable bias. This method may be particularly useful in cases in which random assignment is not possible and natural experiments are uncommon. For instance, this method would be well suited for research on the consequences of an individual's incarceration for civic engagement or employment. Although not a magic bullet for dealing with unobservable heterogeneity, we think the method proved useful here, and has many applications in related work.

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Endnotes

1 Roettger and Swisher (2011) also comment on the problem of possible selection effects and omitted variable issues, noting that their findings "reflect a mixture of the effects of a father's unobserved characteristics and incarceration, making causality impossible to determine" (p.1117).

2 Although differential association is often associated with peer effects, Sutherland (1947) also drew attention to the role of families, a point that has been emphasized in prior empirical work in this tradition (e.g., Heimer, 1997).

3 A related argument is suggested in earlier work by Agnew (1995, p.390), where he speculates that anger and frustration are likely associated with aggression but may not explain crimes of opportunity, such as property crime.

4 Related methods have been used in the study of incarceration and employment or earnings (Grogger, 1995; Raphael, 2007). Grogger, for instance, compares a group experiencing arrest with those who will later experience arrest and concludes that "most of the negative correlation between arrest records and labor market success stems from unobserved characteristics that jointly influence crime and labor market behavior" (p.70). This work is also similar to Wildeman's (2010) use of placebo regression, which also makes use of data collected after the measurement of the outcome variable.

5 We see future incarceration as a preferable comparison group to 'father incarcerated prior to birth' because in the latter case the treatment (i.e., paternal incarceration) has occurred for both groups, and only the timing has changed. In our case the treatment has not occurred at the time of the wave 1 interview in the Add Health data.

6 A full description of the Add Health dataset can be found at www.cpc.unc.edu/projects/addhealth/data.

7 These measures are quite similar to those categorized as 'aggressive' by Aseltine et al. (2000) in their analysis of anger and delinquency (see p.260). In line with our suggestion that these are crimes associated with frustration and anger, Aseltine et al. show that anger is associated with aggression, but not other forms of delinquency.

8 We use wave I delinquency measures because the response categories entail more precision than those at the wave II interview. At wave II, most expressive forms of delinquency are measured with the broad response categories of "once" or "more than once."

9 Respondents who had a father incarcerated by wave I did not differ significantly on any demographic characteristics from children who had fathers incarcerated in the future, with the exception of age. As might be expected, children whose fathers will be incarcerated in the future were 0.3 years younger on average (15.3 versus 15.6; see Appendix A.2).

10 The syntax for our coding of the paternal incarceration categories is available from the authors upon request.

11 For instance, if age of respondent was equal to age of father's first admission, but the release date was greater than the respondent's age *and* the biological father was living with the respondent at the time of the interview, then we could safely code this case as 'future' incarceration. Alternatively, some respondents indicated their ages when their fathers were released were equal to their ages at wave I. In some of these cases, a father could have been recently released by the time of the wave I interview, but he could also be *about to be* released. In these instances a father was considered 'released' if the respondent

indicated living with the biological father at wave I or having engaged in any activities (such as shopping, going to church, going to the movies, or playing a sport) with their biological father during the past four weeks.

12 We also estimated models that considered 'father attachment' to refer to the household father in cases where the biological father did not live with the respondent. The results were consistent across models.

13 GPA reflects the average of grades reported. For example, if a respondent reported grades for only two of these classes, the average of these two was calculated. If the respondent only reported one, this grade was considered the GPA.

14 Notably, these results indicate that blacks have a lower expected rate of instrumental delinquency compared to whites. Supplemental analyses reveal that this effect is driven by shoplifting and stealing items worth less than fifty dollars, for which white respondents reported higher levels.

15 We make a final note about our choice of estimator and supplementary analyses. Although negative binomial models are frequently employed in criminological research and the distributional properties of our dependent variables indicate that this is an appropriate estimator, it is also possible that the nature of our data violate the assumption that occurrences of events (offenses in this case) are independent of one another. For instance, this may be the case if events cluster in time or occur simultaneously (e.g., multiple offenses within a single criminal act). Also, our crime index summed a series of ordinal categories of offending. To check the robustness of our findings with an estimator that makes different assumptions, we replicated our findings with a series of continuation ratio logit models, an estimator that is appropriate for ordinal outcomes in which a given value is contingent on having experienced all prior values (i.e., one must have committed a fourth crime to commit a fifth). For instrumental offenses, the 'released' coefficient was positive and statistically significant when including the full slate of control variables, but the effect completely washed out when changing the reference category (a 53% reduction in the size of the coefficient; p-value changed from $p<.001$ to non-significant). The 'released' coefficient remained significant for expressive delinquency (as in Table 3) in the full model.

16 The data include the age of the child when the father was *first* admitted and *most recently* released from jail or prison. As such, duration cannot be calculated for respondents with more than one paternal incarceration, which constitutes a sizeable proportion of the respondents reporting one or more bouts of incarceration of their father.

Table 1. Descriptive Statistics

Variable	***Mean***	***S.D.***	***Min***	***Max***
Outcome Variables				
Instrumental Delinquency	1.079	2.257	0	18
Expressive Delinquency	1.223	1.937	0	12
Paternal Incarceration Variables				
Currently Incarcerated	.010	.102	0	1
Released after R's Birth	.066	.249	0	1
Released before R's Birth	.008	.091	0	1
Currently Incarcerated or Released	.019	.136	0	1
Incarcerated, but Cannot Place	.029	.169	0	1
Never Incarcerated	.844	.363	0	1
Control Variables				
Black	.215	.411	0	1
Hispanic	.170	.376	0	1
Other	.110	.313	0	1
Male	.495	.500	0	1
Respondent Age	15.657	1,746	11	21
Respondent Age^2	248.181	54.342	121	441
Father Attachment	3.482	1.682	0	5
Single Parent Household	.328	.470	0	1
Parent Education	2.411	1.686	0	5
School Attachment	11.200	2.615	3	15
GPA	2.999	.671	1	4

Table 2. Negative Binomial Regression of Instrumental Delinquency on Father's Incarceration

Variable	*Model 1*	*Model 2*	*Model 3*
Paternal Incarceration Variables			
Currently Incarcerated	.414* (.178)	.276 (.221)	-.180 (.260)
Released after R's Birth	.339** (.099)	.201 (.166)	.106 (.179)
Released before R's Birth	.378 (.244)	.240 (.276)	.203 (.280)
Currently Incarcerated or Released	.517** (.162)	.379 (.201)	-.049 (.211)
Incarcerated, but Cannot Place	.410** (.120)	.271 (.176)	-.093 (.180)
Never Incarcerated	---	-.142 (.146)	-.177 (.154)
Control Variables			
Black	---	---	-.218 (.088)
Hispanic	---	---	.279** (.088)
Other	---	---	.317** (.095)
Male	---	---	.520** (.056)
Respondent Age	---	---	.942** (.361)
Respondent Age^2	---	---	-.032** (.012)
Father Attachment	---	---	-.108** (.018)
Single Parent Household	---	---	.222** (.054)
Parent Education	---	---	.064** (.017)
School Attachment	---	---	-.101** (.009)
GPA	---	---	-.350** (.044)
Constant	-.040 (.036)	.098 (.142)	-4.754 (2.764)
N	13,644	13,644	12,195
Log likelihood	-17359.02	-17,358.14	-14,983.09

**p<.01, *p<.05

Table 3. Negative Binomial Regression of Expressive Delinquency on Father's Incarceration

Variable	*Model 1*	*Model 2*	*Model 3*
Paternal Incarceration Variables			
Currently Incarcerated	.488** (.18)	.293 (.200)	-.020 (.16)
Released after R's Birth	.455** (.069)	.260* (.105)	.259* (.108)
Released before R's Birth	.179 (.152)	-.017 (.174)	.132 (.161)
Currently Incarcerated or Released	.459** (.122)	.264 (.149)	-.079 (.133)
Incarcerated, but Cannot Place	.433** (.095)	.237 (.130)	-.186 (.122)
Never Incarcerated	---	-.201* (.094)	-.083 (.093)
Control Variables			
Black	---	---	.183** (.058)
Hispanic	---	---	.240** (.051)
Other	---	---	.157* (.070)
Male	---	---	.769** (.038)
Respondent Age	---	---	.050 (.162)
Respondent Age^2	---	---	-.005 (.005)
Father Attachment	---	---	-.076** (.013)
Single Parent Household	---	---	.066** (.047)
Parent Education	---	---	-.028** (.011)
School Attachment	---	---	-.064** (.008)
GPA	---	---	-.342** (.027)
Constant	.098** (.027)	.294** (.091)	2.016 (1.22)
N	13,650	13,650	12,198
Log likelihood	-19,963.75	-19,957.08	-16,888.20

**p<.01, *p<.05

Appendix A

Table A1. Negative Binomial Regression of Expressive Delinquency on Father's Incarceration

Variable	***Model 1 Reference= Father Incarcerated<10 years after wave 1***	***Model 2 Reference=Father Incarcerated <5 years after wave I***
Paternal Incarceration Variables		
Currently Incarcerated	.264 (.206)	.284 (.228)
Released after R's Birth	.232* (.110)	.25† (.135)
Released before R's Birth	-.045 (.175)	-.026 (.188)
Currently Incarcerated or Released	.235 (.156)	.254 (.191)
Incarcerated, but Cannot Place	.209 (.133)	.228 (.158)
Never Incarcerated	-.230* (.096)	-.211 (.133)
Constant	.322** (.094)	.303* (.132)
N	13,575	13,480
Log Likelihood	-19,864.64	-19,693.86

**p<.01, *p<.05, †p<.1

Table A2: T-tests for Future Incarceration and 'Currently or Released' Categories

Variable	Mean for 'Currently Incarcerated / Released'	Mean for 'Future Incarceration'	T-Value
Black	.28	.25	0.849
Hispanic	.19	.17	1.1067
Other race	.08	.10	-1.719
Age	15.57	15.28	2.805*
Male	.48	.47	0.267
Parent Education	1.86	1.88	-0.278

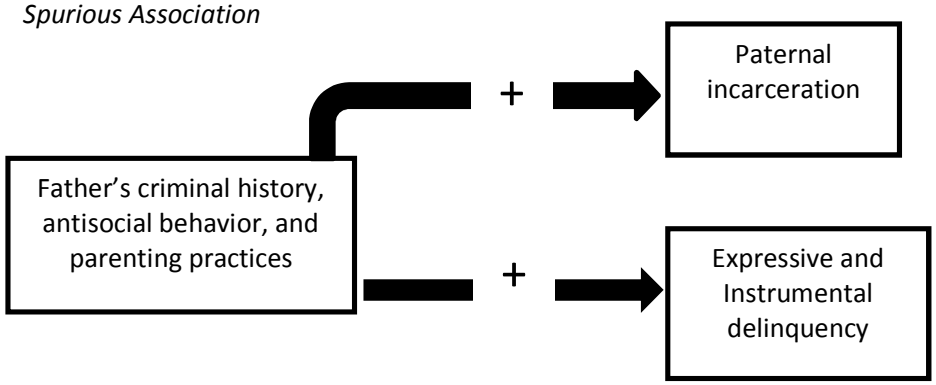
*p<.05 (two-tailed)

N=1,118 currently incarcerated or released and N=335 for the 'future incarceration' category.

Figure 1: Pathways Linking Paternal Incarceration and Child Delinquency

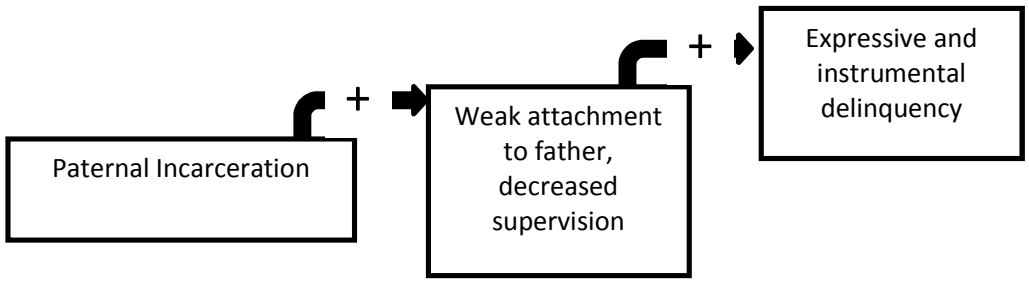
A. Protective Association

B. Spurious Association



C. Causal, Indirect Association

i. Attachment and Separation



ii. Strain