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Beyond the Classroom: The Intergenerational Effect of Incarceration on Children's Academic and Nonacademic School-Related Outcomes in High School

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Abstract

The author uses strategic comparison regression and the Longitudinal Study of Adolescent to Adult Health (n = 11,767) to explore the effect of parental incarceration on academic and nonacademic outcomes in high school. This method compares youth whose parents were incarcerated before the outcomes are measured with those whose parents will be incarcerated after. The author examines most recent grades and a range of nonacademic outcomes, such as truancy, involvement in school activities, and suspension. Results indicate that the associations between parental incarceration and grades are largely accounted for by selection, but associations between parental incarceration and nonacademic processes persist. Maternal incarceration holds particular importance for behavioral outcomes (fighting and truancy), and paternal incarceration holds particular importance for behavioral, connectedness, and disciplinary outcomes. Researchers examining the intergenerational consequences of incarceration should examine school contexts beyond the classroom and explore the pathways through which this disadvantage occurs.

Keywords

parental incarceration; strategic comparison regression; addressing selection; youth; educational outcomes; Add Health

Parental incarceration is now a common event, with more than 5 million youth having incarcerated or formerly incarcerated resident parents (Murphy and Cooper 2015). This risk is particularly acute for black children, with 1 in 4 black children born in 1990 experiencing parental incarceration compared with 1 in 25 white children (Wildeman 2009). Parental incarceration is associated with an increased risk for contact with child protective services (Johnson and Waldfogel 2002), experiencing housing insecurity (Wildeman 2014), future criminal justice involvement (Lee, Fang, and Luo 2016; Murray and Farrington 2005;

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Supplemental Material

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Murray, Loeber, and Pardini 2012; Wildeman and Andersen 2017), stigma (Braman 2004; Comfort 2007), and experiencing health issues (Dallaire, Ciccone, and Wilson 2010; Lee, Fang, and Luo 2013; Turney 2014; Wildeman, Goldman, and Turney 2018; Wildeman et al. 2017). A comprehensive body of literature has found that parental incarceration is also associated with children's educational outcomes, in terms of both academic processes, such as reductions in academic performance (Haskins 2014, 2016; Turney and Haskins 2014) and highest grade attainment (Braman 2004; Foster and Hagan 2009; Hagan and Foster 2012; Miller and Barns 2015), as well as nonacademic school-related processes such as increased problem behaviors (Geller et al. 2012; Haskins 2015; Turney and Wildeman 2015) .

Despite the comprehensive body of literature examining the academic and nonacademic school-related effects of parental incarceration, several core gaps remain. First, selection effects are a consistent issue when examining the consequences of parental incarceration. It is possible that families in which a parent is incarcerated have unobserved preexisting disadvantage that may contribute to both parental incarceration and poor education-related outcomes. In recent years scholars have used rigorous methods (e.g., propensity score matching and fixed effects) to adjust for unobserved variation. I reviewed articles published in journals from the disciplines of sociology, psychology, and human development between 2000 and 2018 and found that about half accounted for selection. I found 25 articles examining the effect of parental incarceration on outcomes directly related to children's education, and 13 accounted for selection. The studies that did adjust for selection are reviewed in Figure 1.

Much of the research in this area that does address selection either relies heavily on the Fragile Families data set or looks exclusively at maternal incarceration using location-specific linked administrative data, as evidenced by Figure 1. Studies using data from Fragile Families have long represented the most rigorous research in this area, mainly because of the higher prevalence of parental incarceration and the richness of the data. However, research based on Fragile Families still has several limitations. First, it is an exclusively urban sample. The Vera Institute found that growth in rural jails has driven much of the increase in jail incarceration rates since the 1970s and that the increase in rural jail growth is contributing to the changing demographics of incarceration broadly (Kang-Brown and Subramanian 2017). Focusing specifically on urban populations may miss this changing demographic and limit the generalizability of findings. Second, the Fragile Families data has a particularly high attrition rate, further threatening the generalizability of findings. The most recent wave of data, collected when the youth were 15 years old, has completion rates of 73 percent for the primary caregiver survey, 70 percent for the youth survey, and 22 percent for the home visit assessments compared with baseline (Bendheim-Thoman Center for Research on Child Wellbeing, Princeton University 2018).

Given the immense financial and time costs required to conduct another rich, comprehensive, and longitudinal study in which rigorous methods could be used, researchers need to diversify their methodological tools. I propose expanding the use of a relatively novel analytic technique for this area of research—a strategic comparison regression exploiting variation in the timing of incarceration—to assess the impact of parental

incarceration on academic and nonacademic school-related processes that occur in high school using the National Longitudinal Study of Adolescent Health (Add Health) data set.

The method used in this study is similar to that developed by Porter and King (2015), but it is applied to new outcomes. Strategic comparison regression allows researchers to account for unobserved heterogeneity with a larger variety of data sets by exploiting exogenous variation in timing to create a strategic comparison group. In a strategic comparison regression, those who have experienced parental incarceration before the outcomes are measured are compared with those who will experience parental incarceration after the outcomes are measured (see Figure 2 for timeline). Comparing families in which the timing of parental incarceration varies limits omitted variable bias; families that have experienced and will experience parental incarceration are considerably more similar on a variety of measured and unmeasured domains than families that have experienced incarceration and those that never will. Although other research has used Add Health to examine the effects of parental incarceration (Lee et al. 2013; Porter and King 2015; Roettger and Boardman 2012; Roettger and Swisher 2011), and some research has even explored education as an outcome (Foster and Hagan 2007), these studies largely did not adjust for selection in this way. This study builds on this foundation by both using a design that adjusts for selection and using the Add Health data.

I use both a traditional and a strategic comparison regression to estimate the effect of parental incarceration on a variety of youth academic and nonacademic school-related processes. I show both models to indicate the change in the association by using a strategic comparison regression. First I estimate the effect of parental incarceration on the probability of earning a B or better in their most recent English and mathematics courses. Second, I consider the effect of parental incarceration on a variety of nonacademic school-related processes for youth that are associated with long-term academic success: suspension, fighting in school, skipping school without an excused absence, reporting involvement in no school activities, and feeling like a part of the school.

Background

Parental incarceration is a common experience in the life course of children, and the risk for parental incarceration is unequally distributed (Wildeman 2009). One in four black children and one in two black children born to high school dropouts in 1990 had imprisoned parents by age 14 (Wildeman 2009). Between 1991 and 2007, the number of imprisoned parents of minor children increased by 79 percent, and the number of minor children with mothers in prison doubled (Glaze and Maruschak 2010). Altogether, 7 percent of U.S. children have lived with parents who were incarcerated (Murphy and Cooper 2015). In light of the large and dramatically unequal risk for parental incarceration, it is important to examine how parental incarceration affects the long-term success and well-being of children.

Linking Parental Incarceration to Education.

Parental incarceration can affect both the academic and nonacademic school-related schooling experiences of youth in various ways. As a result of parental incarceration, youth may experience stigma and social isolation (Chui 2016; Gabel and Shindledecker 1993;

Geller et al. 2010; Murray and Farrington 2008; Poehlmann 2005b) and economic strain (Geller et al. 2009; Pager 2007; Schwartz-Soicher, Geller, and Garfinkel 2011; Wildeman and Muller 2012). Parental incarceration is associated with difficulty with socialization and peer isolation through trauma and increased responsibilities at home (Foster and Hagan 2007). Peer social interactions are important for motivation (Ryan 2003) and stigma negatively affects both peer interactions and teachers' expectations of students (Dallaire et al. 2010). Parent incarceration also causes economic strain during the period of incarceration and has long-term economic impacts. Children's educational experiences may be shaped by economic strain as a result of parental incarceration, as these youth face unmet material needs, inadequate access to food (Hagan and Foster 2015; Turney 2015) and residential instability at higher rates than their counterparters with nonincarcerated parents (Geller et al. 2009). More than half of parents in state prisons were the primary financial providers for their children prior to incarceration, and of those who were not primary providers 64 percent were still earning income in the month prior to arrest (Glaze and Maruschak 2010). Children from homes with lower incomes struggle more in school than their wealthier counterparts, and residential instability is associated with academic difficulty (Cavanagh and Fomby 2011). Changing schools can interrupt student learning and distractions from food insecurity and other issues facing lower income families can decrease attainment (Alaimo, Olson, and Frongillo 2001).

Importance of Academic and Nonacademic School-Related Processes.

A substantial body of research examines the effect of parental incarceration on educational attainment and experiences. Broadly, the existing literature examines the effect of parental incarceration on academic processes (such as grades and scores on standardized tests) and nonacademic school-related processes (such as discipline, truancy, and peer connectedness).

Academic Processes.

Academic capability and achievement are important determinants of long-term educational attainment (Bowen, Kurzweil, and Tobin 2005). In fact, academic performance is among the top three factors that improve college attendance and completion (Burzichelli, Mackey, and Bausmith 2011). When examining highest degree completion, those with incarcerated parents are less likely to complete high school and less likely to complete college (Braman 2004; Foster and Hagan 2009; Hagan and Foster 2012; Miller and Barns 2015). Additionally, those who experienced paternal incarceration are less likely to report being satisfied with their level of education (Miller and Barns 2015).

Paternal incarceration has a negative association with school readiness in children at age five (Haskins 2014), and lower cognitive skills in middle childhood (Haskins 2016). Children of incarcerated fathers are also more likely to be placed in special education classrooms (Haskins 2014). However, a study by Turney (2017) showed that the association between paternal incarceration and cognitive skills during childhood was small.

Research examining maternal incarceration has found more limited effects. A study by Cho (2009a) showed that maternal incarceration had no statistically significant effect on standardized test scores at age 12, and children whose mothers were imprisoned were less

likely than their matched counterparts to repeat a grade (Cho 2009b). However, a more recent study demonstrated that maternal incarceration increased grade retention and the risk for dropout (Brown 2016) . Despite the lower prevalence of and mixed results of studies examining the effect of maternal incarceration on academic outcomes, research in others contexts suggests that maternal incarceration yields chronic stress and strain for families (Turney and Wildeman 2018), and that children of incarcerated mothers face risk across multiple contextual levels (Poehlmann 2005a). Both chronic stress and increased risks across contexts (including the home and family environment) are potential pathways that could affect children's educational experiences.

Sociologists have examined the effect of parental incarceration on cognitive skills at various time periods from early childhood through adulthood, finding evidence that the consequences of parental, particularly paternal, incarceration on youth's cognition may grow over time (Turney 2017). Studies examining the effect of parental incarceration on early childhood have shown smaller or less significant effects, whereas studies examining middle childhood through adolescences have demonstrated larger effect sizes and more consistent significant effects (Haskins, Amorim, and Mingo 2018).

Nonacademic School-Related Processes.

I also examine nonacademic school-related processes, which have been shown to have deleterious consequences for educational outcomes. Nonacademic school-related processes may be particularly important in light of the role stigma may play in student-teacher interactions (Dallaire et al. 2010), as well as peer interactions. Fighting in school is associated with antisocial behavior, risk for injury or mortality, and disruptions in academic trajectories and work (Rudatsikira, Muula, and Siziya 2008). Truancy and unexcused absence are highly predictive of school dropout and associated with lower educational aspirations (Burzichelli et al. 2011). A study designed to predict educational attainment using longitudinal data showed that the strongest predictors included truancy and a youth's own expectations, which are vulnerable to feeling included at school and being involved (Ou and Reynolds 2008). Throughout the educational trajectory, school connectedness is associated with achievement outcomes, health and development, and continued education (Tomek et al. 2017). Last, exclusionary discipline (such as suspension) is associated with an increased probability of behavioral problems, decreased educational attainment, and increased probability of criminal justice contact (Anderson and Ritter 2017; Raffaele Mendez 2003).

One study found that parental incarceration was associated with learning disabilities, developmental delays, behavioral problems, and attention deficit hyperactivity disorder (Turney 2014). Children of incarcerated parents are also more likely to face disciplinary issues (Haskins et al. 2018). Robust evidence supports that maternal incarceration increases the odds of dropout, even after controlling for child and family demographic characteristics and the effects of maternal crime and arrest (Cho 2010, 2011). Additionally, paternal incarceration is associated with increased behavior issues, including internalizing and externalizing behaviors, antisocial behaviors, and early signs of delinquency (Haskins 2015). A meta-analysis examining the effect of parental incarceration on health, well-being, and

education revealed robust evidence of an increase in antisocial behavior (of about 10 percent compared with their peers who have not experienced parental incarceration) but little causal evidence supporting an increase in mental health issues or drug use (Murray, Farrington, and Sekol 2012).

Obstacles to Causal Inference in the Study of Parental Incarceration.

There are several obstacles to causal inference in the study of parental incarceration, including the low prevalence and considerable selection effects (Murray, Farrington, et al. 2012; Wildeman and Turney 2014; Wildeman, Wakefield, and Turney 2013). To address these issues, researchers have used fixed-effect models or matching models to reduce the effect of unobserved heterogeneity using, in most part, the Fragile Families and Child Wellbeing Study because of the higher prevalence of parental incarceration. Research published in *Socius* has shown that propensity score matching with the Fragile Families data set is highly sensitive to researcher decisions (Copp et al. 2018). The authors argued that researchers of parental incarceration need to develop and use new identification strategies that rely on different assumptions, cautioning against basing the conclusions of a body of research on mostly one method with sensitivity to researcher choices and difficult to meet assumptions (Copp et al. 2018).

Several researchers have similarly chosen to use a strategic comparison of groups to try to minimize the role of unobserved heterogeneity in this area of research. One approach that has been used is comparing the children of parents who were incarcerated for short periods of time (e.g., spending a night or two in a county jail or experiencing pretrial conviction) with those whose parents were incarcerated for a longer time (such as going to prison) (Cho 2009a, 2009b). However, the mere process of conviction or short-term incarceration is still stigmatizing and may cause disruptions to family structure and caregiving. Another comparison group that has been used is children whose parents have died or been separated for other reasons, such as death or hospitalization (Murray and Farrington 2005, 2008). This comparison is helpful in isolating whether the effects of parental incarceration are truly attributable to something unique about incarceration and not really caused by other factors associated with parental incarceration, in the above cases parental separation. However, the question of the effect of parental incarceration on children's education remains and is still complicated by selection issues. Following the lines of Porter and King (2015), who explored how paternal incarceration affects children's delinquency by comparing children whose parents have been incarcerated with those whose parents will be incarcerated, in this study I apply their strategic comparison group to another important outcome: the academic and nonacademic school-based experiences of youth in schools.

In this study I address unobserved heterogeneity by comparing youth who have experienced parental incarceration with those who will experience it. The objective of this study is to assess the relative effects of parental incarceration on the academic and nonacademic school-related processes that occur in schools. Identifying where in the schooling process parental incarceration has an effect can inform future research with the aim of identifying how this occurs.

Methods

Add Health is a large, nationally representative longitudinal study initiated in 1994 aimed at exploring how social environments and behaviors in adolescence (such as families, friendships, communities, schools, and neighborhoods) are linked with health and success in young adulthood. Add Health is an ongoing study, with the first data collection (wave 1) occurring in the 1994–1995 school year from youth in grades 7 through 12. Through stratified sampling, 80 high schools were given in-school surveys (n = 90,118), with approximately one quarter of the originally surveyed students being selected for the longitudinal sample (n = 20,745). Add Health has a low attrition rate through emerging adulthood; at wave IV nearly 93 percent of the longitudinal sample could be located, and more than 80 percent were interviewed (Carolina Population Center n.d.). This study focuses specifically on the longitudinal sample and uses data collected between wave I and wave IV, following more than 15,000 participants until 24 to 32 years of age. Wave IV was collected in 2008, and the retention rate to wave IV is just above 75 percent (n = 15,701). Wave IV collected retrospective data on parental incarceration and the timing of parental incarceration from the respondents; as a result, only participants who responded in waves I, III, and IV and had complete data on the independent variable are included in my analytic sample (n = 11,767). There are differing response rates for the dependent variables (as seen later in Tables 2 and 3). Data from wave II are not used in this study. This study will seek to evaluate the effects of parental incarceration before high school on academic and nonacademic school-related processes. This project uses an existing data set and was approved by an institutional review board.

Independent Variable: Parental Incarceration

In wave IV, participants reported whether their parents had ever been incarcerated, how many times they had been incarcerated, and at what age their parents were first incarcerated. Using this information, I operationalized parental incarceration by using a set of six dichotomous variables focused on exploiting exogenous variation in timing to create a strategic comparison group. All six variables are used in the study. Table 1 in the Supplementary Materials contains the proportions for these various groups. First, I created an indicator of prebirth parental incarceration. Second, I created an indicator for cases in which the timing of parental incarceration is unknown. Third, I created an indicator marking those whose parents have never been incarcerated, referred to as the “nevers.” Then I created three indicators to reflect if first parental incarceration occurred during the respondent’s life—one indicating parental incarceration prior to high school age, one indicating parental incarceration after high school age, and one indicating those whose parents were incarcerated during high school. I refer to those whose parents were incarcerated after high school as the “futures” because they have not experienced the event at the time of data collection for the outcomes variables but will experience parental incarceration in the future (see Figure 2 for timeline of data collection).

It is important to note that because of the retrospective nature of the reporting of parental incarceration and the timing of parental incarceration, there is likely to be some under- or misreporting. This is particularly true for early-life parental incarceration, when the

respondent is less likely to remember the occurrence and will need to rely on others' retelling. Using a series of dichotomous variables instead of treating the age of parental incarceration as a continuous variable reduces the effect of mismeasurement. Participants will be more likely to misreport the timing of parental incarceration that occurs early in life, but by adolescence, participants will be able to recall parental incarceration from their own memories (Bryan 2017) . Most adults are able to recall specific events starting at around the age of four (Rubin 1982).

Dependent Variables: School Outcomes

In this study I examine a variety of outcomes that serve as proxies for academic and nonacademic school-related processes that occur during high school. First, I examine the probability that students reported earning a B or better in English or mathematics in their most recent semester. I consider a B or better in these primary subjects because a B is considered "college ready." By examining recent grade, instead of a cumulative measure such as grade point average, differences that might result for the varying ages of participants when they were surveyed are limited. Additional analyses (not included here) explored reporting A, B, C, or D or lower for most recent grade, finding no difference in significance pattern. Second, I examine the probability that students reported being suspended, being in a fight during school, skipping school without an excused absence, reporting that they are involved in no school activities, and if they report feeling like they are a part of the school. All of these outcomes examine the probability of reporting the event during high school specifically.

Covariates

All covariates are measured at wave I. Using a strategic comparison regression should limit differences between "treatment" and "control" groups, as it is plausible that the economic, social, and family lives are similar between families in which only the timing of parental incarceration is different (Porter and King 2015). However, differences associated with the timing of parental incarceration may exist, so I include both youth covariates and parent covariates. Youth covariates consist of gender, race (white, black, Hispanic, other nonwhite), age, and household income (measured in thousands of dollars). Parent covariates consist of parent's age, parent's education (less than high school, high school, post–high school), parent's race (white, black, Hispanic, and other nonwhite), and marital status. Marital status is measured using three dichotomous variables—single, married, and previously married (including those who are divorced, widowed, or separated). To address missing data, I used chained multiple imputation for all control variables. Multiple imputation creates less biased estimates than alternative methods for dealing with missingness in the data, such as mean imputation, without the systemic loss of participants like listwise deletion (Allison 2001). Many of these controls, such as income, may be affected by parental incarceration, making them mechanisms as well. This is particularly true because the control variables are collected at wave I and not at the time of the youth's birth. Therefore, I may be underestimating the effect of parental incarceration by overcontrolling.

Analytic Strategy

I use traditional linear regression models and linear probability models with a strategic comparison group to limit (although not eliminate) the effect of unobserved heterogeneity. The association between parental incarceration and outcomes could be due to preexisting disadvantage or unobserved characteristics that account for both parental incarceration and academic difficulties. Traditionally, to limit these threats statistical controls are used to try to account for family and youth characteristics (such as controlling for family income). Although this method has been useful in identifying associations for future research, it provides little ability to rule out the influence of omitted variable bias. This study will use a less used method that exploits longitudinal data to create a more compelling comparison group, developed in part by Porter and King (2015). This method is also similar to that used by Western (2002) to examine wage mobility, but it has yet to be applied to academic outcomes. I compare students whose parents were incarcerated before high school with those whose parents will be incarcerated after high school by changing the comparison group for parental incarceration prior to age 13 between model 1 and model 2.

Although comparing families in which only the timing of incarceration is different certainly limits selection effects, this threat should still not be overlooked. It is possible that families in which parental incarceration occurs prior to high school and families in which parental incarceration occurs after high school are still different on an unobserved dimension, but they are likely considerably more similar than families in which parental incarceration never occurs. Using a strategic comparison group of only "futures" can significantly reduce bias in causal estimation compared with traditional statistical controls alone (Bryan 2017; Porter and King 2015).

For each outcome, model 1 uses a traditional regression comparison group ("futures" and "nevers" combined), whereas model 2 uses the "futures" comparison group only. All models include youth and parent covariates, and the model equations follow. Tables 2 and 3 present the coefficient for $\beta_{pre\text{–}13P.I.}$ from these models.

$$Model1: y_{outcome} = \beta_{pre-13P.I.} + \beta_{pre-birthP.I.} + \beta_{13-18P.I.} + \beta_{timing\ unknownP.I.} + \beta_{youth\ covariates} + \beta_{parent\ covariates} + e$$

$$Model2: y_{outcome} = \beta_{pre-13P.I.} + \beta_{pre-birthP.I.} + \beta_{13-18P.I.} + \beta_{timing\ unknownP.I.} + \beta_{neversP.I.} + \beta_{youth\ covariates} + \beta_{parent\ covariates} + e$$

Although changing the comparison group from "nevers" and "futures" to only "futures" does limit the sample size of the group, I can use comparison between the coefficients in models 1 and 2 to examine if the loss of significance is due to a reduced comparison group size or the reduction of omitted variable bias (Porter and King 2015). If a coefficient were to lose significance but retain a similar value, the loss of significance between models might be a result of the smaller comparison group. However, if there is a steep change in coefficient value and a loss in significance, we can conclude that the loss of significance is due to the

reduction of unobserved heterogeneity, not the decrease in sample size (Porter and King 2015). Grand weights were used.

Findings

Nearly 18 percent of the sample experienced parental incarceration, with about 16 percent experiencing paternal incarceration and nearly 4 percent experiencing maternal incarceration. Descriptive analyses (not shown) indicate that nonwhite participants are more likely to experience parental incarceration (21 percent) than white participants (13 percent). Participants who have experienced parental incarceration experienced lower rates of earning B's or better in English and mathematics. For example, nearly 61 percent of those whose parents have been incarcerated reported earning a B or better in English compared with nearly 71 percent of those who have not experienced parental incarceration. Those who have experienced parental incarceration also experienced higher rates of problem behaviors and lack of school attachment. For example, of those who have experienced parental incarceration, 20 percent reported being involved in no school activities, compared with 13 percent of those whose parents have not been incarcerated.

Next, I examined the similarity between the intervention group (parental incarceration prior to high school) and the traditional control group (those who never experience parental incarceration) and the strategic comparison control group (those who will be incarcerated after the outcomes are measured). This analysis is shown in Table 1. The means for the three groups are in columns 1 to 3, and the p values of the joint orthogonality tests examining if the group means are statistically different are in columns 4 and 5. If the p value is higher than .05, the means are not statistically significantly different, and if the p value is lower than .05, the means are statistically significantly different. The pre-high school parental incarceration group is more similar to the future comparison group, as seen by the high p values in column 4, than to the never parental incarceration comparison group, as seen by the low p values in column 5. Overall, this analysis supports the assumption of this method that those who have and will experience parental incarceration are considerably more similar than those that have and never will. Next, I examined the association between paternal and maternal incarceration and academic and nonacademic school-based processes using inferential methods.

Academic Processes

I examined the effect of parental incarceration on most recent grades in English and mathematics. Paternal incarceration is associated with a 10 percentage point lower probability of getting a B or better in English ($p < .000$) and a 6 percentage point lower probability of reporting a B or better in mathematics ($p < .000$), as seen in model 1 in Table 2. When using a strategic comparison regression, the relationship between paternal incarceration and reduced academic performance in English remains ($b = -.098$, $p = .04$), and the relationship between paternal incarceration and reduced academic performance in mathematics is no longer significant.

The association between maternal incarceration and the probability of reporting a B or better in English is nonsignificant, and maternal incarceration is associated with a 10 percentage

point lower probability of reporting a B or better in mathematics ($p = .009$), as seen in model 1 in Table 2. When using the strategic comparison regression (model 2 in Table 2), the relationship between maternal incarceration and the probability of reporting a B or better in English remains insignificant, and the association between maternal incarceration and the probability of reporting a B or better in math becomes nonsignificant.

Nonacademic School-Related Processes

Using a traditional regression, paternal incarceration is significantly associated with higher probabilities of being suspended during high school ($b = .0761$, $p < .000$), being expelled during high school ($b = .019$, $p < .000$), being in a fight during high school ($b = .139$, $p < .000$), skipping school without an excused absence ($b = .077$, $p < .000$), reporting involvement in no school activities ($b = .078$, $p < .000$), and reporting feeling like a part of school ($b = -0.080$, $p = .001$) (for full results, see Table 3, model 1). When using a strategic comparison regression, the associations between paternal incarceration and nonacademic school-based processes persist, as seen in model 2 in Table 3. Experiencing paternal incarceration is associated with a 7 percentage point increase in the probability of being suspended ($p = .013$), a 2 percentage point increase in the probability of reporting expulsion ($p = .032$), a nearly 10 percentage point increase in the probability of reporting fighting during school ($p = .042$), a 7 percentage point increase in the probability of skipping school, a 7 percentage point larger probability of reporting no school activity involvement ($p = .037$), and a 26 percentage point reduction in the probability of reporting that the participant feels like a part of the school ($p = .001$).

Maternal incarceration is significantly associated with increased probabilities of being suspended ($b = .073$, $p = .002$), being expelled ($b = .018$, $p = .061$), being in a fight at school (b = .162, $p = .000$), and skipping school ($b = .114$, $p = .002$) using a traditional regression. Maternal incarceration is not significantly associated with reporting involvement in school activities or the probability of reporting feeling like a part of school. When using a strategic comparison regression in model 2, the relationships between maternal incarceration and suspension, expulsion, reporting no involvement in school activities, and feeling like a part of school are no longer significant. However, the association between maternal incarceration and reporting involvement in a fight ($b = .170$, $p = .31$) and skipping school without an excused absence ($b = .146$, $p = .029$) become larger.

Discussion

Although parental incarceration is largely associated with decreased probabilities of earning B's or better in English and mathematics, there are limited effects when using a strategic comparison regression, indicating that the associations may be attributable to selection effects. There are persistent effects of parental incarceration on nonacademic school-related processes, especially for paternal incarceration, which may affect long-term academic achievement and highest degree completion.

This study extends research examining the effect of parental incarceration on education-related outcomes in a few key ways: it uses a relatively novel method for controlling for unobserved heterogeneity in this area that can be used with a larger variety of data sources, it

reveals significantly different patterns between maternal and paternal incarceration, and it confirms that nonacademic school-related processes were significantly associated with parental incarceration even after controlling for unobserved variation. As previously argued, most research in this area that adjusts for selection uses one data set: the Fragile Families data set. This is due to the level of richness in these data, which allows rigorous research designs. Alternatively, this study demonstrates that strategic comparison regression can be effectively used to assess the effects of parental incarceration using other nationally representative existing data sets. The analysis in Table 1 supports the underlying assumption that those who have and will experience parental incarceration are more similar than those that have and never will on a variety of measured domains. The use of strategic comparison regression with a wider variety of data sets can strengthen the body of literature examining the effects of parental incarceration by allowing researchers to ask questions that extend beyond what is possible with the Fragile Families data set and by creating the opportunity to demonstrate generalizability of findings using less urban samples. Along with Porter and King (2015), I recommend that researchers examining parental incarceration add this method to their toolkits.

A key substantive contribution of this study is the finding that paternal incarceration has more consistent effects on nonacademic school-based outcomes and that selection may play a more important role in estimating the effects of maternal incarceration than paternal incarceration. When examining Table 3, the significance pattern between model 1 and model 2 is consistent for paternal incarceration, yet when examining maternal incarceration, some of the significant effects in model 1 are no longer significant in model 2. An additional important difference between maternal and paternal incarceration is that the association between maternal incarceration and connectedness outcomes (no activity and feeling like a part of school) are not significant in any model yet are significant for paternal incarceration. Taken together, these results suggest that different mechanisms may be at play behind the effect of maternal and paternal incarceration on nonacademic school-related processes, with paternal incarceration having a particularly robust relationship across the board and maternal incarceration having a robust relationship with behavioral problems.

Examining differences by parent gender in the effect of parental incarceration is particularly important given the possible differential selection into paternal and maternal incarceration as well as the difference in caregiving that often exists between mothers and fathers. The gender-based differences may encompass differences in family structure destabilization compared with economic strain effects children, as mothers are more often caregivers while fathers are less often caregivers but do often provide financial assistance to families prior to incarceration and may experience lower earnings after incarceration (Geller, Garfinkel, and Western 2011). Although the results of this study cannot provide evidence confirming these different hypotheses, they can shed light on the potential role each plays in negatively effecting the educational experiences of children of incarcerated parents.

Last, the findings of this study identify nonacademic school-related processes as a key area in which parental incarceration is linked with the education of youth, especially paternal incarceration. This may help inform future research examining the mechanisms behind the postsecondary gap between those with and without parental incarceration. This is consistent

with previous literature; for example, researchers have found that suspension can estrange students from institutions of education and leads to lower achievement, higher future suspensions, and increased risk for dropout (Arcia 2006). Additionally, nonacademic school-related processes are important for future development in adolescence. The goal of education includes socializing students into their roles as citizens (Ballantine, Hammack, and Stuber 2017), and youth may be labeled as "bad students" if they struggle to conform to the socialization expectations in schools. Low expectations for youth whom teachers view as troublemakers, such as those who may skip school, get into fights, or be disengaged, may act as self-fulfilling prophesies that limit the development and opportunities they receive (Ballantine et al. 2017). However, I must caution against ruling out academic processes as another potential mechanism for disadvantage. The coefficients for parental incarceration lose significance between the traditional and strategic comparison regression when examining the probability of reporting a B or better in mathematics. Although I hypothesize that this is due to the reduction of selection effects, it is possible that it is the result of something else (such as the reduced sample size). The picture here is not entirely clear.

Despite the important implications of this study, several limitations should be considered. First, this study relies on self-reported data, which present the potential of social desirability bias and underreporting. Additionally, recall issues may be present, although steps were taken to reduce this potential bias (primarily collapsing the exact age into categories). Second, this method relies on the assumption that there is little difference between the families in which the timing of incarceration is different. However, it is quite possible that families in which incarceration is evaded until after high school are a unique group that is different from families in which incarceration occurs before. To reduce the effect of this possible variance in families and parents, parent-level controls are included. Additionally, parents who are incarcerated for the first time before the youth's birth are excluded from the comparisons of interest. There is likely a much larger difference between parents who are incarcerated before their children's birth and after than between parents who are incarcerated when a youth is 12 and parents who are incarcerated when a youth is 19. Most important, although families that experience incarceration before and after high school are not identical, Table 1 supports the assertion that they are considerably more similar than families that experience parental incarceration prior to high school and families that never do.

Conclusion

The educational experiences of youth are a critical pathway through which parental incarceration affects long-term social stratification and inequality. Identifying the areas within the educational trajectory in which parental incarceration affects youth is required for more targeted future research with rigorous research designs, as well as identifying areas for intervention. Additionally, parent gender differences indicate that different mechanisms, including family destabilization, disruption in caregiving, and financial deprivation, affect different aspects of the educational experience for students. Future research should explore how family structure destabilization affects the behavior of children and how economic deprivation may play a role in students' connectedness to school and peers. Another fruitful

area for future research is how stigma may affect teacher-student interactions and play a role in youth's education, especially with regard to nonacademic school-related processes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Author Biography

Erin McCauley is a PhD candidate in sociology in the Departments of Sociology and Policy Analysis and Management at Cornell University. Her research centers on the intergenerational consequences of incarceration and the role of mass incarceration in shaping social inequality. Her current work examines how stigma in micro-sociological interactions shape macro-sociological disparities in education, policing, and health. Prior to pursuing her doctoral studies, she earned a master's degree in education from Vanderbilt University.

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Author	Parent	Outcomes	Age	Method	Dataset
Cho, 2009a	Maternal	Standardized reading and Mathematics scores	Childhood	Non-experimental comparison (brief jail v. imprisoned)	Chicago Public Schools data, Illinois Department of Corrections data, Cook County Jail data
Cho, 2009b	Maternal	Grade retention	Childhood through adolescence	Difference-in-difference	Chicago Public Schools data, Illinois Department of Corrections data, Cook County Jail data
Geller et al., 2009	Maternal and paternal	Cognitive development	Childhood	Regression	Fragile Families and Child Wellbeing
Cho, 2010	Maternal	Effect of timing and dosage on drop out	Childhood through adolescence	Matching	Chicago Public Schools data, Illinois Department of Corrections data, Cook County Jail data
Cho, 2011	Maternal	School dropout	Adolescence	Non-experimental comparison (brief jail v. imprisoned)	Chicago Public Schools data, Illinois Department of Corrections data, Cook County Jail data
Wakefield & Wildeman, 2011	Paternal	Developmental behaviors and mental health	Childhood	Propensity based matching	Project on Human Development in Chicago Neighborhoods and Fragile Families and Child Wellbeing
Geller et al., 2012	Paternal	Internalizing behavior, and verbal ability.	Childhood	Fixed Effects	Fragile Families and Child Wellbeing
Haskins, 2014	Paternal	School readiness and special education placement	Childhood	Matching	Fragile Families and Child Wellbeing
Turney & Wildeman, 2015	Maternal	Internalizing and externalizing behaviors, and verbal ability.	Childhood	Propensity based matching	Fragile Families and Child Wellbeing
Haskins, 2016	Paternal	Cognitive skills	Childhood	Matching	Fragile Families and Child Wellbeing
Haskins, 2016b	Paternal	Non-cognitive behavioral development	Childhood	Matching	Fragile Families and Child Wellbeing
Turney, 2017	Paternal	Reading comprehension, Mathematics comprehension, and verbal ability	Childhood	Matching	Fragile Families and Child Wellbeing

Figure 1.

Existing literature exploring the association between parental incarceration and school-based measures that addresses unobserved heterogeneity.

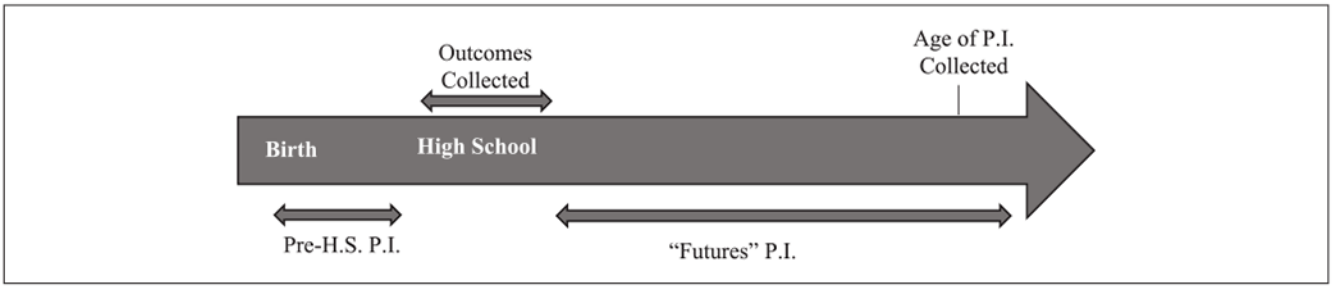

Figure 2.
Timeline of data collection.
Note: HS = high school; PI = parental incarceration.

Table 1.

Joint Orthogonality Test Comparing the Intervention Group with the Two Comparison Groups (the Future and Never Groups) for the Predictor Variables, the Outcome Variables, and a Selection of Other Associated Variables That Are Not Included in This Study.

	Parental Incarceration Group Means			*p* Test from Joint Orthogonality Tests	
	Pre-HS Parental Incarceration	"Futures" Parental Incarceration	"Nevers" Parental Incarceration	Pre-HS vs. Futures	Pre-HS vs. Nevers
Predictors					
Race					
White	.40	.39	.50	.74	.00
Black	.36	.34	.22	.35	.00
Hispanic	.19	.15	.17	.91	.02
Other nonwhite	.05	.12	.11	.01	.00
Female	.58	.58	.54	.89	.00
Age	15.46	16.03	15.83	.00	.00
Family income	38.07	4.61	46.99	.22	.00
Parent age	41.40	42.61	42.76	.22	.00
Parent race					
White	.33	.27	.36	.00	.00
Hispanic	.10	.10	.10	.50	.68
Black	.21	.17	.13	.02	.00
Other nonwhite	.36	.08	9.41	.16	.00
Parent's marital status					
Single	.10	.05	.05	.00	.00
Married	.58	.62	.75	.04	.00
No longer married	.33	.33	.20	.80	.00
Parent's education					
Less than HS	.29	.23	.19	.06	.00
HS or equivalent	.31	.32	.30	.68	.22
More than HS	.40	.34	.51	.03	.00
Education outcomes					
B or better in English	.53	.60	.68	.00	.00
B or better in math	.46	.48	.58	.20	.00

	Parental Incarceration Group Means			*p* Test from Joint Orthogonality Tests	
	Pre-HS Parental Incarceration	**"Futures" Parental Incarceration**	**"Nevers" Parental Incarceration**	**Pre-HS vs. Futures**	**Pre-HS vs. Nevers**
Suspension	.20	.17	.13	.09	.00
Fight	.56	.48	.42	.00	.00
Skipped school	.36	.29	.30	.00	.00
No school activity	.21	.14	.15	.00	.00
Part of school	.49	.56	.58	.01	.00

Note: HS = high school.

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Table 2.

The Effect of Parental Incarceration before High School on Academic Performance Outcomes Using Traditional (Model 1) and Strategic Comparison (Model 2) Regression with Covariates.

	Academic Outcomes	
	B or Better in English	**B or Better in Mathematics**
Paternal incarceration		
Model 1	−.099*** (.000)	−.063*** (.000)
Model 2	−.098* (.014)	.002 (.972)
Maternal incarceration		
Model 1	−.032 (.355)	−.096** (.009)
Model 2	−.062 (.299)	−.023 (.725)
n	11,344	11,344

Note: Values are coefficients, with *p* values in parenthesis. All models include youth and parent controls. Model 1 is a traditional regression (comparison group “nevers” plus “futures”), and model 2 is a strategic comparison regression (comparison group “futures”).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3.

The Effect of Parental Incarceration before High School on School-Based Behaviors Using Traditional (Model 1) and Strategic Comparison (Model 2) Regression with Covariates.

	Behavior					
	Suspension	**Expulsion**	**Fight**	**Skipped School**	**No Activity**	**Part of School**
Paternal incarceration						
Model 1	.061*** (.000)	.019*** (.000)	.139*** (.000)	.077*** (.000)	.078*** (.000)	−.080** (.001)
Model 2	.065* (.013)	.024* (.032)	.097* (.042)	.068+ (.097)	.068* (.037)	−.161*** (.001)
Maternal incarceration						
Model 1	.073** (.002)	.018+ (.061)	.162*** (.000)	.114** (.002)	.007 (.819)	−.051 (.259)
Model 2	−.023 (.725)	−.023 (.725)	.170* (.031)	.146* (.029)	.032 (.546)	−.082 (.302)
n	11,758	11,767	8,344	8,671	9,149	8,324

Note: Values are coefficients, with *p* values in parenthesis. All models include child and parent controls. Model 1 is a traditional regression (comparison group “nevers” plus “futures”), and model 2 is a synthetic regression (comparison group “futures”).

+ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.