



# Paternal Incarceration and Early Sexual Onset Among Adolescents

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## Abstract

Despite a growing literature documenting deleterious intergenerational consequences of incarceration, relatively little is known about how exposure to paternal incarceration is associated with risk behaviors in adolescence. In this article, we use data from the Fragile Families and Child Wellbeing Study ( $N=3405$ )—a cohort of urban children born around the turn of the twenty-first century and followed for 15 years—to examine the relationship between paternal incarceration and one indicator of adolescent risk behavior, early sexual onset. Results from adjusted logistic regression models show that paternal incarceration is associated with a greater likelihood of initiating sexual activity before age 15, in part resulting from externalizing problems that follow paternal incarceration. We also find that these associations are concentrated among boys living with their fathers prior to his incarceration. Given that paternal incarceration is a stressor concentrated among already vulnerable children, paternal incarceration may exacerbate inequalities in adolescent sexual risk behavior.

**Keywords** Adolescent sexual activity · Family instability · Family stress · Fragile Families and Child Wellbeing Study · Paternal incarceration

Incarceration rates in the United States have risen dramatically since the mid-1970s, leading to a corresponding increase in the number of children exposed to parental incarceration (Sykes and Pettit 2014). By age 9, nearly one-third of urban children born around the turn of the twenty-first century will experience paternal incarceration (Turney 2017). In response to children's increasing exposure to paternal incarceration, a growing literature documents that paternal incarceration is a family stressor with wide-ranging deleterious consequences for behavioral, educational, and health outcomes in early and middle childhood. The deleterious intergenerational consequences of incarceration also proliferate throughout adulthood (for

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reviews, see Foster and Hagan 2015; Johnson and Easterling 2012; Murray et al. 2012).

Despite growing evidence of the deleterious intergenerational consequences of incarceration, relatively little is known about the relationship between paternal incarceration and risk behaviors among adolescents (though see, for example, Khan et al. 2018; Kopak and Smith-Ruiz 2016; Nebbitt et al. 2017; Roettger et al. 2011). In particular, paternal incarceration is a stressor (Foster and Hagan 2013; Turney 2014), one that may structure risk behavior including early sexual onset. Paternal incarceration, and the corresponding removal of a father, contributes to widespread immediate and lasting transformations across the entire family unit. Incarceration can prompt changes in parent–child relationships (Arditti et al. 2003), trigger parental relationship instability (Turney 2015), generate economic insecurity (Schwartz-Soicher et al. 2011), and lead to externalizing problems in children (Wildeman 2010), all of which may accelerate adolescents' engagement in sexual activity (e.g., Albrecht and Teachman 2003). Alternatively, given the unequal distribution of paternal incarceration across the population (Wakefield and Uggen 2010), it is possible that paternal incarceration—above and beyond characteristics associated with experiencing paternal incarceration—does not accelerate adolescents' initiation of sexual activity. Further, given that stressors are not experienced equally (Pearlin 1989), paternal incarceration may be differentially consequential across characteristics such as adolescent gender or whether the adolescent co-resides with the father prior to his incarceration. Understanding this heterogeneity is especially critical for identifying the adolescents most at risk of experiencing deleterious consequences stemming from paternal incarceration.

Understanding the correlates of sexual onset is important because this is one of the multiple major transitions that occur largely during adolescence. Initiation of sexual activity at some point in adolescence is statistically normative in the United States (Harden 2014); approximately 75% of U.S. youth have had sexual intercourse by age 20 (Abma and Martinez 2017). However, sexual onset in early adolescence is far less prevalent. For example, only 11% of girls and 16% of boys have ever had sexual intercourse by age 15 (Abma and Martinez 2017). Moreover, initiation of sexual activity early in adolescence is linked with higher than average rates of negative outcomes, including elevated risk of sexually transmitted infections (Vasilenko et al. 2016); depression (Vasilenko et al. 2016; Meier 2007); and inconsistent contraceptive use and early pregnancy (Magnusson et al. 2012; Resnick et al. 1997; Wellings et al. 2001).

In this paper, we use newly available data from the Fragile Families and Child Wellbeing Study—a longitudinal study of children born around the turn of the twenty-first century who have been followed through adolescence—to examine the relationship between paternal incarceration and early sexual onset among adolescents, which we define as heterosexual or non-heterosexual intercourse before age 15 (Dixon-Mueller 2008). We first estimate early sexual onset as a function of experiencing the incarceration of a biological father in early or middle childhood (between ages 1 and 9), net of an array of characteristics associated with both paternal incarceration and early sexual onset. We then explore five sets of family-level mechanisms that might explain this association (including parent–child

relationships, parental monitoring, family instability, economic strain, and prior externalizing behaviors) and examine heterogeneity in this association by child gender and parental residential status prior to incarceration.

In doing so, we contribute to literature on the intergenerational consequences of incarceration in four ways: first, by examining outcomes in adolescence, a pivotal life course period (Crosnoe and Johnson 2011; for other research considering adolescent outcomes, see Bryan 2017; Porter and King 2015; Roettger et al. 2011; Swisher and Shaw-Smith 2015); second, by providing one of the first rigorous accountings of the relationship between paternal incarceration and early sexual onset, one that uses prospective longitudinal data (Nebbitt et al. 2017); third, by considering the family-level mechanisms that may serve as strategic points of intervention; and fourth, by considering which subgroups of children experience the most deleterious consequences of paternal incarceration. We additionally contribute to literature on the predictors of adolescent behavior by examining a commonly experienced family-level risk factor, paternal incarceration. Given that paternal incarceration is a stressor concentrated among already vulnerable children, understanding this association may shed light on racial/ethnic and social class disparities in adolescent sexual activity (Abma and Martinez 2017).

## Background

### Linking Paternal Incarceration to Early Sexual Onset

There are theoretical reasons to expect that paternal incarceration will have consequences for adolescent risk behavior, including an increased likelihood of early sexual onset. Incarceration is frequently conceptualized as a stressor that is deleterious for not only those confined in jail or prison, but also as a stressor that proliferates throughout an entire family unit (e.g., Foster and Hagan 2013; Turney 2014). The removal of a father from the home, via incarceration, is a traumatic experience that can engender stigma and strain for children (Hagan and Dinovitzer 1999). Acknowledging and investigating the consequences of children's exposure to stressors is critical for fully understanding how stress impairs health and wellbeing across the life course (Avison 2010). Indeed, stress can shape sexual behaviors in adolescence (Mazzaferro et al. 2006).

There are a number of pathways through which the stressor of paternal incarceration may lead to early sexual onset. Specifically, paternal incarceration can alter relationships between family members, strain household economic resources, and lead to externalizing problems among offspring, all of which may increase the likelihood of early sexual onset. An alternative possibility is that the association between paternal incarceration and early sexual onset results not from paternal incarceration, per se, but instead from characteristics associated with the likelihood of experiencing paternal incarceration. We discuss each of these possibilities below.

## Altered Relationships Between Family Members

To begin with, the stressor of paternal incarceration may increase the likelihood of early sexual onset among adolescents by altering relationships between family members. Indeed, a large literature documents that paternal incarceration changes family dynamics. Three types of related yet distinct family dynamics may explain the relationship between paternal incarceration and early sexual onset (Barber 1992; Miller et al. 2001): (1) parent–child relationships, (2) parental monitoring, and (3) family instability. First, the physical absence of an incarcerated father, combined with the logistic challenges of visiting an incarcerated father, may decrease relationship quality between incarcerated fathers and their children. And paternal incarceration, along with the corresponding altered roles and responsibilities of family members left behind, may strain relationships between non-incarcerated parents and children (Braman 2004). Second, incarceration may reduce the monitoring and supervision offspring receive from their parents, as one parent is physically unavailable for such monitoring and the other (non-incarcerated) parent is left juggling multiple employment and household responsibilities (Bruns 2017). Third, given the logistical, emotional, and economic difficulties associated with maintaining relationships when one partner is behind bars, it is well known that paternal incarceration facilitates forms of family instability such as union dissolution (Turney 2015) and repartnering (Turney and Wildeman 2013).

In turn, strained parent–child relationships, low levels of parental monitoring, and family instability may all influence the risk of early sexual behavior among adolescents. Social control theories suggest that parents inhibit adolescents' risk behavior by simultaneously expressing care and constraining involvement in particular activities (Longmore et al. 2009). Close parent–child relationships are linked to delays in sexual intercourse (Deptula et al. 2010; Longmore et al. 2009; Miller et al. 2001; Whitbeck et al. 1993). The evidence linking parental monitoring to adolescent sexual activity suggests that close parental monitoring in preadolescence and adolescence also delays children's sexual debut (Longmore et al. 2001; Miller et al. 2001); nonetheless, this association is complex, as excessive or coercive parental control may hasten onset (Longmore et al. 2009; Upchurch et al. 1999). Finally, early sexual activity is associated with family instability, often defined as parental moves in and out of partnerships (Albrecht and Teachman 2003; Fomby et al. 2010; Goldberg et al. 2017). Family instability accelerates sexual onset in part by diminishing both parental support and monitoring (Albrecht and Teachman 2003).

## Strained Household Economic Resources

Additionally, the stressor of paternal incarceration may increase the likelihood of early sexual onset among adolescents by straining household economic resources. It is well established that incarceration has wide-ranging economic consequences, both for the incarcerated parent and for the broader family unit (Western 2006). Indeed, confinement in jail or prison is associated with a mechanical loss of employment and income. Upon release, formerly incarcerated men have difficulty finding employment and earn less than their non-incarcerated counterparts (Pager 2003; Western

2006). These challenges to generating income are compounded by legal debts, fines, and fees (Harris 2016). Family members of the incarcerated are not immune from strained economic resources, as they often shoulder the cost of maintaining contact during incarceration and often bear the burden of legal debt (Comfort 2008; Harris 2016). Recent research, for example, finds women who share children with currently and recently incarcerated men, compared to those connected to fathers who are not incarcerated, report greater material hardship (Schwartz-Soicher et al. 2011).

Strained household economic resources may link paternal incarceration to early sexual onset among adolescents. Indeed, there exists an inverse correlation between socioeconomic status and early sexual intercourse (Capaldi et al. 1996; Miller et al. 2001; Upchurch et al. 1998). Among other explanations, economically disadvantaged families may have fewer resources to provide educational or career opportunities to their children, which can lower adolescents' motivation to avoid the potential negative sequelae arising from early sexual initiation, such as pregnancy (Bearman and Bruckner 2001; Miller et al. 2001; Wu 1996).

### Externalizing Problems Among Offspring

Finally, the relationship between the stressor of paternal incarceration and early sexual onset may be explained through earlier externalizing problems among offspring. Externalizing behaviors in childhood are commonly measured with the Child Behavior Checklist (CBCL; Achenbach 1992), capturing indicators of aggressive behaviors ("child argues a lot" or "child destroys his or her own things"), attention problems ("child fails to finish things he or she starts" or "child is inattentive or easily distracted"), or rule-breaking behaviors ("child lies or cheats" or "child runs away from home").

Theoretical perspectives on the intergenerational consequences of paternal incarceration suggest that the trauma, stigma, and strain associated with this stressor may increase externalizing behaviors in children (Hagan and Dinovitzer 1999). Research consistently documents that children who experience paternal incarceration, compared to their counterparts who do not experience paternal incarceration, have more externalizing problems in early and middle childhood (Geller et al. 2012; Haskins 2014; Turney 2017; Wildeman 2010). These associations persist above and beyond characteristics correlated with paternal incarceration and, in some cases, are larger in magnitude than other forms of father absence such as parental separation (Geller et al. 2012).

A number of studies have also linked externalizing behaviors in childhood (e.g., Skinner et al. 2015) and adolescence (e.g., Caminis et al. 2007; Duncan et al. 1999; Whitbeck et al. 1999) with accelerated sexual onset. For example, using data from an Australian birth cohort study, Skinner and colleagues (2015) associated externalizing behaviors (assessed using CBCL measures from age 5 through age 14) with increased risk of early sexual onset for boys, and externalizing behaviors from age 10 forward with early sexual onset for girls. Caminis et al. (2007) linked externalizing behaviors (specifically, substance use and violent delinquency) in early adolescence with higher rates of sexual initiation during middle school. Problem behavior theory suggests that the inter-correlation between externalizing and sexual risk behaviors

may reflect common causes or influences, such as a single factor of unconventional behavior (Costa et al. 1995; Jessor 1991; Jessor and Jessor 1975).

### **Selection into Paternal Incarceration**

The three sets of mechanisms described above—altered relationships between family members, strained household economic resources, and externalizing problems among offspring—may explain the association between paternal incarceration and early sexual onset among adolescents. Another possibility is that any observed descriptive association between paternal incarceration and early sexual onset results not from incarceration itself but instead from characteristics associated with paternal incarceration. Indeed, exposure to paternal incarceration is not random (Johnson and Easterling 2012). Some groups of adolescents are more likely than are others to experience paternal incarceration. Further, many of the characteristics associated with paternal incarceration are also associated with early sexual onset. For example, non-Hispanic Black children are more likely than non-Hispanic White children to experience paternal incarceration (Sykes and Pettit 2014) and early sexual onset (Abma and Martinez 2017). Socioeconomic status and neighborhood characteristics are also associated with both paternal incarceration and early sexual onset (Browning et al. 2004; Massoglia and Pridemore 2015; Wakefield and Uggen 2010). Therefore, in examining the relationship between paternal incarceration and early sexual onset, we account for an array of characteristics that might render this relationship spurious.

### **Heterogeneity in the Association Between Paternal Incarceration and Early Sexual Onset**

It is also possible that paternal incarceration is not an equally consequential risk factor for early sexual onset for all youth. Theoretically, there are two sources of heterogeneity that may structure the association between paternal incarceration and early sexual onset.

First, it is possible that boys, compared to girls, are more susceptible to the negative consequences of paternal incarceration. Theory suggests that paternal incarceration—and the corresponding loss of a father, who commonly engages in disciplinary parenting—may be more consequential for boys than for girls, particularly with respect to externalizing outcomes (Fritsch and Burkhead 1981). Fathers also engage in more instrumental activities with boys than girls and, accordingly, their incarceration may especially reduce parental supervision among boys (Umberson 2003). Indeed, an expanding literature finds that boys are more sensitive than girls to family disruptions across a range of outcomes (Cooper et al. 2011; Goldberg et al. 2017; Haskins et al. 2018). For paternal incarceration in particular, prior research shows the strongest associations with externalizing and delinquent behaviors for boys (Geller et al. 2012; Haskins 2015; Wildeman 2010).

Second, it is possible that children living with their fathers prior to paternal incarceration suffer more deleterious consequences than children not living with their

fathers prior to paternal incarceration. It is these children who may suffer the largest changes in their relationships with their parents (Turney and Wildeman 2013), who may encounter the greatest strains in household economic resources (Schwartz-Soicher et al. 2011), and who may experience the most increases in their externalizing problems (Geller et al. 2012). In contrast, children not living with their fathers experience fewer changes to their family life (Geller et al. 2012; Turney and Wildeman 2013), suggesting the possibility that paternal incarceration is not associated with early sexual onset among this group.

Finally, it is also plausible that these two potential sources of heterogeneity intersect to make boys who co-resided with their fathers prior to incarceration particularly susceptible to the adverse consequences of paternal incarceration. Losing a same-gender parent to incarceration may be most consequential when that father was residing with the child prior to his removal from the household (as opposed to when the father was not residing with the child).

## Existing Research

Few studies have directly examined the relationship between paternal incarceration and sexual onset timing among youth. One recent study, which examined 142 African American youth living in public housing in Baltimore, found that having a currently incarcerated father was associated with an increased likelihood of initiating sexual activity before age 14 (Nebbitt et al. 2017; also see Whalen and Loper 2014 for an examination of household member incarceration and a related outcome, adolescent pregnancy). Another study identified a positive relationship between trauma (a composite measure encompassing eight indicators that included parental incarceration) and risky sexual behavior among adolescent girls referred to treatment for conduct problems by the Oregon juvenile justice system (Smith et al. 2006). However, both studies relied on cross-sectional data collected through non-probabilistic sampling methods on local samples, and included only a small number of control variables to adjust for selection into paternal incarceration. Both studies also stopped short of assessing mediators or moderators of the observed relationships.

Another study used nationally representative data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) to link parental incarceration in childhood with increased odds of having multiple sexual partners in adolescence (Khan et al. 2018). As in the other studies, however, only a small number of control variables were included in the analysis; moreover, precise causal ordering was limited by retrospective reporting of childhood parental incarceration (measured in adulthood) and a single wave of data, which precluded assessment of mediators.

Taken together, we extend existing research on the intergenerational consequences of paternal incarceration for sexual behavior in adolescence by using broadly representative and longitudinal data gathered over a period of 15 years, by adjusting for an array of selection characteristics, and by considering both mediators and moderators of the relationship between paternal incarceration and early sexual onset.

## Data, Measures, and Analytic Strategy

### Fragile Families and Child Wellbeing Study

We estimate the relationship between paternal incarceration and early sexual onset among adolescents using data from the Fragile Families and Child Wellbeing Study, a cohort of 4898 children born around the turn of the twenty-first century and followed for 15 years (Reichman et al. 2001). Mothers and fathers were interviewed between 1998 and 2000, immediately after their children were born, and have been re-interviewed when their children were ages 1, 3, 5, 9, and 15 (with only primary caregivers interviewed at the last survey). Children were also interviewed at the 9- and 15-year surveys. These data are well positioned to answer our research questions, as they include information about both paternal incarceration and adolescent sexual activity, a relatively large number of children exposed to paternal incarceration, and an array of information about family processes that can be used to both isolate the relationship between paternal incarceration and early sexual onset and to consider the mechanisms underlying this relationship. The National Longitudinal Study of Adolescent to Adult Health (Add Health) also includes information about paternal incarceration and adolescent sexual activity but the Fragile Families data are especially advantageous because they allow us to ensure proper time-ordering between the dependent, independent, mediating, and control variables. This time-ordering allows us to strengthen causal inference.

The analyses draw on data through the 15-year survey. We restrict the analytic sample to observations with non-missing data on our dependent variable, early sexual onset. This excludes 1485 observations (with 1454 missing due to adolescent non-participation in the 15-year survey and 31 missing due to item non-response). We also remove an additional 8 observations who report first sex prior to age 10, assuming that these youth represent a distinct group with a particularly high likelihood of having experienced sexual abuse or non-consensual sex (Harden 2012; Resnick et al. 1997). Therefore, the analytic sample comprises 3405 children (70% of the original sample). We examined differences between the full and analytic samples, which show some statistically significant differences between the two. Mothers in the analytic sample, compared to mothers in the full sample, are more likely to identify as non-Hispanic Black and less likely to identify as Hispanic. Both mothers and fathers in the analytic sample are less likely to be foreign born. Mothers in the analytic sample are less likely to be employed and less likely to have not completed high school. Fathers in the analytic sample, compared to fathers in the full sample, are more likely to have experienced incarceration prior to the 1-year survey.

Relatively few observations are missing data on covariates. We preserve these missing covariates by producing 20 imputed data sets with Stata's MI commands (using the multivariate normal method).

## Measures

### Early Sexual Onset

The dependent variable, early sexual onset, is a binary measure indicating the adolescent reported first engaging in sexual intercourse before age 15. In prior research, definitions of “early” sexual onset range from before 13 years to before age 16 (Vasilenko et al. 2016). Using three criteria (physical maturation; cognitive capacity for making safe, informed, and voluntary decisions; and legal frameworks and international standards), Dixon-Mueller (2008) concluded that age 14 and younger is essentially “too young” to transition into sexual behavior; ages 15–17 may or may not be too young, depending on circumstances; and by age 18 and older, youth are generally “old enough” to make safe and voluntary transitions. Therefore, in this article, we follow Dixon-Mueller (2008) and others (e.g., Epstein et al. 2014; Harden 2012; Magnusson et al. 2012) and define early sexual onset as first sexual intercourse before age 15.

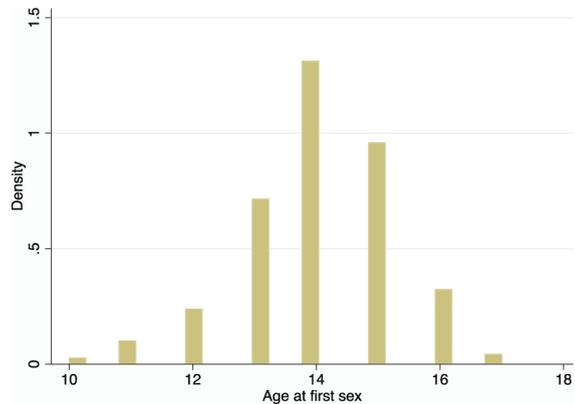
At the last Fragile Families survey wave, when adolescents were on average 15.6 years old (ranging from 14 to 17 years old), they were asked whether they had had intercourse and, if so, the month and year that this first occurred.<sup>1</sup> This is captured in three ways. First, adolescents who reported being in a dating relationship were asked the following: “Some teens your age are sexually active and others are not. Have you ever had sexual intercourse with {partner}, sometimes this is called ‘making love,’ ‘having sex,’ or ‘going all the way’?” Second, adolescents in a dating relationship who reported not having intercourse with their current partner were asked the following: “Some teens your age are sexually active and others are not. Have you ever had sexual intercourse with anyone, that is, made love, had sex, or gone all the way?” Third, adolescents who reported not being in a dating relationship were asked the following: “Some teens your age have had sexual intercourse and others have not. Have you ever had sexual intercourse with anyone, that is, made love, had sex, or gone all the way?” Notably, this measure is not limited to heterosexual penile–vaginal intercourse.

We combine adolescent reports of the timing of first intercourse with the adolescent’s birth date (proxied by the date of the mother’s baseline interview) to create an indicator of early sexual onset ( $1 = \text{adolescent had sex before age 15}$ ). The small number of adolescents who could not recall their month or year of first sex were asked instead for their age at sexual onset in years, and we use these reports when necessary.<sup>2</sup> Figure 1 documents the distribution of age at first sex, among those adolescents who reported having initiated sexual activity by the last wave of data collection. About 13% of adolescents reported sexual onset before age 15.

<sup>1</sup> The percent distribution of adolescents’ age at the time of the 15-year survey is as follows: < 1% age 14, 54% age 15, 34% age 16, 8% age 17, 2% age 18, and < 1% age 19. In supplemental analyses, we removed the 15 adolescents who were younger than 15 at the 15-year survey, given that our dependent variable captures sexual onset before age 15. Results were consistent with those presented.

<sup>2</sup> Supplemental analyses that instead considered early sexual onset to indicate the adolescent reported first having sex before age 16 produced substantively similar results.

**Fig. 1** Histogram describing age at first sex, among adolescents reporting sexual intercourse by 15-year survey ( $N=3405$ )



### Paternal Incarceration

A binary variable indicates whether the adolescent experienced the incarceration of their biological father between the 1- and 9-year surveys. Paternal incarceration is measured during this time period to ensure it is ascertained prior to the measurement of early sexual onset and after the measurement of the control variables (and, accordingly, adolescents of fathers who were incarcerated prior to the 1-year survey [including prior to their birth] are included in the reference category). We use information from both parents' interviews at the 3-, 5-, and 9-year surveys to measure paternal incarceration. We use direct reports of paternal incarceration (e.g., a mother reports the father spent time in jail or prison since the last survey) and indirect reports of paternal incarceration (e.g., a mother reports the relationship between her and the father dissolved because of his incarceration). This approach is consistent with prior research suggesting the importance of taking an inclusive approach to measurement (see, especially, Geller et al. 2016). About 29% of fathers experienced incarceration between the 1- and 9-year surveys.

### Mediating Variables

The analyses consider five sets of mediating variables, all measured at the 9-year survey (and therefore after exposure to paternal incarceration but prior to the measurement of early sexual onset): (1) parent–child relationships, (2) parental monitoring, (3) family instability, (4) economic strain, and (5) externalizing behaviors.

First, the parent–child relationship mediators include the following variables, all reported by adolescents about their biological parents: closeness to mother and father (1 = *not very close* to 4 = *extremely close*); sharing ideas or talking about things that matter with mother and father (1 = *not very well* to 4 = *extremely well*); and support from mother and father. Support is measured by averaging the following four items (0 = *never* to 3 = *always*): (a) mom/dad talks over important decisions with you; (b) mom/dad listens to your side of an argument; (c) mom/dad spends

enough time with you; and (d) mom/dad misses events or activities that are important to you (reverse coded) ( $\alpha=0.51$  for mothers and  $0.82$  for fathers).

Second, we measure parental monitoring by averaging the primary caregiver's responses to the following ( $0=never$  to  $3=always$ ): (a) you know what child does during free time and (b) you know how child spends his/her money ( $\alpha=0.44$ ).

Third, we measure family instability by parental separation, a binary variable indicating the adolescent experienced separation of his or her biological parents between the 1- and 9-year surveys, and repartnership, a binary variable indicating the adolescent's mother is in a relationship with someone other than the child's biological father.

Fourth, economic strain is measured by both mothers' and fathers' income-to-poverty ratio (defined as the total household income divided by the official poverty threshold set by the U.S. Census Bureau) and material hardship. The measures of material hardship are a sum of mothers' and fathers' responses, respectively, to 11 questions about various types of hardships they experienced over the past year (e.g., "did not pay the full amount of rent or mortgage payments" and "were hungry but didn't eat because you couldn't afford more food").

Fifth, externalizing problems is measured by primary caregivers' responses to 34 statements about the child's behavior, such as "child argues a lot" or "child destroys his or her own things" ( $0=not\ true$  to  $2=very\ true\ or\ often\ true$ ;  $\alpha=0.91$ ). These items come from the Child Behavior Checklist (CBCL; Achenbach 1992).

## Control Variables

The multivariate analyses adjust for a number of variables that may render the relationship between paternal incarceration and early sexual onset spurious. All control variables are measured at the baseline or one-year surveys (except when otherwise noted). Control variables include parents' demographic characteristics such as race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic other race), immigrant status, age at first birth, and childhood family structure ( $1=lived\ with\ both\ biological\ parents\ at\ age\ 15$ ). We adjust for parents' socioeconomic characteristics including educational attainment (less than high school, high school diploma or GED, post-secondary education), employment ( $1=employed\ in\ the\ past\ week$ ), income-to-poverty ratio, and material hardship. We also adjust for housing characteristics including residential mobility ( $1=moved\ in\ past\ year$ ), public housing ( $1=lives\ in\ public\ housing$ ), and neighborhood disadvantage (measured as a sum of four standardized census tract characteristics [e.g., percent of residents in tract with incomes below the poverty line]).

We also adjust for family characteristics, parental health, and early childhood traits. Family characteristics include the number of children in the household, grandparent in the household, relationship status of the child's biological mother and father (married, cohabiting, non-romantic relationship, separated), repartnership, fair or poor relationship quality between the child's biological mother and father, parenting stress (average of four items [e.g., "taking care of my child is much more work than pleasure"],  $1=strongly\ disagree$  to  $4=strongly\ agree$ ;  $\alpha=0.59$ ), engagement with child (average of eight items [e.g., "tell stories to child"],  $0=0\ days\ a\ week$

to 7 = 7 days a week;  $\alpha = 0.80$ ), shared responsibility in parenting (average of four items [e.g., “how often father runs errands like picking things up from the store”], 1 = *never* to 4 = *often*;  $\alpha = 0.89$ ), cooperation in parenting (average of six items [e.g., “you and father talk about problems that come up with raising child”], 1 = *never true* to 4 = *always true*;  $\alpha = 0.96$ ), and domestic violence (1 = *mother reports father slaps, kicks, or hits her*). Parental health characteristics include depression (measured with the Composite International Diagnostic Instrument Short Form [CIDI-SF]), fair or poor overall health, illicit drug use (1 = *used drugs in the past month*), binge drinking (1 = *had five or more drinks in the same sitting in the past month*), substance abuse (1 = *mother or father reports drinking or drug use interfered with fathers’ relationships in past year*), and perceived social support (sum of six items capturing available financial, housing, and child care support). Childhood characteristics include gender, low birth weight, and temperament (average of six items [e.g., “child reacts strongly when upset”], 1 = *not at all like my child* to 5 = *very much like my child*;  $\alpha = 0.52$ ).<sup>3</sup>

Finally, we adjust for parental characteristics especially associated with incarceration. These include cognitive ability, measured by the Wechsler Adult Intelligence Scale [WAIS] at the 3-year survey (Wechsler 1981); self-control, measured by an abbreviated form of Dickman’s impulsivity scale at the 1-year survey for fathers and at the 3-year survey for mothers (Dickman 1990); and prior incarceration, with mothers’ prior incarceration being measured between the baseline and 1-year surveys and fathers’ prior incarceration being measured at any point prior to the 1-year survey (including prior to baseline).

## Analytic Strategy

The analytic strategy proceeds in three stages. In the first analytic stage, we use logistic regression models to estimate early sexual onset as a function of paternal incarceration. We first estimate the unadjusted association. We then estimate the association that adjusts for all variables described above. We pay careful attention to time-ordering, with control variables measured prior to paternal incarceration and paternal incarceration measured prior to sexual onset.<sup>4</sup> We model sexual onset before age 15 using logistic regression, rather than survival analysis, for two reasons. First, our focus on early sexual onset, rather than timing of onset across the age spectrum, suggests the use of a binary measure with a particular age cutoff. Additionally, because timing of sexual onset was measured when respondents were approximately age 15, a survival model would contain a great deal of right censoring. Finally, we

<sup>3</sup> We do not control for pubertal development, as information on pubertal maturation was not collected until the 15-year survey, after any reported first sexual activity. Some prior research suggests that younger pubertal development may confer higher risk of early sexual onset (e.g., Moore et al. 2014; Udry 1979; Zimmer-Gembeck and Helfand 2008). However, this association has been inconsistent across studies with varying designs (see Marino et al. 2013, for example, for a null association using prospective birth cohort data), and observed associations are usually small (Zimmer-Gembeck and Helfand 2008).

<sup>4</sup> There is also no measure of externalizing behaviors at the 1-year survey. However, we do adjust for child temperament, which is an age-appropriate measure of children’s behavior.

are interested in the cumulative association of childhood paternal incarceration with timing of sexual onset, not in whether experiencing paternal incarceration at a given time during adolescence triggers sexual onset.

In the second analytic stage, we investigate explanations for the association between paternal incarceration and early sexual onset by further adjusting for mediators measured at the 9-year survey. We examine the four stages of mediation: (1) the relationship between paternal incarceration and each proposed mediator; (2) the relationship between each proposed mediator and early sexual onset; (3) the relationship between paternal incarceration and early sexual onset without the proposed mediator; and (4) the relationship between paternal incarceration and early sexual onset with the proposed mediator (Baron and Kenny 1986; Sobel 1986). As part of this, we compare the baseline model (the adjusted model from the first analytic stage) to five additional models that each adjust for one set of mediators: (1) parent–child relationship, (2) parental monitoring, (3) family instability, (4) economic strain, and (5) externalizing problems. A final model includes all mediators considered. Importantly, whenever possible (and in all cases except for the parent–child relationship and parental monitoring measures, which are unavailable at earlier waves), our mediators are included as controls in the first analytic stage (i.e., at the 1-year survey). Therefore, these analyses explicitly look at changes in the mediators (prior to and after the measure of paternal incarceration).<sup>5</sup> We also conduct formal Sobel–Goodman tests (Sobel 1986).

In the third analytic stage, we examine heterogeneity in the association between paternal incarceration and early sexual onset. We estimated subgroup analyses by child gender (with separate models for boys and girls), by parental residential status prior to paternal incarceration (with separate analyses for children with residential fathers and children with non-residential fathers), and by the intersection of these subgroups (boys with residential fathers, boys with non-residential fathers, girls with residential fathers, and girls with non-residential fathers). We test for statistically significant differences in the association between paternal incarceration and early sexual onset across subgroups (for example, by comparing coefficients across girls and boys), employing a *z*-test that appropriately estimates the standard error of the difference across groups (for the formula, see Paternoster et al. 1998).

To account for observed differences between children exposed and not exposed to paternal incarceration, our models adjust for an array of characteristics associated with observed selection into paternal incarceration. Some research examining the intergenerational consequences of paternal incarceration uses propensity score matching to match children exposed to paternal incarceration with otherwise similar children not exposed to paternal incarceration (e.g., Haskins 2015). We conduct supplemental analyses that employed propensity score matching, which came to results consistent with those presented (see Appendix Table 5). We present results from the logistic regression models in the main tables given that propensity score matching

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<sup>5</sup> We present coefficients from logistic regression models for ease of interpretation but, given that comparing across logistic regression models is not recommended (Mood 2010), supplemental analyses use linear probability models to estimate early sexual onset.

models, similar to logistic regression models, cannot account for unobserved characteristics that might be associated with selection into paternal incarceration (Morgan and Winship 2015; Shadish 2013).

## Sample Description

Table 1 presents descriptive statistics for all variables in the analytic sample. The majority of parents identify as a racial/ethnic minority, with about half (50%) of mothers identifying as non-Hispanic Black and one-quarter (25%) of mothers identifying as Hispanic. About 13% of mothers and 15% of fathers were born outside the United States. Mothers, on average, had their first child at age 22. Nearly three-fifths (56%) of parents are in a marital or cohabiting romantic relationship with one another at the 1-year survey. An additional 10% of parents are in a non-residential romantic relationship and 34% are separated at the 1-year survey. The majority of parents—57% of mothers and 66% of fathers—do not have education beyond high school.

## Results

### Paternal Incarceration and Early Sexual Onset

Table 2 presents results from logistic regression models that estimate early sexual onset as a function of exposure to paternal incarceration in early or middle childhood (i.e., between the 1- and 9-year surveys). Model 1, which presents the unadjusted association, shows that paternal incarceration is associated with a greater likelihood of early sexual onset. Children who experience paternal incarceration between the 1- and 9-year surveys, compared to children who do not experience paternal incarceration during this time period, are 1.94 times more likely to report early sexual onset ( $b=0.661$ ,  $p<0.001$ ). In Model 2, which adjusts for a range of parent and child characteristics, the association between paternal incarceration and early sexual onset is reduced in magnitude but remains statistically significant. Paternal incarceration is associated with a 1.35 times greater odds of early sexual onset ( $b=0.297$ ,  $p<0.05$ ).<sup>6</sup>

Although few control variables are independently associated with early sexual onset in Model 2, those that are generally work as expected. For example, boys are more likely than girls to report early sexual onset ( $b=1.065$ , OR 2.90,  $p<0.001$ ). Non-Hispanic Blacks, compared to non-Hispanic Whites, are more likely to report

<sup>6</sup> The measure of paternal incarceration collapses any paternal incarceration that occurred between the 1- and 9-year surveys. It is possible that paternal incarceration occurring in early childhood is differentially associated with early sexual onset than paternal incarceration occurring in middle childhood. We considered this possibility in supplemental analyses. In adjusted logistic regression models (the equivalent of Model 2), paternal incarceration between the 1- and 5-year surveys and paternal incarceration between the 5- and 9-year surveys are similarly associated with early sexual onset (test for differences across coefficients:  $p=0.610$ ).

**Table 1** Descriptive statistics of all variables ( $N=3405$ )

	Mean or %	(SD)
Early sexual onset (y15)	13.3%	
Paternal incarceration (y3, y5, y9)	29.4%	
<i>Mother characteristics</i>		
<i>Race/ethnicity (b)</i>		
White, non-Hispanic	21.9%	
Black, non-Hispanic	49.9%	
Hispanic	24.7%	
Other race, non-Hispanic	3.6%	
Mixed race couple (b)	14.8%	
Foreign born (b)	13.4%	
Age at first birth (y1)	21.574	(5.221)
Lived with both parents at 15 (b)	42.0%	
Cognitive ability (y3)	6.806	(2.654)
Impulsivity (y5)	1.519	(0.480)
Prior incarceration (y1)	0.7%	
<i>Education (y1)</i>		
Less than high school	29.1%	
High school diploma or GED	28.4%	
Post-secondary education	42.5%	
Number of kids in household (y1)	2.292	(1.306)
Lives with parent (y1)	19.1%	
<i>Relationship status with father (y1)</i>		
Married	29.7%	
Cohabiting	26.7%	
Non-romantic relationship	10.0%	
Separated	33.6%	
Repartnered (y1)	11.6%	
Fair or poor relationship quality (y1)	28.6%	
Employed (y1)	55.1%	
Income-to-poverty ratio (y1)	1.863	(2.216)
Material hardship (y1)	1.168	(1.634)
Parenting stress (y1)	2.207	(0.671)
Engagement (y1)	4.861	(1.504)
Depression (y1)	15.6%	
Fair or poor overall health (y1)	12.4%	
Illicit drug use (y1)	2.1%	
Binge drinking (y1)	6.9%	
Perceived social support (y1)	4.056	(1.809)
Moved in past year (y1)	46.0%	
Lives in public housing (y1)	13.5%	
Neighborhood disadvantage (y1)	0.022	(3.523)
<i>Father characteristics</i>		
Foreign born (b)	14.8%	

**Table 1** (continued)

	Mean or %	(SD)
Lived with both parents at 15 (b)	44.3%	
Cognitive ability (y3)	6.516	(2.723)
Impulsivity (y1)	2.017	(0.671)
Prior incarceration (b, y1)	32.0%	
Education (y1)		
Less than high school	29.8%	
High school diploma or GED	35.9%	
Post-secondary education	34.3%	
Repartnered (y1)	11.9%	
Employed (y1)	76.8%	
Income-to-poverty ratio (y1)	2.488	(3.043)
Shared responsibility in parenting (y1)	2.841	(1.120)
Cooperation in parenting (y1)	3.347	(0.925)
Engaged in domestic violence (y1)	4.5%	
Depression (y1)	11.7%	
Illicit drug use (y1)	8.1%	
Binge drinking (y1)	27.8%	
Substance abuse (y1)	8.5%	
<i>Child characteristics</i>		
Boy (b)	51.4%	
Born low birth weight (b)	9.2%	
Temperament (y1)	3.408	(0.769)
Age (y15)	15.582	(0.760)
<i>Mechanisms</i>		
Child closeness to mother (y9)	3.591	(0.810)
Child closeness to father (y9)	2.850	(1.295)
Child talk to mother (y9)	3.083	(0.957)
Child talk to father (y9)	2.487	(1.211)
Child support from mother (y9)	2.031	(0.660)
Child support from father (y9)	1.397	(0.990)
Parental monitoring (y9)	2.710	(0.495)
Parents separated (y9)	58.6%	
Mother repartnered (y9)	34.8%	
Mother income-to-poverty ratio (y9)	1.985	(2.533)
Father income-to-poverty ratio (y9)	2.608	(2.884)
Mother material hardship (y9)	1.569	(2.031)
Father maternal hardship (y9)	1.499	(2.004)
Child externalizing behaviors (y9)	0.178	(0.196)

Timing of variable measurement: b=baseline survey, y1=1-year survey, y3=3-year survey, y5=5-year survey, y9=9-year survey, y15=15-year survey. Early sexual onset defined as having first intercourse before age 15

**Table 2** Logistic regression models estimating early sexual onset as a function of paternal incarceration ( $N = 3405$ )

	Model 1		Model 2	
	<i>b</i>	(SE)	<i>b</i>	(SE)
Paternal incarceration	0.661	(0.104)***	0.297	(0.119)*
<i>Mother characteristics</i>				
Race/ethnicity (reference = White, non-Hispanic)				
Black, non-Hispanic			0.427	(0.188)*
Hispanic			0.108	(0.205)
Other race, non-Hispanic			-0.244	(0.426)
Mixed race couple			0.263	(0.164)
Foreign born			-0.441	(0.305)
Age at first birth			-0.005	(0.016)
Lived with both parents at 15			-0.185	(0.123)
Cognitive ability			0.016	(0.024)
Impulsivity			0.228	(0.123)
Prior incarceration			0.452	(0.528)
Education (reference = less than high school)				
High school diploma or GED			-0.225	(0.143)
Post-secondary education			-0.295	(0.158)
Number of kids in household			0.073	(0.042)
Lives with grandparent			-0.111	(0.147)
Relationship status with father (reference = married)				
Cohabiting			0.155	(0.176)
Non-romantic relationship			0.217	(0.225)
Separated			0.251	(0.225)
Repartnered			-0.064	(0.180)
Fair or poor relationship quality			-0.125	(0.190)
Employed			0.298	(0.120)*
Income-to-poverty ratio			-0.119	(0.055)*
Material hardship			0.000	(0.037)
Parenting stress			0.031	(0.092)
Engagement			0.043	(0.043)
Depression			-0.027	(0.160)
Fair or poor overall health			-0.094	(0.167)
Illicit drug use			0.053	(0.349)
Binge drinking			0.181	(0.211)
Perceived social support			0.014	(0.035)
Moved in past year			0.129	(0.113)
Lives in public housing			-0.116	(0.159)
Neighborhood disadvantage			0.048	(0.019)*
<i>Father characteristics</i>				
Foreign born			-0.021	(0.284)
Lived with both parents at 15			-0.127	(0.131)

**Table 2** (continued)

	Model 1		Model 2	
	<i>b</i>	(SE)	<i>b</i>	(SE)
Cognitive ability			0.039	(0.026)
Impulsivity			-0.006	(0.104)
Prior incarceration			0.444	(0.122)***
Education (reference = less than high school)				
High school diploma or GED			-0.006	(0.133)
Post-secondary education			-0.261	(0.173)
Repartnered			0.221	(0.195)
Employed			0.120	(0.181)
Income-to-poverty ratio			0.006	(0.033)
Shared responsibility in parenting (mother-reported)			0.079	(0.090)
Cooperation in parenting (mother-reported)			-0.077	(0.100)
Engaged in domestic violence (mother-reported)			-0.203	(0.273)
Depression			0.009	(0.189)
Illicit drug use			-0.205	(0.214)
Binge drinking			0.030	(0.151)
Substance abuse			-0.168	(0.219)
<i>Child characteristics</i>				
Boy			1.065	(0.116)***
Born low birth weight			-0.016	(0.183)
Temperament			-0.006	(0.075)
Age			0.123	(0.077)
Constant	-2.105		-5.939	
Log likelihood	-1314		-1182	

Early sexual onset defined as having first intercourse before age 15. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  (two-tailed tests)

early sexual onset ( $b = 0.427$ , OR 1.53,  $p < 0.05$ ). Mothers' income-to-poverty ratio is negatively associated with early sexual onset ( $b = -0.119$ , OR 0.89,  $p < 0.05$ ). Neighborhood disadvantage is positively associated with early sexual onset ( $b = 0.048$ , OR 1.08,  $p < 0.05$ ).

### Explaining the Relationship Between Paternal Incarceration and Early Sexual Onset

The next set of analyses seek to explain the relationship between paternal incarceration and early sexual onset. We first examine the association between paternal incarceration and each of the proposed mediators, all measured at the 9-year survey (analyses not presented in tables for parsimony). Paternal incarceration is negatively and significantly associated with aspects of the parent-child relationship (closeness to father:  $b = -0.302$ ,  $p < 0.001$ ; talk to father:  $b = -0.285$ ,  $p < 0.001$ ; support from

father:  $b = -0.298$ ,  $p < 0.001$ ) but is not significantly associated with parental monitoring. Paternal incarceration is positively associated with family instability (parents separated:  $b = 1.096$ ,  $p < 0.001$ ; mother repartnered:  $b = 0.481$ ,  $p < 0.001$ ), positively associated with fathers' material hardship ( $b = 0.338$ ,  $p < 0.001$ ), and positively associated with children's externalizing behaviors ( $b = 0.041$ ,  $p < 0.001$ ).

In Table 3, we examine how each of the five sets of mediators alter the relationship between paternal incarceration and early sexual onset.<sup>7</sup> Model 1 (the equivalent of Model 2 of Table 2) presents the baseline model, the model against which we compare all subsequent models. We first consider the three sets of mediators that measure relationships between household members at age 9. The first two sets of mediators—parent-child relationship (Model 2, measured by closeness to mother/father, talking to mother/father, and support from mother/father) and parental monitoring (Model 3)—explain little of the association between paternal incarceration and early sexual onset (6% and 1%, respectively). The third set of mediators (Model 4, measured by parental separation and maternal repartnership) explains a moderate percentage of this association. Comparing this model to the baseline model, the coefficient decreases by 9% (from 0.297 to 0.269) but remains statistically significant ( $p < 0.05$ ). We find that, independently, separation explains more of the paternal incarceration coefficient (9%) than repartnership (5%).

We next consider economic strain as a mediator (Model 5, measured by mothers' and fathers' income-to-poverty ratio and material hardship), which explains little of the relationship between paternal incarceration and early sexual onset (3%). Finally, Model 6 shows that externalizing behaviors explains 13% of the paternal incarceration coefficient (from 0.297 to 0.260). In the final model, which simultaneously includes all proposed mediators, the association between paternal incarceration and early sexual onset decreases by 25% (compared to the baseline model) and to statistical non-significance. In this final model, externalizing behaviors is the only mediator statistically significantly associated with the outcome variable ( $b = 0.750$ ,  $p < 0.01$ ). Taken together, the results from these mediation analyses suggest that externalizing problems, but not the other considered mediators, explain some of the relationship between paternal incarceration and early sexual onset.<sup>8</sup>

## Heterogeneity in the Relationship Between Paternal Incarceration and Early Sexual Onset

The final set of analyses considers heterogeneity in the relationship between paternal incarceration and early sexual onset by child gender, by father's residential status

<sup>7</sup> These results are confirmed with Sobel-Goodman tests of mediation (Sobel 1986).

<sup>8</sup> Two mediating variables—parental monitoring and externalizing problems—are reported by both primary caregivers and children at the 9-year survey. In supplemental analyses, we substituted mothers' reports of these measures with children's reports of these measures. Results were consistent with the mothers' reports, with parental supervision explaining 0% of the paternal incarceration coefficient (compared to 1% when using mothers' reports) and externalizing behaviors explaining 7% of the paternal incarceration coefficient (compared to 13% when using mothers' reports).

**Table 3** Logistic regression models estimating early sexual onset as a function of paternal incarceration, with mechanisms (N= 3405)

	Model 1 baseline		Model 2 (+ parent-child relationship)		Model 3 (+ parental monitoring)		Model 4 (+ family instability)		Model 5 (+ economic strain)		Model 6 (+ externalizing behaviors)		Model 7 (+ all mechanisms)	
	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)	<i>b</i>	(SE)
Paternal incarceration	0.297	(0.119)*	0.280	(0.121)*	0.294	(0.119)*	0.269	(0.121)*	0.289	(0.120)*	0.260	(0.120)*	0.224	(0.124)
Child closeness to mother			-0.014	(0.077)									0.008	(0.078)
Child closeness to father			0.022	(0.077)									0.026	(0.077)
Child talk to mother			-0.056	(0.066)									-0.036	(0.067)
Child talk to father			0.004	(0.082)									0.001	(0.082)
Child support from mother			0.042	(0.101)									0.045	(0.101)
Child support from father			-0.066	(0.111)									-0.034	(0.114)
Parental monitoring					-0.213	(0.104)*							-0.179	(0.106)
Parents separated							0.106	(0.158)					0.120	(0.173)
Mother repartnered							0.119	(0.130)					0.088	(0.134)
Mother income-to-poverty ratio									-0.050	(0.049)			-0.046	(0.049)
Father income-to-poverty ratio									0.009	(0.034)			0.008	(0.034)
Mother maternal hardship									0.007	(0.034)			0.001	(0.034)
Father maternal hardship									0.024	(0.033)			0.019	(0.034)
Child externalizing behaviors											0.814	(0.268)**	0.750	(0.274)**
Constant	-5.940		-5.851		-5.815		-6.036		-6.027		-6.015		-5.719	
Log likelihood	-1182		-1181		-1180		-1180		-1179		-1175		-1170	

Early sexual onset defined as having first intercourse before age 15. All models adjust for all controls in Model 2 of Table 2

\*\**p* < 0.01. \**p* < 0.05 (two-tailed tests)

**Table 4** Logistic regression models estimating early sexual onset as a function of paternal incarceration, considering heterogeneity by child gender and father's pre-incarceration residential status ( $N=3405$ )

	Full sample		Residential $N=1917$		Non-residential $N=1488$	
	$b$	(SE)	$b$	(SE)	$b$	(SE)
Full sample	0.297	(0.119)*	0.518	(0.183)**	0.145	(0.171)
Boys ( $N=1749$ )	0.313	(0.149)*	0.647	(0.236)**	0.087	(0.221)
Girls ( $N=1656$ )	0.210	(0.217)	0.105	(0.362)	0.212	(0.306)

Early sexual onset defined as having first intercourse before age 15. Coefficients for paternal incarceration presented. All models adjust for all variables in Model 2 of Table 2. Sample includes 932 boys with residential fathers, 724 boys with non-residential fathers, 985 girls with residential fathers, and 764 girls with non-residential fathers. Coefficients for boys with residential fathers and boys with non-residential fathers are marginally statistically different from one another ( $p < 0.10$ )

\*\* $p < 0.01$ , \* $p < 0.05$  (two-tailed tests)

(prior to the measurement of incarceration), and by the intersection between child gender and paternal residential status (Table 4). First, we find some evidence that the magnitude of the association between paternal incarceration and early sexual onset is larger for boys ( $b=0.313$ , OR 1.37,  $p < 0.05$ ) than girls ( $b=0.210$ , OR 1.23,  $n.s.$ ), but these differences are not statistically significant ( $z=0.39$ ). Second, we find some evidence that the magnitude of the association is larger for children with residential fathers ( $b=0.518$ , OR 1.68,  $p < 0.01$ ) than for children with non-residential fathers ( $b=0.145$ , OR 1.16,  $n.s.$ ), but these differences are also not statistically significant ( $z=1.49$ ). Third, in examining the intersection of child gender and paternal residential status, we find that the relationship between paternal incarceration and early sexual onset is concentrated among boys with residential fathers ( $b=0.647$ , OR 1.91,  $p < 0.01$ ) and that this association is marginally significantly larger than the association among boys with non-residential fathers ( $z=1.73$ ).

## Discussion

A large literature documents that paternal incarceration, a commonly experienced family stressor among urban children, is consequential for outcomes across the life course (for reviews, see Foster and Hagan 2015; Johnson and Easterling 2012; Murray et al. 2012). In this article, we use newly available data from the Fragile Families and Child Wellbeing Study, a cohort of children born around the turn of the twenty-first century and followed for 15 years, to examine the consequences of paternal incarceration during adolescence. Adolescence is a particularly important life course period because experiences during this time play a pivotal role in magnifying or deflecting trajectories set in motion during early childhood (Crosnoe and Johnson 2011).

Specifically, we extend prior research on the intergenerational consequences of paternal incarceration for adolescents (Bryan 2017; Khan et al. 2018; Porter and King 2015; Roettger et al. 2011; Swisher and Shaw-Smith 2015) by considering how the stressor of paternal incarceration can be consequential for one type of adolescent

risk behavior, early sexual onset. Understanding the predictors of early sexual onset is important because it is correlated with a range of future outcomes, including elevated risks of sexually transmitted infections, depression, inconsistent contraceptive use, and early pregnancy (e.g., Resnick et al. 1997; Vasilenko et al. 2016).

Our results suggest three key conclusions about the relationship between paternal incarceration and early sexual onset. First, we find that the stressor of paternal incarceration is positively associated with early sexual onset. That is, adolescents who experience paternal incarceration in early or middle childhood, compared to adolescents who did not experience paternal incarceration during this time period, are more likely to report having sexual intercourse before age 15. Importantly, we find that this relationship persists despite adjusting for an array of demographic, socioeconomic, and behavioral indicators that are tightly correlated with exposure to paternal incarceration (e.g., parental substance use, impulsive behaviors). This is consistent with other research that documents a link between paternal incarceration and early sexual onset (Nebbitt et al. 2017) or other outcomes including adolescent pregnancy (Whalen and Loper 2014) and sexual risk behaviors (Khan et al. 2018; Smith et al. 2006). We extend this research by using a recent sample of urban children, many of whom are at risk of exposure to paternal incarceration, and by using prospective data and a wide array of control variables to provide a rigorous accounting of the relationship between paternal incarceration and early sexual onset.

Second, we extend prior research on this topic by considering the mediators linking paternal incarceration to early sexual onset, finding that one of the five sets of mechanisms we considered—externalizing problems at age 9—explains a modest percentage (13%) of the relationship. The explanatory power of externalizing problems is consistent with expectations. Research, which increasingly describes paternal incarceration as a stressor that can be quite consequential for children (Avison 2010; Turney 2014), consistently finds that the trauma, stigma, and strain stemming from paternal incarceration leads to increased externalizing problems in middle childhood (Hagan and Dinovitzer 1999; Turney 2017). In turn, externalizing behaviors have lasting implications for engagement in types of risky behavior such as early sexual onset (Duncan et al. 1999; Skinner et al. 2015). Some have suggested that the co-occurrence of externalizing behaviors and early sexual activity may reflect an underlying problem behavior syndrome (e.g., Duncan et al. 1999; Jessor 1991), one that could potentially be set in motion by a stressor like paternal incarceration.

Relatedly, we found that family instability (measured by parental separation and maternal repartnering) explained a modest percentage (10%) of the relationship between paternal incarceration and early sexual onset among adolescents but that these indicators of family instability were not independently linked to early sexual onset. We also found that three of five mechanisms that we considered—parent–child relationships, parental monitoring, and economic strain—explained virtually none of the association between paternal incarceration and early sexual onset among adolescents. The lack of explanatory power of these sets of mechanisms was inconsistent with expectations, given that theory and research suggests these mechanisms follow paternal incarceration and precede early sexual onset. One possibility is that parent–child relationships, parental monitoring, and economic strain simply do not explain the association between paternal incarceration and early sexual onset.

Another possibility is that the measures of parent–child relationships and parental monitoring do not capture these constructs well, as these measures have relatively low reliability. A third possibility is that these mechanisms are measured too distally from the measure of early sexual onset. In particular, the timing of parent–child relationships and parental monitoring may not capture normative developmental change in adolescence (Steinberg and Morris 2001). For example, parent–child relationships measured immediately prior to the timing of early sexual onset might provide more explanatory power than parent–child relationships measured at the 9-year survey (though data limitations preclude a consideration of this). Future research, ideally research that relies on more frequent data collection time points, should consider this possibility (Goldberg and Tienda 2017). Additionally, future research should consider additional time-varying mechanisms such as entry into romantic relationships, potentially important given links between non-traditional family forms and family instability and adolescent romantic relationship formation (Cavanagh et al. 2008; Cherlin et al. 1995; Valle and Tillman 2014).

Third, we extend prior research on this topic by considering heterogeneity in the intergenerational consequences of paternal incarceration for adolescents, finding that the relationship between paternal incarceration and early sexual onset is concentrated among boys living with their fathers. This group of adolescents is especially vulnerable to the negative consequences of paternal incarceration. This is consistent with theoretical expectations. First, theory suggests that the consequences of paternal incarceration may be stronger for boys than for girls, as the loss of a same-gender parent may create particular trauma, stigma, and strain (Foster and Hagan 2013). Second, theory suggests that the consequences of paternal incarceration may be stronger when children are living with their fathers prior to his incarceration (as opposed to when children are not living with their fathers prior to his incarceration), as it is these children who may experience the greatest changes in their lives (Turney and Wildeman 2013). The finding that the association between paternal incarceration and early sexual onset is concentrated among boys living with their fathers is also consistent with prior research that finds family disruptions such as paternal incarceration most strongly influence boys' behavior (Cooper et al. 2011; Haskins et al. 2018) and that paternal incarceration is more consequential among children with residential parents (Geller et al. 2012). More generally, these findings reinforce the fact that stressors are not equally consequential (Pearlin 1989) and highlight the importance of considering heterogeneity in the intergenerational consequences of the stressor of paternal incarceration.

## Limitations

We used the best available data to examine the relationship between paternal incarceration and early sexual onset among adolescents. The Fragile Families data include a relatively large number of individuals exposed to paternal incarceration in early and middle childhood and include rich information about adolescents over a 15-year period. Nonetheless, several aspects of the data—in addition to the relatively

wide intervals between the later waves of data collection, as described above—limit our conclusions.

First, an unobserved variable could render the relationship between paternal incarceration and early sexual onset spurious. We guard against this possibility, by adjusting for an array of parent and child characteristics and by carefully establishing proper time-ordering between our dependent, independent, and control variables. It is likely that our analyses present a conservative estimate of the association between paternal incarceration and early sexual onset, as children who experienced paternal incarceration between the 9- and 15-year surveys (but prior to sexual onset) are included in the comparison group. Second, specific indicators of paternal incarceration (e.g., frequency of father–child visitation) remain unobserved, and heterogeneous incarceration experiences may be differentially related to early sexual onset. Relatedly, given the stark differences between incarcerated men and women (Western 2018) and the differential consequences of paternal and maternal incarceration for children’s wellbeing (Wildeman and Turney 2014), maternal incarceration may be differentially associated with early sexual onset than paternal incarceration. Future research should investigate the consequences of maternal incarceration for early sexual onset among adolescents. Third, as described above, survey attrition means that there are some differences between the baseline sample and the analytic sample. It is not clear how these differences may bias the results, though. Some groups underrepresented in the analytic sample (such as children of foreign-born mothers) are less likely to experience paternal incarceration and early sexual onset (Goldberg et al. 2017; Turney 2017) and some groups overrepresented in the sample (such as non-Hispanic Black children) are more likely to experience paternal incarceration and early sexual onset (Abma and Martinez 2017; Sykes and Pettit 2014). Finally, we rely on retrospective self-reports of sexual onset timing, which are subject to both recall and social desirability biases (DiClemente 2016; Fenton et al. 2001). However, reports were elicited within two years of sexual onset for most sexually active youth, which should minimize the extent of biases.

## Conclusions

Our findings have several implications for policy and practice. First, by underscoring potential unintended consequences of paternal incarceration on adolescents, the findings highlight the need for changes to criminal justice policies and programs to minimize disruption of families (Khan et al. 2018). Second, the fact that externalizing behaviors explain some of the link between paternal incarceration and early sexual onset suggests that programs to prevent problem behaviors in childhood may have an added effect of delaying sexual onset in adolescence (Caminis et al. 2007) and, more generally, preventing a trajectory of risk behaviors persisting into adolescence and beyond (Khan et al. 2018). Third, the fact that associations between paternal incarceration and early sexual onset are concentrated among boys living

with their fathers prior to incarceration suggests that this group of children may be especially in need of interventions.

Paternal incarceration is by now well known as a mechanism of stratification in the United States (Foster and Hagan 2015). This is both because children have varying risks of exposure to paternal incarceration—with the most disadvantaged children more commonly exposed to paternal incarceration than their counterparts—and because paternal incarceration is associated with a range of deleterious outcomes in childhood. Our findings extend prior research on the deleterious consequences of paternal incarceration by suggesting that the consequences of paternal incarceration persist into adolescence and, specifically, influence the timing of entry into sexual activity (Bryan 2017; Swisher and Shaw-Smith 2015). Given that early sexual onset is linked to a range of negative outcomes in adolescence and adulthood (e.g., Kaestle et al. 2005; Resnick et al. 1997), these findings suggest one more pathway through which the prison boom shapes inequality in the United States.

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## Appendix

See Table 5.

**Table 5** Propensity score matching models estimating the association between paternal incarceration and early sexual onset

	Treatment <i>N</i>	Control <i>N</i>	<i>b</i>	SE
Unmatched estimates	1001	2404	0.661	(0.104)***
Matched estimates	975–995	2404	0.275	(0.123)*
Matched estimates (doubly robust)	975–995	2404	0.308	(0.127)*

Matched estimates use Kernel matching, using all control variables in Table 1 in the matching equation. Doubly robust estimates further adjust for control variables after matching. All estimates are restricted to the region of common support. Standard errors in parentheses. Treatment group *N*s vary across imputed data sets

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

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