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**Social Exclusion and Parental Incarceration Impacts on
Adolescents' Networks and School Engagement**

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Social Exclusion and Parental Incarceration Impacts on Adolescents' Networks and School Engagement

ABSTRACT

Although prior research links parental incarceration to deleterious outcomes for children over the life-course, few studies have examined whether such incarceration affects the social exclusion of children during adolescence. Drawing on several lines of scholarship, we examine whether adolescents with incarcerated parents have fewer or lower quality relationships, participate in more antisocial peer networks, and feel less integrated or engaged in school. The study applies propensity score matching to survey and network data from a national sample of youth.

Analyses indicated that children with incarcerated parents have more antisocial peers; we found limited evidence, though, that parental incarceration adversely impacts peer networks and school integration domains. Generally, the results suggested that the impacts of parental incarceration on adolescents' social lives have less to do with isolation than with the types of peers adolescents befriend. Findings provide support for the idea that parental incarceration may adversely affect children's social exclusion.

Keywords: parental incarceration, social exclusion, adolescents, peers, mass incarceration

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INTRODUCTION

The dramatic expansion of the prison system in the United States has spurred interest in understanding the implications that incarceration may pose for families. This focus stems in part from recognition that the impacts extend beyond public safety and recidivism (e.g., Mears & Siennick 2016; Nagin et al. 2009; Western 2006). Incarceration may, for example, adversely affect the children of those who have been incarcerated (Aaron & Dallaire 2010; Arditti 2012; Braman 2004; Wakefield & Wildeman 2014). A recent report by The Pew Charitable Trusts indicates that more than 50 percent of U.S. inmates are parents with minor children, resulting in more than 2.7 million children in the U.S. with an incarcerated parent (2010; see also Mumola 2000). Parental incarceration has been linked to children's problems in several different life domains—health, behavior, education, material well-being, political participation, homelessness, employment, and other later life course outcomes (Cho 2010; Eddy & Poehlmann 2011; Foster & Hagan 2007; Geller et al. 2012; Roettger & Boardman 2012; Uggen & McElrath 2014; Wildeman 2014). Such outcomes stem in part from ways in which incarceration marginalizes individuals and their families and excludes them from conventional society. There remains, however, a limited understanding of potential earlier marginalization or exclusion experienced by children of incarcerated parents.

Scholarship suggests that incarceration leads to shame, psychological distress, and the

stigmatization of families (e.g., Eddy & Reid 2003). The subsequent consequences for adults can include the cessation of romantic partnerships, exclusion from social activities, and disconnection from the labor market. We suggest that children may experience analogous consequences in domains appropriate to their developmental stage. Parental incarceration may lead to the cessation of peer relationships, contribute to children gravitating or feeling pushed toward antisocial peer contexts, and reduce their integration in school. More generally, it may lead to children's social exclusion. To date, however, few empirical studies exist that assess the impact of parental incarceration on social exclusion among youth (see, e.g., Arditti 2012; Foster & Hagan 2015; Murray & Murray 2010), especially during the period of adolescence (Bockneck et al. 2009; Foster & Hagan 2007; Johnson & Easterling 2012; see, however, Lowenstein 1986). Understanding the potential for the incarceration of parents to adversely influence the social lives of children is important because it can shed light on a critical period of the life-course, and on the potential beginnings of consequences that extend into adulthood and that go well beyond the intended effects of incarceration (i.e., reduction of crime; Arditti 2012; Ross & Reid 2003; Shlafer & Poehlmann 2011; Warr 2002).

Accordingly, the goal of this study is to examine whether parental incarceration affects adolescent social exclusion and, in so doing, to contribute to efforts to illuminate the consequences of incarceration and its role in adolescent development. Specifically, we examine effects on peer relationships and integration in school—two major social contexts for adolescents. The focus on these dimensions reflects the facts that the social lives of adolescents revolve around peer relationships *and* that these relationships typically occur within a school context (Dallaire & Aaron 2011; Shlafer & Poehlmann 2011). Social exclusion among adolescents thus may simultaneously entail isolation from peers and school. This dual focus

parallels prior studies of parental incarceration that examine behaviors and social contexts germane to later life course stages (see, e.g., Foster & Hagan 2007, 2009; Lee et al., 2014). The focus stems, too, from calls for research on how parental incarceration may influence youths' relationships (e.g., Arditti 2012; Johnson & Easterling 2012; Lowenstein 1986; Phillips et al. 2002), and on the effects of mass incarceration on families with children (Hagan & Dinovitzer 1999; Johnson & Easterling 2015).

To investigate the effects of parental incarceration on social exclusion of youth, we examine data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Propensity score matching is used to estimate the effect of parental incarceration on peer network size and quality, association with antisocial peers, and integration or engagement in school. The results provide mixed support for the possibility that parental incarceration contributes to the social exclusion of children.

BACKGROUND

Parental Incarceration and Its Effects on Children and Social Exclusion

A growing body of literature exists aimed at identifying the wide-ranging implications of parental incarceration for families and children (Aaron & Dallaire 2010; Braman 2004; Wakefield & Wildeman 2014). Parental incarceration has, for example, been shown to adversely affect the future education, income, and labor market prospects of children (Cho 2009; Giordano 2010; Hagan & Dinovitzer 1999; Haskins 2014; Turney & Haskins 2014), and studies consistently link parental incarceration to an increased likelihood that children go on to engage in

future crime and eventually experience their own incarceration (Besemer et al. 2011; Kjellstrand & Eddy 2011; Mears & Siennick 2016; Murray & Farrington 2005; van de Rakt et al. 2012).

More broadly, scholarship over the past two decades indicates that parental incarceration and the family fragility caused by it may have profound, collateral impacts that work to marginalize youth in diverse ways during adulthood (e.g., Foster & Hagan 2007; Lee & McLanahan 2015; Turney & Haskins 2014; Wakefield & Wildeman 2013).

Prior scholarship has used the phrase “social exclusion” and others, such as “exclusionary outcomes” (Foster & Hagan 2015), to refer broadly to the possibility that parental incarceration reduces family members’ social integration across various micro- and macro-level domains (see, generally, Kahn & Kamerman 2002; Micklewright 2002; Murray 2007; Walker & Walker 1997). Here, we use the phrase “social exclusion” to refer specifically to potential adverse, micro-level impacts on social experiences. Few empirical studies have focused on social exclusion, or other outcomes, that can result from parental incarceration and that occur during adolescence (see, however, Bockneck et al. 2009; Turney & Haskins 2014). Foster & Hagan (2007) provide one of the most comprehensive assessments of how parental incarceration may marginalize children after adolescence, in early adulthood. The authors used Wave 3 from the Add Health data—when respondents were young adults ages 18 to 26—to evaluate the extent to which paternal incarceration leads to cumulative disadvantages that eventually manifest into heightened forms of social isolation. They found parental incarceration may be linked to such adverse effects as homelessness, healthcare uninsuredness, and political nonparticipation during the transition to adulthood. These types of outcomes can be framed broadly as collateral consequences of parental incarceration, but can also be viewed as more extreme forms of social isolation, or exclusion, experienced by youth in later life-course stages.

*Theoretical Pathways Linking Parental Incarceration to Adverse Effects on Adolescent Peer
Contexts and Engagement in School*

This paper focuses on the potential impacts of parental incarceration on adolescents' social lives. In so doing, it examines youth relationships with peers and involvement in school. This dual focus stems from two considerations. First, peer relationships typically are more important during adolescence, and, second, these relationships occur primarily within a school context, one that can be important in its own right and that may compete with or shape these relationships (Akers et al. 1979; Haynie & Osgood 2005; Matsueda & Anderson 1998; Patterson & Dishion 1985; Dallaire & Aaron 2011; Shlafer & Poehlmann 2011; Warr & Stafford 1991). Traumatic events, such as parental incarceration, may disrupt these relationships and a youth's integration into school life. Such a possibility appears especially likely given that adolescence is a critical period for the development of social skills and identity; it also is a period during which youth undergo several forms of rapid change (see, e.g., Shlafer & Poehlmann 2011).

To advance this argument, we begin with a discussion of prior theory and research that anticipates adverse effects of parental incarceration on adolescent peer relationships and engagement in school. This work points to three potential pathways through which parental incarceration may shift or otherwise affect adolescent social experiences and cause social exclusion during adolescence.

First, scholarship argues that parental incarceration causes increased shame and embarrassment among youth (e.g., Lowenstein 1986; Boswell & Wedge 2002; Nesmith & Ruhland 2008). The incarceration of a parent, along with the difficult and potentially embarrassing family circumstances that may result from their incarceration, may impede youths'

abilities to sustain or make new social relationships. Shame and embarrassment may stem from internal sources—youth may themselves feel their own sense of shame for their parent's and family's situation, or they may anticipate harsh stigmatization from their peers (Lowenstein 1986). There may also be external sources of shame if peers or others outwardly embarrass youth in their day-to-day life activities because of a parent's incarceration (see, e.g., Boswell & Wedge 2002; see also, Sack 1977). Regardless of its internal or external source, embarrassment about the incarceration and the family circumstances that stem from it may lead children to seek to minimize any instances where they may be compelled to discuss their parent or familial circumstances. Prior studies and surveys of youth with incarcerated parents find, for example, that youth feel pressure to keep their parental incarceration a secret due to the stigmatization and shame that they perceive to be attached to it (Braman 2004; Johnson & Easterling 2015; Johnston 1995; Lowenstein 1986; Nesmith & Ruhland 2008).

Such experiences may contribute to social exclusion. They may, for example, isolate youth by pushing them away from social activities and relationships, in turn potentially disrupting their ties to others. If youth are able to maintain relationships, these relationships may be less intimate and more superficial. In addition, shame and embarrassment stemming from parental incarceration may cause a shift in the extent to which a given youth feels like he or she “belongs” amongst his or her peers, causing youth to withdraw (Lowenstein 1986). It seems plausible, too, that youth who have experienced parental incarceration might anticipate feeling a greater sense of belonging among peers who are involved in criminal behavior; such individuals may be viewed as less likely to judge youth for their parents' status as incarcerated felons. In short, adolescents with incarcerated parents may withdraw from their social networks. Simultaneously, they may gravitate towards less normative, or delinquent, peer groups and also may feel less

connected to their schoolmates and school (Arditti 2012; Bockneck et al. 2009; Lowenstein 1986; Poehlmann 2005a; see also Braman 2004; Rulison et al. 2014).

Second, there may be an indirect labeling effect of parental incarceration. Any social label applied to an incarcerated parent may transfer, at least partly, to his or her child. Here, as with the experience of shaming, this label may stem from internal (e.g., self-labeling) or external sources (e.g., discrimination based on parent's status). This process may have similar outcomes as shame and embarrassment, but entails a different experience. A labeling process involves substantial change in an individual's perception of self (see, generally, Lemert 1951; Paternoster & Iovanni 1989). For example, adolescents with incarcerated parents may begin to internalize their parents' felony label (Giordano 2010). They may begin to see themselves as the "inmate's kid" or the "future felon." Externally, labels may arise through the treatment that youth receive from others. Parental incarceration, for example, may elicit differential treatment from teachers or peers. An illustration of this possibility comes from a study by Dallaire and colleagues (2010), who conducted an experiment to gauge how parental incarceration may change teachers' perceptions; they found that parental incarceration adversely affects perceived competency of their students. It is possible, too, that youth may perceive that they receive differential treatment. The outcome is the same in each instance—youth may adopt a deviant self-concept.

The labeling or stigmatizing effect of parental incarceration suggests yet another basis for anticipating that youth with incarcerated parents will withdraw from peer networks and become less integrated into normative social institutions. Youth who experience labels may feel less accepted among their peers in general. In addition, the labeling effect may cause youth to feel especially distant from prosocial peers—that is, from peers who they perceive are less like themselves. Instead, these youth may feel a greater affinity with those who engage in antisocial

activity. The end result, then, is that the youth may turn away from a normative social peer context and toward an antisocial peer context because doing so would accord more with “criminal” or “inmate” labels (Giordano 2010).

Third, as a result of parental incarceration, a child may experience the loss of an important social role model. This third pathway highlights the possibility that the incarceration of a parent diminishes a child’s exposure or access to an adult figure who models prosocial behavior. This possibility may seem contradictory—those who go to prison have committed crimes and so presumably role model criminality. However, parents may commit crimes but not expose their children to this activity (Dallaire & Wilson 2010) or may condemn it; at the same time, they may model prosocial behavior and relationships (Giordano 2010; Kampfner 1995; see, generally, McLanahan & Bumpass 1988). Prior literature suggests that it is not uncommon for parents with criminal records to do so and to emphasize higher moral standards (i.e., “do as I say, not as I do”) to their children (e.g., Braman 2004; Rose & Clear 1998).

Concomitant to this possibility is the fact that incarceration of one parent leaves the remaining caregiver in a precarious position. Indeed, scholarship suggests that the remaining, non-incarcerated parents or caregivers experience substantial stress as a result of a spouse, partner, or family member’s incarceration (e.g., Arditti 2012; Braman 2004; Mackintosh et al. 2006; Wildeman & Western 2010; Turanovic et al. 2012; Turney 2014, 2015). This stress can adversely affect parenting behaviors of non-incarcerated caregivers. It may cause increased social isolation, greater use of harsh punishment towards children, more aggressiveness, and lead to role modeling of antisocial rather than prosocial behaviors (Dallaire & Zeman 2013).

The end result, then, is that parental incarceration may inhibit youths’ ability to develop prosocial relationships. Prior studies suggest, for example, that youth with limited social skills

are more likely to garner negative reactions from peers and teachers, which increases the risk of social withdrawal (Eddy & Reid 2003; McLanahan & Bumpass 1988; Parke & Clarke-Stewart 2002). This process, too, may limit youths' social network size and prosocial peer options, and push youth towards antisocial peer groups and away from normative peers and school activities.

These three mechanisms suggest that parental incarceration may increase the social isolation of youth. However, there exists the possibility that parental incarceration helps children. For example, families may benefit if the incarcerated parent was abusive or exerted a criminogenic influence on children and partners (for discussion, see Rose & Clear 1998; Western 2006). For adolescent socialization, the incarceration of the “bad” parent may reduce the shame or embarrassment that they feel; they may feel more comfortable, for example, bringing friends home. Such incarceration also may facilitate better parenting and social role modeling by the remaining parent or by a new guardian (Eddy & Reid 2003). It is possible, too, that incarcerated parents may change, and, in particular, may focus their attention on improving their relationships with their loved ones (Comfort 2008; Edin et al. 2004; Roy & Dyson 2005; Turney 2015). In short, compelling arguments can be advanced that parental incarceration may harm or help children in their development during a critical life state, adolescence. The unanswered question, then, is whether such incarceration is in fact harmful or beneficial to the social lives of adolescents.

CURRENT STUDY

The goal of this study is to address this research gap. Drawing on the theoretical pathways identified above, and literature that consistently has identified harmful longer-term effects of

parental incarceration, we hypothesize the following: (1) Parental incarceration is associated with lower size and quality of adolescent social networks, (2) parental incarceration is associated with youth involvement in less prosocial and more antisocial peer contexts, and (3) parental incarceration is associated with youth school disengagement. The salience of this focus stems from the importance of understanding how incarceration affects youth and from the potential for shorter-term effects on social exclusion to create ripple effects that contribute to longer-term harms (Eddy & Poehlmann 2011; Eddy & Reid 2003; Mears & Siennick 2016; Warr 2002).

Heeding the recommendations of recent scholarship (Cho 2009; Johnson & Easterling 2012; Wildeman et al. 2013), we use propensity score matching to account for confounding that may be associated with parental incarceration and measures of social exclusion. The matching methodology works to account for measured sources of selection bias by matching “exposed” (youth with incarcerated parents) to “not exposed” youth, based on a range of personal and family background characteristics. When used with a wide range of relevant matching covariates, it holds the potential to provide a more credible basis on which to estimate the effects of parental incarceration (Johnson & Easterling 2012; Mears & Siennick 2016; Wildeman et al. 2013).

DATA

This study uses data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), which is a panel study using a nationally representative sample of school-age youth drawn from a stratified sample of 132 schools. To date, the Add Health data consist of a schoolwide in-school survey completed by over 90,000 respondents in the selected schools,

followed by four waves of in-home survey interviews following a random subset of respondents from those schools over time ($N = 20,745$ at Wave 1; $N = 15,701$ at Wave 4). Friendship network information was collected as part of the in-school surveys. Respondents' parents were also surveyed at Wave 1. The focus of our analysis is on measures taken primarily from the in-school survey (1994-1995) and the Wave 1 (1994-1995, age range 11-21), 3 (2001-2002, age range 18-28), and 4 (2007-2008, age range 24-34) in-home surveys. We thus use data from the 11,681 respondents who participated in all three of those surveys. Across the study variables, median missingness was 9%. We used multiple imputation to reduce potential bias from item-missing data. Specifically, we created ten imputed datasets and combined resulting estimates across them using Rubin's (1987) rules.

Our analyses are unweighted. The Add Health data does not provide a weight tailored to the specific combination of surveys and waves that we use here (in-school, in-home Wave 1, in-home Wave 4). Nonetheless, following the recommendation of DuGoff et al. (2014), we re-estimated our models using as a matching covariate the sample weight provided for respondents who participated in the in-home surveys at Waves 1 and 4. The results were substantively similar to the results presented here.

Independent (exposure) variable

At Wave 4, respondents were asked to report whether either of their parents had spent time in a jail or prison, and how old they were when that first occurred. We used this information and respondents' ages at the Wave 1 interview to create our "exposed" group of youth whose parent(s) had been incarcerated before Wave 1 ($N = 1,441$) and a dichotomous indicator of

exposure, *parent ever incarcerated* (1 = parental incarceration, 0 = no parental incarceration).

This measure serves as the dependent variable in our propensity score estimation model, and as the independent variable used in post-matching regression analyses to predict adolescent social exclusion outcomes.

Dependent variables

We predict a series of measures of adolescent peer relationships, peer behaviors, and engagement in school. For peer relationships and behaviors, we used friendship network data collected in the in-school surveys. Those surveys asked respondents to nominate up to five of their male friends and five of their female friends from their school rosters. Because entire schools were targeted for the in-school survey, it was possible to match the nominated friends with those friends' survey responses about their own behaviors.

Peer relationships. For peer relationships, we examine the following six measures.

Friendship nominations received is the number of other respondents who indicated a given respondent was their friend. *Friendship nominations made* is the number of friends nominated by the respondent; because the survey allowed respondents to nominate up to five male and five female friends, this measure was bounded at ten. The respondent's *centrality* is an index of his or her "connectedness" or prominence in the school network. We use a measure of Bonacich centrality, which is a function of the respondent's number of friends weighted by his or her friends' own centrality. The respondent's *reach* is a continuous index of the number of people the respondent could reach through his or her friendship ties. *Best friend* is a dichotomous measure indicating whether the respondent identified having a best friend (1 = best friend, 0 = no

best friend). The respondent's network *density* is an index of the cohesion of his or her personal friendship network. We measure density as the proportion of pairs of friends within the respondent's set of friends—including those nominated by the respondent and those who nominated the respondent—who are friends with each other.

Peer behavior. For peer behavior, we include seven continuous measures representing the average score on the indicated in-school survey item across all of the respondent's nominated friends. For example, *friends' GPA* is the average of friends' scores on a GPA measure calculated as the friend's mean grade across English, math, social studies, and science (1 = F, 4 = A). We include similarly computed measures of *friends' smoking*, *friends' drinking*, *friends' getting drunk*, *friends' lying*, *friends' skipping school*, and *friends' fighting* (for each, 0 = never, 6 = nearly every day).

School engagement. Last, for school engagement, we examine six measures taken from the in-school survey. *Adolescent not in any school clubs* is a dichotomous measure indicating whether the respondent reports involvement with school clubs (1 = yes, 0 = no). *Adolescent has trouble with teachers* is an ordinal measure with values ranging from 0 to 4; higher values indicate more trouble with teachers. *Adolescent has trouble with other students* is an ordinal measure with values ranging from 0 to 4; higher values indicate more trouble with other students. *Adolescent does not feel close to others at school* is an ordinal measure with values ranging from 1 to 5; higher values indicate less closeness to others. *Adolescent does not feel part of school* is an ordinal measure with values ranging from 1 to 5 and higher values indicate a stronger sense of feeling detached from school. And *adolescent does not feel socially accepted* is an ordinal measure with values ranging from 1 to 5; higher values indicate an increased sense of not feeling socially accepted.

Matching covariates

To estimate the propensity score, we incorporate a diverse range of matching covariates, many of which stem from Wave 1 of the Add Health in-home survey data (unless otherwise noted). They measure theoretically relevant dimensions for predicting parental incarceration that align with measures used in prior empirical studies of parental incarceration (e.g., Aaron & Dallaire 2010; Murray & Farrington 2005; Turney & Haskins 2014; Mears & Siennick 2016; for reviews, see Johnson & Easterling 2012; Wildeman et al. 2013). Specifically, and after consulting prior literature, we identified available measures in the Add Health data that address potential confounding that would bias the estimates of parental incarceration effects (Brookhart et al. 2006). These span a range of important domains, including youth's demographic characteristics, socioeconomic status, family structure, stability, and intimacy, and characteristics that might otherwise affect social isolation, including immigration status, mother's age at birth, neighborhood disorder, and years at current school.

Unfortunately, some of the matching covariates were measured after Wave 1 and so they were not measured prior to the incarceration of a parent. It is possible that some were affected by parental incarceration, and thus were mediators rather than confounds. Matching on these measures may operate to underestimate potential exposure effects on the outcomes. Thus, we present two sets of analyses. The first set—the full matching model—utilizes all matching covariates described below and ignores any potential time-order problems. The second set of analyses—the reduced matching model—accounts for time-order by matching only on covariates that could not plausibly have been affected by exposure to parental incarceration. Each set of analyses has particular strengths. The first set uses more matching variables and so accounts for

more potential sources of confounding. The second set, although it is arguably less stringent because it uses fewer matching variables, may provide more accurate estimates of parental incarceration effects because the matching variables included could not be caused by parental incarceration. Inspection across the two sets of findings is, we believe, important for developing a balanced assessment of how parental incarceration impacts adolescent social exclusion.

Table 1 provides the descriptive statistics for the full set of matching covariates (described below) and the measures used as independent and dependent variables described above. Descriptive statistics are presented for the full sample, and then separately for the exposed and non-exposed group. We account for respondent demographics using a continuous measure of the *adolescent's age*, and the following dichotomous measures: *adolescent is male* (1 = yes, 0 = no), *black* (1 = yes, 0 = no), *Hispanic* (1 = yes, 0 = non-no), and *other non-white race/ethnicity* (1 = yes, 0 = no; *white* = reference category for race and ethnicity variables). We also include the following rich set of matching covariates in our regression model that measure various household, family, and personal characteristics, all of which are used to estimate the propensity scores. *Household socioeconomic status* is the mean of the Z-scores of respondents' parents' occupational prestige and educational attainment at Wave 1. *Parental economic hardship* is taken from the parent survey at Wave 1 and indicates whether the parent reports having insufficient funds to pay bills (1 = yes, 0 = no). *Intact family during adolescence* is a binary measure based on information from respondents and their parents that indicates whether respondents lived in a two-married-parent household at Wave 1 (1 = yes, 0 = no). *Number of siblings* is an ordinal measure of whether respondents had no, one, or more than one sibling.

Mother-adolescent separation and *father-adolescent separation* are based on information from respondents and their parents and measure whether biological mothers or fathers,

respectively, had ever lived in a different household other than that of the respondent prior to Wave 1 (1 = yes, 0 = no). *Maternal alcoholism* and *paternal alcoholism* are dichotomous indicators of whether respondents' parents reported that the respondent's biological mother or father had alcoholism (1 = yes, 0 = no). *Mother-adolescent closeness* and *father-adolescent closeness* are index variables that range from 1 to 5 assessing respondents' reported closeness to their mothers and fathers, respectively, with higher values indicating stronger closeness.

Childhood sexual abuse is taken from the Wave 3 in-home survey and is an index measure that ranges from 0 to 5 with higher values indicating more self-reported instances of childhood sexual abuse prior to sixth grade. *Residential mobility* is a dichotomous measure indicating whether a respondent's family had moved to a new residence in the past five years (prior to Wave 1; 1 = yes, 0 = no). *English-speaking household* is a dichotomous measure indicating whether English is usually spoken in the home (1 = yes, 0 = no). *Immigrant* is a dichotomous measure indicating whether respondents were born outside of the U.S. (1 = yes, 0 = no). *Low birth weight* is a dichotomous measure based on parents' reports of whether respondents weighed less than five pounds and eight ounces at birth (1 = yes, 0 = no). *Mother's age at adolescent's birth* is based on information from respondents and their parents and is a continuous measure of the difference between mothers' and respondents' age at Wave 1 (in years). *Neighborhood disorder* is a continuous measure that is the mean value of two ratings by parents at Wave 1 of the extent to which litter or trash, and drug dealers and users, were problems in their neighborhood. *Years at current school* is a count measure of the number of years a respondent has been at their current school, taken from the in-school survey.

METHODS

Our analyses proceeded in the following stages. First, we estimated a logistic regression equation, where parental incarceration was regressed on the matching covariates. The predicted values from this model represented respondents' propensities for experiencing parental incarceration.

Second, using the *psmatch2* command written for Stata, we then matched exposed respondents with not exposed respondents that had similar predicted values from the logistic regression model. For this, we used three nearest-neighbor matching strategies: one-to-one matching without replacement with a .005 caliper, five-to-one matching with replacement and a .005 caliper, and one-to-one matching without replacement and a .001 caliper. We treated the first matching specification—one-to-one matching without replacement with a .005 caliper—as the benchmark set of analyses. In the presentation of post-matching regression results (see further below), we used gray shading to indicate these benchmark results. The additional matching procedures acted as checks on the robustness of the benchmark results, including when the matching requirements were loosened (i.e., five-to-one matching) or tightened (i.e., a .001 caliper).

Third, we examined the extent to which the matching procedure achieved “balance” or eliminated statistically significant differences in the matching covariates between the two groups (see, e.g., Becker & Ichino 2002; Rosenbaum & Rubin 1985; Winship & Morgan 1999). As an additional check, for logistic and ordinal matching variables, we used logistic and ordinal regression models to ensure that the dichotomous exposure indicator was a non-significant predictor of those matching variables under each matching strategy.

Fourth, we turned to a series of post-matching regression equations among exposed cases and

the statistically comparable group of not exposed cases to estimate the effects of having a parent incarcerated, across each of the peer relationship, peer activity, and school engagement measures. Here, we analyzed a series of separate regression equations, appropriate to the distributions of the outcome variables (i.e., linear, logistic, and ordinal regression), with each outcome regressed on the exposure indicator variable. In ancillary analyses (provided in the paper's appendix) we assessed the robustness of the results across an additional matching specification and a different post-matching estimation technique. In those analyses, rather than using regression models to test for differences in outcomes between the exposed and not exposed groups, we estimated "average treatment effects on the treated" (ATT) via the differences in means estimated as part of the *psmatch2* command (regardless of the distributions of the outcomes). In addition to the three different types of nearest-neighbor matching strategies described above, we included in the appendix results from radius matching with a .005 caliper.

These analytical stages were first conducted using a full matching specification (all covariates). We then repeated the process using a reduced matching specification that, as described earlier, is meant to account for any potential time order problems that might bias exposure effect estimates. The reduced matching analysis retained the following covariates: age, male, race/ethnicity, number of siblings, parental alcoholism, English-speaking household, immigrant, low birth weight, and mother's age at birth.

FINDINGS

The focus of our analysis was assessing the extent to which youth with incarcerated parents experience heightened forms of social exclusion. The bivariate comparisons shown in table 1

indicate that parental incarceration is associated with a wide range of adolescent social experiences. Comparing youth who have experienced parental incarceration with those who have not, we see modest evidence of modestly higher social exclusion among the group that experienced parental incarceration. For example, peer relationship outcomes indicate that youth with an incarcerated parent have overall more limited peer networks. Specifically, parental incarceration is linked to fewer friendship nominations received (4.02 versus 4.50) and fewer friendship nominates made (3.95 versus 4.46), reduced centrality in peer networks (0.69 versus 0.82), reduced social reach (524.27 versus 583.82), and a slightly lower percentage of youth with incarcerated parents reporting having a best friend (0.71 versus 0.76); each of these differences was statistically significant.

A similar pattern of increased social exclusion for youth with incarcerated parents surfaces as we move down the table and examine peer behavior and school engagement. In particular, youth with incarcerated parents associate with more antisocial peers; that is, parental incarceration is linked to somewhat lower average friends' GPA (2.63 versus 2.82) and somewhat higher averages on friends' smoking (1.25 versus 1.09), drinking (1.23 versus 1.17), getting drunk (0.71 versus 0.66), lying (2.30 versus 2.12), skipping school (0.63 versus 0.55), and fighting (0.87 versus 0.71). Similarly, we see a difference in the expected direction across each measure of school engagement. Youth with incarcerated parents are more likely to report that they do not participate in school clubs (0.20 versus 0.15), report more trouble at school with teachers (1.37 versus 1.19) and peers (1.79 versus 1.53), and report a reduced sense of belonging at school, across a range of dimensions, compared to youth without incarcerated parents.

Insert table 1 here

In short, parental incarceration appears to be associated with substantial differences across social and school outcomes, indicating overall greater social exclusion for those youth during adolescence. Bivariate comparisons, however, are not valid estimates of the *effects* of parental incarceration. We can also see in table 1, by comparing the matching measures across exposed and not exposed cases, that the groups vary across many substantive dimensions that potentially are important for social adjustment. For example, non-intact and less emotionally close families, parental alcoholism, disordered neighborhoods, and shorter school tenures, among other factors, all are more common among youth who have had a parent incarcerated.

Full matching analysis

To address these group compositional differences, we now turn to a propensity score matching analysis, which sought to create comparable exposed and not exposed groups. Table 2 provides the logistic regression results used to predict exposure propensities. Parental incarceration was regressed on the matching covariates. Inspection of the table reveals relationships between each of the matching covariates and the likelihood of parental incarceration. For example, the model results indicate that black (0.30) and Hispanic (0.27) youth, youth from more disadvantaged households (-0.34), and youth from more disordered neighborhoods (0.15) are more likely to experience parental incarceration. Other matching covariates also predict parental incarceration and are in the expected directions.

Insert table 2 here

Turning now to the matching results, table 3 provides descriptive statistics for the matched sample, along with diagnostic statistics that help assess whether balance was achieved as a result of the propensity score matching. The statistics in table 3 are based off of the one-to-one without replacement matching (.005 caliper) approach, and the same statistics produced using the other matching approaches were substantively the same (not shown). The final matched sample under this strategy contains 1,369 exposed and 1,369 not exposed cases, and includes only cases that fell in the region of common support (e.g., Becker & Ichino 2002); that is, only cases for which propensity scores fell within the range of overlap between exposed and not exposed groups' scores.

Comparing across the exposed and not exposed groups in table 3, the matching appears to have successfully reduced substantive differences between the two groups and results suggest that statistical balance has been achieved. By contrast to the group comparisons pre-matching, exposed and not exposed cases after adjustment are statistically identical for each of the matching covariates, including dimensions such as race, ethnicity, socioeconomic indicators, parental alcoholism, measures of family structure, and neighborhood disorder. Each of these dimensions, and many others, revealed substantively large differences in the two groups prior to matching that now have been eliminated. The third column in table 3 provides the *t*-scores for a significant difference test between the two group means for each variable. None of these values reach conventional levels of statistical significance, indicating that no statistically significant differences remain after matching. The final column in the table provides a statistic indicating remaining percent bias between the two groups for each covariate. In each instance, the remaining percent bias is low, with the highest value reaching only 4 percent. Taken together, post-matching statistics indicate that balance was achieved.

Insert table 3 here

The final step—and the main focus of the analysis—involved using the matched sample to assess differences between exposed and not exposed cases for each of the adolescent social exclusion dimensions. Table 4 provides coefficient estimates from a series of regression models that estimate the effect of parental incarceration using only matched cases. Each row represents a different outcome measure that was regressed on the parental incarceration exposure indicator variable. We repeated these regression models across the three different matching techniques. Subscripts indicate the type of regression used based on the nature of the outcome measure (linear, logistic, or ordinal regression).

Insert table 4a here

The outcome measures were split into three categories: peer relationships, peer behaviors, and engagement in school. Beginning with peer relationships, we do not see consistent evidence of an adverse impact of parental incarceration on the size and quality of adolescent social networks. Regardless of the matching specifications, the coefficients for parental incarceration in predicting friendship nominations received and made—as well as centrality, reach, and the likelihood of youth reporting having a best friend—are negative. However, the effects do not reach statistical significance. The only estimate that does reach statistical significance is for centrality (-0.05) when the analysis is conducted among statistically comparable groups created using a less conservative five-to-one matching approach with replacement. Similarly, in ancillary analyses using radius matching, parental incarceration was marginally significantly

associated with centrality, but was unassociated with the other five peer relationship outcomes (see appendix, column D).

By contrast, we find evidence that parental incarceration predicts a more antisocial peer context, as measured by several indices of friends' behavior. Although the coefficients are similar regardless of the matching specifications, there are some slight differences in statistical significance across specifications. Across the three matching strategies, friends of youth with ever-incarcerated parents have significantly lower GPAs and engage in significantly more lying and fighting. Parental incarceration is a marginally significant predictor of friends' skipping school in two of the three matching strategies. In addition, under the five-to-one strategy, parental incarceration is a marginally significant predictor of friends' smoking. The ATT analyses presented in the Appendix provide similar estimated effects. These estimates provide additional insight into the substantive differences between these groups for each of these dimensions. For example, the average GPA score for the exposed group is 2.64 compared to 2.71 for the not exposed group, which amounts to an average difference of .08. For peer lying the average difference is .13 (2.30 for exposed versus 2.17 for not exposed) and for peer fighting the average difference is .06 (.87 for exposed versus .81 for not exposed). Regardless of matching approach, then, there appears to be modest, adverse effects of parental incarceration across several dimensions of antisocial peer context.

The final set of coefficient estimates reveals only limited evidence of effects of parental incarceration on school engagement. Across the three matching strategies, we see that youth with incarcerated parents feel significantly less like they are a part of school; parental incarceration is not consistently associated with other school outcomes. However, the five-to-one matching procedure yields one additional marginally statistically significant difference

between exposed and not exposed cases—children of incarcerated parents are less likely to be involved in school clubs. Here, again, findings from ancillary analyses using ATT estimates post-matching instead of regression analyses are substantively the same as those identified above. Specifically, substantive effects of parental incarceration are similar across all three outcome categories in the appendix and five-to-one matching with replacement and radius matching yield slightly more significant exposure effect estimates.

Reduced matching analysis

A benefit of the above analyses is the reliance on a wide range of theoretically relevant matching variables. At the same time, the variables include some that could be viewed as potential effects emanating from parental incarceration and that, in turn, may influence the social exclusion measures. In this sense, the results may be overly conservative due to controlling for mediating effects. Put differently, they may understate the effect of parental incarceration on the social lives of youth. Accordingly, we conducted a parallel set of analyses using a reduced matching specification that included only covariates that most likely occurred prior to a parent’s incarceration.

The results of the exposure prediction model and balance statistics for this second analysis were similar to those shown in tables 2 and 3, respectively. Thus, to conserve space, we have excluded them here and move directly to the post-matching results. Table 4b presents the same set of post-matching regression estimates as those in table 4a. Here, though, the models utilize a matched sample that resulted from the use of the reduced set of matching covariates.

Insert table 4b here

Inspection of table 4b reveals important similarities and differences compared to 4a. The results are similar in that they reinforce the findings above—exposure to parental incarceration is linked to overall adverse impacts on youth social outcomes and has statistically significant adverse impacts on peer behaviors as well as the extent to which youth felt that they were a part of school. We see, for example, that youth exposed to parental incarceration are significantly less central in their social networks and that this effect is significant across all matching specifications when using the reduced covariates list. Similarly, the same set of statistically significant differences in antisocial peer outcomes and school engagement outcomes emerges in table 4b.

The results from the reduced matching set differ, however, in that they identify substantially more statistically significant effects overall and across matching specifications. In addition, the effects are stronger. Specifically, table 4b identifies, across each of the three matching specifications, significant adverse effects on a range of outcomes that were not statistically significant in table 4a. These include friendship nominations received and made, youth centrality, friends' smoking, friends' skipping school, participation in school clubs, trouble with other students, and closeness to others at school. And differences identified across both sets of matching analyses (i.e., the full covariate list versus the reduced list) are generally larger when using the reduced list. For example, the difference in peer GPA when using 5-to-1 matching with replacement is -0.12 in table 4b compared to -0.08 in table 4a. Similar increases in magnitude emerge when comparing across each outcome in tables 4a and 4b. As we discuss below, the similarities between the two matching approaches broadly support arguments about parental incarceration effects on youth social exclusion. The differences, though, raise questions about some of the specific effects.

DISCUSSION AND CONCLUSIONS

There is a growing body of research aimed at developing a better understanding of the adverse implications of incarceration. This literature has identified consistent evidence that incarceration leads to collateral consequences for families and children (Arditti 2012; Braman 2004; Eddy & Poehlmann 2011; Foster & Hagan 2007; Johnston 1995; Murray & Farrington 2005; Phillips et al. 2002; Turney 2015). Parental incarceration, for example, has been linked to a range of deleterious outcomes for youth in adulthood, including increased delinquency and crime (e.g., Aaron & Dallaire 2010; Roettger & Swisher 2011; Swisher & Roettger 2012; Mears & Siennick 2016) along with other forms of social exclusion (Braman 2004; Murray 2007).

The goal of this study was to investigate whether parental incarceration affects social exclusion among youth during adolescence. Social exclusion has been examined in a handful of studies from the parental incarceration literature (Foster & Hagan 2007; Geller et al. 2012; Giordano 2010; Kahn & Kamerman 2002), but prior work has emphasized forms of exclusion that occur among young children or during early adulthood and beyond (Eddy & Reid 2003; Schlafer & Poehlmann 2011). The focus of this paper was on analogous forms of social exclusion that may be salient during adolescence. The analyses thus focused on three dimensions: (1) adolescent peer relationships, to examine the extent to which youth with incarcerated parents have peer ties; (2) peer activity, to examine whether youth with incarcerated parents have more antisocial peers; and (3) school integration, to examine the extent to which youth are socially engaged in school. We discuss each one in sequence.

First, we found inconsistent evidence that parental incarceration adversely affects an

adolescent's social status among his or her peers or otherwise influences the size of his or her social network. The full matching analysis found essentially no evidence of effects on youth social networks. However, the reduced matching analysis identified some adverse effects on them.

Second, consistent evidence emerged that parental incarceration adversely affects the characteristics of youth social networks. Specifically, both sets of analyses indicated that children of incarcerated parents had friends with slightly lower GPAs and friends who engaged in more lying, skipping school, and fighting. Parental incarceration thus may push youth to gravitate towards antisocial peers or peers who are less prosocially engaged.

Third, we did not find that parental incarceration consistently affects children's integration at school. On the one hand, parental incarceration may adversely affect specific dimensions of school integration, such as adolescents' feeling tied to or a part of their schools. On the other hand, the results also indicated that youth feel no less socially accepted or close to others at school, and are not more likely to report trouble with teachers. In addition, only the reduced matching results indicated that youth were less likely to be in school clubs and had more trouble with other students. These findings are important because of the critical role school plays in the social life of adolescents (Shlafer & Poehlmann 2011). The extent to which youth feel that they belong may influence participation in academic and recreational aspects of school life that can be critical for positive life-course trajectories. That said, the results here only partly aligned with prior work that suggests that parental incarceration impedes adolescents' social engagement at school (see also, Bockneck et al. 2009; Lowenstein 1986).

In short, a mixed picture emerges. It appears that parental incarceration may harm youth social networks, the types of friends with whom they associate, and their involvement at school.

Yet, these effects are most pronounced only in analyses when confounding may be more likely to bias the estimates. In analyses that include a wider array of potential confounders, the harmful effects center primarily on association with delinquent youth or those who are less academically inclined. These findings differ from those that suggest that youth with incarcerated parents are entirely “shut out” from conventional society (see Micklewright 2002:94; and also Foster & Hagan 2007:400). That said, to the extent that the reduced specification model more accurately captured the main effects of parental incarceration, the results aligned more with this idea.

Regardless of whether the effect is particular to peer association or is a broader one of social exclusion, the fact remains that children of adolescent parents are socially marginalized. Parental incarceration may not worsen this marginalization. However, it may provide a signal that this group of children is likely to be isolated and may warrant some form of support or assistance. Even so, the results provide a tentative basis for suggesting that there may be a causal relationship, one in which parental incarceration, through different potential theoretical pathways, negatively affects children’s social lives during adolescence.

Limitations

The Add Health data, along with the analytic approach employed here, provide a unique opportunity to examine the impacts of parental incarceration on adolescent social exclusion. At the same time, three important limitations of the analysis—and related directions for future research—warrant emphasis. First, the study could not include measures that might have better addressed confounding or that would explain why some youth may cope better with or be protected from the adverse consequences of parental incarceration. For example, we were

unable to match on pre-incarceration measures of individuals' peer networks or engagement in school. In addition, research suggests that youth who have more social support and are more optimistic may better cope with their parent's incarceration (e.g., Hagen et al. 2005; Hagen and Myers 2003). Thus, measures that tap into sources of social support and variation in children's access to social support, both prior to and following parental incarceration, would help to account for and shed light on this potential protective factor. Similarly, a study of children of incarcerated parents found that youth who exhibited more empathy were less adversely affected by their parent's incarceration (Dallaire & Zeman 2013); accordingly, studies are needed that can assess further the role of empathy in this context. Other studies have found that youth sometimes use peers and school to cope, and thus seek to become *more* involved with their education and with extracurricular activities to distract themselves from their situations involving an incarcerated parent (Johnson & Easterling 2015; Nesmith & Ruhland 2008). For example, Nesmith and Ruhland (2008) found that children coped with the loss through involvement in recreational activities, church groups, and by finding new friends. Such work suggests that some youth seek support from their friends and seek to better their own selves in the face of the adversity caused by parental incarceration. Here, then, research is needed that can more systematically account for school- and non-school-based social experiences and the engagement of children with and without incarcerated parents.

Second, the analyses did not examine how the influence of parental incarceration on children may vary across a range of factors and contexts. It is possible, for example, that community-level factors may condition parental incarceration effects. To illustrate, the stigma that youth experience as a result of a parent's incarceration might be amplified in areas where incarceration is rare or infrequent and lower in areas where incarceration rates are higher or where parental

incarceration is statistically normative. Other such factors, including crime rates, economic disadvantage, and school quality, also may condition the effect of parental incarceration.

The characteristics of youth and their parents, too, may matter. Prior research has, for example, emphasized the importance of considering parental gender and the extent to which paternal versus maternal incarceration is more adverse for youth (e.g., Miller 2007). Other dimensions, including a youth's age, race, ethnicity, and gender may also matter. Similarly, the living arrangements and characteristics of the primary caregivers following parental incarceration may work to exacerbate or protect youth from the stigmatization, labeling, or loss of social role models that might occur (Dallaire & Miller 2007; Poehlmann 2005). Not least, although our data provide important measures of family circumstances, we had no direct measure of whether youth had actual knowledge of the fact that their parent was incarcerated. Thus, for youth who did not know, it is uncertain how precisely their parents' incarceration would affect their identity. Stigma and adverse effects on the remaining caregiver, however, would still remain as potential contributors to social exclusion.

Third, research is needed that can improve upon our matching specifications and design. The Add Health data are particularly useful for this analysis because they allow for examination of social networks, peer behaviors, and school integration. However, and as we discussed earlier, the pool of measures within the data that tap into theoretically relevant pre-parental incarceration dimensions and characteristics is limited, which creates challenges for developing a rigorous matching scheme that does not incur time order problems. Ideally, future datasets will allow for researchers to overcome such challenges.

Implications for theory, research, and policy

These findings have several implications for theory, research, and policy related to incarceration and its potential collateral effects on families and children. The estimated impacts of parental incarceration on adolescents' peer context (e.g., GPA, lying, fighting) were robust across analytic strategies but were substantively small in some instances. Taken as a whole, they provide limited support for the theoretical mechanisms discussed earlier. Still, they could mean that having a parent incarcerated may be stigmatizing or may exert an indirect and adverse labeling effect on youth. For example, it may make it more difficult for them to connect with or maintain connections to prosocial peers over time, or it may increase the appeal of connections to antisocial peers (Giordano 2010). Stigmas and labels, whether they stem from external or internal sources, can then cause children to seek out friendship networks that reinforce their perceived sense of who they are or what their family is (i.e., "criminals" or "outsiders"). Future research should seek to further uncover these potential effects by utilizing longitudinal studies that include interviews and surveys of adolescents, and closely comparing social and psychological dimensions of youth who have and have not experienced parental incarceration (Eddy & Reid 2003; Poehlmann 2005a). New data collections can help to identify both shifts in the perceptions youth hold about themselves and how self-perceptions may change after parental incarceration. This type of research could also be used to examine possible shifts in the external treatment youth experience from their peers and in school following parental incarceration, and whether other differential social experiences may be spurred on by a parent's incarceration.

Although it takes us beyond the scope of our analysis, the limited adverse impacts of parental incarceration identified here, when paired with a considerable body of studies that have

identified substantively more serious consequences of parental incarceration, continue to underscore looming questions about punishment policies and how to minimize collateral harms of incarceration for families and children. As state and federal governments contemplate dramatic changes to how incarceration is used (Clear 2015; Jonson & Cullen 2015), scholars have emphasized that any policy that fails to consider unintended harms may actually undermine correctional goals of crime reduction and public safety (Wildeman & Western 2010). General recommendations, like decarceration, reduced sentences for drug offenders, and diversion of prison sentences to community sanctions could potentially work to reduce collateral harms for families, but are unlikely to do so if they are not configured explicitly to reduce such harms. To inform future policy discussions, we need more research on whether, when, and how parental incarceration has adverse impacts on children and families.

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Table 1. Sample Descriptive Statistics ($N = 11,861$)

Variable	Mean	SE	Min	Max
Focal independent variable				
Parent ever incarcerated	0.12	(0.00)	0	1
Focal dependent variables				
Friendship nominations received	4.44	(0.03)	0	32
Friendship nominations made	4.39	(0.03)	0	10
Centrality (friends' social connectedness)	0.80	(0.01)	0	4.29
Reach (connectedness via friends-of-friends)	576.47	(4.55)	0	1791
Has a best friend	0.75	(0.00)	0	1
Density (cohesion among friends)	0.30	(0.00)	0.06	1
Friends' GPA	2.80	(0.01)	1	4
Friends' smoking	1.11	(0.01)	0	6
Friends' drinking	1.18	(0.01)	0	6
Friends' getting drunk	0.66	(0.01)	0	6
Friends' lying	2.15	(0.01)	0	6
Friends' skipping school	0.56	(0.01)	0	6
Friends' fighting	0.73	(0.01)	0	4
Adolescent not in any school clubs	0.16	(0.00)	0	1
Adolescent has trouble with teachers	1.22	(0.01)	0	4
Adolescent has trouble with other students	1.57	(0.01)	0	4
Adolescent does not feel close to others at school	2.46	(0.01)	1	5
Adolescent does not feel part of school	2.46	(0.01)	1	5
Adolescent does not feel socially accepted	2.25	(0.01)	1	5
Covariates				
Adolescent's age ^a	14.99	(0.02)	10	19
Adolescent is male ^a	0.48	(0.00)	0	1
Black ^a	0.23	(0.00)	0	1
Hispanic ^a	0.15	(0.00)	0	1
Other non-White race / ethnicity ^a	0.09	(0.00)	0	1
Household socioeconomic status	0.07	(0.01)	-2.19	1.84
Parental economic hardship	0.18	(0.00)	0	1
Intact family during adolescence	0.54	(0.00)	0	1
Number of siblings ^a	1.20	(0.01)	0	2
Mother-adolescent separation	0.15	(0.00)	0	1
Father-adolescent separation	0.44	(0.00)	0	1
Maternal alcoholism ^a	0.03	(0.00)	0	1
Paternal alcoholism ^a	0.15	(0.00)	0	1
Mother-adolescent closeness	4.43	(0.01)	1	5
Father-adolescent closeness	3.80	(0.01)	1	5
Childhood sexual abuse	0.13	(0.01)	0	5
Residential mobility	0.45	(0.00)	0	1
English-speaking household ^a	0.90	(0.00)	0	1
Immigrant ^a	0.08	(0.00)	0	1
Low birth weight ^a	0.14	(0.00)	0	1
Mother's age at adolescent's birth ^a	25.63	(0.06)	14	40
Neighborhood disorder	1.50	(0.01)	1	3
Years at current school	2.69	(0.01)	1	6

^aIncluded in reduced set of matching covariates

Source: National Longitudinal Study of Adolescent to Adult Health.

For group differences (parent ever vs. never incarcerated): † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2. Logistic Regression of Parental Incarceration on Matching Variables (N = 11,681)

Variable	b	SE	OR
Adolescent's age	-0.06**	(0.02)	0.94
Adolescent is male	0.11†	(0.06)	1.12
Black	0.30***	(0.08)	1.35
Hispanic	0.27**	(0.11)	1.32
Other non-White race / ethnicity	-0.17	(0.14)	0.84
Household socioeconomic status	-0.34***	(0.04)	0.71
Parental economic hardship	0.06	(0.08)	1.06
Intact family during adolescence	-0.37**	(0.14)	0.69
Number of siblings	-0.10*	(0.04)	0.91
Mother-adolescent separation	0.30***	(0.08)	1.34
Father-adolescent separation	0.38**	(0.14)	1.47
Maternal alcoholism	0.76***	(0.13)	2.13
Paternal alcoholism	1.10***	(0.07)	3.02
Mother-adolescent closeness	-0.03	(0.03)	0.97
Father-adolescent closeness	-0.15***	(0.03)	0.86
Childhood sexual abuse	0.05	(0.05)	1.05
Residential mobility	0.29***	(0.07)	1.34
English-speaking household	0.30†	(0.16)	1.35
Immigrant	-0.52**	(0.17)	0.59
Low birth weight	0.27**	(0.08)	1.31
Mother's age at adolescent's birth	-0.05***	(0.01)	0.95
Neighborhood disorder	0.15**	(0.06)	1.16
Years at current school	-0.04†	(0.02)	0.96
Constant	-0.23	(0.46)	

Source: National Longitudinal Study of Adolescent to Adult Health.

†p < .10. *p < .05. **p < .01. ***p < .001.

Table 3. Descriptive Statistics and Balance Statistics for Matched Samples

Variable	Parent Ever Incarcerated		Parent Never Incarcerated		Post-Matching Diff. in Means (<i>t</i>)	% Bias
	Pre-Matching Mean	Post-Matching Mean	Pre-Matching Mean	Post-Matching Mean		
Adolescent's age	14.91	14.92	15.00	14.95	-0.43	1%
Adolescent is male	0.47	0.47	0.48	0.47	-0.10	0%
Black	0.34	0.33	0.22	0.33	-0.19	0%
Hispanic	0.16	0.16	0.15	0.18	-0.82	4%
Other non-White race / ethnicity	0.05	0.05	0.10	0.05	-0.10	0%
Household socioeconomic status	-0.24	-0.22	0.11	-0.23	0.49	2%
Parental economic hardship	0.24	0.24	0.17	0.25	-0.54	1%
Intact family during adolescence	0.21	0.22	0.58	0.21	0.67	3%
Number of siblings	1.13	1.13	1.21	1.13	0.25	1%
Mother-adolescent separation	0.30	0.28	0.13	0.28	0.04	0%
Father-adolescent separation	0.77	0.76	0.40	0.77	-0.51	3%
Maternal alcoholism	0.10	0.08	0.02	0.08	0.34	1%
Paternal alcoholism	0.40	0.37	0.12	0.36	0.38	2%
Mother-adolescent closeness	4.25	4.28	4.46	4.30	-0.11	1%
Father-adolescent closeness	3.13	3.18	3.90	3.18	0.13	1%
Childhood sexual abuse	0.19	0.19	0.13	0.20	-0.43	1%
Residential mobility	0.61	0.60	0.43	0.61	-0.57	2%
English-speaking household	0.94	0.94	0.90	0.94	0.43	1%
Immigrant	0.04	0.04	0.08	0.05	-0.80	2%
Low birth weight	0.18	0.18	0.14	0.17	0.47	2%
Mother's age at adolescent's birth	23.32	23.44	25.96	23.52	-0.47	1%
Neighborhood disorder	1.62	1.60	1.49	1.60	-0.06	2%
Years at current school	2.48	2.50	2.71	2.51	-0.14	0%
<i>N</i>	1,441	1,369	10,240	1,369		

Source: National Longitudinal Study of Adolescent to Adult Health.

Note: Balance statistics shown for one-to-one matching without replacement (.005 caliper).

Table 4a. Post-Matching Regression Analyses Predicting Adolescent Social Adjustment from Exposure Status (Prior Parental Incarceration) Using Full Set of Matching Covariates.

Outcome	A. 1-to-1 Matching without Replacement, .005 Caliper		B. 5-to-1 Matching with Replacement, .005 Caliper		C. 1-to-1 Matching without Replacement, .001 Caliper	
	b	SE	b	SE	b	SE
Peer relationships						
Friendship noms. received ^a	-0.10	(0.18)	-0.14	(0.16)	-0.09	(0.19)
Friendship noms. made ^a	-0.16	(0.15)	-0.18	(0.11)	-0.15	(0.16)
Centrality ^a	-0.04	(0.03)	-0.05*	(0.02)	-0.04	(0.03)
Reach ^a	-22.62	(23.54)	-22.61	(18.86)	-21.59	(24.84)
Has a best friend ^b	-0.11	(0.12)	-0.12	(0.09)	-0.10	(0.12)
Density ^a	0.00	(0.01)	0.00	(0.01)	0.00	(0.01)
Peer behaviors						
Friends' GPA ^a	-0.08**	(0.03)	-0.08***	(0.02)	-0.08*	(0.03)
Friends' smoking ^a	0.08	(0.07)	0.09†	(0.05)	0.07	(0.07)
Friends' drinking ^a	0.03	(0.04)	0.03	(0.04)	0.03	(0.05)
Friends' getting drunk ^a	0.02	(0.03)	0.02	(0.03)	0.02	(0.03)
Friends' lying ^a	0.13*	(0.05)	0.12*	(0.05)	0.13*	(0.05)
Friends' skipping school ^a	0.05†	(0.03)	0.05†	(0.03)	0.05	(0.03)
Friends' fighting ^a	0.06*	(0.03)	0.06*	(0.03)	0.06†	(0.03)
Engagement in school						
Not in school clubs ^b	0.16	(0.13)	0.19†	(0.10)	0.17	(0.13)
Trouble with teachers ^c	0.05	(0.09)	0.06	(0.08)	0.04	(0.10)
Trouble with other students ^c	0.06	(0.09)	0.06	(0.08)	0.07	(0.09)
Not close to others at school ^c	0.06	(0.09)	0.08	(0.08)	0.06	(0.10)
Does not feel part of school ^c	0.15†	(0.08)	0.15*	(0.07)	0.15†	(0.09)
Does not feel socially accepted ^c	0.00	(0.09)	0.01	(0.08)	0.01	(0.09)
<i>N</i> _{exposed}	1,369		1,428		1,295	
<i>N</i> _{not exposed}	1,369		3,670		1,295	

Source: National Longitudinal Study of Adolescent to Adult Health.

Note: Estimates are coefficients predicting outcomes from parental incarceration among matched sample.

†*p* < .10. **p* < .05. ***p* < .01. ****p* < .001.

^aLinear coefficients shown.

^bLogistic coefficients shown.

^cOrdinal coefficients shown.

Table 4b. Post-Matching Regression Analyses Predicting Adolescent Social Adjustment from Exposure Status (Prior Parental Incarceration) Using Reduced Set of Matching Covariates.

Outcome	A. 1-to-1 Matching without Replacement, .005 Caliper		B. 5-to-1 Matching with Replacement, .005 Caliper		C. 1-to-1 Matching without Replacement, .001 Caliper	
	b	SE	b	SE	b	SE
Peer relationships						
Friendship noms. received ^a	-0.32*	(0.15)	-0.37**	(0.14)	-0.32†	(0.17)
Friendship noms. made ^a	-0.37*	(0.15)	-0.37**	(0.12)	-0.37*	(0.15)
Centrality ^a	-0.08**	(0.03)	-0.08***	(0.02)	-0.08**	(0.03)
Reach ^a	-29.66	(23.30)	-24.64	(19.29)	-28.07	(24.00)
Has a best friend ^b	-0.15	(0.12)	-0.16†	(0.09)	-0.16	(0.11)
Density ^a	0.01	(0.01)	0.01	(0.01)	0.01	(0.01)
Peer behaviors						
Friends' GPA ^a	-0.11***	(0.02)	-0.12***	(0.02)	-0.11***	(0.02)
Friends' smoking ^a	0.13*	(0.05)	0.12*	(0.05)	0.13*	(0.06)
Friends' drinking ^a	0.05	(0.04)	0.04	(0.04)	0.05	(0.04)
Friends' getting drunk ^a	0.04	(0.03)	0.03	(0.03)	0.05	(0.03)
Friends' lying ^a	0.12*	(0.05)	0.12*	(0.05)	0.13*	(0.05)
Friends' skipping school ^a	0.07*	(0.03)	0.08**	(0.03)	0.08*	(0.03)
Friends' fighting ^a	0.10***	(0.03)	0.10***	(0.02)	0.10***	(0.03)
Engagement in school						
Not in school clubs ^b	0.31*	(0.12)	0.30**	(0.11)	0.30*	(0.12)
Trouble with teachers ^c	0.10	(0.09)	0.10	(0.08)	0.10	(0.10)
Trouble with other students ^c	0.16†	(0.09)	0.15*	(0.08)	0.16†	(0.09)
Not close to others at school ^c	0.13	(0.09)	0.15*	(0.07)	0.13	(0.09)
Does not feel part of school ^c	0.27**	(0.09)	0.27***	(0.07)	0.29**	(0.09)
Does not feel socially accepted ^c	0.08	(0.09)	0.10	(0.07)	0.09	(0.09)
<i>N</i> _{exposed}	1,369		1,428		1,295	
<i>N</i> _{not exposed}	1,369		3,670		1,295	

Source: National Longitudinal Study of Adolescent to Adult Health.

Note: Estimates are coefficients predicting outcomes from parental incarceration among matched sample.

†*p* < .10. **p* < .05. ***p* < .01. ****p* < .001.

^aLinear coefficients shown.

^bLogistic coefficients shown.

^cOrdinal coefficients shown.

Appendix. Propensity Score Matching Estimates Predicting Adolescent Social Context from Exposure Status (Prior Parental Incarceration).

Outcome	A. 1-to-1 Matching without Replacement, .005 Caliper			B. 5-to-1 Matching with Replacement, .005 Caliper			C. 1-to-1 Matching without Replacement, .001 Caliper			D. Radius Matching, .005 Caliper		
	Exp.	Not Exp.	Diff.	Exp.	Not Exp.	Diff.	Exp.	Not Exp.	Diff.	Exp.	Not Exp.	Diff.
Peer relationships												
Friendship nominations received	4.05	4.15	-0.10	4.03	4.17	-0.14	4.07	4.16	-0.09	4.03	4.17	-0.14
Friendship nominations made	3.99	4.14	-0.16	3.96	4.14	-0.18	4.01	4.15	-0.15	3.96	4.13	-0.17
Centrality	0.70	0.74	-0.04	0.70	0.74	-0.05*	0.70	0.75	-0.04	0.70	0.74	-0.04†
Reach	528.84	551.46	-22.62	525.93	548.55	-22.61	532.27	553.86	-21.59	525.93	546.48	-20.55
Has a best friend	0.53	0.53	0.00	0.52	0.53	-0.01	0.53	0.53	0.00	0.52	0.53	0.00
Density	0.30	0.30	0.00	0.30	0.30	0.00	0.30	0.30	0.00	0.30	0.30	0.00
Peer behaviors												
Friends' GPA	2.64	2.71	-0.08**	2.63	2.71	-0.08***	2.64	2.71	-0.08*	2.63	2.71	-0.08***
Friends' smoking	1.25	1.17	0.08	1.25	1.16	0.09†	1.24	1.17	0.07	1.25	1.16	0.09†
Friends' drinking	1.24	1.21	0.03	1.24	1.21	0.03	1.24	1.21	0.03	1.24	1.21	0.03
Friends' getting drunk	0.71	0.69	0.02	0.71	0.69	0.02	0.71	0.69	0.02	0.71	0.69	0.02
Friends' lying	2.30	2.17	0.13*	2.30	2.18	0.12*	2.30	2.17	0.13*	2.30	2.18	0.13**
Friends' skipping school	0.63	0.58	0.05†	0.63	0.58	0.05†	0.63	0.58	0.05	0.63	0.57	0.06*
Friends' fighting	0.87	0.81	0.06*	0.87	0.81	0.06*	0.86	0.80	0.06†	0.87	0.80	0.06**
Engagement in school												
Not in school clubs	0.20	0.18	0.03	0.20	0.18	0.03†	0.20	0.18	0.03	0.20	0.18	0.03*
Trouble with teachers	1.35	1.34	0.02	1.37	1.34	0.03	1.34	1.33	0.01	1.37	1.33	0.04
Trouble with other students	1.77	1.73	0.05	1.79	1.74	0.05	1.77	1.72	0.05	1.79	1.73	0.06
Non-closeness to others at school	2.59	2.55	0.04	2.59	2.53	0.06	2.59	2.54	0.04	2.59	2.54	0.06
Does not feel part of school	2.65	2.54	0.10†	2.64	2.53	0.11*	2.65	2.54	0.11†	2.64	2.53	0.11**
Does not feel socially accepted	2.31	2.29	0.02	2.31	2.29	0.02	2.31	2.29	0.02	2.31	2.29	0.02
<i>N</i>	1,369	1,369		1,428	3,670		1,295	1,295		1,428	10,240	

Source: National Longitudinal Study of Adolescent Health.

†*p* < .10. **p* < .05. ***p* < .01. ****p* < .001.

“Exp.” = Exposed group, “Not Exp.” = Not exposed group