INTERGENERATIONAL EFFECTS OF MASS INCARCERATION: PARENTAL INCARCERATION AND CHILDREN'S EARNINGS IN YOUNG ADULTHOOD

ABSTRACT

Objective: To analyze the association between maternal/paternal incarceration at various stages of child development and children's earnings during young adulthood.

Methods: Data were from 10,014 respondents in the United States National Longitudinal Study of Adolescent to Adult Health from Waves I (1994-1995) and IV (2008). Using propensity score weighting, a two-part model calculated the association between maternal/paternal incarceration and children's earnings between ages 32 – 42.

Results: Maternal incarceration was associated with average earnings significantly lower for respondents who were not yet born ($19,063.25), or ages 0 – 4 ($14,754.60), 5 – 10 ($10,544.68), and 15 – 17 ($8,453.85) at first maternal incarceration, compared to those whose mothers were never incarcerated. Paternal incarceration was associated with significantly lower average earnings for respondents who were 5 – 10 ($7,929.68), 11 – 14 ($10,264.91), and 15 – 17 ($10,670.16) at first paternal incarceration.

Conclusions: On average, children experiencing maternal/paternal incarceration earn less during young adulthood than children who do not. The association is stronger when children were younger when their mothers were incarcerated, or older when their fathers were incarcerated. These intergenerational economic impacts have major public health implications.

INTRODUCTION

The "War on Drugs" beginning in the 1980s fueled a massive increase in the U.S. prison population[1] that disproportionately targeted communities of color, independent of differences in drug offending, non-drug offending, and neighborhood contexts.[2] These disparities persist, with implications for children. In 2009, 4% of white children compared to 25% of black children experienced parental incarceration at some time in their childhood. Among children of parents who had dropped out of high school, 14.6% of white versus 62% of black children experienced parental incarceration before age 17.[1]

The disproportionate burden on families of color makes parental incarceration a racial equity issue. People of color historically and currently contend with systemic economic disadvantage, including slavery, Jim Crow, redlining, and employment discrimination.[3] Mass incarceration is an additional form of economic oppression, financially harming imprisoned individuals and their family members.[4–6] Penalties to families of the incarcerated are not merely questions of economics or criminal justice, but also of public health. Socioeconomic status (SES) and health are highly correlated.[7] Lower SES predicts negative outcomes such as higher infant and perinatal mortality, higher burden of mental and physical health, and lower life expectancy.[8,9] Economically disadvantaged individuals disproportionately live in unsafe neighborhoods with restricted options for physical activity, poor access to healthy food options, higher concentrations of environmental toxins, and poor schools.[10]

Because mass incarceration affects so many children, it is important to understand the long-term effects of parental incarceration. Parental incarceration is associated with short-term economic consequences for the child's family.[11,12] It is also associated with numerous future adverse health and social outcomes for the child, including decreased educational attainment and

social capital,[13,14] which are important predictors of economic wellbeing.[15,16] However, how parental incarceration affects children's economic wellbeing, particularly earnings, into adulthood is not well understood. The handful of studies that have examined the effects of parental incarceration on children's future earnings have yielded mixed results,[17,18,19,20] even when based on the same data.[17,18,19]

These mixed findings likely are due to differences in analyses. Some studies looked at maternal *or* paternal incarceration, while others combined the two experiences. Additionally, analysts' choice of covariates varied greatly. Each study used extensive controls, including parental alcoholism, parental marital status, child health, and child drug use, all during the child's adolescence. Controlling for variables like these that often occurred *after* parental incarceration is problematic because these variables are associated with parental incarceration and may be results of the incarceration.[14] The relationship between parental incarceration and economic wellbeing in adulthood likely would be indirect, not direct. Controlling for variables along the causal pathway likely underestimates the association between parental incarceration and economic wellbeing.

This paper aims to clarify the intergenerational effects of mass incarceration by using a different analytical approach from previous studies. It investigates the total effect of parental incarceration, rather than measuring the effects of suspected mediating variables. Analyses test two hypotheses: 1) parental incarceration negatively affects future earnings of affected children, and 2) the timing of parental incarceration differentially affects future earnings, as some periods of development are particularly critical.

CONCEPTUAL MODEL

The conceptual model (Figure 1) is guided by stress theory and life course theory (LCT). Health-related theories, rather than economic theories, were applied to these research questions because of the inextricable link between economics and health. Stress theory posits that prolonged or repeated exposure to stressors causes wear and tear on immune and neurological response systems, resulting in outcomes such as behavioral changes and cognitive deficits.[21] LCT explains patterns of health and disease across populations over time and suggests that adverse events have the greatest impact during critical periods of development, such as early childhood and adolescence.[22,23] Parental incarceration can be an acute, chronic, and/or repeated stressor that is often accompanied by other stressors, such as economic loss and shifts in family structure.[14] Many negative outcomes associated with parental incarceration (e.g., decreased educational attainment) affect earning potential.

DATA

National Longitudinal Study of Adolescent to Adult Health ("Add Health") data from 1994 through 2008 were used. These data are appropriate because they allow examination of the effects of parental incarceration among respondents growing up during the peak of the prison boom. Add Health began following adolescents in the U.S. between grades seven and twelve during the 1994-95 school year. Psychological, social, biological, and other data were gathered at each wave of data collection. Parents also completed a questionnaire. This paper uses data from Waves I (grades seven – twelve, years 1994-1995) and IV (ages 32 – 42, year 2008), and the Wave I parent questionnaire. Respondents were clustered by school and stratified by region; certain minority groups were oversampled. The grand sample survey weights for cross-sectional data Wave IV outcomes at (gswgt4_2) were used to make the final sample nationally

representative. Of the 15,701 respondents in Wave IV, 10,014 had complete data for analysis of maternal incarceration and 9,733 for paternal incarceration. Incomplete data often reflected absence of parent questionnaires.

MEASURES

The dependent variable is personal earnings at Wave IV (age 32 – 42). Respondents were asked, "How much income did you receive from personal earnings before taxes, that is, wages or salaries, including tips, bonuses, and overtime pay, and income from self-employment?".[24] Respondents who did not know their earnings the previous year were asked, "What is your best guess of your personal earnings before taxes?" so respondents could select a dollar range that best approximated their earnings. Following Mears and Siennick,[19] the midpoints of the selected ranges were used for earnings of those who did not know their personal earnings to preserve data points.

The key independent variables are maternal and paternal incarceration before age 18. Respondents were asked at Wave IV whether either biological parent or a mother or father figure had ever been incarcerated and respondent ages at the time of the first incarceration and most recent release. Recall bias is a concern with this variable. However, according to Foster and Hagan, "Add Health youth reported parental incarceration reliably: the correlation across waves in reported parental incarceration is .82 ($p<.001$; with new onset cases excluded at Wave IV).[17]" This response is therefore reliable, though validity is still a concern. Maternal and paternal incarceration were categorized by age at time of first incarceration: before birth only, 0 – 4, 5 – 10, 11 – 14, 15 – 17, 18 and over, and a referent group of those who never experienced parental incarceration. The age categories are consistent with those used by Brown[20] in his National

Longitudinal Survey of Youth study, allowing for comparison across datasets. Separate models were run for maternal and paternal incarceration, building on evidence Foster and Hagan presented that maternal and paternal incarceration are associated with different long-term effects for children.[17]

Covariates included highest level of biological parental education (referent less than high school, high school graduate/GED, some college or vocational education, college graduate or beyond, Wave I), foreign-born status of parent surveyed (referent foreign-born, Wave I), respondent biological sex (referent female, Wave I), respondent race/ethnicity (black, Hispanic, other, or referent white, Wave I), and region of the country (referent Northeast, South, Midwest, or West, Wave I). Low birthweight (<2,500g) was included as a proxy for baseline health of the child (referent normal birthweight, Wave I). Natural log of parental income Wave I was included as a continuous variable to control for endogenous parental characteristics. Although parental incarceration has been associated with future parental income,[14] this variable was included because of the difficulty in ascertaining pre-incarceration versus post-incarceration characteristics. Including it provides a conservative estimate of the effects of parental incarceration.

Propensity Score

The variables used to predict maternal and paternal incarceration before age 18 were parent education, whether the parent was foreign-born, the respondent's biological sex and race/ethnicity, whether the respondent was low birthweight as a proxy for baseline health, and region in which respondent lived at Wave I. These variables were chosen under the assumption that, for the most part, they were the same or similar at the child's birth and at Wave I.

Maternal and paternal incarceration were coded as 1 for respondents who experienced

incarceration of any biological or parent figure before age 18. Those who never experienced maternal or paternal incarceration or whose parents were only incarcerated before their birth or after age 17 were coded as 0.

ANALYSIS

A high proportion (7%) of respondents reported personal income of zero at Wave IV. Therefore, a two-part model—suitable for distributions with large numbers of zeroes in which the zero values are not censored—was used for this analysis. First, we estimated the probability that earnings are greater than zero with a logit model. Second, we estimated the continuous earnings variable, given it is greater than zero, with ordinary least squares regression. The marginal effect is the derivative of the product of the two parts: $\partial y/\partial x$ [P(Y>0, X)*E(Y|Y>0, X)]. Analyses were conducted using Stata 15 software.

Endogeneity is a fundamental concern in our analyses. Certain individual or family characteristics could make individuals more vulnerable to experiencing parental incarceration, and those same characteristics might also influence economic wellbeing during adulthood. Propensity score analysis (PSA) has been used to address this problem by approximating a control group with covariates that are balanced with those who have had the exposure.[20,25,26] Using logistic regression, a propensity score was generated that reflected the probability of having incarcerated parents, based on a selection of covariates associated with respondent's adult income. Covariates were included in the two-part model even after propensity score weighting, making the estimates "doubly robust." Covariates along the causal pathway between parental incarceration and income (e.g., adolescent health) were avoided in this prediction because they would reduce precision.[27] An inverse probability weight was created using the propensity score.

The inverse probability weight was multiplied by the grand sample weight, and the product was used to weight the final two-part model. This combined weight allowed results to remain nationally representative.

After creating propensity scores, the balance of covariates between the parental incarceration group and control group was tested. The standardized difference for all covariates except for one (low birthweight in maternal incarceration model) was less than 10%, indicating that the two groups' covariates were sufficiently balanced (see supplemental materials).

RESULTS

Descriptive Statistics

Table 1 displays descriptive statistics. Average earnings, including those with no earnings, were $34,391 at Wave IV. By Wave IV, 2.8% and 12.8% of respondents had experienced maternal and paternal incarceration, respectively. Age categories are broken down further in Table 1. Note that, consistent with previous findings, black and Hispanic respondents were disproportionately exposed to parental incarceration compared to white respondents. Twenty-eight percent of black respondents ever experienced parental incarceration, compared to 21% of Hispanic and 15% of white respondents.

First Part: Logit

Table 2 displays the results of the logit and OLS components of the two-part model for maternal and paternal incarceration. Maternal and paternal incarceration logit results differed. Respondents whose mothers were incarcerated for the first time between 0 – 4 and over 18 had predicted probabilities of reporting any earnings 1.16 and 1.31 percentage points significantly lower, respectively, than those who had not experienced any maternal incarceration, controlling

for covariates. In contrast, experiencing paternal incarceration before birth and between ages 5 – 10 was significantly associated with 1.50 and 0.55 percentage point lower predicted probabilities of reporting any earnings, respectively.

Second Part: OLS

The second part of the two-part model, which used OLS to predict expected earnings, given respondents reported any earnings at all, also yielded differing results for the maternal and paternal incarceration models. Respondents whose mothers were incarcerated had significantly lower earnings on average than those who did not experience maternal incarceration when first maternal incarceration occurred before birth ($11,160.45), 0 – 4 ($13,508.24), 5 – 10 ($10,244.43), and 15 – 17 ($6,858.77). Those whose fathers were incarcerated had significantly lower earnings on average than those whose fathers were never incarcerated when first paternal incarceration occurred between 5 – 10 years ($7,380.07), 11 – 14 ($10,954.70), and 15 – 17 ($10,819.17).

Marginal Effects of Two-Part Model

The unconditional estimated association between parental incarceration and personal earnings also differed between the maternal and paternal incarceration models. The marginal effect combines the predicted probability of having any earnings with the expected value of earnings among those who had any earnings. In the maternal incarceration model, average earnings were significantly lower for respondents who were not yet born at the time of incarceration ($19,063.25), between 0 – 4 ($14,754.60), 5 – 10 ($10,544.68), and 15 – 17 ($8,453.85) when their mothers were first incarcerated compared to those whose mothers were never incarcerated. In the paternal model, expected earnings were significantly lower for respondents who were between 5 – 10 ($7,929.68), 11 – 14 ($10,264.91), and 15 – 17

($10,670.16) when their fathers were first incarcerated compared to respondents whose fathers were never incarcerated.

DISCUSSION

This paper helps to clarify the contradictory literature on the association between parental incarceration and future earnings of the affected children. Results show that, on average, children whose mothers or fathers were incarcerated earn less when they reach young adulthood than children whose parents were not incarcerated. Results support previous findings that the effects of maternal versus paternal incarceration are different and that age of the child at the time of the first incarceration matters. Children whose mothers were incarcerated during almost every child age group experienced penalties in earnings, with stronger associations with earlier exposure. In contrast, children whose fathers were incarcerated when they were between five and seventeen experienced earning penalties, with increasingly higher penalties with each age group.

These reverse trends point to possible differences in the way maternal versus paternal incarceration affects children. Following attachment theory[28] and past research,[29] maternal incarceration early in life may result in weak attachment to the mother, which can harm development of emotional regulation and social skills. Emotional regulation and social skills could hinder academic and occupational success, affecting earnings. Maternal incarceration also was significantly associated with lower earnings between 15 – 17 years. The patterning of age groups aligns partially with Brown's[20] findings that maternal incarceration was associated with decreased educational attainment when it occurred between birth and age 10 and that wage penalties were associated with maternal incarceration between 15 – 17. The analysis on wages controlled for educational attainment, which may explain Brown's lack of significant

associations for maternal incarceration occurring earlier in life. He postulated that maternal incarceration that occurs during late adolescence may cause adolescents to go into the workforce early into lower wage jobs.

The stronger effect of paternal incarceration later in life may operate through processes such as social exclusion[17] and behavioral and cognitive effects of having an incarcerated father that are hypothesized to result from trauma, stigma, and strain.[25] These possible mediators have been found to be associated with paternal incarceration, but not maternal. This is an area for future research.

Neither maternal nor paternal incarceration occurring after age eighteen was associated with lower earnings in the combined, unconditional model. This finding supports the notion that the strain during childhood that parental incarceration causes contributes to children's outcomes, rather than the endogenous factors associated with having parents who are incarcerated, such as cognitive ability or motivation. However, the logit model indicated that those who experienced maternal incarceration after age 18 had a lower predicted probability of reporting any earnings. A possible explanation is that when a mother caring for other family members is incarcerated, older siblings over eighteen forego employment to help at home, possibly leading to economic penalties into the future. Future research should explore these mechanisms.

Notably, maternal incarceration was associated with the most severe penalty on future earnings when the first exposure was before the child's birth. Possible explanations include stress during pregnancy or that women incarcerated for a drug offense before their child's birth may struggle with drug addiction during pregnancy and/or after the child's birth. Both stress and drug abuse during pregnancy are associated with adverse effects for children, including pre-term birth, growth restriction,[30] and emotional and cognitive problems.[31] These adverse effects have been

negatively linked to economic security and future earnings.[32,33] Drug abuse that continued after a child's birth could also result in adverse child outcomes that could affect earning potential.[34]

That effects were seen after controlling for the family's income during adolescence indicates that the negative association between parental incarceration and future income is not due just to the economic impacts of incarceration. Other possible causes of this negative association include ramifications of toxic stress, stigma, disruption in parent-child relationships, and/or lack of social support, which in turn affect earning potential.

This paper has some limitations. First, since Wave I occurred during adolescence, there are limited data on pre-incarceration variables, such as child health, parental marital status, and household income prior to incarceration. Child birthweight and parental educational status were used for proxies for these pre-incarceration variables. Second, PSA is only a successful method if the variables included in the propensity score capture the endogenous characteristics associated with the outcome. By including baseline parental and child variables that capture health, education, and demographics, much of this endogeneity should be captured. However, there likely are other unobserved characteristics that influence parental incarceration and future income in adulthood, such as cognitive ability and motivation. Not fully capturing the endogeneity could inflate results. Third, anyone who did not have a parent report was not included in this analysis. The majority of respondents without parent questionnaires (64%) were people of color, who are disproportionately affected by parental incarceration, potentially biasing results toward the null.

The present work also has several strengths. The two-part model has not been used before to examine this question. Because of the high number of people who reported no earnings at all, it is important to incorporate the effects of parental incarceration on earning no income (which

points to unemployment) *and* on earnings among those who are employed. In addition, this paper uses PSA to address endogeneity. While causality cannot be inferred from the results, PSA helps reduce the possibility that endogenous factors were the cause of the association. Unlike past studies, this analysis compared outcomes between those whose parents were incarcerated during childhood versus those whose parents were incarcerated before they were born and after they turned eighteen. Comparing these groups, as previously mentioned, also helps ameliorate endogeneity concerns.

CONCLUSION

The negative association between parental incarceration and future income of children signals that mass incarceration is a systemic, intergenerational form of economic oppression. Children of color are disproportionately exposed to parental incarceration, largely as a result of the systemic racism inherent in the "War on Drugs" and differences in sentencing since the 1980s. The high prevalence of parental incarceration, compounded with other forms of current and historical economic oppression, comprise a system that imposes multiple barriers to children of color's economic wellbeing. The findings from this paper are particularly relevant now, as the current administration reinstates policies that led to the vast disparities in the criminal justice system, such as mandatory minimum sentences, and reverses Obama era legislation that eased penalties for some nonviolent drug offenses.[35]

Of course, many children of color do attain high earnings and other measures of economic wellbeing. Further, earnings are the only or most important measure of success. However, parental incarceration is an often overlooked barrier to economic wellbeing, and economic wellbeing is highly correlated with physical and mental health.

PUBLIC HEALTH IMPLICATIONS

Given the strong link between SES and health,[9] mass parental incarceration must be a public health concern, in addition to one of criminal justice and economics. Economic hardship increases susceptibility to poor health outcomes and limits the ability to access quality healthcare. A top goal of Healthy People 2020 is achieving health equity and eliminating health disparities.[7] Policies and systems that oppress people of color's economic wellbeing must be corrected to achieve economic and health equity. In the long term, criminal justice reforms that shift the focus from penalization and instead prioritize drug addiction treatment, mental health treatment and prevention, and restorative justice are necessary steps to stopping the cycle of inequity. As Wildeman and Western articulate, investments in sectors such as education and public health are also necessary to strengthen vulnerable populations and society as a whole, thereby reducing the social environments conducive to crime.[12] Further, the explicit and implicit biases that contribute to policies and practices that disproportionately penalize people of color, regardless of criminal offending,[2] must be addressed. In the short term, to mitigate the negative effects of parental incarceration, it is important to support children who experience the incarceration of a parent to ensure that their mental health, economic, and social needs are met.

REFERENCES

1. Sykes BL, Pettit B. Mass Incarceration, Family Complexity, and the Reproduction of Childhood Disadvantage. *Ann Am Acad Pol Soc Sci*. 2014;654(1):127-149. doi:10.1177/0002716214526345.
2. Mitchell O, Caudy MS. Examining Racial Disparities in Drug Arrests. *Justice Q*. 2015;32(2):288-313. doi:10.1080/07418825.2012.761721.
3. Mehta NK, Lee H, Ylitalo KR. Child health in the United States: Recent trends in racial/ethnic disparities. *Soc Sci Med*. 2013;95:6-15. doi:10.1016/j.socscimed.2012.09.011.
4. Johnson RC. Ever-increasing levels of parental incarceration and the consequences for children. In: *Do Prisons Make Us Safer? The Benefits and Costs of the Prison Boom*. ; 2009:177-206. doi:10.1017/CBO9781107415324.004.
5. Arditti JA, Lambert-Shute J, Joest K. Saturday morning at the jail: Implications of incarceration for families and children. *Fam Relat*. 2003;52(3):195-204. doi:10.1111/j.1741-3729.2003.00195.x.
6. Shaw M. The racial implications of the effects of parental incarceration on intergenerational mobility. *Sociol COMPASS*. 2016;10(12):1102-1109. doi:10.1111/soc4.12440.
7. HealthyPeople.gov. About Healthy People.
8. Marmot M. Achieving health equity: from root causes to fair outcomes. *Lancet*. 2007;370(9593):1153-1163. doi:10.1016/S0140-6736(07)61385-3.
9. Link BG, Phelan J. Social Conditions As Fundamental Causes of Disease. *J Health Soc Behav*. 1995;35(1995):80-94.

10. Woolf SH. Progress In Achieving Health Equity Requires Attention To Root Causes. 2017;36(6):984-991.
11. Chung Y. The Effects of Paternal Imprisonment on Children's Economic Well-Being. *Soc Serv Rev*. 2012;86(3):455-486. doi:10.1086/667779.
12. Wildeman C, Western B. Incarceration in fragile families. *Futur Child*. 2010;20(2):157-177. doi:10.1353/foc.2010.0006.
13. Bryan B. Paternal Incarceration and Adolescent Social Network Disadvantage. *Demography*. 2017;54(4):1477-1501. doi:10.1007/s13524-017-0589-8.
14. Arditti J. *Parental Incarceration and the Family : Psychological and Social Effects of Imprisonment on Children, Parents, and Caregivers*. New York and London: NYU Press; 2012.
15. Bowles S, Gintis H, Osborne M. The Determinants of Earnings: A Behavioral Approach. *J Econ Lit*. 2001;39(4):1137-1176. doi:10.1257/jel.39.4.1137.
16. Schafer MH, Vargas N. The dynamics of social support inequality: Maintenance gaps by socioeconomic status and race? *Soc Forces*. 2016;94(4):1795-1822. doi:10.1093/sf/sow024.
17. Foster H, Hagan J. Maternal and Paternal Imprisonment and Children's Social Exclusion in Young Adulthood. 2016;105(2).
18. Miller H, Barnes J. The Association Between Parental Incarceration and Health, Education, and Economic Outcomes in Young Adulthood. *Am J Crim JUSTICE*. 2015;40(4):765-784. doi:10.1007/s12103-015-9288-4.
19. Mears DP, Siennick SE. Young Adult Outcomes and the Life-Course Penalties of Parental Incarceration. *J Res Crime Delinq*. 2016;53(1):3-35. doi:10.1177/0022427815592452.

20. Brown C. Maternal Incarceration and Children's Education and Labor Market Outcomes. *LABOUR*. 2017;31(1):43-58. doi:10.1111/labr.12086.
21. Baum A, Revenson T, Singer J, eds. *Handbook of Health Psychology*. Second. New York: Taylor & Francis Group, LLC; 2012. https://ebookcentral-proquest-com.libproxy.lib.unc.edu/lib/unc/detail.action?docID=957304.
22. Elder GH. The Life Course as Developmental Theory. *Child Dev*. 1998;69(1):1-12. doi:10.1111/j.1467-8624.1998.tb06128.x.
23. Maternal and Child Health Bureau. Rethinking MCH: The Life Course Model as an Organizing Framework. 2010:21.
24. Add Health: The National Longitudinal Study of Adolescent to Adult Health. Add Health Codebook Explorer (ACE). http://www.cpc.unc.edu/projects/addhealth/documentation/ace/tool/variablecollection?VariableCollectionId=2371. Accessed January 18, 2018.
25. Haskins AR. Beyond boys' bad behavior: Paternal incarceration and cognitive development in middle childhood. *Soc Forces*. 2016;95(2):861-892. doi:10.1093/sf/sow066.
26. Turney K. The Unequal Consequences of Mass Incarceration for Children. *Demography*. 2017;54(1):361-389. doi:10.1007/s13524-016-0543-1.
27. Garrido MM, Kelley AS, Paris J, et al. Methods for constructing and assessing propensity scores. *Health Serv Res*. 2014;49(5):1701-1720. doi:10.1111/1475-6773.12182.
28. Dunham S. Attachment Theory. In: Carlson J, Dermer SB, eds. *The SAGE Encyclopedia of Marriage, Family, and Couples Counseling*. Thousand Oaks: SAGE Publications, Inc.; 2017:111-114.

29. Poehlmann J. Representations of Attachment in Children of Incarcerated Mothers. *Child Dev*. 2005;76(3):679-696. doi:10.1111/j.1467-8624.2005.00871.x.

30. Pinto SM, Dodd S, Walkinshaw SA, Siney C, Kakkar P, Mousa HA. Substance abuse during pregnancy: effect on pregnancy outcomes. *Eur J Obstet Gynecol Reprod Biol*. 2010;150(2):137-141. doi:10.1016/j.ejogrb.2010.02.026.

31. Talge NM, Neal C, Glover V. Antenatal maternal stress and long-term effects on child neurodevelopment: How and why? *J Child Psychol Psychiatry Allied Discip*. 2007;48(3-4):245-261. doi:10.1111/j.1469-7610.2006.01714.x.

32. Hall ES, Greenberg JM. Estimating community-level costs of preterm birth. *Public Health*. 2016;141:222-228. doi:10.1016/j.puhe.2016.09.033.

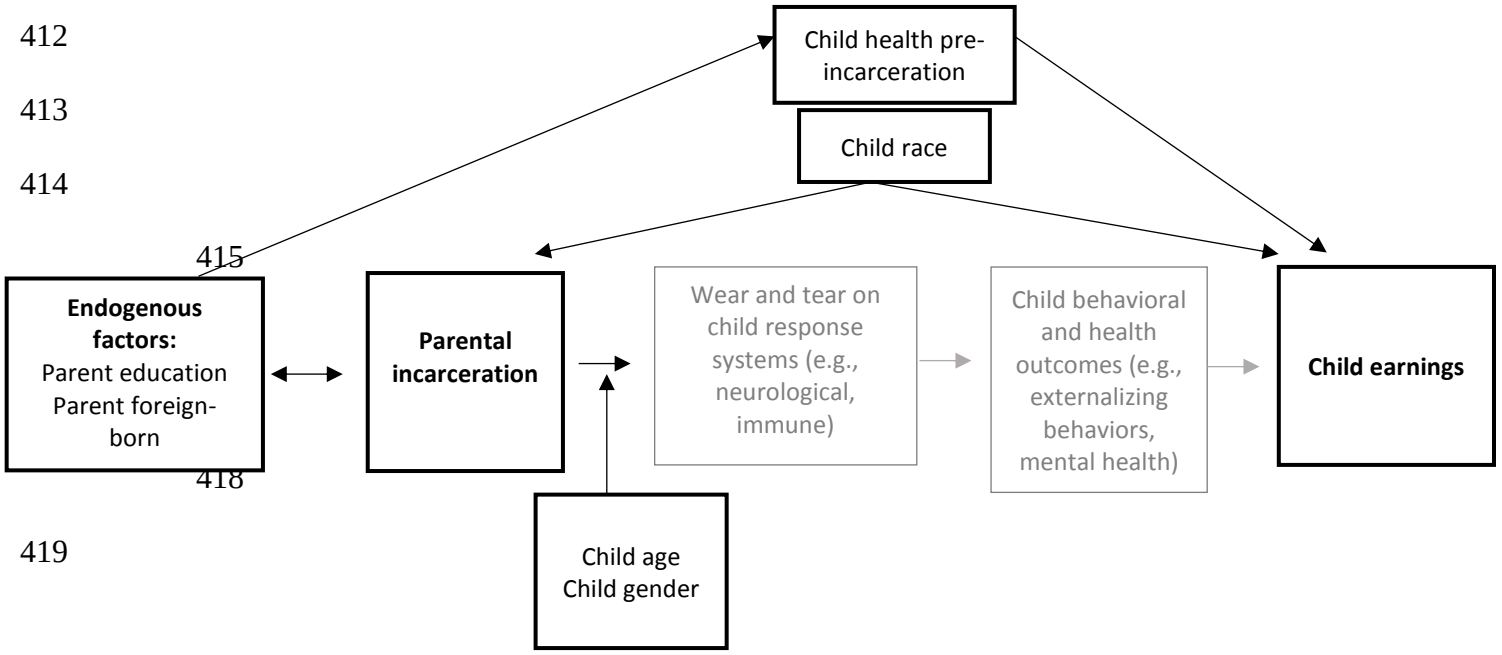
33. Roy A, Hechtman L, Arnold LE, et al. Childhood Predictors of Adult Functional Outcomes in the Multimodal Treatment Study of Attention-Deficit/Hyperactivity Disorder (MTA). *J Am Acad Child Adolesc Psychiatry*. 2017;56(8):687-695.e7. doi:10.1016/j.jaac.2017.05.020.

34. Kerker BD, Zhang J, Nadeem E, et al. Adverse Childhood Experiences and Mental Health, Chronic Medical Conditions, and Development in Young Children. *Acad Pediatr*. 2015;15(5):510-517. doi:10.1016/j.acap.2015.05.005.

35. Ruiz RR. Attorney General Orders Tougher Sentences, Rolling Back Obama Policy. *The New York Times*. https://www.nytimes.com/2017/05/12/us/politics/attorney-general-jeff-sessions-drug-offenses-penalties.html. Published May 12, 2017.

Figure

Figure 1. Conceptual Model



TABLES

Table 1. Sample Characteristics of Add Health Participants in the United States from Waves I and IV, 1994–2008[1]

Variable	Mean or Percentage (N or SE)
Wave IV Personal Wages in US dollars	34,390.9 (893.5)
Child age at 1st maternal incarceration	
Never	97.2 (9,483)
Before birth	0.1 (11)
0–4	0.5 (36)
5–10	0.6 (60)
11–14	0.4 (42)
15–17	0.4 (34)
18 +	0.8 (76)
Child age at 1st paternal incarceration	
Never	87.2 (8,485)
Before birth	1.5 (147)
0–4	3.5 (291)
5–10	3.8 (377)
11–14	1.6 (167)
15–17	0.9 (94)
18 +	1.6 (181)
Parent education	
Less than high school	8.9 (922)
High School or GED	26.7 (2,932)
Some college/vocational ed.	31.9 (3,084)
College graduate +	32.5 (3,344)
Parent foreign-born	9.9 (1,376)
Child sex	
Female	49.2 (5,131)
Male	50.8 (4,611)

[1] Weighted with grand sample weight for cross-sectional outcomes at Wave IV. N=9,742 participants with complete data

Child race/ethnicity	
White	71.1 (5,788)
Black	13.0 (1,843)
Hispanic	10.5 (1,398)
Other	5.4 (713)
Child experienced parental incarceration at any age, by race/ethnicity	
White	15.1 (882)
Black	28.0 (450)
Hispanic	21.3 (263)
Other	15.6 (85)
Child low birthweight	7.2 (916)
Region	
Northeast	16.1 (2,106)
Midwest	33.8 (2,724)
South	36.0 (3,561)
West	14.1 (1,357)

Table 2. Predicted Probability of Reporting $0 Personal Earnings in U.S. Dollars and Association with Personal Earnings Conditional on Reported Income Greater than $0 during Wave IV, United States 2008[2]

	Predicted Probability P(Y>0, X)**: Maternal incarceration**	**Predicted Probability** P(Y>0, X)**: Paternal incarceration**	**OLS Predicted Earnings** E(Y|Y>0, X): **Maternal incarceration**	**OLS Predicted Earnings** E(Y|Y>0, X): **Paternal incarceration**
Child age at 1st parental incarceration *(referent = no parental incarceration)*				
Before birth	-2.64 (p=0.06)	-1.50* (p=0.03)	-11,160.45** (p<0.01)	4,109.44 (p=0.32)
0–4	-1.16** (p=0.01)	-0.17 (p=0.57)	-13,508.24** (p<0.01)	-3,815.04 (p=0.25)
5–10	-0.58 (p=0.27)	-0.55* (p=0.03)	-10,244.43** (p=0.01)	-7,380.07** (p<0.01)
11–14	0.57 (p=0.64)	-0.03 (p=0.95)	-4,620.26 (p=0.21)	-10,954.70** (p<0.01)
15–17	-0.89 (p=0.23)	-0.38 (p=0.51)	-6,858.77* (p=0.03)	-10,819.17** (p<0.01)
18 +	-1.31** (p<0.01)	-0.59 (p=0.09)	-102.87 (p=0.98)	-4,071.24 (p=0.33)
Parent education *(less than high school)*				
High School or GED	-0.84 (p=0.18)	0.29 (p=0.26)	2,070.47 (p=0.47)	4,863.48*
Some college/vocational ed.	-0.07 (p=0.92)	0.55 (p=0.05)	6,136.40 (p=0.05)	7,419.17**
College graduate +	-0.68 (p=0.32)	0.75** (p=0.01)	7,933.56* (p=0.02)	12,914.48**
Parent born in U.S. *(parent foreign-born)*	0.88 (p=0.21)	-0.11 (p=0.78)	-3,061.17 (p=0.11)	-10,178.59*
Ln(parent income Wave I)	0.19**	0.18**	250.26	1,134.67

[2] Two-part model logit and OLS estimates weighted with combined propensity score and grand sample weight

	(p<0.01)	(p<0.01)	(p=0.75)	(p=0.35)
Region *(Northeast)*				
Midwest	0.32 (p=0.50)	.16 (p=0.65)	-1,060.89 (p=0.75)	-4,510.71 (p=0.11)
South	0.28 (p=0.47)	-0.51 (p=0.10)	-180.74 (p=0.95)	-3,641.15 (p=0.24)
West	1.34 (p=0.05)	0.06 (p=0.89)	11,471.04** (p<0.01)	877.51 (p=0.80)
Child sex *(female)*				
Male	1.19* (p=0.02)	1.39** (p<0.01)	9,552.22** (p<0.01)	10,412.19** (p<0.01)
Child race/ethnicity *(white)*				
Black	0.28 (p=0.57)	0.56* (p=0.02)	-4,245.27* (p=0.04)	-2,619.83 (p=0.17)
Hispanic	-0.11 (p=0.91)	0.60 (p=0.06)	-315.10 (p=0.89)	1,610.27 (p=0.63)
Other	-0.83 (p=0.18)	-0.21 (p=0.67)	106.82 (p=0.97)	-5,054.05 (p=0.12)
Child low birthweight *(not low birthweight)*				
Low birthweight	0.05 (p=0.94)	-0.39 (p=0.25)	-3,461.90 (p=0.42)	-776.89 (p=0.69)

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Table 3. Unconditional Estimated Association between Parental Incarceration and Personal Earnings in U.S. Dollars Wave IV, United States 2008[3]

	Maternal incarceration	**Paternal incarceration**
Child age at 1st parental incarceration *(referent = no parental incarceration)*		
Before birth	-19,063.25** (p=0.01)	-1,991.70 (p=0.71)
0–4	-14,754.60** (p<0.01)	-3,876.02 (p=0.21)
5–10	-10,544.68** (p<0.01)	-7,929.68** (p<0.01)
11–14	-3,451.81 (p=0.38)	-10,264.91** (p<0.01)
15–17	-8,453.85** (p=0.01)	-10,670.16** (p<0.01)
18 +	-4,542.85 (p=0.31)	-3,010.96 (p=0.45)
Parent education *(less than high school)*		
High School or GED	275.77 (p=0.93)	4,981.99* (p=0.03)
Some college/vocational ed.	5,575.66 (p=0.09)	7,852.06** (p<0.01)
College graduate +	5,821.09 (p=0.10)	13,357.58** (p<0.01)
Parent born in U.S. *(parent foreign-born)*	-65.15 (p=0.98)	-9,640.10* (p=0.02)
Ln(parent income Wave I)	657.80 (p=0.36)	1,398.19 (p=0.24)
Region *(Northeast)*		
Midwest	-142.62 (p=0.97)	-3,948.33 (p=0.15)
South	554.51 (p=0.86)	-4,466.54 (p=0.13)

[3] Marginal effects of two-part model weighted with combined propensity score and grand sample weight

West	13,396.57** (p<0.01)	935.83 (p=0.79)
Child sex *(female)*		
Male	11,299.77** (p<0.01)	12,413.22** (p<0.01)
Child race/ethnicity *(white)*		
Black	-3,303.96 (p=0.11)	-1,461.32 (p=0.42)
Hispanic	-532.45 (p=0.87)	2,593.17 (p=0.41)
Other	-2403.81 (p=0.46)	-5,035.86 (p=0.11)
Child low birthweight *(not low birthweight)*		
Low birthweight	-2,996.43 (p=0.44)	-1,572.16 (p=0.43)

SUPPLEMENTAL MATERIALS