A Tale Half Told: Incarceration of Fathers, State Investment in Families, and the Educational Attainment of Children*

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Abstract

Paternal incarceration intensifies educational disparities among children innocent of their fathers' crimes. Individual-level analyses underestimate the macro-level influence of variation in state socio-legal contexts. State investment in inclusionary welfare and educational programming can offset some exclusionary effects of paternal incarceration that state *dis*investment doubly disadvantages. Intergenerational educational attainment therefore requires individual- and contextual-level analyses. We analyze multi-level national data with HGLM regression and propensity scoring supplemental models. Post-secondary educational attainment is especially important. College graduation rises with state investment in welfare and education, even among children found in this and prior research to have been "held back" following paternal incarceration.

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The Double Disadvantage and the Individualistic Fallacy

Sampson and Wilson (1995; also Sampson et al. 2018) argue it is a fallacy to assume that micro-level analyses of individual level data can meaningfully explain micro- and macro-level variation in criminal behavior within and between neighborhoods. In theoretical and empirical terms, they contend the individualistic story of criminal behavior is a tale half told. The same problem occurs in criminal justice research. For example, research on the effects of paternal incarceration on child educational outcomes focuses on individual level analyses while neglecting macro-level contextual effects[1] of the state socio-legal settings in which these outcomes occur.[2] Our hypothesis is that state investment in welfare and educational programs can partially offset harmful effects of paternal incarceration on the academic attainments of children, while state *dis*investment in these programs can doubly disadvantage educational outcomes.[3] We contend both possibilities are real and therefore in need of analysis. Understanding the variable consequences for children of the incarceration of fathers in the American state dominated federalist system of criminal justice requires multi-level contextual and individual analyses.

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[1] We use the term effect when referring to the magnitude and sign of relationships between two variables and do not presume the existence of a proven causal relation.

[2] Although we are aware of no joint individual- and state-level analyses of paternal incarceration on child educational outcomes, the research of Murray et al. (2014) indicates significant effects of paternal incarceration on delinquency in more punitive national settings.

[3] Two recent studies (Perry and Morris 2014; Edwards 2016) provide important attention to related kinds of doubly disadvantaging effects.

A half century of research on social stratification confirms the importance of parental characteristics for child educational attainments (Warren et al. 2002), and in the mass incarceration era it is therefore incumbent on researchers to investigate consequences for children of paternal imprisonment.[4] Below we review a growing research literature which indicates the individual-level significance of paternal incarceration for child educational success. This otherwise robust research literature neglects the contextualization of these educational attainments by schools, neighborhoods, and states. States are particularly important structural and cultural sources of variation in both American mass incarceration and welfare and educational policies impacting families and children (see Campbell and Schoenfeld 2016).

Proposed federal budget cuts and block grants allowing state repurposing of funds are increasing attention to state jurisdictions. Large states such as California and New York are committed to maintaining supportive social programming, while other states are committed to reducing or redirecting funds, making growing state differences for families and children more likely (see Cobb 2016; Rosen 2016). Yet we know little either about how reduced state level support for families combines with high rates of paternal incarceration to harm children, or about how enhanced state level investment in supportive programing can compensate for these effects. Current as well as historical variation across states - from an earlier emphasis on rehabilitation to a more recent focus on incapacitation - is little examined in research on parental incarceration effects on children.

In this paper, we join exclusionary (e.g., Foster and Hagan 2007) and inclusionary (e.g., Sykes and Pettit 2015) perspectives on paternal imprisonment with a life course approach (e.g., Western

[4] We focus in this study on the incarceration of fathers because of its extraordinarily high prevalence in the United States (cf., Wakefield and Wildeman 2014). However, there also is evidence that the rising incarceration of mothers is harming children (Foster and Hagan 2015; Hagan and Foster 2012). The results of this study encourage future research at micro- and macro-levels of the effects on children of incarceration of both mothers and fathers.

2006:20-28; Hagan 2012:116-124) to assess the thesis that state variation in welfare and educational support for families and children combines with incarceration of fathers to influence intergenerational educational attainment.

Exclusion, Inclusion, and Life Course Capitalization

Exclusion and Inclusion: Seefeldt's (2016) recent monograph, *Abandoned Families: Social Isolation in the Twenty-First Century,* documents the plight of families headed by women left behind by contemporary institutions. We refer to this abandonment as a form of *systemic exclusion* because it involves deliberately chosen state policies. However, we also focus on *systemic inclusion* to consider states that continue to invest in family programming.

The coexistence and oscillation between exclusionary and inclusionary criminal justice policies is highlighted in Goodman, Page and Phelps' (2017) recent book, *Breaking the Pendulum: The Long Struggle Over Criminal Justice*. This book challenges the presumption that the 1970s marked a 'punitive turn' in which rehabilitative programming nearly disappeared. The authors argue contemporary scholarship mistakes radical shifts in political *rhetoric* for actual shifts in institutional *practice* (Goodman et al. 2017:7). They acknowledge that the last third of the twentieth century featured a major increase in punitive practices (Garland 2001), but they contend rehabilitation endured. Goodman et al. (121) conclude that "rehabilitation was … not buried" and even reappeared in new forms.

There is evidence to support this inclusionary argument. Using the National Survey of Children's Health, Sykes and Pettit (2015) show that many children with incarcerated parents are enrolled in social assistance programs. We consider further evidence of the persistence of rehabilitative

programing below. This work is important in clarifying how states can be sources of supportive inclusionary policies for families and children, even as recent trends point in the opposite direction.

Life Course Capitalization: Consideration of state investment as well as disinvestment can add an important macro-level dimension to a micro-level life course capitalization perspective that extends from pre-school to adulthood (e.g., Sampson and Laub 1993). As discussed further below, Beckett and Western (2001) have demonstrated what Goodman et al. acknowledge: that in the 1990s many American state governments *simultaneously* disinvested in welfare programs while investing massively in imprisonment – in effect doubling down on disadvantaged families and the children of incarcerated fathers.

Western (2006:138) demonstrates that the latter investment in incarceration is so pervasive that going to prison is today a "normal life event" or "stopping point" for many young less educated black men on the pathway to mid-life (see also Pettit and Western 2004). Since these men are disproportionately parents, the absence of incarcerated fathers is now common place. This micro-level intergenerational life course linkage is the starting point for our multi-level analysis of the disadvantaging effects of paternal incarceration on children.

Micro-level work by Lareau (2003, 2011) on the parental capitalization of childhood further illuminates the educational life course. She finds that while some families are able to invest in 'concerted cultivation' of childhood social and human capital, others rely on naturally unfolding growth processes. Concerted cultivation is important in sustaining college attendance to completion (Hamilton 2016).

The macro-level consequence is that life course capitalization can require state subsidized investment in children and families to successfully compensate for micro-level disadvantages associated with paternal incarceration (Arditti 2012). We use this kind of life course theory in conjunction with a

state-based approach to assess the "doubling down" - as contrasted with the "lifting up" - of the educational prospects for children of incarcerated fathers (see also Nesmith and Ruhland 2008; Nichols, Loper, and Meyer 2015; Poehlmann and Eddy 2013).

Life after High School: Finally, we argue that educational success is an especially important pathway to employment and earnings, and therefore a key to better understanding the role of paternal incarceration in the intergenerational reproduction of social inequality. We analyze below how post-secondary educational attainment in particular is linked to state-level policies for the support and protection of families and children. While we specifically hypothesize that state *dis*investment in protective and supportive family programming adds to the disadvantage already experienced by children of incarcerated fathers - doubling down on their disadvantaged prospects for post-secondary educational success - we further hypothesize the parallel importance of state investment in families and children through protective and supportive programs. A multi-level analytic framework – that simultaneously considers individual and state level variation in dis/investment in families and children - can estimate positive as well as negative outcomes for the children of incarcerated fathers.

State Variation in the Rise of an Exclusionary Penal-Welfare Regime

We build on panel data collected from 1995 by the National Longitudinal Study of Adolescent and Adult Health [Add Health], beginning with a sample of mid-adolescent youth and their parents. The timing of this study is propitious, as it includes a youth cohort born at the approximate beginning of the early 1980s era of mass incarceration. These youth are tracked through their transition from school to work. The era immediately preceding the first Add Health interviews, from 1975 to 1995, is further identified by Beckett and Western (2001) as the period when a penal-welfare policy regime crystalized

in America. Beckett and Western (2001) locate the consolidation of this regime in 1995[5], and as both increasing incarceration and decreasing welfare spending.

Yet while Beckett and Western (2001:45) demonstrate a growing negative relationship between incarceration and welfare spending leading up to 1995, like Goodman et al. (2017), their analysis also reveals substantial state and temporal variation in this relationship. They interpret the strengthening of the penal-welfare regime as a signal of a "tightened coupling" that occurred when policy makers in many states targeted crime-related problems for punitive political action at the end of the 20th century. However, in other states where penal policy was more "loosely coupled," political action was less systematic in reducing welfare support and protection. Phelps (2011) made this point in anticipation of her work with Goodman et al. (2017), setting the evidentiary foundation for the assertion that rhetoric can belie actual practices in punishment regimes (Phelps 2012:348). Working with a national data source on prison programming that we also use to supplement Add Health data in our analysis below, Phelps found that despite punitive rhetoric, inmate services often continued to be available to prisoners, for example, in northeastern states where progressive protective and supportive reforms originated. This does not discount that fewer inmate services were available elsewhere, for example, in southern states with the weakest history of rehabilitation and where targeted reduction in care for inmates clearly occurred.

Paternal Incarceration and Intergenerational Educational Exclusion

The nationally representative Add Health survey (Lee, Fang and Luo 2013) confirms America's world leading level of paternal incarceration at between 10 and 15 percent, while also revealing that this

[5] This was the year following the passage of the 1994 Violent Crime Control and Law Enforcement Act which increased funding for states to expand the construction of prisons (U.S. Department of Justice 1994).

high rate of incarceration is unequally distributed (Garland 1991, 2001). In the Fragile Families data set, which is stratified to over-sample economically disadvantaged minority families, approximately 41 percent of children experience paternal incarceration (Wildeman 2009).

Damaging outcomes linked to paternal incarceration are consistently found in a wide range of studies, net of controls for extraneous variables and selection effects (e.g., Murray, Janson and Farrington 2007; Murray, Loeber and Pardini 2012; Wakefield and Uggen 2010; Wakefield and Wildeman 2011). Yet some negative outcomes - for example, externalizing behavior problems – are reported more consistently than others. There is more uncertainty about educational outcomes.

Educational studies use a range of measures across a variety of educational stages (see Hagan and Dinovitzer 1999; Murray and Farrington 2008; Murray et al. 2012; National Research Council 2014; Wakefield and Uggen 2010; Wakefield and Wildeman 2014). For example, recent research using the Fragile Families data reveals notable paternal incarceration effects on early school readiness and receipt of special education services (Haskins 2014). Turney and Haskins (2014) further report with these same data that paternal incarceration is linked to grade retention in early elementary school. Studies using several waves of Add Health data with older students additionally indicate robust connections between paternal incarceration and transcript-reported as well as self-reported grades and educational attainment (Bussell 2013; Foster and Hagan 2015). Nichols et al. (2016) replicate the latter findings using a combined measure of maternal and paternal incarceration on several types of educational outcomes.

Turney and Haskins (2014:2) speculate that the early childhood effects of paternal incarceration they observe on grade retention in kindergarten through grade three may have long term harmful effects on intergenerational and life course social mobility. They note that “given the cumulative nature of schooling in the United States, retention and promotion decisions that alter children’s early educational trajectories have important implications for … labor market success, and social mobility” and that

"therefore, understanding the link between paternal incarceration and grade retention can lend insight into intergenerational inequality."

Yet past research indicates that paternal incarceration is not always consistently linked to parent-, teacher-, and self-reported grades and high school graduation (Murray et al. 2014), possibly because many analyses are truncated before the cumulative intergenerational effect anticipated by Turney and Haskins (2014) becomes apparent. Kao and Thompson's (2003) review of research identifies several complications that may be associated with the unfolding life course effects of paternal incarceration on the educational attainment of children.

The first complication derives from a contemporary narrowing of disparities at high school graduation in America. Kao and Thompson explain (430) that disparities in educational attainment have moved upwards, from earlier to later stages of schooling, as average levels of attainment have risen across groups.[6] But they also report that "inequalities persist or even increase at the postsecondary level as groups become more equal at lower levels of education." This makes it important to analyze adult post-secondary college level outcomes in assessing Turney and Haskins' anticipation of intergenerational effects.

A second complication is that controlling at the individual level for influences, such as the academic readiness scores that are incorporated in Turney and Haskin's (2014) analysis of grade retention, can unexpectedly remove effects of variables such as race and concentrated disadvantage on educational attainments. Thus Kao and Thompson explain (431) that race effects on college graduation are often diminished and even eliminated when controls are introduced for academic test scores and

[6] A Pew Research Center report (2009) indicates that in 2008, 89 percent of 18-24 year olds completed high school. This is the same year the Wave 4 Add Health data were collected. In 2008, there were also a record low number of high school dropouts. The extreme positive skew in high school completion helps to account for the decline in disparities at the secondary level.

when the longitudinal time frame is extended to include the longer periods often taken by minorities to complete college (see also Camburn 1990; Velez 1985; Donovan 1984; U.S. Department of Education 1995).

Our study assesses the long term effects of paternal incarceration, academic readiness, grade retention and other micro- and macro-level variables on intergenerational social mobility by tracking post-secondary educational outcomes well into adulthood. We contend that post-secondary education in America involves challenges that make completion of college uniquely difficult and therefore sensitive to variation in state investment in policies and programs of support for families and children. We contend that close attention to college completion is an untold story in micro-level studies that do not take macro-level contextual variation into account.

Exclusion, Inclusion, and College Completion

Wightman and Danziger (2014) observe that secondary and post-secondary education, like other civil rights, has expanded unevenly across American states. Federal and state efforts to reduce these disparities through subsidies have been outmatched by rising costs, especially at four year colleges. Thus Wightman and Danziger (2014:23) emphasize that inflation has increased the ratio of college costs to parental income, especially in low-SES families. High levels of incarceration of parents in poorer neighborhoods and communities add to these challenges.

Progressive efforts to increase access to post-secondary education have focused on two-year, community, and junior colleges. From the beginning, there was skepticism about entry-level post-secondary institutions. Erving Goffman (1952) provocatively argued that these limited efforts amounted (in the underworld argot of the confidence game) to “cooling out the marks.” In the modern era,

Rosenbaum et al. (2009) confirm that expanded access to college through entry level post-secondary institutions has yielded disappointingly low rates of college completion.

Still, many states have supported families and children through a variety of other welfare and educational programs that may have positive effects. As noted, our analysis of the effects of this support is based on the National Longitudinal Study of Adolescent and Adult Heath [Add Health]. Add Health began data collection the year before President Clinton signed into law the 1996 Personal Responsibility and Work Opportunity Reconciliation Act [the PRWORA], which followed his 1992 campaign promise "to end welfare as we know it."

Danziger and colleagues (2002) observe that this act was actually the product of a longer term evolution in welfare reform: from the War on Poverty era through the Nixon Administration's Family Assistance Plan, to the Carter Administration's Program for Better Jobs and Income, to the "workfare" projects stimulated by the 1981 Omnibus Budget Reconciliation Act, followed by the 1988 Family Support Act, and leading to the 1996 PRWORA (Assistant Secretary for Planning and Evaluation 1996; Burke 2003). During this period, state investment in welfare assistance declined, while transfers of federal block funds for reallocation by states increased.

Nonetheless, Beckett and Western observe (2001:56, n5) that the rank-ordering of states did not change much over this period. This was likely for the reason Phelps (2011;2012) and Goodman et al. (2017) note: namely, that states which in the past invested in inclusionary support for welfare and educational programs continued to do so, even if their investments did not increase, or even decreased. Differences between states that are the macro-level focus of this paper therefore remained largely as ordered before, but in a new period of constraint that constitutes an important context in which to consider positive program state investment in life course capitalization.

Orienting Hypotheses

The analysis below is organized around four hypotheses that follow from the above discussion. Our first hypothesis is that measures of academic readiness and grade retention will transmit yet not reduce below statistical significance the effects of paternal incarceration on college attendance and college completion, confirming the long term importance of readiness and retention in combination with paternal incarceration and other variables on intergenerational mobility.

Our second hypothesis is that because contemporary disparities in academic attainment have diminished at lower educational levels, the negative effects of paternal incarceration and other disadvantaging variables that are seen at the level of college attendance will be even more apparent at the level of college graduation.

Our third hypothesis extends attention to college completion and predicts that it is a crucial educational stage at which children are excluded from opportunities for upward social mobility by the combined doubly disadvantaging main effects of incarceration of fathers *and* state *dis*investment in welfare and educational support for families and children.

In contrast, our fourth hypothesis is that children disadvantaged by the incarceration of fathers but located in states with higher levels of investment in welfare and educational support for families and children are more likely to complete college, reducing a major barrier to their successful life course advancement.

The above hypotheses, if confirmed, make the case that college completion is a crucial stage in the educational life course whose influence is driven by macro- as well as micro-level socio-legal policies and processes that impact educational attainment and occupational advancement for children of incarcerated as well as non-incarcerated fathers.

Data and Methods

Our analysis of the educational impact of paternal incarceration is based on multi-level models using several waves of individual level data drawn from the National Longitudinal Study of Adolescent and Adult Health [Add Health], combined with state-level government agency data, state population census data, and survey data collected from state correctional facilities. The state-level data were developed through an ancillary protocol with Add Health. This involved the use of "pseudo-state" indicators that located respondents within their nested state contexts, allowing multi-level analyses while preserving state and individual level confidentiality. Using the longitudinal in-home panel survey data [from Waves 1-4], we focus on 8659 respondents nested within 30 states with a minimum of 45 respondents each. Descriptive statistics for these data are presented in Table 1.

[Table 1 about Here]

Individual-Level Data: Pettit (2012) observes that inadequate enumeration and explanation of the impact of mass incarceration policies by social scientists and policy analysts has contributed to a "collective blindness" about the results of high U.S. rates of imprisonment and in itself is a unique source of social exclusion. She blames much of this inadequacy on the lack of essential data collected by the U.S. government on mass incarceration. However, Pettit (2012: 90) also notes that there are exceptions to this generalization, including the data collected in the National Longitudinal Study of Adolescent and Adult Health (Add Health).

The Add Health panel study (see Chantala and Tabor 2010 [1999]; Udry and Bearman 1998; see also Resnick et al. 1997) has tracked respondents over time and collected information about parental incarceration, as well as family, school, and work experiences identified as important in prior research on educational attainment. Add Health is organized around a nationally representative sample of children born in the early 1980s (initially surveying students in 132 U.S. schools between grades 7-12 in

1994/1995) who entered adulthood (at average age twenty-one) at the turn of the 21st century, and then transitioned through early adulthood (to an average age of twenty-eight) in the first decade of the current century. The response rate in the fourth wave of the Add Health survey (2007/2008) was 80.3 percent (Harris 2009; Harris et al. 2009). Further descriptive details about variables discussed next are presented in Appendix 2.

We analyze the educational success of the Add Health children through their transition into adulthood using information about educational attainment provided by respondents at Wave 4. These outcomes include binary measures of (1) college admission and attendance and (2) completion of a baccalaureate college degree or more. By comparing results using these measures, we are able to assess the relative importance of incarceration of fathers and state-level variation in exclusionary and inclusionary investment policies for high levels of educational attainment, especially college graduation. The average Add Health respondent received some post-secondary instruction, with about two thirds (65%) attending college, but only about one third (31%) completing college. Our results ultimately reveal how low and high macro-level dis/investment in family support policies combines with micro-level paternal incarceration to significantly and substantially influence child prospects for college completion.

By Wave 4, the fathers of 16 percent of the respondents were reported to have served time in jail or prison. Additional Wave 1 paternal measures in our analysis include the fathers' own educational attainments, smoking behavior, alcoholism, and closeness to the child respondent. In a supplementary analysis, we further consider measures of the fathers' health problems, birth in the U.S., physical and mental disability, death, and neighborhood problems involving drug dealers and users as well as presence of litter or trash. Also at Wave 1, measures are included of gender, single parent family, and

self-identified race/ethnicity: African-American (16%), Hispanic (12%), Asian American (4%), and other (3%), with non-Hispanic whites as the omitted comparison group.

Finally, our analysis of respondent educational attainment in young adulthood includes Wave 1 scores on an Add Health academic readiness test and reported retention in grades 1-12. The former measure is a modified version of Dunn and Dunn's (1981) Peabody Picture Vocabulary Test (Goldberg et al. 2014). Picture vocabulary tests are widely used to assess vocabulary knowledge in children and adults (Hoffman, Templin and Rice 2012). The latter retention measure is based on a self-report by respondents of "retention" or being "held back" one or more grades in school.

State-Level Data: The state-level data we join with the individual-level Add Health variables in multi-level models presented below include measures of linked expenditures on welfare and education programs, provision of educational programming in prisons, a punitive judicial policies index, a concentrated disadvantage scale, and a per 100,000 measure of index crimes (see Appendix). These measures are designed to allow analysis of variation in investment and disinvestment in state-level capitalization through inclusionary supportive and protective programs (i.e., through interinstitutional investment in welfare and school and prison education programs) in comparison to exclusionary investment in punitive state policies (i.e., through legislated judicial measures linked to imprisonment), while also taking into account economic disadvantage (i.e., concentrated disadvantage) and controlling for levels of crime (i.e., index crimes per 100,000 persons). These state-level measures are timed to precede as closely as possible onset of the Add Health Study in 1995.

The welfare-education expenditures index (α=.98) is based on six programs identified as relevant by Beckett and Western (2001): Aid to Families with Dependent Children (AFDC), the Supplemental Nutrition Assistance Program (SNAP), Social Security Income (SSI), Medicaid, unemployment benefits, primary education, and school lunch programs.

The prison education program index is formed with information reported in the Census of State and Federal Correctional Facilities (1995) (Stephan 1997). The scales consist of the proportion of facilities in states offering a range of programming, including basic adult education, secondary education, special needs, vocational, and college course programs (α=.82). The combination of welfare and public education programs for families and children with the prison education programs for fathers provides a broad interinstitutional measure of state investment in programming relevant to intergenerational academic attainment.

The punitive judicial policies index includes variables identified by Western (2006) as limiting judicial discretion and aimed at increasing uniformity in sentence severity. The index is based on state legislation mandating sentencing guidelines, truth-in-sentencing restrictions, and the abolition of discretionary parole release by parole boards or other parole authorities. The scale ranges from zero to three in level of severity (α=.75).

The two final state-level variables measure concentrated disadvantage and index crime. The concentrated disadvantage index is based on census measures utilized in the work of Sampson, Raudenbush and Earls (1997). The measures include percent of residents living in poverty, self-identified as Black/African-American, living in female-headed families, and unemployed (α=.78). The total state-level measure of index crime includes reported property and violent crime per 100,000 people (α=.72).

Analytic Sample: The data used in this analysis consists of 8659 Add Health respondents with valid responses for educational outcomes interviewed at Wave 1 in 1995 in mid-adolescence and re-interviewed at Wave 4 in 2007/8 in early adulthood, with longitudinal sample weights. We applied multiple imputation for missing values of analytic variables using Stata 15 (Allison 2001; StataCorp 2017). Ten separate multiply imputed data sets were created and incorporated into HLM 7 which

provided the averaged HLM results reported in our tables (Raudenbush, Bryk, and Congdon 2013; Raudenbush et al. 2016). Our analytic sample includes 30 states with a minimum of 45 respondents each. Data restrictions prevent identification of the specific states included in the sample.

Analytic Methods: The analysis separately assesses determinants of college attendance and college graduation. The individual- and state-level determinants we consider have a hierarchical structure that allows the multi-level modeling strategy [HLM] increasingly used in educational research to establish contextual effects (Raudenbush and Bryk 2002: Chap. 5; Hagan and Foster 2015a; see also Sampson et al. 1997; Nichols et al. 2015; Nowotony et al. 2015). The contextual factors are potentially protective as well as punitive state-level determinants of educational attainment among children of incarcerated and non-incarcerated fathers. The analyses include longitudinal weights that adjust for the design features of Add Health sampling at the level of individuals (see Chantala and Tabor 1999 [2010]). State-level sampling weights (version 2) were derived from the Wave 1 school-level weights using the PWIGLS macro in Stata (Chantala, Blanchette, and Suchindran 2011; Christ 2014; Pfeffermann et al. 1998).

We analyze joined individual and state-level HGLM equations providing logit estimates for college attendance and college completion. The individual-level equations are estimated separately for students in each school, yielding logistic coefficients (for each predictor) and an intercept term representing the respondent adjusted state outcomes for college attendance and college completion measures (with the continuous predictors centered on their means). The state-level equations include intercept terms for each jurisdiction representing the dependent variable adjusted for individual-level respondent characteristics and estimated with state-level characteristics. We test for significant cross-level interactions, including an interaction of individual-level grade retention with state-level welfare and education programing that (given the stigma and challenges associated with being “held back”) is of

particular interest in relation to the potential restorative influence of inclusionary state resource investment in families and children.

As a further test of the effect of the incarceration of fathers in the HGLM models, we also present in the Appendix a propensity score analysis that matches (Appendix 1C, 1F) the Add Health respondents on ten characteristics (Appendix 1B, 1E) of their fathers and estimates average treatment effects (Appendix 1A, 1B) of paternal incarceration on college attendance and completion. The plots indicate that balance was achieved among covariates in the treatment and comparison groups. As in the HGLM models reported in greater detail below, the propensity score analyses indicate that the incarceration of fathers has statistically significant average treatment effects (ATE) on college attendance (ATE=-.08, $p<.01$, as per Appendix 1D) and college completion of children (ATE=-.19, $p<.001$, as per Appendix 1A). We are particularly interested below in how the effect of paternal incarceration combines with low as contrasted with high state-level investment in welfare and education programming in predicting college attendance and graduation of children in America.

HGLM Results

We use HGLM in Tables 2 and 3 to estimate hierarchical linear models respectively of the binary outcomes of college attendance and college graduation by Wave 4 of the Add Health study when the child respondents were on average 28 years of age. In Tables 2 and 3 we assess the individual-level predictive impact of the incarceration of fathers and state-level expenditures on welfare and public and prison educational programming in combination with other individual-level factors on child attendance and completion of college. We then use the final Table 3 college graduation results to estimate in Figure 1 the predictive impact of incarceration of fathers when combined with *low* as contrasted with *high* state-level investment in welfare and education programming in state populations and in prisons. The

difference between these college graduation rates provides an estimate of the doubled down effects of paternal imprisonment in states with punitive penal-welfare regimes, as contrasted with the potential uplifting effects in states with more supportive regimes. The last models presented in Tables 2 and 3 estimate cross-level interaction effects of individual-level grade retention and state-level welfare and education expenditures on college graduation, which are summarized graphically in Figures 2 and 3.

[Table 2 about Here]

The variance component term for the intercepts in Model 1 of Table 2 indicates there is statistically significant variation between states in levels of college attendance. Although Model 2 of Table 2 indicates no state level predictive influence of punitive judiciary policies on educational attainment, it does reveal a significant negative state level effect of concentrated disadvantage ($b=-.10$, $p<.01$), and a significantly positive effect of state welfare and education expenditures ($b=.17$, $p<.05$). The latter inclusionary welfare-education result suggests that state-level supportive and protective policies significantly improve prospects of college attendance.

In Model 3 of Table 2, we next introduce additional individual-level variables measured in mid-adolescence. This model confirms that daughters are more likely than sons ($b=.50$, $p<.001$) to attend college and that several father related risk variables (i.e., education and smoking) as well as single parenthood negatively influence college attendance – although these factors do not reduce the father incarceration effect. Notably, when we remove variables individually from Model 3, it is single parenthood that in addition to father's incarceration reduces the state-level effect of concentrated disadvantage below statistical significance. In contrast, the inclusionary effect of state investment in welfare and education support is somewhat increased.

Models 4 and 5 of Table 2 respectively introduce the verbal readiness and grade retention measures. Although these variables predictably influence college attendance in opposite ways and have

different metrics, both have highly significant effects ($p<.001$) on college attendance - as predicted in our first hypothesis - with verbal readiness increasing and grade retention decreasing attendance. However, as anticipated in our first hypothesis, these variables do not reduce the effect of paternal incarceration below statistical significance.

The most noteworthy change in Models 4 and 5 resulting from the addition of the verbal readiness and grade retention variables parallels prior research (see Kao and Thompson 2003) in shifting the African-American effect from weakly negative and non-significant to positive and significant (from $b=-.06$, $p>.10$ to .44, $p <.001$). The Asian-American coefficients also become positive and significant (shifting from $b=.08$, $p>.10$ to $b=.43$ and .36, $p<.05$), while the negative Hispanic coefficient becomes negligible and non-significant (shifting from $b=-.26$, $p<.10$ to .01, $p>.10$). Several plausible interaction effects on college attendance were tested in Table 2 (and subsequently in Table 3) and found non-significant, and they are therefore not presented. However, we do include in Model 6 the non-significant effect of the interaction of grade retention and welfare-education expenditures - for purposes of comparison with the estimation of this effect that is significant in the following table.

We earlier argued and presented as our second hypothesis that the cumulative challenges involved in completing college are especially great when compared to the access involved in gaining admission to and attending college. To more clearly assess this difference, we have analyzed college attendance and completion separately in Tables 2 and 3. We now consider predictors in comparable models of college completion in Table 3.

[Table 3 about Here]

The variance components portion of Model 1 in Table 3 indicates there is significant variation between states in college graduation and that this variation in the log-odds of graduation (.42) is greater than that the variation in college attendance (.20). In Table 3, the disadvantaging exclusionary influence

of father's incarceration becomes especially apparent. While in Model 2 of Table 2 father's incarceration reduced college attendance by 48 percent ($e^{-.66}$-1=-.48) (Pampel 2000:23), in the parallel model of Table 3 father's incarceration reduces college completion by 68 percent ($e^{-1.15}$-1=-.68). Thus as anticipated in our second hypothesis, the disadvantage of father's incarceration is notably stronger in relation to college completion than college attendance. Beyond this, the effect of the welfare and education index (b=.19, p<.05) is similarly significant in Model 2 of Table 3 and is joined by the further significance of the prison education index (b=.22, p<.05), while concentrated disadvantage remains similarly significant (b=-.11, p<.05).

Also consistent with our second hypothesis, seven of the coefficients for variables in Model 3 of Table 3 are larger or newly significant compared to Table 2. Gender has a smaller influence, and it continues to be significant (b=.38, p<.001), while there is also a slightly smaller influence of age (b=-.05, p<.05). The exclusionary effect of father's incarceration (b=-.49, p<.001) remains persistently negative and strong in Model 3 and beyond. The next strongest and persistently negative effect in Model 3 and thereafter is single parent family (b=-.38, p<.05). The strength of this variable likely reflects the socio-economic challenges of a single parent – almost all women – sustaining support for a child through college completion and graduation in early adulthood. Concentrated disadvantage is reduced below statistical significance in Model 3 (from b=-.11 to -.06, p>.10), and as in the previous college attendance analysis, it is again father's incarceration and single parenthood that most notably accounts for the exclusionary consequences of concentrated disadvantage.[7]

In terms of the contextual emphasis of this paper, summarized in our third and fourth hypotheses, the results in Model 3 and beyond reveal the persistent breadth and significance of the effects of state-

[7] The marginally significant effect of the index crime rate (b=-.10, p<.10) is also similarly reduced in Model 3 by father's incarceration and single parenthood.

level investment in welfare and education in the general population (b=.20, p<.01), as well as the significance of the provision of educational opportunities in the prison population (b=.19, p<.05). These effects persist in their significance in spite of the controls in Model 3 for not only father's incarceration, but also the range of other father and father related variables which are notable and significant in this model, including the expected strong influence from stratification research of father's education (b=.31, p<.001), as well as father's closeness to the child (b=.09, p<.05), smoking (b=-.35, p<.001), alcoholism (b=-.32, p<.05), and single parenthood noted above.

The next findings of interest in Table 3 involve the shift upwards in the effects of race and ethnicity that parallel those previously observed for college attendance in Table 2 when verbal readiness and retention were brought into the analysis in Columns 4, 5, and 6, and that now are further enlarged when brought into Columns 4, 5, and 6 for college graduation in Table 3. The most noteworthy change in Models 4 and 5 resulting from the respective addition of the verbal readiness and grade retention variables parallels findings of prior research (Kao and Thompson 2003) in shifting the African-American effect from weakly negative and non-significant to positive and significant (from b=-.19, p>.10 to .30, p <.01 and b=.36, p<.01). The Asian-American coefficients also become positive and significant (shifting from b=.08, p>.10 to b=.68 and .65, p<.01), while the Hispanic coefficients shift from negative and significant to negligible and non-significant (shifting from b=-.37, p<.001 to b=-.13 and -.10, p>.10).

Model 6 of Table 3 adds to the preceding main effects model the estimation of an interaction term for the effect on college graduation of retention (i.e., being "held back") in primary and secondary school with state-level investment in welfare-education expenditures. This interaction effect involving the special difficulties of retention is of particular interest for the reasons explained next. Recall that Turney and Haskins (2014) report a significant effect of father's incarceration on early grade retention

and speculate that this experience is a barrier to intergenerational social mobility. This expectation is consistent with our own finding in Model 5 of Table 3 that grade retention has a strong and highly significant negative effect (b=-1.37, p<.001) on college graduation. Turney and Haskins's speculation that paternal incarceration is a source of this retention effect is further supported by our finding that the inclusion of retention in Model 5 reduces the effect of paternal incarceration by almost 10 percent (from b=-.49 to -.45). Model 6 in Table 3 includes the further finding that the interaction of grade retention and state investment in welfare-education expenditures is significant and protective (b=.30, p<.05). The implications of this finding are explored graphically below.

We first use the above Model 6 college graduation results to estimate in Figure 1 the predictive exclusionary micro-level impact of incarceration of fathers when combined with *low* as contrasted with *high* macro-level state investment in welfare and public and prison education programs. We then further use results of the above Models 5-6 to estimate in Figures 2-3 the main effects and cross-level interaction effects of individual-level grade retention and state-level welfare and education expenditures on college graduation. Paternal incarceration does not significantly interact with grade retention or welfare and education expenditures on college graduation, which means that the effects of grade retention and welfare-education expenditures are operative for the children of incarcerated as well as non-incarcerated fathers.

[Figure 1 about Here]

The results presented in Figure 1 highlight the additive effects on college graduation of two key variables in Model 5: individual level father's incarceration and state level investment in welfare and public and prison education, with other variables in Model 5 set at their mean values. The bars in Figure 1 indicate college graduation rates in the averaged lower and upper quartile states when fathers have and have not been incarcerated.

As we saw in Model 5 of Table 3, children of incarcerated fathers are disadvantaged in terms of college outcomes and advantaged by state investment in welfare and education. However, as indicated in the previous paragraph, the exclusionary individual level father incarceration and inclusionary state welfare-education investment effects in Table 3 are additive. The results are similar advantages to both children of incarcerated and non-incarcerated fathers when the respondent resides in a state with higher rather than lower investment in welfare and education. Thus the results in Figure 1 indicate that the prospects of college graduation for children of incarcerated fathers rise from about 17 percent in lower investment states to 25 percent in higher investment states, while the prospects of college graduation for the children of non-incarcerated fathers increase from about 24 to 31 percent. The relative increases (i.e., 8 and 7 percent) are comparable, indicating that these gains are similarly important for children of incarcerated as well as un-incarcerated fathers. The lower and higher percentages in low and high investment states reflect the doubling down versus uplifting possibilities anticipated in our second, third and fourth hypotheses.

The results presented in Figures 2 and 3 next highlight the respective additive main effects and non-additive cross-level interaction effects on college graduation (observed in Models 5 and 6 of Table 3) of individual level primary or secondary school retention and state level investment in welfare and public education, with other variables set at their mean values. This focus on retention in Figure 2 draws on Turney and Haskins (2014) finding (noted above) that father's incarceration leads to being held back in early primary grades, together with our finding in Model 5 of Table 3 that retention in primary or secondary school, as also anticipated by Turney and Haskins, mediates longer term effects of father's incarceration on college completion.

[Figures 2 & 3 About Here]

We first observe using Model 5 of Table 3 in Figure 2 that the prospects of college graduation for children who are retained in primary or secondary school rise from about 10 percent in lower investment states to about 15 percent in higher investment states, while the parallel prospects for college graduation for un-retained children increase from about 30 to 32 percent.

However, these differences are intensified in Figure 3 when we further estimate with Model 6 the non-additive cross-level interaction effect on college graduation of individual-level primary or secondary school retention and state level investment in welfare and public education, again with other variables set at their means. The sources of these heightened differences are the lowered prospect of college graduation for retained students in states with low investment in welfare and education, and the increased prospects of college graduation for un-retained students in states with high investment in welfare and education. Thus the prospects of college graduation for retained children in states with lower state investment in welfare and education are only six percent, while the parallel prospects nearly triple to 15 percent in states with high state investment in welfare and education. These respective figures are suggestive of floor and ceiling effects of the doubled down and uplifting, micro- and macro-level processes predicted in our third and fourth hypotheses. College completion for un-retained children increases from about 30 to 35 percent in more supportive states, while college completion for retained children remains at 15 percent in these states.

These findings indicate the macro-level importance of state-level inclusionary investments (Beckett and Western 2001; Sykes and Pettit 2015) for college completion. On the other hand, as throughout this analysis, neither of the state crime and punishment variables (i.e., neither the state level crime rate nor punitive judicial policies) that might alternatively have been expected to account for failures to complete college are consistently significant.

From Exclusion to Inclusion through State Capitalization

Although children are innocent of the crimes of their fathers, children nonetheless are significantly disadvantaged by paternal incarceration. Yet this individual-level disadvantage is only the micro-level part of the story. The macro-level part involves the variable location and impact on children across states providing differing amounts of welfare and educational support for families, children and incarcerated fathers. Together the individual-level and state-level parts of this story more fully reveal the educational consequences for children of the incarceration of fathers in an era when these state level differences are threatening to grow larger.

We have observed a micro-macro doubly disadvantaging effect on child college graduation rates stemming from the exclusionary incarceration of fathers in states that offer little inclusionary welfare and educational support for these incarcerated fathers or their families and children. However, we have also observed that these doubly disadvantaged outcomes can be counteracted at the macro-level with state investments in inclusionary welfare and educational programming - which we conceptualize as state capitalization of the educational life course – and which have the capacity to lift college graduation rates for children of incarcerated fathers.

Our findings further reveal how sensitive the observation of exclusionary and inclusionary state capitalization policies are to the level at which educational attainment is assessed. In recent decades, American educational disparities have declined at the secondary school level. State policy effects are more fully revealed in relation to the attainment of a four year college degree. Children of incarcerated fathers have lower rates of college completion overall, but inclusionary state welfare and education policies have lifted the college graduation rates of these children from 17 percent in less supportive states to 25 percent in more supportive states. Although the graduation rate for children of non-incarcerated fathers in the latter states is notably higher at 31 percent, compared to 24 percent in less

supportive states, the improvement from 17 to 25 percent college completion for children of incarcerated fathers is consequential. The difference between these college graduation rates is a way of estimating the effects of state choices to invest or disinvest in welfare and educational support for incarcerated fathers, families, and children.

Our findings have limitations that should be addressed in future research. We have found, consistent with past research, that problems of verbal readiness and being retained in primary and secondary school can significantly influence post-secondary attainment. As further indicated below, there is reason to expect that if problems of academic readiness and retention were effectively addressed, that negatively associated effects of race and ethnicity could be reduced or eliminated. Six percent – or almost 300 of the successful college graduates in the Add Health sample - were retained in primary or secondary school, with this retention linked to paternal incarceration and problems of verbal readiness. We found the prospects of college graduation for retained students were nearly three times greater in states that invested more highly in welfare and educational programming. Yet we need to learn more about how these improved college prospects were achieved. Past research points to the importance of schools as an important intervening mechanism.

For example, Bennett (2015) has shown (also with Add Health data) that neighborhood school quality can mediate the relationship between community racial concentration and verbal readiness scores. And Turney and Haskins (2014) have shown that teachers' perceptions of children's academic readiness play an important role in mediating or transmitting the effect of paternal incarceration on grade retentions. These studies suggest that the grade retention and educational attainment of minority students will be more similar to those of white students with increased access to higher quality schools and more positive teacher perceptions of their prospects. This is consistent with our finding that race effects on college graduation are diminished or even reversed when academic readiness and retention

problems are taken into account. This finding anticipates the potential for racial resilience (sometimes also called racial invariance) in contextual settings where fathers, families and children – regardless of race or ethnicity - experience the enhanced benefits of supportive school polices.

Our analysis considers only the effects on children of the incarceration of fathers. Although the incarceration of mothers has increased dramatically in the mass incarceration era, the problems of mothers are likely different in ways that require their own separate consideration. Our analysis also has focused on the era in which a penal-welfare regime of mass incarceration emerged in America. However, it is now more than 20 years since this emergence, and it will be important to explore how changes in this regime are further impacting youth and their transitions from adolescence to adulthood. As well, the welfare and prison programs we have analyzed are only beginning points in the measurement of state capitalization. A wider range of programming should be investigated.

Finally, we are in a period when more than a half million incarcerated persons per year - about half of whom are parents - are re-entering communities from prison. There is much to learn about the impact of returning parents on children and communities. Some of what we may learn has the potential to expand our understanding of life course capitalization processes that lead to enhanced educational attainment and societal inclusion.

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Table 1. Descriptive Statistics: Individual and State Level Variables

	Mean	SD	Range
Respondent's Individual Level Educational Outcomes (N=8659)			
College Attendance (W4)	.65	--	0-1
College Degree Completion (W4)	.31	--	0-1
espondent Individual Level Background Characteristics			
Biological Father's Incarceration (W4)	.16	--	0-1
Biological Father's Education level (W1)	5.25	2.40	1-9
Closeness to Biological Father (W1)	4.10	1.26	1-5
Biological Father Smokes (W1)	.65	.48	0-1
Biological Father's Alcoholism (W1)	.16	--	0-1
Gender (female=1)	.50	--	0-1
Single Parent Family (W1)	.23	--	0-1
Hispanic	.12	--	0-1
African American	.16	--	0-1
Asian American	.04	--	0-1
Other race/ethnicity	.03	--	0-1
Age (years) (W4)	27.88	1.66	24-34
Verbal Readiness Scores (standard scores) (W3)	101.59	14.36	9-123
Grade Retention in Primary or Secondary School (abbreviated as Grade Retention) (W1)	.22	--	0-1
State Level Variables 1995 (N=30)(Standard form in models)			
Welfare-Education Index (Beckett and Western 2001:49)	13530.91	13021.51	1908-5532
Prison Education Index	.57	.12	.33-.80
Punitive Judiciary Policies Index (Western 2006:65)	1.23	1.13	0-3
Index Crimes (rates per 100, 000 persons)	5306.30	1249.16	2458.16 to 8181.41
Concentrated Disadvantage	.11	.04	.06 to .21
Additional Covariates for Propensity Scores			
Father Health Problems (W1)	.64	.79	0-4
Father Born in U.S.A (W1)	.90	--	0-1
Father has Physical or Mental Disability (W1)	.10	--	0-1
Father has passed away (W1)	.11	--	0-1
Neighborhood Problems (W1)	-.03	-.84	2.32

Table 2. Population Average HGLM Logistic Regression Results of Respondent's College Attendance (W4) on State and Individual Predictors[#] *(b/sb)*

	1	2	3	4	5	7
Intercept	.65***	.84***	.90***	.72***	.95***	.95***
	(.08)	(.09)	(.10)	(.11)	(.12)	(.11)
State-Level Characteristics (1995)(n=30)						
Welfare-Education Index		.17*	.21*	.23**	.23*	.22*
		(.06)	(.08)	(.08)	(.11)	(.11)
Prison Education Index		.08	.08	.07	.09	.13
		(.07)	(.07)	(.07)	(.09)	(.08)
Punitive Judiciary Policies Index		.10	.08	.05	.07	-.01
		(.07)	(.07)	(.07)	(.08)	(.08)
Index Crimes (rate per 100,000 persons)		-.05	-.01	-.01	-.01	.05
		(.05)	(.06)	(.07)	(.08)	(.07)
Concentrated Disadvantage		-.10**	-.07	-.001	.04	.13†
		(.03)	(.05)	(.06)	(.08)	(.07)
Individual Level Characteristics (n=8659)						
Biological Father Incarceration (W4)		-.66***	-.22*	-.23*	-.20†	-.20*
		(.09)	(.10)	(.10)	(.09)	(.09)
Biological Father Education (W1)			.26***	.22***	.21***	.21***
			(.02)	(.02)	(.01)	(.01)
Biological Father Closeness (W1)			.05	.05	.06†	.06†
			(.05)	(.05)	(.03)	(.03)
Biological Father Smokes (W1)			-.24**	-.25**	-.24***	-.23***
			(.08)	(.08)	(.07)	(.07)
Biological Father Alcoholism (W1)			-.12	-.13	-.11	-.11
			(.13)	(.13)	(.11)	(.11)
Single Parent			-.24*	-.22†	-.16*	-.15*
			(.11)	(.12)	(.07)	(.07)
Gender (female=1)[a]			.50***	.60***	.60***	.51***
			(.13)	(.14)	(.14)	(.05)
Hispanic[b]			-.26†	.01	.01	.03
			(.15)	(.16)	(.16)	(.08)
African American			-.06	.44***	.44***	.58***
			(.14)	(.15)	(.15)	(.09)
Asian American			.08	.43*	.36*	.38**
			(.18)	(.20)	(.15)	(.15)
Other race/ethnicity			.05	.11	.15	.20
			(.16)	(.16)	(.17)	(.17)
Age (years) (W4)			-.07*	-.07*	-.01	-.01
			(.03)	(.04)	(.02)	(.02)
Verbal Readiness Scores (W3)				.05***	.04***	.04***
				(.005)	(.002)	(.002)
Grade Retention (W1)					-1.01***	-.99***
					(.07)	(.12)
Grade Retention*Welfare-Education						.14
						(.14)
Variance Components						

Between States	.20***	.13***	.13***	.13***	.15***	.12***
Grade Retention Slope						.20***

***p<.001, **p<.01, *p<.05, †p<.10 (two-tailed tests) Reference Categories: [a]Male=0; [b]Non-Hispanic White.
[#]with robust standard errors and using 10 multiply imputed data sets.

Table 3. Population Average HGLM Logistic Regression of Respondent's College Degree Completion (W4) on State and Individual Predictors.[#] (b/sb)

	1	2	3	4	5	6
Intercept	-.70***	-.47***	-.46***	-.79***	-.56***	-.56***
	(.11)	(.10)	(.11)	(.11)	(.12)	(.11)
State Level Characteristics (1995)(n=30)						
Welfare Education Expenditure Index		.19*	.20**	.18*	.19*	.17*
		(.07)	(.07)	(.07)	(.07)	(.07)
Prison Education Index		.22*	.20*	.19*	.20*	.21**
		(.09)	(.08)	(.07)	(.08)	(.07)
Punitive Judiciary Policies Index		.10	.08	.04	.05	.06
		(.08)	(.08)	(.08)	(.08)	(.08)
Index Crimes (per 100,000 persons)		-.10†	-.07	-.07	-.07	-.05
		(.06)	(.06)	(.07)	(.07)	(.07)
Concentrated Disadvantage		-.11*	-.06	.03	.06	.09
		(.05)	(.06)	(.07)	(.07)	(.08)
Individual Level Characteristics (n=8659)						
Biological Father Incarceration (W4)		-1.15***	-.49***	-.49***	-.45**	-.45***
		(.12)	(.14)	(.14)	(.15)	(.14)
Biological Father Education level (W1)			.31***	.27***	.26***	.25***
			(.02)	(.02)	(.02)	(.02)
Biological Father Closeness (W1)			.09*	.09*	.09*	.09*
			(.04)	(.04)	(.04)	(.04)
Biological Father Smokes (W1)			-.35***	-.34***	-.32***	-.32***
			(.08)	(.08)	(.08)	(.08)
Biological Father Alcoholism (W1)			-.32*	-.35*	-.34*	-.34*
			(.13)	(.14)	(.15)	(.14)
Single Parent Family (W1)			-.38**	-.37***	-.34**	-.32**
			(.12)	(.13)	(.12)	(.12)
Gender (female=1)[a]			.38***	.46***	.38***	.38***
			(.11)	(.11)	(.12)	(.11)
Hispanic[b]			-.37***	-.13	-.10	-.10
			(.11)	(.12)	(.11)	(.10)
African American			-.19	.30*	.36**	.38**
			(.13)	(.12)	(.13)	(.12)
Asian American			.36	.68**	.65**	.62**
			(.23)	(.24)	(.25)	(.24)
Other race/ethnicity			-.36	-.35	-.31	-.30
			(.37)	(.38)	(.36)	(.36)
Age (years) (W4)			-.05*	-.06*	-.004	-.003
			(.02)	(.03)	(.02)	(.02)
Educational Histories						
Verbal Readiness Score (W3)				.06***	.05***	.05***
				(.004)	(.004)	(.004)
Grade Retention					-1.37***	-1.27***
					(.14)	(.13)
Grade Retention*Welfare-Education						.30*
						(.12)
Variance Components						
Between States	.42***	.25***	.17***	.16***	.18***	.16***
Grade Retention Slope						.34**

$^{***}p<.001$, $^{**}p<.01$, $^{*}p<.05$, $^{\dagger}p<.10$ (two-tailed tests) Reference Categories: [a]Male=0; [b]Non-Hispanic White. # with robust standard errors and using 10 multiply imputed data sets.

Figure 1. Predicted Probabilities from Logistic Regression Model of College Completion on Father's Incarceration, State Investment with other covariates set at their means (Re: Table 3, Col. 6).

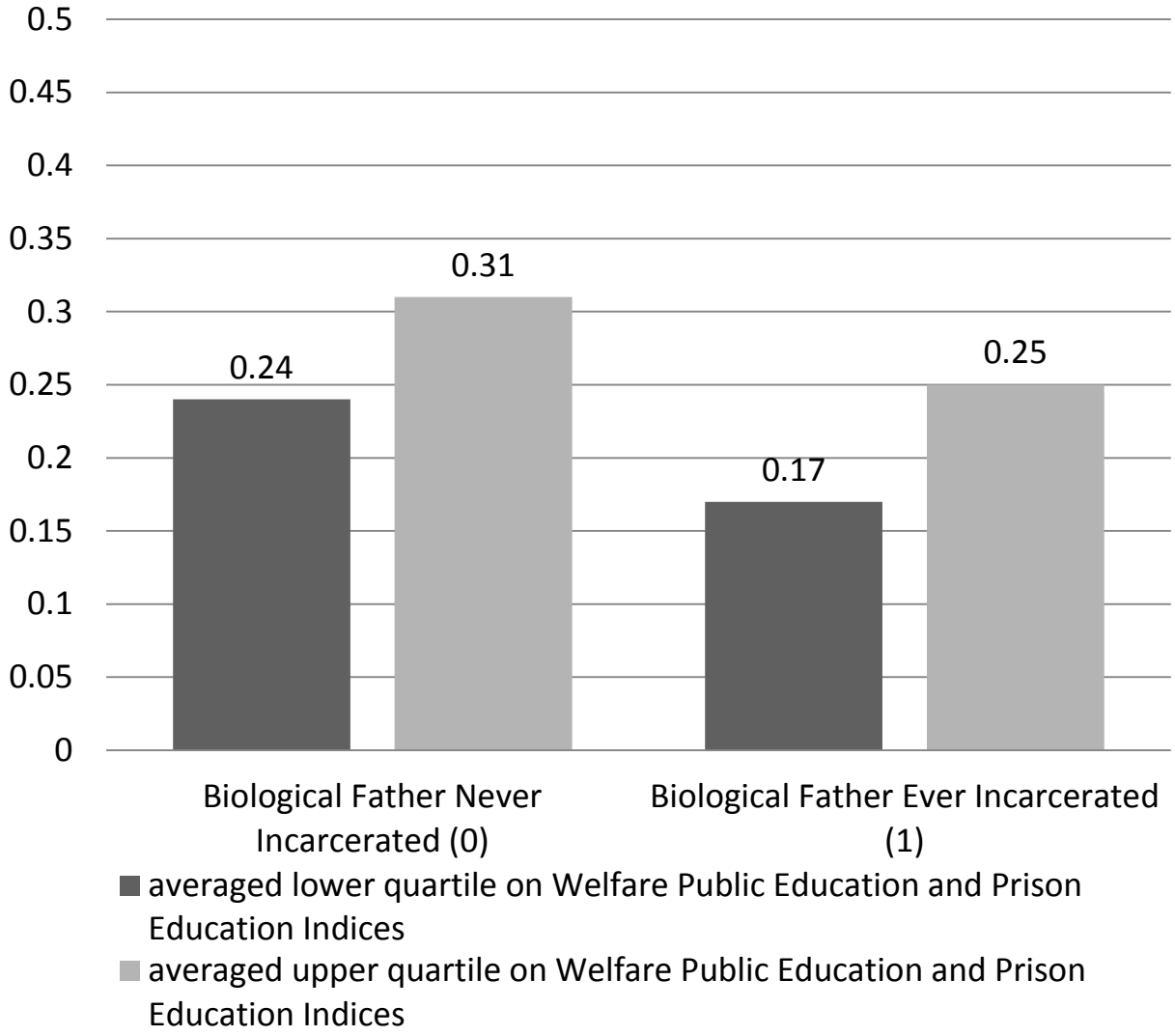


Figure 2. Predicted Probabilities of College Degree Completion from Main Effects Model of Grade Retention and State Welfare Support (averaged upper and lower quartiles) with all other covariates set to their means (Re: Table 3, Col. 5).

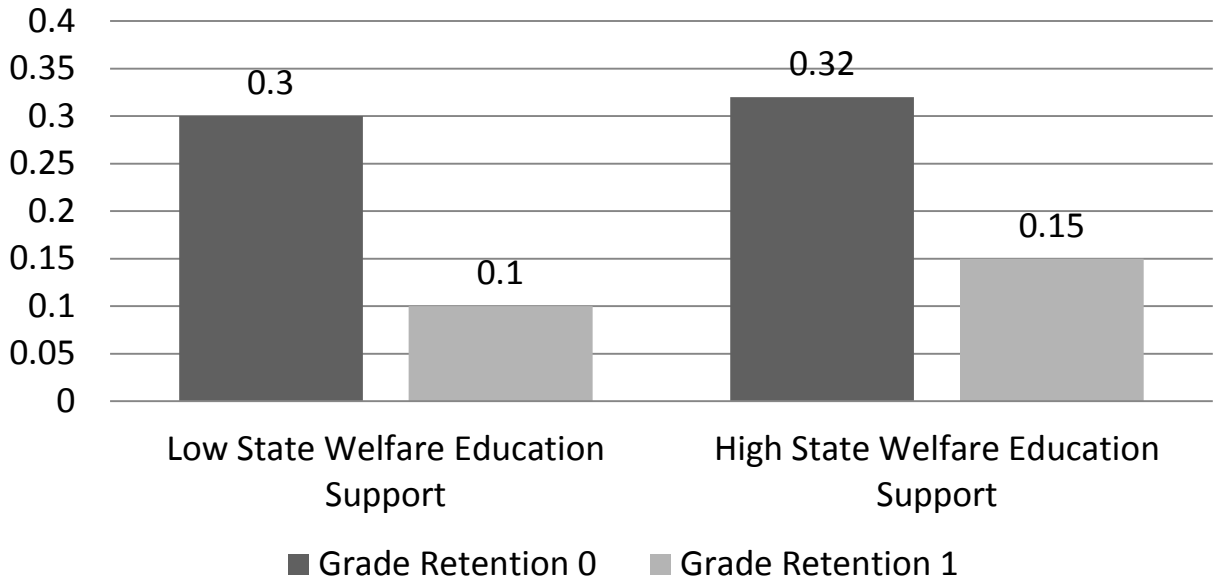
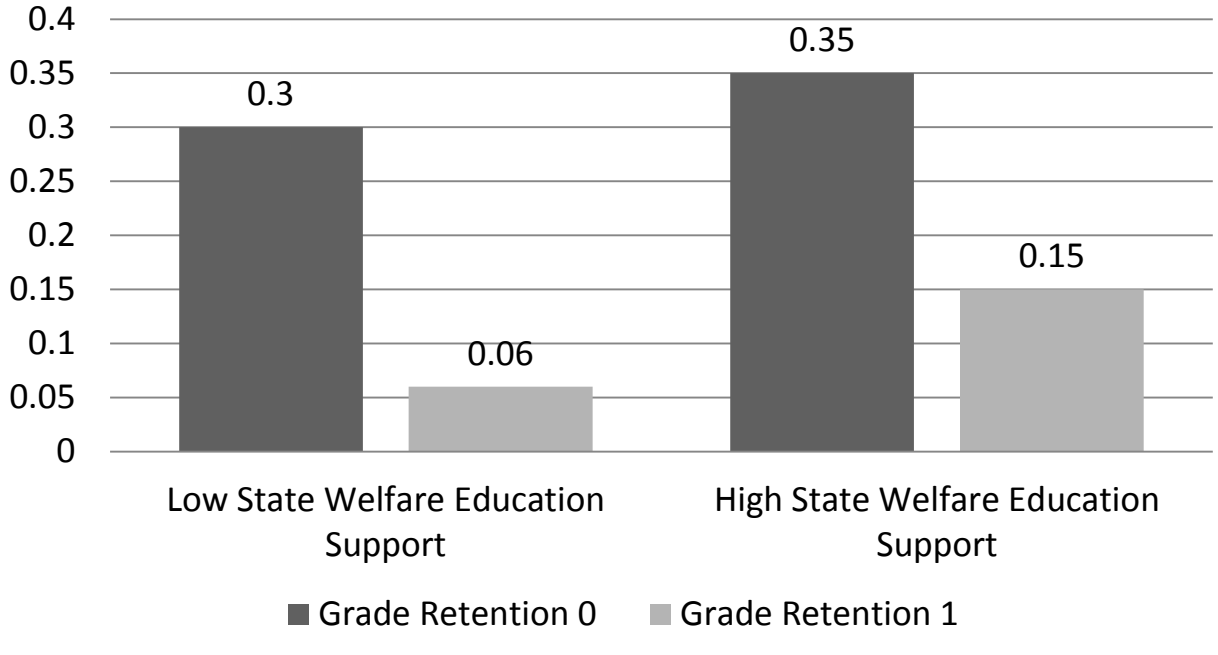


Figure 3. Predicted Probabilities of College Degree Completion from Interaction Effects Model of Grade Retention and State Welfare Support (averaged upper and lower quartiles) with all other covariates set to their means (Re: Table 3, Col. 6).



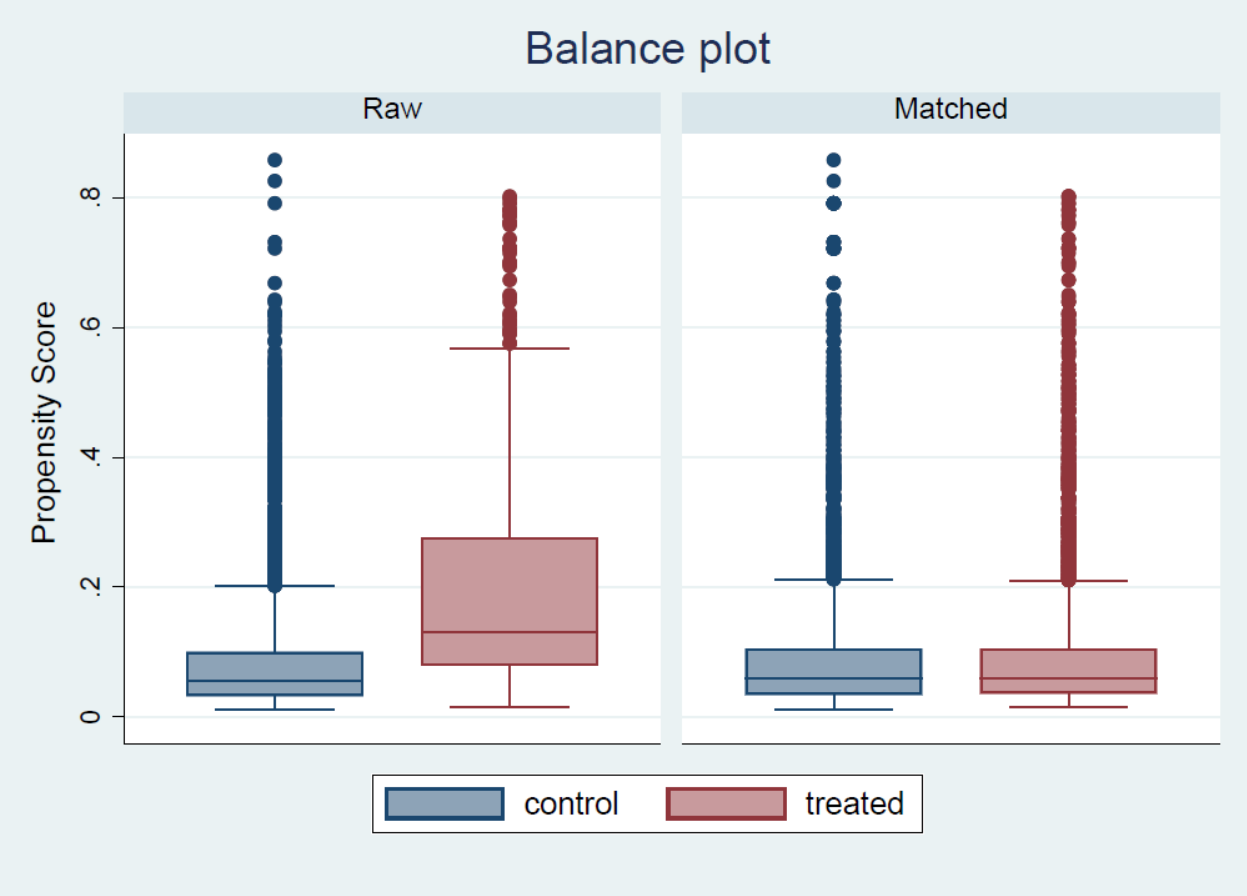
Appendix 1A. Average Treatment Effect of Father's Imprisonment on College Degree Completion (W4).

	Raw	Matched
Number of Observations	6541	
Treated Observations	606	6541(allowing for 1-96 matches per observation)
Control Observations	5935	
Average Treatment Effect	-.19*** (.04)	
Z-test		-4.93, p<.001

Appendix 1B. Covariate Balance Summary (Propensity Score Analysis, Stata 15).

	Standardized Differences		Variance Ratio	
	Raw	Matched	Raw	Matched
Father Alcoholism	.61	.01	3.68	1.03
Father Education	-.65	-.04	.79	.94
Father Bonding	-.50	.04	2.89	.94
Father Smoking	.50	-.04	.67	1.01
Father Disability	.37	-.04	2.59	.87
Father Ill-Health	-.05	.05	-.05	.05
Father Death	.16	.04	1.66	1.14
Father Born in U.S.	.10	.03	.82	.95
Neighborhood Problems	.18	.09	1.21	1.08
Single Parent	.24	-.01	4.26	.92

Appendix 1C. Balance Plot on Covariates in Raw and Matched Samples for College Degree Completion.



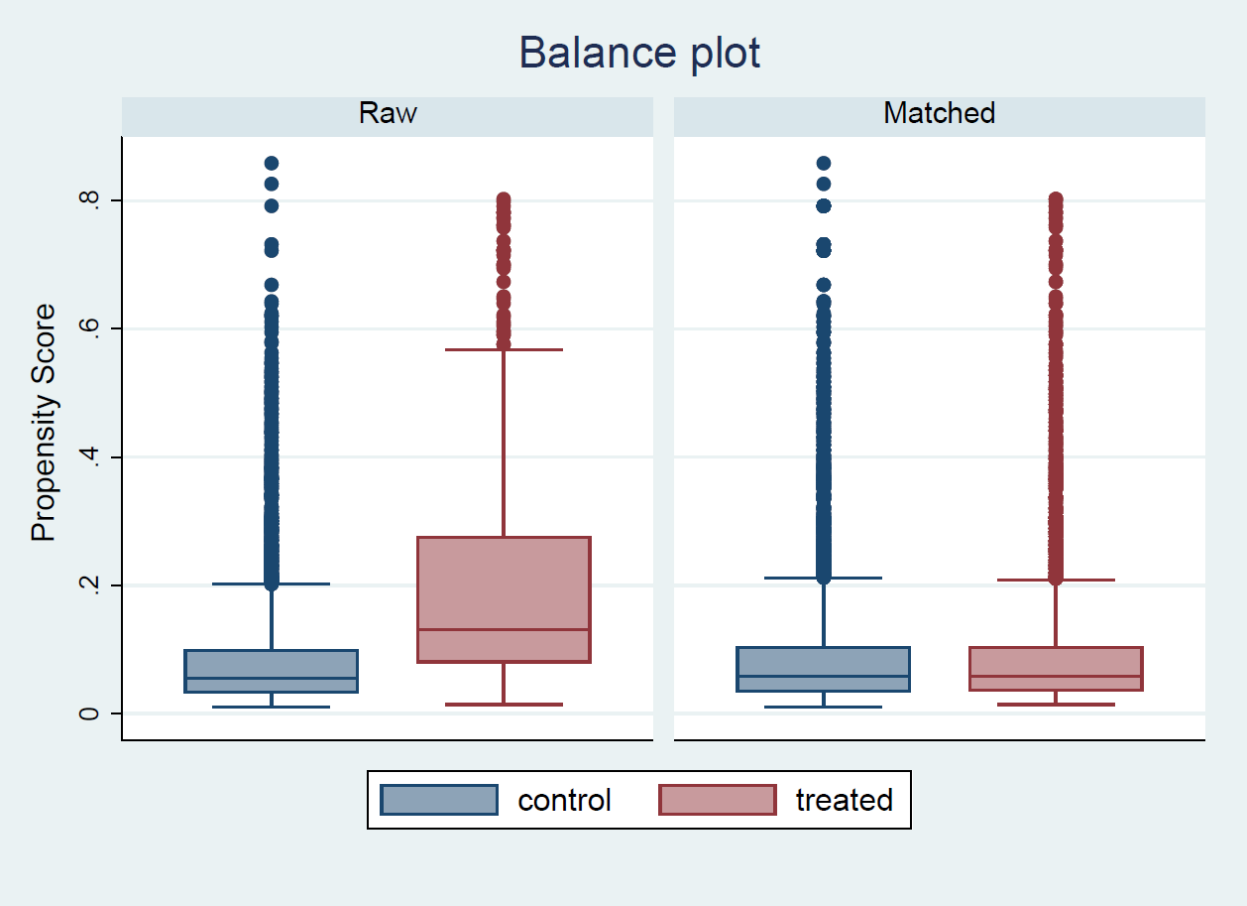
Appendix 1D. Average Treatment Effect of Father's Imprisonment on College Attendance (W4).

	Raw	Matched
Treated Observations	606	
Control Observations	5935	
Average Treatment Effect	-.08* (.03)	N=6541 (allowing for 1-96 matches per observation)
Z-test		-2.25, p<.05

Appendix 1E. Covariate Balance Summary (Propensity Score Analysis in Stata 15).

	Standardized Differences		Variance Ratio	
	Raw	Matched	Raw	Matched
Father Alcoholism	.61	.01	3.68	1.03
Father Education	-.65	-.04	.79	.94
Father Closeness	-.50	.04	2.89	.94
Father Smoking	.50	-.04	.67	1.01
Father Disability	.37	-.04	2.59	.87
Father Health	-.05	.05	1.17	1.24
Father' Death	.16	.04	1.66	1.14
Father Born U.S.	.10	.02	.82	.95
Neighborhood Problems	.18	.09	1.21	1.08
Single Parent	.24	-.01	4.25	.92

Appendix 1F. Balance Plot on Covariates in Raw and Matched Samples for College Degree Attendance.



Appendix 2. Description of Study Variables.

Variable	Description
Individual Educational Outcome Variables	
College Attendance (W4)	Respondents were asked at Wave 4: "What is the highest level of education that you have achieved to date?" 1=8th Grade or less; 2=Some High School; 3= High School graduate; 4=Some vocational/technical training (after High School); 5=Completed vocational/technical training (after High School); 6=Some College; 7=Completed College (Bachelor's degree); 8=Some graduate school; 9=Completed a Master's degree; 10=Some graduate training beyond a Master's degree; 11=Completed a doctoral degree; 12=Some post baccalaureate professional education (e.g., law school, med school, nurse); 13=Completed post baccalaureate professional education (e.g., law school, med school, nurse). This measure was dichotomized at values 6 to 13 to indicate college attendance=1, and values 1-5 to indicate no college attendance as the reference category.
College Degree (Bachelor's) (W4)	This measure used the above information and dichotomized values 7 to 13 to indicate completion of college degree at Wave 4, with values 1-6 as the reference category.
State Level Variables (Constructed under a supplemental study contract with Add Health. Variables are based on aggregate scores for pseudo-states to preserve anonymity of individual states).	
Welfare-Education Index (1995)	This index is expressed in millions of dollars of expenditure based on an index developed by Beckett and Western (2001:49) and including recipients of: (1) Aid to Families with Dependent Children (AFDC); (2) Supplemental Nutrition Assistance Program (SNAP); 3) Supplemental Security Income (SSI); 4) Medicaid; 5) unemployment benefits; 6) primary school education programs; and 7) school lunch programs (α=.98). See Katherine Beckett and Bruce Western. 2001. "Governing Social Marginality: Welfare, Incarceration and the Transformation of State Policy." *Punishment & Society* 3: 43-59. Primary data sources include U.S. Census Bureau data from 1996, 1997, and 1998.
Punitive Judiciary Policies Index (1995)	This index is based on variables analyzed by Western (2006:65) and includes state legislation mandating: (1) sentencing guidelines; (2) truth-in-sentencing guidelines; and 3) abolition of discretionary parole release by parole boards or other parole authorities. State scores range from none to three of these legislative mandates. See Bruce Western. 2006. *Punishment and Inequality in America*. New York: Russell Sage Foundation (α=.75). Further information on data sources available on codebook for the Supplemental Study for Psuedo-States at 1995.
Index Crimes (rates Per 100,000 persons 1995)	Index crime rates were created from states' property and violent index crimes per 100, 000 persons. Primary source data: Federal Bureau of Investigation. 1995. *Crime in the United States. Uniform Crime Report* (α=.72).
Concentrated Disadvantage (1995)	A mean score measure was formed from census data, as originally used by Sampson, Raudenbush and Earls (1997) and including percentages of: (1) residents in poverty; (2) residents self-identified as Black/African American; (3) female headed family households; and (4) unemployed. See Robert Sampson, Stephen W. Raudenbush and Felton Earls. 1997. "Neighborhoods and Violent C rime: A Multilevel Study of Collective Efficacy." *Science* 227(15): 918-924. Primary data sources include Social Explorer 2003-2014 "U.S. Demography 1790 to Present" and U.S. Census Bureau, 1996, 1997, and 2000 (α=.78).
Prison Education Index (1995)	This index is the percent of state correctional facilities with programs for: (1) basic adult education; (2) secondary education; (3) special education; (4) vocational training; and 5) college courses. Primary data source: ICPSR. 1998. "Census of State and Federal Correctional Facilities, 1995" (α=.82).
Individual Level Father Background Characteristics	
Paternal Imprisonment (W4)	Respondents were asked at Wave 4: "Has/did your biological father ever spent time in jail or prison?" 1=yes; 0=no.
Biological Father Alcoholism (W1)	We created a dummy variable where a positive response indicated that the child's biological father was alcoholic, as indicated in a question posed in the parent questionnaire at wave 1.

Biological Father Smokes (W1)	This variable combined information from adolescent reports on biological fathers from the non-resident biological father section of the questionnaire and the resident father section. Adolescents responded to the question on nonresident fathers: *Has your biological father ever smoked cigarettes?* 1 = yes. If the parent interview indicated that the person filling out the parent questionnaire was the child's biological father or that the biological father lived in the household, this measure also used information on the resident father from the question: *Has he ever smoked?* 1 = yes. A positive response to either of these two questions indicated that the biological father smoked.
Biological Father Education Level (W1)	This variable combined information from adolescent reports at wave 1 on biological fathers from the nonresident biological father section of the questionnaire and the resident father section. It used responses to the question that reported the father's level of education: *How far in school did your biological father go?* The same response scale (1-9) was used for a question on the education level of the resident father that was used if the person filling out the parent questionnaire was the child's biological father or if it was indicated that the biological father lived in the household.
Biological Father Closeness (W1)	This variable combined information from adolescent reports on biological fathers from the nonresident biological father section of the questionnaire and the resident father section. Youth with nonresident biological fathers were asked: *How close do you feel to your biological father?* 1 = not close at all, 2 = not very close, 3 = somewhat close, 4 = quite close, and 5 = extremely close. Information was also used on relations with the father figure if the parent interview indicated that the person filling out the parent questionnaire was the child's biological father or that the biological father lived in the household, using the item: *How close do you feel to your (father figure)?* 1 = not at all, 2 = very little, 3 = somewhat, 4 = quite a bit, and 5 = very much. The two questions were combined to take a non-missing response as the indicator of the respondent's closeness to the biological father.
Individual Level Respondent's Characteristics	
Verbal Readiness Scores (W3)	This measure is described in the Add Health Wave 3 PVT codebook. The scores range from 9-123. The measure is framed in terms of standard English and is a modified version of the Peabody Picture Vocabulary Test (Dunn and Dunn 1981; Goldberg et al. 2014).
Grade 1-12 Retention	In-home adolescent respondents were asked at Wave 1 to self-report "Have you ever repeated a grade or been held back a grade?" Yes=1; 0=No.
Hispanic	We used adolescent self-reported racial and ethnic identification data at wave 1 to construct the race-ethnicity dummy variables. Any incidence of Hispanic status were used to first categorize respondents, followed by other group designations. The reference group in the analyses was the white non-Hispanic group.
Black non-Hispanic	As above.
Asian	As above.
Native American	As above.
Other	As above.
Age (W4)	Adolescent age as reported in years at Wave 4.
Gender of Adolescent (W1)	1=female; 0=male
Single Parent Family (W1)	We used the measure created by Kathleen Mullan Harris (1999) to operationalize family status using adolescent household roster information to index living in a single-parent household compared to all other family types. Source: "The Health Status and Risk Behavior of Adolescents in Immigrant Families." Pp. 286-347 in Donald J. Hernandez (ed.), *Children of Immigrants: Health, Adjustment, and Public Assistance*. Washington, D.C.: National Academy Press.
Additional Covariates in Propensity Scores	
Neighborhood Problems (W1)	This measure is a mean score of two questions from parent interview (W1): (1) "In this neighborhood, how big a problem are drug dealers and drug users?" and (2) "In this neighborhood, how big a problem is litter or trash on the streets and sidewalks?" The response scale is: no problem at all (0); a small problem (1); a big problem (3).

Biological Father has Passed Away (W4)	At Wave 4 respondents were asked: "Is your biological father still alive?" The dichotomous variable recoded to indicate paternal death (1); alive (0).
Biological Father Health (W1)	This index counts the number of the biological father's health problems reported in the parent interview at Wave I including: (1) Obesity; (2) Migraine headaches; (3) Allergies or hay fever; (4) Asthma or emphysema; (5) Diabetes.
Biological Father Disability (W1)	This variable combined information from adolescent reports on biological fathers from the nonresident biological father section of the questionnaire and the resident father section. Youth with nonresident biological fathers were asked if their biological father has a physical or mental disability: yes (1); no (0). Information was also used on relations with the father figure if the parent interview indicated that the person filling out the parent questionnaire was the child's biological father or that the biological father lived in the household, using the same item regarding whether the father has a physical or mental disability. The two questions were combined to take a non-missing response as the indicator of whether the biological father has a disability or not.
Biological Father was Born in U.S. (W1)	This variable combined information from adolescent reports on biological fathers from the nonresident biological father section of the questionnaire and the resident father section. Youth with nonresident biological fathers were asked if their biological father was born in the United States (1) vs. elsewhere (0). Information was also used on relations with the father figure if the parent interview indicated that the person filling out the parent questionnaire was the child's biological father or that the biological father lived in the household, using the same item regarding paternal birthplace. The two questions were combined to take a non-missing response as the indicator of the biological father being born in the U.S.A. or not.