Intergenerational Risks of Criminal Involvement and Incarceration[1]

Rucker C. Johnson
Goldman School of Public Policy
University of California, Berkeley
Tel: (510) 643-0169
E-mail: ruckerj@berkeley.edu

April 2007

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Abstract

This paper provides nationally-representative estimates of the cumulative risks of incarceration and obtaining a criminal record by age 40 for a cohort born between 1951-1975. I show that men born in the 1960s/early 1970s have significantly greater cumulative lifetime risks of imprisonment than similarly-aged men born in the 1950s. This is in part a direct consequence of the transformation of incarceration and sentencing policy that took off in the 1980s. The racial disparities in lifetime incarceration risks are alarming. The results highlight that among black low-educated men, one-half either died or had been incarceration before the age of 40.

Second, this analysis uses an innovative approach to investigate the relative importance of family background and neighborhood context on deviant behavior over the life course, including ever being expelled, criminal involvement, ever being incarcerated, the early formation of risk preferences, and risky health behaviors. Particularly noteworthy, the analysis of brother and male child neighbor correlations in adult incarceration history revealed remarkably high correlations of 0.69 and 0.54, respectively. These results highlight the profound influence that family and/or neighborhood background has on criminal involvement and risks of imprisonment. Moreover, the results suggest that neighborhood quality during childhood is a significant gatekeeper of the intergenerational transmission of deviant behavior and incarceration risks among males.

Third, this study examines the intergenerational consequences by examining children of the next generation. I find, using the PSID-CDS data, that the prevalence rates of parental incarceration at some point during childhood are significantly larger than point-in-time estimates. I find that 20 percent of black children had a father with an incarceration history; and among black children with fathers who did not graduate from high school, an alarming 33 percent of their father's had an incarceration history.

Fourth, this study is among the first longitudinal child-outcome studies that examines the role of pre-incarceration risk factors and children's living arrangements, parent-child relationships and substitute caregiver-child relationships, to help determine the impact of parental incarceration on families and children.

I find linkages between exposure to parental incarceration and child behavioral outcomes. The pattern of results is remarkably similar across all of the empirical approaches utilized that address omitted variables bias—including hierarchical random effects models with an unusually extensive set of controls, family fixed effect models, child fixed effect models, and instrumental variables estimates. This study bears evidence on the extent to which parental incarceration has exacerbated racial disparities in childhood and in early adulthood.

Intergenerational Risks of Criminal Involvement and Incarceration

I. Introduction

A variety of "get tough" on crime sentencing laws passed during the decade of the 1980s, including truth-in-sentencing laws, mandatory minimum sentencing laws, and "three strikes" or habitual offender laws, were engines of growth for the escalating incarceration rates witnessed over the past three decades. Between 1980 and 2004 the number of inmates in U.S. state and federal prisons increased from approximately 320,000 to over 1.4 million. This corresponds to a change in the incarceration rate from 139 to 486 prisoners per 100,000 residents.

The enormous increase in incarceration led to a parallel, but far less well-documented, increase in the proportion of children who grew up with a parent incarcerated at some point during their childhood. Moreover, the concentration of these incarceration trends among less educated African-Americans has resulted in a larger gulf between the early-life experiences of white and black children, which may have profound effects on their later-life chances. The implications for child well-being of policy-induced increases in the incidence of parental incarceration are not well understood.

This paper has four primary aims:

1) To produce nationally-representative estimates of the cumulative risks of having a criminal record and/or incarceration history by age 40 for birth cohorts born between 1951 and 1975, by race, gender, and education;

2) To assess the importance of neighborhood and family background in influencing deviant behavior in adolescence and criminal involvement and

incarceration risk in adulthood; including analysis of intertemporal correlations of risky behaviors in adolescence and adulthood;

3) To produce nationally-representative estimates of the prevalence of parental incarceration for children born 1985-2002, by race/socioeconomic status;

4) To investigate the effects of parental incarceration on child outcomes, including early antecedents of youth crime; intergenerational correlations in the likelihood of criminal involvement (arrest, conviction, incarceration).

The empirical analyses use nationally representative longitudinal data covering nearly a 40-year period in the U.S. to produce evidence that concern each of these issues in turn. I exploit unique features of the Panel Study of Income Dynamics (PSID) and its Child Development Supplement (CDS) to tackle these interrelated research questions; and, this is the first such study of the full U.S. population. In particular, the analyses take advantage of the unique genealogical design of the PSID that allows comparisons among siblings, childhood neighbors, as well as across generations within the same family.

Specifically, the initial PSID sample in 1968 was highly clustered, allowing one to compare the similarity in adult risk preferences, adult criminal involvement, incarceration history, deviant behavior, risky health behaviors between siblings who grew up together, versus unrelated individuals who grew up in the same narrowly defined neighborhood. Sibling correlations and child neighbor correlations in adult risk preferences, adult criminal involvement, deviant behavior, risky health behaviors (age of onset of cigarette smoking initiation in adolescence and smoking behavior in adulthood) are used to assess the relative importance of neighborhood and family background on the early formation of these behaviors. I use correlations between neighboring children's

subsequent behavioral outcomes to bound the proportion of inequality in incarceration risks that can be attributed to disparities in neighborhood background. Small neighbor correlations would indicate that community origins can explain only a minor portion of the variation in these outcomes. Large neighbor correlations would leave open the possibility that neighborhoods strongly influence criminality, risky behaviors and contribute significantly to incarceration disparities; and thus, further analyses of the effects of particular neighborhood characteristics would be warranted.

   I begin by using the restricted-use, geocoded version (at the neighborhood census block/tract level) of the Panel Study of Income Dynamics (PSID) and its Child Development Supplement (CDS), to produce nationally-representative estimates over the life cycle of the cumulative risk of being suspended/expelled from school, likelihood of being placed in a reform school, probability of ever being charged or convicted of a crime, and the risk of death or imprisonment. These descriptive statistics are presented separately by gender, race, education, and parental socioeconomic status. Where possible, these prevalence estimates are compared with previous research that has used other data sources, including the NLSY, BJS data, and the Fragile Families data.

   Using the PSID-CDS, I provide evidence on a series of important descriptive questions regarding how often white, black, and Hispanic children experience paternal incarceration, how the risk has changed over the past 25 years (recent birth cohorts versus older birth cohorts from other data sources), and how this risk varies within racial/ethnic groups. Few empirical estimates of this kind exist (Wilderman (2006) is one exception).

   The focus of the final regression analysis section investigates the consequences for children of parental incarceration. The results highlight changes in the child's family

income and poverty status before, during, and following a father's incarceration. It is shown that children from families with an incarceration history have worse behavioral outcomes. This work is among the first to show evidence on intergenerational correlations in deviant behavior. Several different empirical strategies are employed to distinguish whether this correlation emanates primarily from observed and unobserved disadvantaged childhood environment characteristics (proximate causes) versus the causal effects of parental incarceration.

To this end, I compare estimates from OLS models that include an unusually comprehensive set of explanatory variables, with estimates from hierarchical random effects models, descendant family fixed effect models, mother/sibling fixed effect models, child fixed effect models, and an instrumental variables approach using state incarceration rates to instrument for parental incarceration history. While each approach has limitations in controlling for unobserved heterogeneity, consistency across these methods enhances confidence in the findings.

The first method relies on OLS estimation of a series of sequential specifications, with each specification including a unique and extensive array of family and neighborhood background variables. Parental incarceration experiences *prior* to birth are added to the regression equation to test for bias due to unobserved parental factors. The empirical model specifications test for differential effects of parental incarceration by childhood life stage (early childhood (ages 0-5); middle years (ages 6-10); adolescence (ages 11-17)), and length of parental incarceration exposure. The hierarchical random effects models highlight the significant heterogeneity in the effects of parental incarceration on child well-being. Taken together, the findings in this paper underscore

the importance of neighborhood and family background in influencing criminal involvement and incarceration, and document the intergenerational consequences for children.

II. Previous Research

The literature in economics has focused primarily on the effects of a criminal record and interaction with the criminal justice system on subsequent employment and earnings of ex-offenders (Freeman, 1992; Grogger, 1995; Holzer, Raphael, Stoll, 2006; Western, 2002). Ludwig, Duncan, Hirschfield (2001) provide among the strongest findings to date to suggest that the behavior or characteristics of neighbors influences juvenile criminal activity. Their experimental evidence from the Move-to-Opportunity (MTO) demonstration indicate that providing families with the opportunity to move from high- to low-poverty neighborhoods has substantial effects on the prevalence and incidence of violent criminal behavior, particularly among adolescent males. Gaviria & Raphael (2001) find strong evidence of peer-group effects at the school level for drug use, alcohol drinking, cigarette smoking, church going, and the probability that the student will drop out of school in the future.

The distributional consequences of incarceration have an important geographic dimension due to racial residential segregation and the fact that a relatively small number of communities account for a disproportionate number of felons sent to state and federal prison. The geographic incidence of these consequences must be examined on not only prisoners, but their families and the communities that disproportionately send young men to prison.

There is an extensive sociology literature investigating neighborhoods' effects on crime (Sampson). The typical analytical approach used in neighborhood studies is to regress individual level outcomes such as criminal activity on neighborhood level factors such as census tract level mean income, poverty rates, or rates of single motherhood. However, attempts to estimate causal effects of neighborhood context have faced well-documented challenges of endogeneity (Manski, 1993) and of obtaining accurate measures of neighborhood factors. Few studies have used convincing identification strategies to overcome these challenges, exceptions being experimental evaluations such as Katz, Kling, Liebman (2001) and Leventhal & Brooks-Gunn (2001).

An aim of the present study is to help unify research on deviant behaviors at different stages of the life cycle and its intergenerational transmission. During early adolescence, the means as well as the variances of deviance measures increase rapidly, but only a minority of eventual criminals commit their first criminal offense (Johnson et al, 1997). We are interested in tracing the roots of deviant behavior to the socialization experiences of early childhood. We, thus, turn first to discuss prior work on youth risky behavior.

Youth Risky Behavior

The Influence of Socioeconomic Environments

An important contributor to socioeconomic dimensions of inequality in adulthood is differences in the nature of risk-taking behaviors as youths (Gruber, 2000). Risky decisions made in adolescence are significant determinants of adult socioeconomic status attainments. Because the early onset of risky behaviors are early antecedents of criminal involvement, there is a critical need to identify their causal determinants and later-life

consequences on adult socioeconomic success. My interest is to understand the changes of youth risk-taking and their long-run implications for well-being.

Children raised in high-poverty neighborhoods are plagued by under-funded schools and social services, higher crime rates, low housing quality, and the stressful feelings of hopelessness and powerlessness that accompany experiences of socioeconomic disadvantage (Krivo and Peterson, 1996; Ross et al., 2000).

Youth engage in risky behaviors that not only reflect their perceived life chances, but also have causal impacts on the degree of realized success in adulthood outcomes such as long-run health, education, earnings, and family structure. This study will build on the recent research findings of Harris, Duncan, Boisjoly (2002) to explore the theory that a "nothing to lose" attitude, which ferments in high crime/ poverty neighborhoods, predicts greater involvement in risky behaviors. In this paper, I will investigate the role of parental schooling/educational expectations of their children on the children's subsequent later-life outcomes (including the propensity to engage in risky behaviors, deviant behavior and criminal involvement). In future work, I will also attempt to disentangle the influence of the youth, parental factors, peer and role model effects, and other dimensions of neighborhood and school quality.

The Influence of Risk Preferences

Risk preferences shape a variety of individuals' behavioral choices and their life chances. Youth who engage in high-risk behaviors are significantly more likely to do so as adults. Thus, analysis of risk preference formation and how they are shaped by childhood neighborhood influences has far-reaching implications and may contribute to our understanding of the emergence of the spatial clustering of a wide array of seemingly

different phenomena, such as criminal activity, health-related behaviors, substance abuse, poor health outcomes, educational attainment, age of onset of adolescent sexual activity, sexually-transmitted disease, out-of-wedlock births, low earnings.

A motivation of this work is to demonstrate that risky behaviors in adolescence are responsive to an array of factors that influence an adolescent's neighborhood/school/family environments. Moreover, the confluence of these environmental contexts has not only contemporaneous impacts on youth behavior, but also has long-run implications on long-term risk taking behavior and well-being in adulthood. The negative externalities that accompany youth risky behaviors have implications for the development and implementation of more effective policy interventions.

Endogenous Risk Preference Formation and Neighborhoods

Analysis of endogenous preference formation—i.e., how space and community influence individual perceptions, aspirations, and opportunities—may illuminate a common underlying process. The key insight is that all of these choices can be viewed in an investment framework—whether health, human capital, or financial investment. Thus, it is important to investigate the effects of neighborhood context in shaping risk-taking and rate of time preference parameters, because these parameters are determinants of these outcomes. This represents a significant departure from simplistic assumptions embodied in Tiebout sorting of exogenous preferences into neighborhoods with homogeneous preferences within neighborhoods. Simple "culture of poverty" explanations in which individuals do not respond to incentives and opportunities are

incomplete because the ways in which neighborhood context shapes preferences, beliefs, and constraints are not considered.

The conceptual framework adopted for this paper will extend the standard human capital model to joint human investment (education) and disinvestment (risky behavior) and will examine the interaction between education and risky behaviors that lead to criminal involvement (Levy-Garboua, Loheac, Fayolle, 2006). The perspective developmental psychologists contribute to the model of risk taking is that the decision to engage in risky behaviors is determined by "cognitive" development (how people think about the world), "affective" development (how people feel about the world), and "social" development (the roles that neighborhood, school, and peer influences play in youth choices) (Fischoff, 1992).

Predictors of Risky Behavior

In this paper, I examine risk preferences and risky behaviors, including criminal involvement, deviant behavior, and early onset of smoking. One of the strongest predictors of adult substance use problems is early onset of substance use. Previous research on early cigarette use has focused on individual- and family-level factors, documenting a significant relationship between family socioeconomic status and young people's likelihood of smoking. There are differing views regarding whether these health behavioral patterns reflect a health lifestyle orientation or are responses to behavioral incentives resulting from neighborhood contextual-level pressures. Neighborhood conditions, such as the proliferation of liquor stores, the availability of nearby facilities, or fear of crime/violence, may make it more or less costly to undertake health-promoting

behavior. These health-behavior habits are formed to a large degree in childhood/adolescence.

An examination of sibling and child neighbor correlations in criminal involvement and risky health behaviors can be used as an omnibus measure of the overall importance of family background and neighborhood background in influencing criminality and risky health behaviors. Among the only prior related estimates to my knowledge is Snell (1993), who finds that in 1991, nearly one-third of all inmates in state prisons reported having a brother who had also been incarcerated. This finding highlights the profound influence that family and/or neighborhood background has on criminal involvement and risks of incarceration/imprisonment.

Models of both criminal participation and health behaviors have in common a focus on individual-level risk factors. The atomistic view of crime—that decisions to engage in crime are products of the likelihood and degree of punishment if caught, independent of the context in which they live—is detached from the influence that neighborhood social environments have on individuals' preference formations and perceptions of the benefits/costs of certain behaviors. The underlying assumption in this individual-centered approach has been that the causes of crime or risky health behaviors can be found at the individual level.

What is needed, however, is a more systematic investigation of the causes of the spatial pattern of crime and risky health behaviors, to include factors at multiple levels (i.e., the multi-level determinants: neighborhood, family, individual). As well, there is a need for a closer examination of the role of incarceration policy and its impact on the spread of these phenomena affecting the health of communities. In modeling both

phenomena—crime and risky health behaviors—it is crucial to incorporate the fact that the probability of an individual developing an outcome depends in part on the prevalence of the outcome of the group to which s/he belongs and the potential impacts of cycling many inmates in and out of crowded urban communities. This study provides insights into how these seemingly unrelated risk-taking decisions fit together.

This paper considers endogenous risk preference formation and risky behaviors that are correlates of adult criminal involvement and lead to interaction with the criminal justice system. Prior research has documented strong intertemporal linkages between risky behaviors as youths and as adults. For example, intertemporal correlations in early-onset of risky behaviors in adolescence and adulthood have been shown for juvenile delinquency and adult criminal involvement, early-onset of smoking and substance abuse in adulthood, unprotected sex and out-of-wedlock births, and other addictive behaviors.

Simple intertemporal correlations between youth and adult risky behaviors are difficult to interpret because they may not reflect habit formation through youth participation, but may instead be driven by heterogeneity across individuals that cause some persons to participate in crime/risky activities at all ages and others to never participate at any age (Gruber, 2000; Cook and Moore, 2000). In models of peer effects, even small shifts in neighborhood/school/family environment can rapidly propagate through the entire population (through "peer multiplier" effects). An aim of this work is to disentangle the influence of the youth, parental factors, peer and role model effects, and other dimensions of neighborhood and school quality. There are well-known identification problems in the estimation of neighborhood effects and econometric difficulties with disentangling neighborhood effects from omitted factors that might be

influencing the individual's decision (Manski, 1993). For example, if smoking rises among one's peers and s/he also smokes more, is this the results of a peer influence or some omitted neighborhood change that is simultaneously impacting both the individual and his/her peers? The empirical strategy proposed in this paper will contribute to distinguishing between these alternative explanations and the identification of the habit component and our understanding of the extent to which changes in the underlying environment facing youths affects their propensity to engage in crime and other risky behaviors.

III. Data

The PSID began interviewing a national probability sample of families in 1968. These families were re-interviewed each year through 1997, when interviewing became biennial. All persons in PSID families in 1968 have the PSID "gene" which means that they are followed in subsequent waves. In addition, anyone born to or adopted by PSID sample members acquires the PSID "gene" themselves and therefore is followed. When children with the "gene" become adults and leave their parents' homes, they become their own PSID "family unit" and are interviewed in each wave. Studies have concluded that the PSID sample of heads and wives remains representative of the national sample of adults (Fitzgerald, Gottschalk, and Moffitt, 1998a; Becketti et al, 1988), and that the sample of "split offs" is representative (Fitzgerald, Gottschalk and Moffitt, 1998b). The 95-98% wave-to-wave response rate of the PSID makes this possible. Moreover, the genealogical design implies that the PSID sample today includes numerous adult sibling groupings and parent-child groupings who have been members of PSID-interviewed families for nearly four decades.

Two samples are examined in the study. (A detailed discussion of the samples is available in the appendix.) What I call the adult sample consists of PSID sample members who were children when the study began and who have been followed into adulthood. Specifically, I choose PSID sample members born between 1951 and 1975, which consists of children 0-17 years old in the first wave of interviewing in 1968, plus children born into the PSID sample between 1968 and 1975. We then obtain all available information on these individuals for each wave, 1968 to 2005. Therefore, by 2005 the oldest person in the adult sample is 55 and the youngest is 30.

Data on siblings and childhood neighbors are available because the PSID used a "cluster sample" (i.e., several households were selected in the same vicinity, usually within a block or two of each other) when it started in 1968 in order to economize on interviewing costs. This design effect is typically a liability in statistical analyses because one has to account for non-independence across individuals within the same cluster. But for our purposes the clustering provides the unique opportunity to examine criminal behavior outcomes for adults who were childhood neighbors in 1968. Moreover, because all 1968 family members within a given family are followed throughout their lives, we can examine the similarity in criminal involvement over the life-course of both siblings and childhood neighbors.

In our analyses, we define the neighborhood of upbringing as the census block where the child lived in 1968. Census tracts typically comprise approximately 5000 people, and due to the cluster design, respondents in urban areas may have lived just a city block apart. In rural areas, the families were spread farther apart, but still were among each other's closest neighbors due to the cluster design. The PSID cluster design

is discussed in greater detail in Solon et al. (2000). On average children in the sample spent roughly two-thirds of their childhood in these neighborhoods.

Given the enormous differences in risky behaviors, criminal involvement, and incarceration between men and women, the analysis of sibling and child neighbor correlations focuses on males. For the deviant behavior, crime and incarceration outcomes, the adult sample consists of original sample PSID males born between 1951-1975 who answered the criminal history questions in the 1995 wave of the PSID or were positively identified as incarcerated in any wave of the survey between 1968 and 2005 (Total N=2,944: whites N=1612; blacks N=1207; Hispanics N=103; other N=22).

Spells of incarceration can be recovered from information on PSID respondents' collected in each survey that includes whether a respondent was incarcerated at the time of the interview. This data alone on incarceration has limitations. Among the most important is that this will only identify incarceration in a given year if it was on-going at the time of the survey interview. As a result, we are likely to miss individuals serving shorter sentences that did not coincide with the time of the interview.

The 1995 wave added a crime history module to the PSID including several key questions that I use to augment and obtain more precise information about the timing and duration of incarceration and minimize measurement error. In particular, information was collected for all adults in the 1995 wave on whether respondents had ever been expelled/suspended from school; whether they had ever been booked or charged with a crime; whether ever placed in a juvenile correctional facility; whether ever served time in jail or prison, the number of times and the month and year of release.

Using the PSID information, if an individual was incarcerated, I identify whether he/she was a parent and then compare the dates of these incarceration spells to children's birth dates in order to identify which parents were incarcerated while they had children at home, and at what child ages.

The role of childhood neighborhood conditions will be examined. A key aspect of the data is that each individual is geocoded to the census block of residence in 1968 and we utilize detailed information on neighborhood characteristics from respondent self-reports and merged on neighborhood-level variables from the 1970 Decennial Census. The self-reports of housing/neighborhood conditions include: whether live in Public Subsidized Housing; poor neighborhood for children, whether there exist plumbing problems, housing structural problems, security problems, cockroach or rat problems, insulation problems, neighborhood cleanliness problems, overcrowding, noise, or traffic problems, burglary, robbery, assault, drug use, or problems related to having too few police.

The PSID is the only survey that contains information on adult risk preferences, criminal and risky-health behaviors, the neighborhood in which the person grew up, along with the same information on that individual's siblings and childhood neighbors.

Using this longitudinal data of a nationally-representative cohort of children born between 1951-1975 and followed through 2005, I estimate sibling and childhood neighbor correlations in adult risk preferences, adult criminal involvement, deviant behavior, risky health behaviors—age of onset of cigarette smoking initiation in adolescence and smoking behavior in adulthood—to assess the relative importance of neighborhood and family background on the early formation of these behaviors.

For the brother and male child neighbor correlation estimates, the initial sample selection is on PSID sample children born during the 1950s. The selection criteria was guided by both sample size considerations as well as the need to ensure the resulting sample comprised children who grew up in neighborhoods during comparable periods (e.g., we did not want to compare adult outcomes of neighboring children who were more than seven years apart, as neighborhood change over the period could cause child neighbor correlations to be downwardly biased). The age restriction is used to also ensure that individuals were at least 35 years of age by the 1995 wave in which the criminal history questions were asked.

This initial sample consisted of roughly 4,300 boys who were between the ages of 7 and 17 in the original survey year 1968. Of these boys, roughly seventy percent had valid address information that could be geocoded to a census block.[2] Of these boys, 860 had valid report of criminal and incarceration history in adulthoood, which are the key dependent variables. Therefore, the resulting sample includes people into their early 50s (in 2005). (A summary discussion of sample attrition issues is presented in Appendix B.)

To increase the sample size as well as the proportion of poor and black families in our sample, we include both the Survey Research Center (SRC) component and the Survey of Economic Opportunity (SEO) component, commonly known as the "poverty sample," of the PSID sample. We appropriately apply sample weights at the neighborhood level.

To be eligible for the SEO sample, households had to have income that was below two times the poverty line, which in theory could be problematic for our purposes

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[2] Address information that could not be geocoded to census blocks is comprised primarily of addresses that contained only post office box numbers and are disproportionately in rural areas.

because two neighboring families could enter that component of the PSID only if they had sufficiently low income. However, due to the significant degree of residential segregation by income, we find evidence that the typical neighbor of a low-income family was also low income; thus, in practice this does not present any significant within-neighborhood sample selection bias problems. In particular, in the 1968 SRC component of the PSID, the average family with income less than two times the poverty line (in that year) lived in neighborhoods in which neighbors' average income was also among the bottom third of the income distribution. Similarly, using larger national samples geocoded to the census block, Hardman and Ioannides (2005) find that among the poorest 30 percent of households, roughly 75 percent live in neighborhoods in which neighbors' median income is also among the poorest 30 percent of households. Most importantly, our results are robust to the exclusion of the SEO sample, as estimates that exclude the SEO sample are nearly identical to those reported in the paper (results available upon request).

The ability to conduct analyses within families and between neighboring families is a unique feature of our study. Because our study is among the first to report evidence of brother correlations in deviant behavior, criminal involvement, and incarceration over the life course, we include all neighborhoods to increase the effective sample size for our brother correlation estimates. Results on the sub-sample that is restricted to neighborhoods containing children from at least two different families yielded very similar magnitudes of sibling and child neighbor correlations in deviant/risky behavior outcomes (results available upon request).

As shown in Table 3, the resulting sample for men for incarceration history contains 860 individuals from 601 families in 521 neighborhoods. Seventy-one neighborhoods have individuals from at least two different families.

An important feature of the PSID for my purposes is that minority and low-income families were over-sampled, which generate sufficient medium to high poverty neighborhoods that allow investigation of nonlinear neighborhood effects. I will investigate whether neighborhood effects are linear or emerge only at some threshold, such as high poverty concentrations. Similarly, I will also examine differential impacts of neighborhood effects by race/ethnicity and parental education. In a subset of analyses I will estimate four-level hierarchical random effects models (with nested levels: neighborhoods, families, individuals, over time) and will consider the role of spatial autocorrelation in analyzing neighborhood-level factors.

I use new, experimental data from a 1996 supplement to the PSID to explore the extent to which an index of risk tolerance measured in adulthood is correlated between siblings and correlated between childhood neighbors. Our measure of risk tolerance is developed from a series of questions asked of respondents about the circumstances under which they would take different hypothetical gambles. The PSID risk tolerance measures are computed from an identical set of questions to those used by Barsky et al. (1997), who show that these measures predict risky behaviors, including smoking, by respondents in the Health and Retirement Survey (HRS).

The questions in the PSID are as follows: "Suppose you had a job that guaranteed you income for life equal to your current, total income. And that job was (your/your family's) only source of income. Then you are given the opportunity to take a new, and

equally good job with a 50-50 chance that it will cut your income by one-third, or, on the other hand, it could double your income with a 50-50 probability. Would you take that new job?" Based on the response to that question, the PSID asks follow-ups about jobs that double their income with a 50 percent probability or either cut your income by 10%, 20%, 50%, or 75% with a 50 percent probability. The risk aversion questions were only asked of 1996 PSID household heads who were working. Assuming a CES utility function and correcting for measurement error, PSID respondents can be sorted into four distinct levels of risk tolerance (high risk tolerance, medium risk tolerance, low risk tolerance, and very low risk tolerance), based on their responses to these questions. Barsky et al. (1997) summarize the procedure on how the risk aversion parameters are computed using the HRS data. The same procedure was used to compute the risk aversion measures using the PSID data (Luoh & Stafford, 2001). Assuming CES preferences, the four categories (high risk tolerance, medium risk tolerance, low risk tolerance, and very low risk tolerance) correspond to estimated risk aversion measures of 1.75, 2.86, 3.57, and 6.67, respectively (Barsky et al., 1997). Our estimates indicate that roughly one-quarter of males in our sample have high risk tolerance.

This analysis is the first to investigate both the effects of neighborhood context on the age of onset of cigarette smoking initiation in adolescence, and the effects of the neighborhood of upbringing on the subsequent smoking behavior of these same individuals in adulthood. Among individuals who have ever smoked cigarettes regularly, two-thirds began smoking before age 19 (based on the PSID). Roughly half of both males and females in our sample had ever smoked cigarettes. The average age

corresponding to our measure of smoking behavior in adulthood is 40. Twenty-seven percent of males and 22% of females in our sample currently smoke in adulthood.

After investigating contextual-level effects on the age of onset of cigarette smoking initiation in adolescence, I then estimate sibling and childhood neighbor correlations in subsequent smoking behavior in adulthood. These results have implications for the importance of neighborhood context in shaping the early formation of addictive health behaviors that persist throughout adulthood.

Child sample—CDS

While a rich array of adult outcomes can be assessed for the adult sample, relatively limited information is available about childhood outcomes (with the exception of the aforementioned smoking initiation measures). A much richer set of childhood information is available for a second sample, which I refer to as the child sample. In 1997, children 0-12 years old in PSID families and their caregivers were administrated a series of instruments as part of the Child Development Supplement (CDS). Up to two children within the same family were interviewed resulting in a sample of 3,540 children in 2,348 different families in 1997, and 1,132 families had two children interviewed. Interviews for these children were completed again in 2002/2003 when they were 5-18 years old. In total there are 6,447 child-year observations. (See Mainieri (2005) and Mainieri and Grodsky (2006) for details about the CDS).

I examine the effects of parental incarceration on children's educational and behavioral outcomes using data from the Child Development Supplement to the PSID, allowing for differential impacts for father's and mother's incarceration. I find, using the PSID-CDS data, that the prevalence rates of parental incarceration at some point during

childhood are significantly larger than point-in-time estimates. In this study, the consequences for children are considered by using information collected on the timing of parental criminal/incarceration history and comparisons of changes in multiple dimensions of children's development and lives before and after the parental incarceration occurrence. These dimensions include: (a) child behavioral outcomes; (b) family economic resources—income; (c) family non-economic resources—family structure, parenting behavior; and (d) neighborhood conditions.

These data include a rich set of variables related to both the mother, father, and the child, including parental criminal history, a set of child behavioral problem indices, standardized child cognitive assessments, and whether child has ever been suspended/expelled from school. Armed with this array of information, the PSID-CDS is uniquely suited to consider the impacts of parental criminal/incarceration history on adolescent outcomes, and this work is among the first studies to analyze the intergenerational transmission of risks of imprisonment. The child behavior problems index that will be analyzed as an outcome has been shown to be a predictor of juvenile crime. We utilize information about these child outcomes as reported by the primary caregiver (in most cases the mother), but where data permits I will utilize multiple informants of child behavior (including teacher reports).

III.   Descriptive Results

Cumulative Risks of Deviant Behavior, Criminal Involvement, and Imprisonment

The historical time-series of incarceration rates from 1925-2004 shown in Figure 1 demonstrates the stark and abrupt increase in incarceration that accompanied the "War on Drugs". The crack epidemic that began in 1985 contributed to some of the increase,

but most research indicates sentencing policy reforms during the late 1970s into the 1980s were the major catalysts for this growth in prison population size (Raphael and Stoll, 2007). Prison incarceration rates were stable over the 1925-1975 period, averaging 100 per 100,000, and then shot upward during the decade of the 1980s and beyond reaching 5 times its historic average by 2004 (roughly 500 per 100,000). An additional one-third of the U.S. penal population is held in jails.

Table 1 reports nationally-representative estimates of the cumulative risks of deviant behavior, criminal record, and imprisonment or death by ages 35-40 for the PSID birth cohort born between 1951 and 1975. These estimates are presented for men separately by race/ethnicity and educational attainment. Deviant behavior is defined here as individuals who had ever been either expelled/suspended from school, charged or booked for a crime, or ever been incarcerated.

We find alarmingly high rates of these lifetime risks, especially for black high-school dropouts. Roughly half of black high school dropouts have either died or been incarcerated before reaching the age of 40. For black high school dropouts, the lifetime risks of deviant behavior is 54 percent; 43 percent have a criminal record, and 40 percent have served time in prison or jail. These rates are staggering and unique to this prison boom generation.

The rates for African-Americans are roughly two times the rates of non-Hispanic whites, and not surprisingly, we see lifetime risks are substantially lower for college-educated men. However, we also see that there are dramatic racial disparities in lifetime risks of incarceration among non-college educated men. In fact, black men with some

college education had similar lifetime risks of incarceration as white non-college educated (high school graduates) men (10 percent).

These estimates are broadly consistent with those from the BJS (Bonczar and Beck, 1997), the NLSY (Pettit and Western, 2004), and Raphael (2004) using census data, a synthetic cohort approach and life table calculations.

In Table 2, I give particular attention to the birth cohort differences in the risks of incarceration. I find that the younger cohorts born in the 1960s/early 1970s have roughly seventy percent (7 percentage points) higher lifetime risks (relative to those born in the 1950s) of incarceration. Blacks have more than double the likelihood of ever being incarcerated (relative to non-Hispanic whites).

Sibling and Child Neighbor Correlations

Because the PSID sampled neighboring children and all children within 1968 family members, and followed them into adulthood, we use sibling correlations in criminal behavior-related outcomes and correlations between unrelated neighbors to assess the relative importance of neighborhood versus family background factors in influencing these outcomes. This approach avoids the difficulty of defining neighborhood quality and instead compares sibling with neighbor correlations. Relative to the correlation among siblings, are neighboring children's subsequent adult risk preferences and criminal involvement/incarceration outcomes highly correlated (controlling for family background characteristics)?

In the empirical analyses that follow, I analyze sibling and child neighbor correlations in several dimensions of risky behaviors and criminal/incarceration involvement: 1) incarceration history; 2) criminal record (booked or charged with a

crime); 3) deviant behavior (including being expelled from school); 4) risk preferences (risk tolerance/aversion)—parameters that are determinants of individual risk behavioral decisions/choices (that may be shaped by childhood neighborhood conditions); and 4) risky health behaviors—age of onset of cigarette smoking initiation in adolescence, and smoking behavior in adulthood.

The primary goal of this next set of analyses is focused on an overall assessment of the relative contributions of individual, family, and neighborhood effects on each of these related outcomes. I analyze the relative contribution of a parsimonious set of measured individual, household, and neighborhood covariates to the total variation from each component, and test specific hypotheses about the effects of specific characteristics of households and neighborhoods.

The strategy for assessing the importance of contextual effects involves estimating the fraction of variation in each of these outcomes of interest that lies between families and neighborhoods (or, equivalently, estimating the correlation between siblings and correlation between neighbors), to provide an upper bound on the possible effect of these contexts. The intuition motivating the use of this strategy is that if family background and residential community are important determinants of the early formation of risk preferences and risky and criminal behavior outcomes, there will be a strong correlation between siblings in these outcomes, as compared to two arbitrarily chosen individuals. And if the neighborhood where the child grew up is important, it will show up as a strong correlation between neighboring children's subsequent behavioral outcomes.

Sibling correlations capture the effects of all measured and unmeasured factors shared by siblings that may have an impact on these outcomes, such as the socioeconomic status of parents, genetic traits shared by siblings, family structure, as well as neighborhood effects stemming from the quality of neighborhood conditions (e.g., the school quality and availability of social services, housing and environmental conditions, peer group and role model influences, perceived/actual availability of economic opportunities, as discussed in section II), and sorting of similar family types within neighborhoods. Sibling correlations alone cannot identify the separate effects of family and neighborhood origins.

Augmenting the estimation of sibling correlations with the estimation of child neighbor correlations, enables us to bound the relative importance of family and neighborhood factors. The sibling correlation can be decomposed into a part arising from/due to shared neighborhood origins and a part related to family background characteristics. I assess the extent to which these outcomes are correlated among neighboring children above and beyond the correlation that exists because of similar family backgrounds. Specifically, the difference between the sibling correlation and the adjusted neighbor correlation represents a lower bound of the magnitude of the (composite) effect of family background on the outcome of interest.

IV. Estimation Methods

In order to decompose the total variation in the deviant behavior outcome of interest into the fraction that lies between neighborhoods, families, and individuals, we estimate a three-level hierarchical random effects model. Our data are hierarchical because we have data on individuals who are nested within families, which are nested

within neighborhoods. Multilevel modeling techniques can accommodate the hierarchical and unbalanced structure of our data, nonindependence of the (sometimes overlapping) pairs of siblings and neighbors, as well as the nonnormality of our deviant behavior outcomes of interest (Raudenbush and Bryk, 2002).

All of the deviant behavior outcomes that will be analyzed in this paper are binary outcomes in which the binary response is interpreted as the result of an underlying latent process. The three-level hierarchical random effects model for our binary deviant behavior outcomes can be derived through a latent variable conceptualization. Specifically, we assume that there exists a latent continuous variable H_{nfs}^* underlying H_{nfs}. We observe only our binary deviant behavior outcome H_{nfs} directly, but not H_{nfs}^*. We know, however, $H_{nfs}^* > 0$ if $H_{nfs} = 1$, and $H_{nfs}^* \leq 0$ if $H_{nfs} = 0$. For example, H_{nfs}^* may represent a continuous scale of deviant behavior status, but we observe whether or not the individual has a criminal history (not the intensity within these response categories).

We estimate the three-level hierarchical random effects model given by

$$H_{nfs}^* = \beta' X_{nfs} + \eta_n + \phi_{nf} + \varepsilon_{nfs} , \qquad\qquad (6)$$

where β is a vector of regression coefficients corresponding to the effect of covariates X_{nfs} (which represent observed characteristics of the neighborhood, the family, and the individual), and η_n and ϕ_{nf} are the random effects, which represent unobserved characteristics of the neighborhood and the family, respectively.[3] In this formulation the random effects, which play the role of additional error terms, are assumed to be normally

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[3] Maximum-likelihood (ML) estimates based on a numerical integration procedure were computed using the gllamm6 macro in Stata (Rabe-Hesketh et al. 2000).

distributed with mean 0, and var(η_n)=σ_n^2 and var(ϕ_{nf})=σ_f^2. Here ε_{nfs} is an individual

error term associated with individual s from family f in neighborhood n and is assumed to

have a standard logistic distribution with mean 0 and variance $\dfrac{\pi^2}{3}$ (where $\pi \approx 3.14$).

In this model, individuals from the same neighborhood but not in the same family

(i.e., neighbors) are correlated because they share the random effect η_n, and siblings are

correlated because they share the random effects η_n and ϕ_{nf}. In this model, the sibling

correlation and neighbor correlation can be computed, respectively, as:

$$\rho_{\text{sibling}} = \frac{\sigma_n^2 + \sigma_f^2}{\sigma_n^2 + \sigma_f^2 + \dfrac{\pi^2}{3}} \quad ; \quad \rho_{\text{neighbor}} = \frac{\sigma_n^2}{\sigma_n^2 + \sigma_f^2 + \dfrac{\pi^2}{3}} \quad .$$

The sibling correlation is between the unobserved latent variables H_{nfs}^* & $H_{nfs'}^*$;

the neighbor correlation is between the unobserved latent variables H_{nfs}^* & $H_{nf's'}^*$.

Our deviant behavior-related outcomes vary with age and gender. Because we

did not want our correlations to reflect the influence of either demographic factor, we

adjusted for them in our baseline model by including only age as an explanatory variable

in the vector X_{nfs}, and conducting separate analyses by gender. Moreover, given that age

affects deviant behavior outcomes and that most same-aged children do not belong to the

same family, it is important to control for age in the baseline model (age-adjusted deviant

behavior measure). Otherwise, between-family variance could mostly reflect differences

between individuals of different ages. Separate analyses by gender allow sibling

correlations to differ between brother-brother pairs, sister-sister pairs, and brother-sister

pairs; and allow neighboring boys to have a different correlation in deviant behavior

outcomes than neighboring girls (i.e., allow childhood contextual-level effects on deviant behavior-related outcomes to differ by gender).

We then estimate adjusted neighbor correlations, which are net of the resemblance/similarity arising from childhood neighbors having similar family background characteristics (due to sorting influences). To extract the impact of similar family backgrounds out of the neighbor correlation, we first estimate the following regression:

$$H^*_{nfs} = \alpha_1(fa\min c_{nf} - \overline{fa\min c_{n\bullet}}) + \alpha_2(black_{nf} - \overline{black_{n\bullet}}) + \alpha_3(femhd_{nf} - \overline{femhd_{n\bullet}}) + \varepsilon_{nfs},$$

(7)

where $faminc_{nf}$ is log family income in 1967 (as reported in 1968); $\overline{fa\min c_{n\bullet}}$ is the neighborhood mean of log family income (based on 1970 Census data); $black_{nf}$ is a dummy variable equal to one if the 1968 head of the household was black; $\overline{black_{n\bullet}}$ is the fraction of individuals in the neighborhood that are black (based on 1970 Census data); $femhd_{nf}$ is a dummy variable equal to one if the 1968 head of the household was female; and $\overline{femhd_{n\bullet}}$ is the fraction of households with children that are headed by females in the neighborhood (based on 1970 Census data). The neighborhood means of family income, racial composition, and family structure were obtained by merging on aggregated 1970 Census data at the census tract level. Using the within-neighborhood estimates of the family background effects of parental income, race, and family structure on the relevant health outcome, will ensure the coefficients (α) will not be biased by omitted neighborhood variables. In combination, the resulting estimates of the effects of these

family background characteristics can be taken as a conservative estimate of $\alpha'X_{nf}$ in equation (1).

We, then, estimate the inter-neighbor variance in $\hat{\alpha}'X_{nf}$ by estimating a hierarchical random-intercept model of $\hat{\alpha}'X_{nf}$ on a neighborhood-level random effect and a family-level random effect (as performed to estimate the overall inter-neighbor variance in H^*_{nfs}). We then subtract our estimate of the inter-neighbor variance in $\hat{\alpha}'X_{nf}$ from the estimate of the overall inter-neighbor variance in H^*_{nfs}. Dividing the resulting quantity by $\hat{Var}(H^*_{nfs})$ yields a tighter upper bound on the proportion of $Var(H^*_{nfs})$ that can be attributed to neighborhood effects.

AGE OF INIATIATION OF SMOKING

For smoking initiation we also estimate a three-level hierarchical random effects discrete-time hazard model to analyze the age of onset of cigarette use in adolescence. The hazard function, h_{nfst}, is the probability that individual s from family f in neighborhood n begins smoking cigarettes in year t, given the individual has never smoked cigarettes in any previous year. The hazard is specified in a logit form, where in the baseline model, the explanatory variables include only a set of age dummy variables (AGE_{nfst}) and a neighborhood-level random effect (η_n) and family-level random effect (ϕ_{nf}):

$$h_{nfst} = 1/(1 - \exp[\sum_{t=7}^{18} \alpha_t(AGE_{nfst}) + \eta_n + \phi_{nf}]) \ .$$

In this model, we are implicitly assuming proportional odds—in particular, we assume the baseline logit hazard curves in the J neighborhoods are parallel to one another, and

the baseline logit hazard curves in the *K* families in these neighborhoods are parallel to one another. We, however, conduct the analyses separately by gender to allow the relative importance of neighborhood and family contextual-level influences to differ for boys and girls.

VI. RESULTS

Deviance Behavior-related Outcome Variables

I first present the unadjusted sibling and neighbor correlations in each of the deviance behavior-related outcomes, and examine how much of these effects can be explained by the fact that families in a neighborhood tend to be similar.

SIBLING AND CHILD NEIGHBOR CORRELATIONS

The sibling and child neighbor correlation estimates are based on the decomposition of variance into the fraction that lies between neighborhoods, families, and individuals, for the relevant deviant behavior outcome. The estimates for each of the deviant behavior-related outcomes are reported in Table 2, and discussed in turn. For most deviant behavior-related outcomes, brother correlations are high. Brothers' incarceration history (i.e., whether ever served time in jail or prison) demonstrates the highest correlation at 0.69. We find significant brother correlations in deviant behavior (i.e., whether ever been expelled/suspended from school or booked/charged with a crime) and criminal involvement (i.e., whether ever been charged or booked for a crime) estimated at 0.31.

Risky health behaviors, at least smoking, also demonstrate high correlations within families. The correlation is 0.56 for brothers. Risk tolerance has a brother

correlation of 0.384. In other words, knowing a brother's risk tolerance in adulthood helps predict 38 percent of another brother's risk tolerance.

As discussed in section V, sibling correlations by themselves cannot disentangle how much of the resemblance among siblings in their deviant behavior outcomes is due to the effects of family background and how much is due to the effects of neighborhood quality/influences during childhood. Augmenting the sibling correlation estimates with corresponding child neighbor correlation estimates, reveals neighborhood background is an important determinant for each of the deviant behavior outcomes. The male child neighbor correlation for each of the deviant behavior outcomes is smaller than the corresponding value for brothers, but is still significant.

The results indicate that knowing a childhood neighbor's incarceration history is strongly predictive of another childhood neighbor's incarceration history. Interestingly, the child neighbor correlation estimates for these deviant behavior outcomes are similar in magnitude to Snell (1993), who reports that nearly one-third of all inmates in state prisons reported having a brother who had also been incarcerated. The results highlight the profound influence that family and/or neighborhood background has on criminal involvement and risks of incarceration/imprisonment.

Remarkably, the child neighbor correlation in adult incarceration history is 0.54. By comparing the magnitudes of the brother and male child neighbor correlations in incarceration history, the results suggest that more than half of the 0.69 brother correlation is attributable to neighborhood effects. From the adjusted neighbor correlation estimates (not shown), I also find that observable family sorting does not seem to explain all the resemblance in deviant behavior among persons who grew up in

the same neighborhood. Across all deviant behavior-related measures, the adjusted

neighbor correlation is 10-20% lower than the unadjusted neighbor correlation. In future

work I will consider a broader array of family factors. Taken together, these results

suggest that neighborhood quality during childhood is a significant gatekeeper of the

intergenerational transmission of deviant behavior and incarceration risks among males.

As discussed in section V, I estimate a three-level (hierarchical) random effects

discrete-time hazard model to analyze the age of onset of cigarette use in adolescence for

boys. Roughly 30 percent of boys in the sample smoked cigarettes in adolescence. The

results are presented in the fifth column of Tables 4 and 4a. Estimates of the random

effects of the neighborhood (σ_n) and family (σ_f) components indicate that, for boys,

neighborhood and family background have very large and significant effects on the

likelihood of youth smoking initiation.[4] For example, the estimated σ_n of 1.258 implies

the odds of adolescent smoking initiation for boys who grow up in neighborhoods that are

one standard deviation below average neighborhood quality are 3.5 times [exp(1.258)]

the corresponding odds of individuals who grow up in neighborhoods of average quality.

We next examine the estimated sibling and childhood neighbor correlations in

smoking behavior in adulthood. As shown in the last column of Table 4, the estimated

neighbor correlation in adulthood smoking behavior for males is 0.27, while the neighbor

correlation for females is negligible. In other words, knowing the adult smoking

behavior of a male childhood neighbor predicts 27 percent of the adult smoking behavior

of another male childhood neighbor. Moreover, from the adjusted neighbor correlation

estimate, we also find that observable family sorting does not seem to explain the

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[4] Likelihood ratio tests are used to test the statistical significance of the family and neighborhood random effects.

resemblance in adulthood smoking behavior among persons who grew up in the same neighborhood. These results underscore the importance of neighborhood context in shaping the early formation of addictive health behaviors that persist throughout adulthood for males.

Consistent with the above evidence on the importance of neighborhood effects on smoking behavior among males, we also find the child neighbor correlation in risk tolerance in adulthood is 0.32—approaching the magnitude of the brother correlation (0.38) (see column 4 of Table 4). The results indicate significant childhood neighbor correlations in risk preferences in adulthood, and suggest these preference parameters are shaped by childhood neighborhood influences. Risk preference parameters shape a wide array of behavioral choices of individuals (including criminal involvement), and thus, this evidence on neighbor correlations in risk preferences has far-reaching implications and can contribute to our understanding of many different outcomes/phenomena.

MAGNITUDE OF EFFECTS OF FAMILY AND NEIGHBORHOOD BACKGROUND

What do these correlation estimates mean in terms of the absolute size of the effects of family and neighborhood background? In Table 4a, I present estimates of the standard deviation of neighborhood effects for our deviant behavior outcomes of interest. We see that although the neighbor correlations may seem low for criminal history, estimates of σ_n indicate that neighborhood quality have very large and significant effects on nearly all of the deviant behavior-related outcomes for males. For example, the estimated σ_n of 2.39 for incarceration history among males implies that the odds of having an incarceration history by early-to-mid adulthood for males who grow up in neighborhoods that are one standard deviation below average neighborhood quality are

11 times [exp(2.39)] the corresponding odds of males who grow up in neighborhoods of average quality.

To provide further insight and facilitate interpretation of our results, we present graphically in Figures 2 and 3 the predicted probability of having an incarceration history by age 40 among males over the entire range of neighborhood quality and family background effects, respectively. The graphical representation of the results highlights the dramatic impact of the magnitude of the family and neighborhood effects.[5]

Specifically, Figure 2 shows the predicted probability of having an incarceration history at age 40 over the entire range of neighborhood quality effects, for males with average family background, one standard deviation below average, and one standard deviation above average family background. We see that the differences are especially striking between below average and average families in the probabilities of ever being incarcerated.

Similarly, Figure 3 shows the predicted probability of having an incarceration history at age 40 over the entire range of family background effects, for males who grew up in neighborhoods of average quality, one standard deviation below average, and one standard deviation above average neighborhood quality. We see that the differences are especially striking between below average and average neighborhoods in the probabilities of having an incarceration history by mid adulthood.

Although I present and discuss only the simulation results for incarceration history in early and mid life among males, I have also performed similar simulations for the other deviant-behavior related outcome measures.

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[5] In future work, I plan to also explore potential interactions between family and neighborhood effects— e.g., families who lack social and economic resources may be more vulnerable to poor neighborhood conditions (Currie & Hyson 1999).

DECOMPOSITION ANALYSIS

We next employ a variation of the Blinder-Oaxaca decomposition technique to assess the relative roles of family background and neighborhood quality during childhood in contributing to racial disparities in deviant behavior-related outcomes. In particular, we simulate the effects of giving blacks the distribution of family background and neighborhood quality during childhood that whites possess, respectively, to examine how much of the black-white gap in incarceration can be explained by these factors.

For the latent variable H^*_{nfs}, the standard Blinder-Oaxaca decomposition of the black-white gap in the average value of the dependent variable can be expressed as

$$\overline{H}^{W^*}_{nfs} - \overline{H}^{B^*}_{nfs} = \beta'(\overline{X}^W_{nfs} - \overline{X}^B_{nfs}) + (\overline{\eta}^W_n - \overline{\eta}^B_n) + (\overline{\phi}^W_{nf} - \overline{\phi}^B_{nf}) \quad , \tag{8}$$

where $\overline{X}^j$ is a vector of average values of independent variables for race j, $\overline{\eta}^j$ is the average neighborhood random effect for race j, and $\overline{\phi}^j$ is the average family random effect for race j. For our estimations, age is the only variable included in X and the black-white difference in age is negligible in our sample, so the first quantity on the RHS of equation (8) cancels out. The second quantity on the RHS is the part of the gap due to racial differences in average neighborhood quality during childhood, and the third quantity is the part of the gap due to racial differences in family background. In this draft of the paper, the decompositions are similar in spirit but not equivalent to Blinder-Oaxaca decompositions, because we only focus on the contextual-level portions of the gap and estimate the relative contribution of family background and neighborhood quality.

The results of the decompositions of both the black-white gap in incarceration and criminal involvement among males are reported in Table _. Blacks have more than twice

the incidences of both incarceration and criminal involvement history in mid adulthood. The decomposition results indicate that for incarceration history, racial differences in average neighborhood quality account for roughly 83 percent of the black-white gap that is due to contextual-level factors; and racial differences in average family background account for the remaining 17 percent. The portion attributable to neighborhood quality is overstated to the extent that this captures the sorting of families with similar characteristics into neighborhoods.

To summarize the results presented thus far, I have used correlations collected from a nationally representative longitudinal sample of siblings and child neighbors to estimate upper bounds on the possible causal effects of family background and neighborhood quality on deviant behavior-related outcomes. Estimates based on three-level hierarchical logistic regression models consistently show a significant scope for neighborhood contexts in most of the deviant behavior outcomes. The estimates suggest that disparities in neighborhood factors account for roughly ¼ - 1/3 of the variation in incarceration history among males in mid life, and contribute significantly to current racial disparities in incarceration.

The relatively large child neighbor correlations among males for incarceration history, criminal involvement in adulthood, deviant behavior in adolescence, smoking behavior in adolescence, and adult risk preferences, suggest neighborhood factors play an important role in the intergenerational transmission of deviant behavior. The evidence propels/challenges future research to further our understanding of the underlying processes that produce disparities in criminal involvement and incarceration risk between different racial/ethnic and socioeconomic groups.

This evidence suggests further research on the effects of particular neighborhood characteristics is strongly warranted to improve our understanding of the pathways through which neighborhoods and families affect criminal involvement (e.g., through peer group and role model effects).

We have documented racial disparities over the life cycle of the cumulative risk of being suspended/expelled from school, likelihood of being placed in a reform school, probability of ever being charged or convicted of a crime, and the risk of death or imprisonment. The results have shown the influence of neighborhood and family background in shaping these risks. We next shift to examining the consequences for the next generation.

Parental Incarceration and Child Well-Being

The consequences for children of ever-increasing levels of incarceration are perhaps the least understood aspect of the potential positive or deleterious impacts of incarceration policy on families and communities.

One key aspect of the PSID used in this paper is the information on parental histories of criminal involvement and risky behaviors that might influence children's adoption/early formation of these behaviors. There is a paucity of nationally representative longitudinal data sets with information on both children and their parents that is large enough to have a reasonable sized subset of children with parents with a criminal history—the PSID is a rare exception.

For the PSID original sample males born between 1951-1975, I begin by documenting among their offspring (born sometime over the subsequent 1968-2005 period), what proportion had a father with an incarceration history. Among the 1951-

1975 birth cohort who became fathers, Table 5 presents the proportion who have an incarceration, criminal record, and deviant behavior history, separately by race/ethnicity and educational attainment. Table 6 present these descriptive results for their children. As shown in Table 6, I find that 20 percent of black children had a father with an incarceration history; and among black children with fathers who did not graduate from high school an alarmingly 33 percent of their father's had an incarceration history. The differences in the risk of paternal incarceration are more closely linked to racial differences than parental-education differences. For example, black children whose fathers attended college were only slightly less likely to experience paternal incarceration than white children whose fathers were high school graduates but did not attend college.

Use of the PSID-CDS data paints a similar picture regarding how often black and white children experience parental incarceration, and how this risk varies within racial/ethnic groups. A comparison of these statistics for these recent birth cohorts with older cohorts from other data sources demonstrates how significantly the risk has changed over the past 25 years. For example, Wilderman (2006) uses criminal justice and vital statistics data to estimate the risk of paternal incarceration during early childhood for the 1978 and 1990 birth cohorts of American children. He reports that roughly one in nine black children born in 1978 could expect to have their father incarcerated before their ninth birthday, and nearly one in five black children from the 1990 birth cohort could expect the same—an increase of nearly 60 percent over only a twelve-year period.

Using the PSID-CDS, Table 7 reports the proportion of children who have a parent and/or other 1968 descendent family member with an incarceration history,

criminal involvement history, and/or deviant behavior history. These descriptive results are reported by race/ethnicity and parental educational attainment. It is important to note that these are likely lower bound estimates because we identify only those parents who lived with the child at some point during childhood. As Table 7 shows, 10 percent of black children and 6.9 percent of white children have a parent who has been incarcerated. Nearly one in five black children whose parents did not attend college have a parent with an incarceration history, which is two times the rate for comparable white children. Additionally, black children, on average, have one person in their immediate or extended family with an incarceration history and roughly 3 family members with a deviant behavior history (i.e., either expelled from school, criminal record, or incarceration history). More than one-quarter of black children whose parents did not attend college have a parent with a criminal record; the comparable proportion among white children is 19 percent.

The small research literature on children of incarcerated parents suggests that parental incarceration is associated with increased aggressive behavior and withdrawal (Baunach, 1985), criminal involvement (Johnston, 1992), and depression (Kampfner, 1995), among children whose parents are imprisoned. Existing studies, however, have not been able to separately identify the causal effects of incarceration from the effects of pre-incarceration risk factors such as parental substance abuse, mental health problems, and abuse histories that may have already put the child at risk before the parent was imprisoned (Johnson and Waldfogel, 2002). It is important to bear in mind that not all children respond similarly to parental criminal involvement, incarceration risk, or neighborhood disadvantage. This point is emphasized in the developmental psychology

literature, which posit dynamic interactions between characteristics of individuals and their social context over time and is implicit in research on resilience, which examines differential outcomes in the face of adversity (Rutter, 1987, 1993; Johnson and Waldfogel, 2002).

There are a myriad of ways in which parental incarceration may compound disadvantage. It may 1) increase the probabilities of growing up poor and/or with a single parent; or 2) elevate the risk of criminal involvement and incarceration later in life for children of the incarcerated (prison boom). There are a variety of potential mechanisms through which parental incarceration may affect child outcomes including economic instability, living-arrangement instability, parental attachment issues, role model effects, to name a few. A primary goal of this research is to identify the reduced-form effects, not separately identify the pathways.

The evidence will bear on the question of the likelihood and extent that parental incarceration has exacerbated racial disparities in childhood and (in early) adulthood. Even the direction of the predicted impacts on children is not clear theoretically. The incarceration of an abusive or negligent parent may benefit children and contribute to a more nurturing environment. On the other hand, the incarceration of a parent may be a traumatic event in the life of a child that has deleterious impacts on subsequent emotional and behavioral outcomes.

I examine the effects of parental incarceration on children's educational and behavioral outcomes using PSID-CDS, allowing for differential impacts for father's and mother's incarceration. These data include a rich set of variables related to both the

mother and the child, including parental criminal history and a set of standardized child cognitive assessments.

Measures

Dependent Variables

Our dependent variables capture aspects of children's emotional well-being with three measures of child behavior: behavior problems index, externalizing behavior problems and internalizing behavior problems. Each of these scales relies on maternal reports of children's behavior. In addition, we assess the incidence of the child ever being expelled/suspended from school, disruptive behavior problems in school, school absenteeism, being placed in special education, and grade repetition. The child behavioral outcomes we examine are important (in part) because early manifestations of problem behavior in children have been shown to often be a precursor to more serious involvement in deviant behavior in adolescence and criminal involvement in adulthood.

Behavior Problems. In both surveys, primary caregivers were asked to provide information on their children's (ages 3-17) behavior, and whether they exhibited a particular problem never, sometimes, or often. Particular behaviors were grouped together to create scales of internalizing (withdrawn, sad) and externalizing (aggressive, angry) behaviors.[6] While I do not devote substantial attention to age variation in the behavior problems index, it is recognized that a high score may mean something difference for a six-year old versus a seventeen-year old.

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[6] The internalizing behavior index includes the following behaviors, which are combined to create a continuous count of behaviors: child has felt loved; has been fearful/anxious; has been easily confused; has felt worthless; is unliked by other children; has been obsessed with thoughts; has been sad or depressed; has been withdrawn; has been clinging to adults; has cried too much; has felt others were out to get him/her.

Family poverty status is assesses by matching a child's total family income with corresponding poverty thresholds based on income and family size.

I first document a simple correlation between parental incarceration history and child behavior problem indices. The remainder of the paper attempts to identify whether this simple relationship is causal. To this end, various empirical approaches are used (to address potential omitted variables bias), including the estimation of hierarchical random effects models, child-, mother-, and family-fixed effects models, and instrumental variables models.

Table 8 presents simple descriptive statistics for the child behavior problems index by the parents' most severe offense (incarceration; booked or charged with a crime; expelled/suspended from school; none of these). The estimates indicate a substantial positive relationship between parental incarceration history and child behavioral problems. For example, the average child who has a parent with an incarceration history scores .55-.83 standard deviations above the average behavior problems score of a child without any parental/family incarceration history (BPI=7.7 among children with no family history of deviant behavior versus BPI scores between 10 and 11 among children with a parental incarceration history). Among children who have a father with an incarceration history, the proportion of children who have ever been expelled or suspended is 22.8 percent, as compared with 4 percent among children without a family history of deviant behavior. We see similarly large differences when comparing children with a mother with an incarceration history with children without any parental incarceration history.

Of course, children who experience parental incarceration are different from other children in a multitude of ways that may also contribute to the raw differences in child behavioral outcomes that we observe. Table 9 highlights this point by presenting a series of family and neighborhood characteristics for children who have parents with an incarceration history and those who do not. We see children from families with an incarceration history are disadvantaged along many other dimensions. For example, compared with children who do not experience parental incarceration, children who do come from significantly poorer families, are more likely to be raised in single-parent families, more likely to grow up in worse quality neighborhoods (particularly, neighborhoods with crime and drug use problems), and have less-educated parents.

Perhaps the most important difference is that their family income was considerably lower. Poverty rates are five percent among children who had no family history of deviant behavior versus 19 percent for those children exposed to paternal incarceration. Based on the relationship between family income and child outcomes shown elsewhere (Duncan and Brooks-Gunn, 1997), it may come as no surprise that children who have parents with an incarceration history have more behavioral problems.

The remainder of this analysis is geared to identify whether it is the parental incarceration itself which leads to greater child behavioral problems, or these other differences in family characteristics, including family income that are the main causal factors and mechanisms that link parental incarceration and child well-being.

Table 10 presents the average change in the child's family income as well as the change in the probability the child is living in poverty between the years immediately before, during, and after the release of a father from prison/jail. I find that the proportion

of children growing up poor increases by 8.5 percentage points (from 22.3 to 30.9) in the years during the father's incarceration spell as compared with the years immediately before the incarceration spell, and this significant increase only modestly declines in the first several years following the father's release. Similarly, we see family income decline by an average of $8,726 (from $38,960 to $30,234) in the years during the incarceration spell (relative to the year prior to the incarceration spell) and the child's family income does not resume/regain its pre-incarceration level in the years following the fathers' release.

Econometric approaches

Although the descriptive analyses in Table 8 make a compelling prima facie case that there is a relationship between parental incarceration and child behavioral problems, children who experience parental incarceration differ from children who do not in both observable and unobservable ways. As well, an example of a potential source of omitted variable bias is that a drop in family income could lead both to a child experiencing lower levels of development investment and to a parent engaging in crime. In the analysis, I use several alternative econometric methods to address these concerns.

The first method relies on OLS estimation of a series of sequential specifications, with each specification including a unique and extensive array of family and neighborhood background variables. The empirical model specifications test for differential effects of parental incarceration by childhood life stage—early childhood (ages 0-5); middle years (ages 6-10); adolescence (ages 11-17)—and length of parental incarceration exposure. The child development literature conceptualizes these ages as distinct stages of rapid growth in which parental resources may differentially matter. The

hierarchical random effects models highlight the significant heterogeneity in the effects of parental incarceration on child well-being.

I employ several techniques for addressing unobservable heterogeneity. First, parental incarceration experiences *prior* to birth are added to the regression equation to test for bias due to unobserved parental factors.[7] The second exploits the longitudinal and family-based nature of the survey. This allows me to "difference out" any permanent unobservable characteristics of individual children over time or within families that influence both parental incarceration risk and children's behavioral problems. The identifying source of variation in the sibling fixed effect models is between-sibling differences in the timing of a parental incarceration exposure at the same stage in childhood. The main advantage of the sibling approach is the ability to examine early childhood effects. As well, role modeling influences may be particularly salient in the adolescent years, and, thus, child behavior problems may be more sensitive to parental incarceration experiences in these childhood years. I also estimate 1968 descendant family fixed effect models where the identifying variation includes comparisons of cousins' behavioral outcomes for which there exists differences in parental incarceration history.

Although all the difference methods control for fixed unobservable characteristics (either over time or within the same family), each has different vulnerabilities to factors that change over time or within the family. A number of controls for observable factors that change over time are included in the models to minimize this potential source of bias.

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[7] This approach draws on the method used by Gottschalk (1996) for examining the intergenerational correlation in welfare participation and used by Ruhm (2004) for analyzing the effects of parental employment and child cognitive development.

Finally, I employ an instrumental variables approach to address the endogeneity of parental incarceration using state incarceration rates as an instrument for parental incarceration. In theory, this method can account for unobserved heterogeneity, whether it is fixed or not, and for measurement error bias. In this case, in order for the state incarceration rate to be a valid instrument it must be correlated with parental incarceration, but have no direct effect on children's behavioral outcomes. Here, we use variation in state incarceration rates in 1997. Residing in a state with more punitive sentencing policies increases the likelihood of a paternal incarceration experience. Because the unexplained component in a model of child behavioral problems is unlikely to be related to state incarceration policy, our model should be appropriately identified. In practice, a significant first-stage relationship between state incarceration rates is found to only be significantly related to the probability of paternal incarceration history among blacks. The disadvantage of this instrumental variables approach is that state incarceration rates is weakly related to parental incarceration history, leading to weak second stage results, and there exists concern about this instrument satisfying the exogeneity requirement. In future work, I will attempt to use sentencing policy reforms as an instrument to isolate the discretionary portion of arrests that is not related to changes in crime. Keeping the strengths and weaknesses of each approach in mind, we turn to the results.

Regression Results

The first column of Table 11 presents the results of estimating a simple OLS model of the intergenerational relationships between parental deviant behavior history and child behavior problem indices. These models include controls for self-rated

neighborhood quality, extent of neighbor policing of drugs (which may serve to proxy for neighborhood social cohesion), indicator variables for whether there is a family member residing in household with an alcohol problem, parental religiosity, parental education, marital status, child gender, race/ethnicity, and age. The effects of these unique set of control variables are of interest in their own right, but I focus discussion on the relationships between parental deviant behavior history and child behavioral outcomes.

As shown in Table 11, the results indicate that parental deviant behavior history, including school expulsion, criminal record, and/or incarceration—are all significantly associated with greater child behavioral problems, and the magnitudes are substantive. The patterns of results are similar across the child behavior problem outcomes. I find that paternal incarceration history and maternal deviant behavior history are each associated with an increased likelihood their children are expelled or suspended from school. The effects of other family members' incarceration or criminal history is not significantly related to child outcomes (when the parents do not have that history).

The results in Table 11 also show that neighborhood quality, the extent of neighbor policing of drugs (which may serve to proxy for neighborhood social cohesion), whether there is a family member residing in household with an alcohol problem, parental religiosity, parental education, marital status are all independently significantly related to these child behavioral outcomes.

There is variation in the overall incidence and timing of parental incarceration exposure among children, including a significant portion who have parents with an incarceration history that occurred prior to the child's birth and not during their childhood years. If the association between parental incarceration exposure reflects a causal

influence, then we should expect to see effects only when it occurs during the child's life. I exploit this fact and test for the presence of unobserved heterogeneity bias by including parental incarceration that occurred prior to the child's birth as a model specification check.

Table 12 presents these model results. The results for the effects of parental incarceration pass this falsification test. In particular, I find that the estimated effects of parental incarceration on child well-being are only significant when it occurs during childhood—the estimated effects of parental incarceration prior to birth are small and statistically insignificant. This pattern of results holds for all the behavior problem indices.

So far we have considered the impact of exposure to parental incarceration at some point during childhood, yet recent research emphasizes the importance of the early childhood environment on subsequent outcomes (Johnson and Schoeni, 2007). In Table 13, I investigate whether the timing of parental incarceration exposure makes a difference for children's behavioral outcomes. The models estimated allow parental incarceration between ages 0-5 (pre-school), 6-10 (middle years), and 11-17 (adolescence), to have differential effects on children. One might expect larger effects in the early childhood years, and during adolescence when role modeling influences may be particularly salient.

The OLS results shown in the first column of Table 13 reveal precisely this pattern. The results indicate that parental incarceration is associated with significantly greater behavioral problems at all stages of childhood, with the largest impacts found when the incarceration exposure occurs during the adolescent and early childhood years.

Correcting for unobserved heterogeneity

The preceding section shows that a child who has a parent that is incarcerated during their childhood years exhibits significantly more behavioral problems. This result holds when we control for a wide range of observable family and neighborhood background characteristics and only is not present when the incarceration exposure occurred prior to the child's birth and not during their childhood years.

In columns (2)-(4) of Tables 13-15, I present results for models that control for unobservable differences across families that may affect both parental incarceration and child development outcomes. These models allow the effects of maternal incarceration to differ from the effects of paternal incarceration, and allow the effects to differ by child life stage. Columns (2) and (4) include descendant family fixed effects, and thus identification of effects comes from comparisons of cousins' child outcomes who have differing parental incarceration histories, and also includes comparisons of brothers' child outcomes who have divergent patterns in the life stage in which the incarceration experience occurred. Column (3) includes mother fixed effects and thus restricts comparison to brothers, where the parent's incarceration for one of the siblings occurred prior to their birth.

The pattern of results across these family fixed effect models reveal that both paternal and maternal incarceration exposures lead children to develop significantly more behavioral problems. The results also indicate that parental incarceration that occurs during adolescence appears to have the most negative consequences for children. The magnitudes of the family fixed effect estimates are not significantly smaller than the previous OLS estimates. The pattern of results is again broadly consistent across the different child behavioral outcomes measures as shown in Tables 13-15. There is no

evidence from these estimates, then, that our earlier result was driven primarily by unobserved heterogeneity in fixed characteristics.

I next estimate child fixed effect, mother fixed effect, and descendent family fixed effect models, and examine whether the duration of the parental incarceration exposure is significantly related to child behavioral problems. The results are contained in Tables 16-18. The child fixed effect models presented in the final column of Tables 16-18 exploit variation in the incidence and duration of parental incarceration exposure for the same child over the six-year period 1997-2003 (using the two waves of the CDS).

The similarity in the qualitative pattern of results across the OLS, child fixed effect, mother fixed effect, and descendent family fixed effect models, and various model specifications for parental incarceration is striking. The fact that the results across these various empirical approaches paint a similar picture regarding the negative consequences for children of parental incarceration exposure is noteworthy.

Tables 19 and 20 present the results of the instrumental variables approach models. As previously discussed, I use state incarceration rates in 1997 as an instrument for paternal incarceration history. The first-stage is only significant for blacks, given the lower prevalence rates for the other racial/ethnic groups. The first-stage estimates of the significant effects of the state incarceration rate among blacks on the probability of the father having an incarceration history is shown in the first column of Table 19.

In columns (2) – (4), we see significant positive reduced-form effects of state incarceration rates and internalizing behavior problems among black children and marginally significant effects for the overall behavior problem index score. Table 20 present the IV/2SLS estimate of the effects of paternal incarceration history on child

behavior problems. The point estimates are larger than the OLS and fixed effect models, but are significantly less precise (standard errors are several times larger). This greater imprecision renders the point estimates only marginally significant in these specifications. Nevertheless, these estimates again provide no real indication of serious bias from unobserved heterogeneity in the previous model specification results. However, the instrument does not allow enough power to reject that the true coefficient is zero when standard errors are clustered at the state level.

Overall, then, these results suggest that parental incarceration exposure leads children to develop greater behavioral problem trajectories. Moreover, these results do not appear to be driven primarily by omitted variable bias.

Summary Discussion

The contributions of this study are several-fold. First, this paper provides nationally-representative estimates of the cumulative risks of incarceration and obtaining a criminal record by age 40 for a cohort born between 1951-1975. I show that men born in the 1960s/early 1970s have significantly greater cumulative lifetime risks of imprisonment than similarly-aged men born in the 1950s. This is in part a direct consequence of the transformation of incarceration and sentencing policy that took off in the 1980s (though this is beyond the scope of the present study). The racial disparities in lifetime incarceration risks are alarming. The results presented in this paper highlight that among black low-educated men, one-half either died or had been incarceration before the age of 40.

Second, this analysis uses an innovative approach to investigate the relative importance of family background and neighborhood context on deviant behavior over the

life course, including ever being expelled, criminal involvement, ever being incarcerated, the early formation of risk preferences, and risky health behaviors (early onset of smoking in adolescence). Particularly noteworthy, the analysis of brother and male child neighbor correlations in adult incarceration history revealed remarkably high correlations of 0.69 and 0.54, respectively. These results highlight the profound influence that family and/or neighborhood background has on criminal involvement and risks of imprisonment. Moreover, the results suggest that neighborhood quality during childhood is a significant gatekeeper of the intergenerational transmission of deviant behavior and incarceration risks among males.

Third, this study examines the intergenerational consequences by examining children of the next generation. I find, using the PSID-CDS data, that the prevalence rates of parental incarceration at some point during childhood are significantly larger than point-in-time estimates. I find that 20 percent of black children had a father with an incarceration history; and among black children with fathers who did not graduate from high school an alarmingly 33 percent of their father's had an incarceration history.

Fourth, this study is among the first longitudinal child-outcome studies that examines the role of pre-incarceration risk factors and children's living arrangements, parent-child relationships and substitute caregiver-child relationships, to help to determine the impact of parental incarceration on families and children.

I find linkages between exposure to parental incarceration and child behavioral outcomes. The pattern of results are remarkably similar across all of the empirical approaches utilized that address omitted variables bias—including hierarchical random effects models with an unusually extensive set of controls, family fixed effect models,

child fixed effect models, and instrumental variables estimates. This evidence bears on the question of the extent to which parental incarceration has exacerbated racial disparities in childhood and in early adulthood.

Understanding if and how parental absence due to incarceration differs from separation, due to parental divorce or death, may prove instrumental in designing interventions with families where a parent is incarcerated (Johnson and Waldfogel, 2002).

This study identifies some potential unintended negative consequences for children of incarceration policies designed to "get tough" on crime. A key goal of social welfare policy in the U.S. should be to "break the cycle" of poverty and unemployment from one generation to the next. It is only by following the children of at-risk parents, that we can know whether their developmental trajectories point toward a brighter economic future than the one their own parents once faced. This long-run study is uniquely positioned to provide new insights on this important issue.

Policy Implications

Paramount to a more comprehensive cost-benefit analysis of incarceration policy is the consideration of the unintended consequences of incarceration policy—i.e., beyond the intended effects of punishment, incapacitation, and deterrence. Furthermore, the geographic incidence of these consequences must be examined on not only prisoners, but their families and the communities that disproportionately send young men to prison. The distributional consequences of incarceration have an important geographic dimension due to racial residential segregation and the fact that a relatively small number

of communities account for a disproportionate number of felons sent to state and federal prison.

The societal consequences of dramatic increases in incarceration rates are intensified by the spatial concentration of imprisonment among a relatively small and compact set of predominately minority neighborhoods. Although increased incarceration rates have generally reduced crime rates, some speculate we have reached a tipping point where so many in a neighborhood are going to prison that it has begun to destabilize the community and the inmates' families left behind, and may have become a factor that increases crime (Clear, 2002). With escalating incarceration rates that achieve a certain density of current/former inmates in the community, prison may be transformed from a crime deterrent into a factor that incites an accelerated cycle of crime and neighborhood disorder. If this has the result of leaving communities too populated with people hardened by the experience of prison, perhaps we have already reached a point at which there are diminishing returns to the societal goal of reducing crime.

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FIGURE 1:

Prisoners in State or Federal Prison per 100,000 U.S. Residents, 1925 to 2004
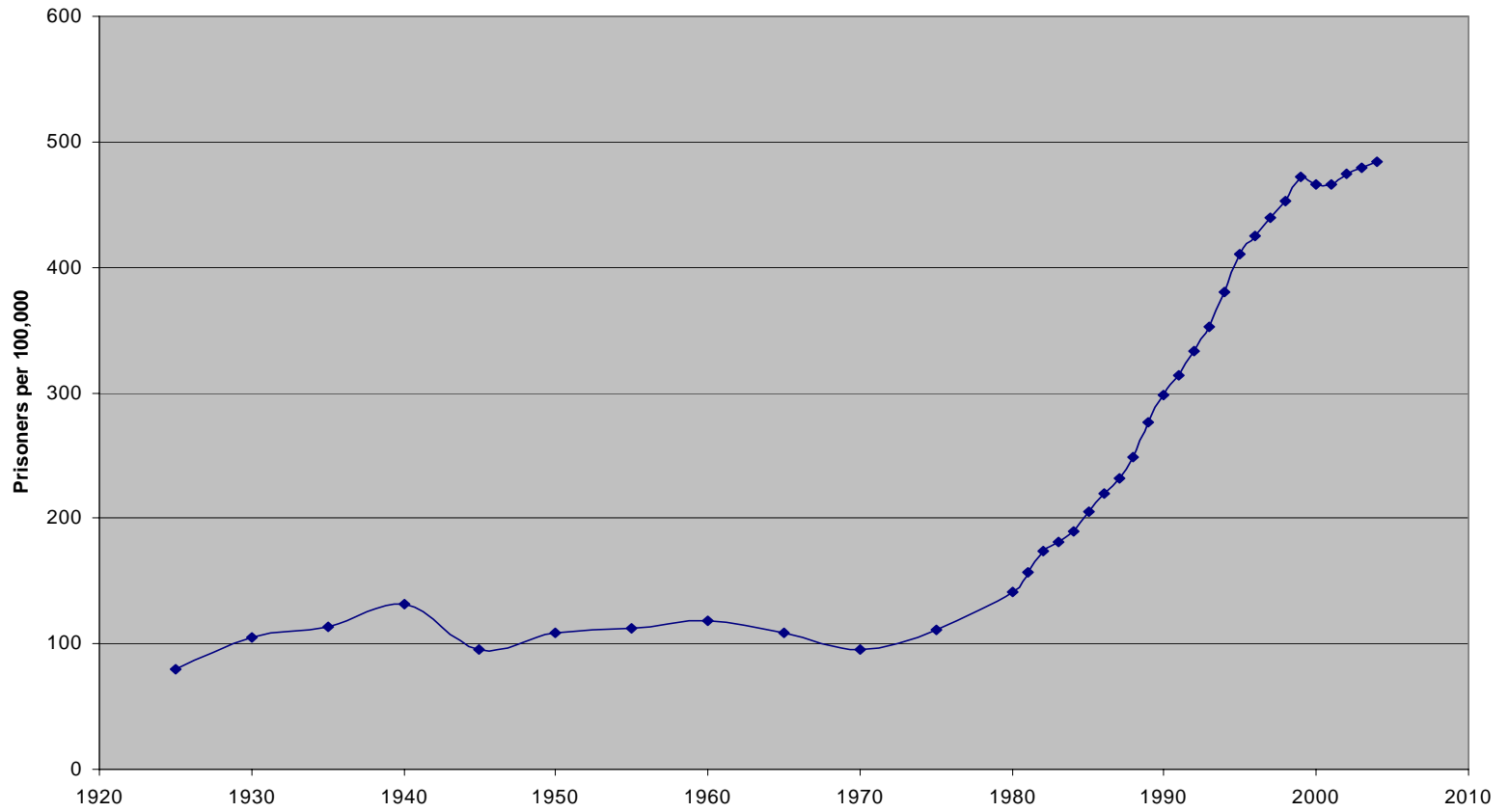
Table 1. Cumulative Risk of Criminal History, Imprisonment, or Death by Ages 35 - 40, by Race & Education

Men born b/w 1951-1975, Data: PSID*

	All	HS Dropout	HS Grad/GED	All Non-college	Some College+
Cumulative Risk of Death or Imprisonment (%)					
Black Men	27.57	49.53	25.43	33.89	11.86
White Men	13.28	37.76	12.91	19.57	6.38
Cumulative Risk of Imprisonment					
Black Men	22.87	40.02	22.62	28.16	10.41
White Men	10.16	27.80	10.54	14.81	5.26
Cumulative Risk of Criminal History**					
Black Men	27.19	42.86	25.78	31.22	17.72
White Men	16.99	34.60	17.88	22.02	11.68
Cumulative Risk of Deviant Behavior***					
Black Men	42.00	54.26	43.62	47.01	30.21
White Men	26.59	52.47	29.49	35.17	17.53

*The sample consists of original sample PSID males born between 1951-1975 who answered the criminal history questions in the 1995 wave of the survey OR were positively identified as incarcerated in any wave of the survey between 1968 and 2005. (blacks N=1,207; whites N=1,612)

**"Criminal history" is defined as ever charged with a crime and/or incarcerated for a crime.

***"History of deviant behavior" defined as ever charged with a crime, incarcerated for a crime, or suspended/expelled from school.

All descriptive statistics are sample-weighted to account for the oversampling of blacks and low-income families, to generate nationally-representative estimates.

Table 2. Race and Cohort Effects in the Risk of Incarceration
Men born b/w 1951-1975, Data: PSID*

	Dependent variable:
	Prob(Ever Incarcerated)
	Probit Model (Marginal Effects)
Birth Cohort:	
(ref cat: Born 1950-1959)	
Born 1960-1967	0.0705**
	(0.0350)
Born 1968-1975	0.0631
	(0.0610)
Race/Ethnicity:	
(ref cat: White)	
Black	0.1319***
	(0.0230)
Avg Prob(Ever Incar), eval at means	0.1123
# of Men	2943

Robust Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Note: Regression is sample-weighted to account for the oversampling of blacks
and low-income families, to generate nationally-representative estimates.
Regression includes controls for age, hispanic and other race (suppessed in table).

Table 3. Sibling and Child Neighbor Sample Sizes for Various Deviant/Risky Behavior-related Outcomes
Males born during the 1950s, Data: PSID*

	Incarceration History	Criminal History	Deviant Behavior History	High Risk Tolerance in Adulthood	Cigarette Smoking in Adolescence	Cigarette Smoking in Adulthood
Brother & Male Child Neighbor Sample:						
# of Individuals	860	704	704	1017	975	459
# of Families	601	534	534	745	696	307
# of Neighborhoods	521	469	469	611	592	127

*The sample consists of original sample PSID males born during the 1950s who have valid census block 1968 child neighborhood IDs and who answered the relevant deviant/risky behavior-related outcome questions in adulthood (for incarceration history, includes individuals who were positively identified as incarcerated in any wave of the survey between 1968 and 2005).

Table 3a. Sibling and Child Neighbor Sample Means for Various Deviant/Risky Behavior-related Outcomes
Males born during the 1950s, Data: PSID*

	Incarceration History	Criminal History	Deviant Behavior History	High Risk Tolerance in Adulthood	Cigarette Smoking in Adolescence	Cigarette Smoking in Adulthood[*]
Mean Age	--	--	--	39.5	15	40.0
Proportion with risk history/behavior	.081	.243	.284	.225	.282	.273

*Forty percent of the sample had ever smoked cigarettes with an average smoking initiation age of 17.8 years old.

Table 4. Sibling and Child Neighbor Correlations in Various Deviant/Risky Behavior-related Outcomes
(based on Decomposition of Variance into fraction that lies between neighborhoods, families, and individuals)
Males born during the 1950s, Data: PSID*

	Incarceration History	Criminal History	Deviant Behavior History	High Risk Tolerance in Adulthood	Age of Onset of Smoking in Adolescence	Cigarette Smoking in Adulthood
Brother	0.689	0.305	0.310	0.384	0.358	0.560
Child Neighbor	0.541	0.243	0.310	0.320	0.325	0.277
Adjusted Neighbor						0.268

Table 4a. Standard Deviation of Neighborhood (Random) Effects on
Risk/Deviant Behavior-related Outcomes

	Incarceration History	Criminal History	Deviant Behavior History	High Risk Tolerance in Adulthood	Age of Onset of Smoking in Adolescence	Cigarette Smoking in Adulthood
Neighborhood	2.390*** (.7817)	1.074* (0.620)	1.215*** (0.392)	1.244*** (0.271)	1.258*** (0.233)	1.705***

Notes: * p<.10, ** p<.05, and *** p<.01. Based on likelihood ratio tests of random effects.

FIGURE 2:

Probability of Ever Being Incarcerated
Over Range of Neighborhood Effects

Men: Ever Incarcerated

Data: PSID, 1968-2005
(Based on 3-Level Hierarchical Random Effects Probit Model of Incarceration)

FIGURE 3:

Probability of Ever Being Incarcerated
Over Range of Family Background Effects

Men: Ever Incarcerated

Data: PSID, 1968-2005
(Based on 3-Level Hierarchical Random Effects Probit Model of Incarceration)

Table 5. Fathers' Cumulative Risk of Criminal History, Imprisonment, or Death by Ages 35 - 40, by Race & Education

Fathers born b/w 1951-1975, Data: PSID*

	All	HS Dropout	HS Grad/GED	All Non-college	Some College+
Cumulative Risk of Death or Imprisonment (%)					
Black Fathers	21.08	34.23	23.94	26.66	9.61
White Fathers	10.09	23.40	11.24	14.04	5.79
Cumulative Risk of Imprisonment					
Black Fathers	19.55	33.13	21.89	24.86	8.62
White Fathers	9.43	22.65	10.04	12.96	5.60
Cumulative Risk of Criminal History**					
Black Fathers	24.37	37.63	25.83	28.95	14.94
White Fathers	16.00	29.44	18.08	20.71	10.89
Cumulative Risk of Deviant Behavior***					
Black Fathers	39.67	51.06	45.39	46.88	24.81
White Fathers	25.77	50.48	28.88	33.88	16.98

*The sample consists of original sample PSID males born between 1951-1975 who became fathers AND lived with their children in at least one year b/w 1968-2005, and who answered the criminal history questions in the 1995 wave of the survey OR were positively identified as incarcerated in any wave of the survey between 1968 and 2005. (black fathers N=703; white fathers N=1,168)

**"Criminal history" is defined as ever charged with a crime and/or incarcerated for a crime.

***"History of deviant behavior" defined as ever charged with a crime, incarcerated for a crime, or suspended/expelled from school.

All descriptive statistics are sample-weighted to account for the oversampling of blacks and low-income families, to generate nationally-representative estimates.

**Table 6. Children with Paternal Criminal History, Imprisonment, or Death
by Race & Fathers' Education**

Children of fathers born b/w 1951-1975, Data: PSID*

	All	HS Dropout	HS Grad/GED	All Non-college	Some College+
Cumulative Risk of Paternal Death or Imprisonment (%)					
Black Children	20.74	34.82	22.22	25.59	10.72
White Children	10.71	23.69	12.77	15.38	5.35
Cumulative Risk of Paternal Imprisonment					
Black Children	18.66	32.20	19.51	22.91	9.89
White Children	10.10	23.06	11.57	14.33	5.26
Cumulative Risk of Paternal Criminal History**					
Black Children	23.21	36.25	23.51	26.93	15.53
White Children	16.67	30.51	19.10	21.84	10.74
Cumulative Risk of Paternal Deviant Behavior***					
Black Children	38.41	46.15	43.54	44.24	26.35
White Children	25.69	50.76	28.72	34.01	16.15

[*]The sample consists of the next-generation children whose fathers were original sample PSID members born between 1951-1975, lived with them in at least one year b/w 1968-2005, and who answered the criminal history questions in the 1995 wave of the survey OR were positively identified as incarcerated in any wave of the survey between 1968 and 2005. (black children N=1,708; white children N=2,626)

[**]"Criminal history" is defined as ever charged with a crime and/or incarcerated for a crime.

[***]"History of deviant behavior" defined as ever charged with a crime, incarcerated for a crime, or suspended/expelled from school.

All descriptive statistics are sample-weighted to account for the oversampling of blacks and low-income families, to generate nationally-representative estimates.

**Table 7. Children with Family Incarceration and Criminal History,
by Race & Fathers' Education**

Children born b/w 1985-2000, Data: PSID-CDS*

	All	All Non-college	Some College+
Parental Incarceration History (%)			
Black Children	10.01	19.60	9.61
White Children	6.88	10.81	4.45
# of Family Members w/ Incarceration History			
Black Children	1.10	1.16	0.89
White Children	0.39	0.55	0.19
Parental Criminal History (%)			
Black Children	12.29	26.15	9.69
White Children	12.61	18.78	9.35
# of Family Members w/ Criminal History			
Black Children	1.43	1.47	1.20
White Children	0.71	0.92	0.44
Parental Deviant Behavior History			
Black Children	29.94	39.88	21.64
White Children	24.12	36.55	15.74
# of Family Members w/ Deviant Behavior History			
Black Children	3.27	3.50	2.50
White Children	1.40	1.93	0.86

[*]The sample consists of all CDS children who were interviewed in 1997 and/or 2002/2003. Family members include all descendent PSID extended family members; using PSID incarceration history info through 2005.

[**]"Criminal history" is defined as ever charged with a crime and/or incarcerated for a crime.

[***]"History of deviant behavior" defined as ever charged with a crime, incarcerated for a crime, or suspended/expelled from school.

All descriptive statistics are sample-weighted to account for the oversampling of blacks and low-income families, to generate nationally-representative estimates.

Table 8. Children's outcomes classified by parent's most severe deviant behavior offense

	No Family History of Deviant Behavior	Father's most severe offense			Mother's most severe offense		
Children born b/w 1985-2000, Data: PSID-CDS*							
		Incarceration	Criminal History	Expelled	Incarceration	Criminal History	Expelled
Child Outcome:							
BPI--total score	7.7087	10.0641	9.7221	9.4128	11.2655	10.5723	9.7247
BPI--internalizing	2.8595	3.3683	3.3756	3.4490	4.2251	3.9445	3.4002
BPI--externalizing	4.9828	6.9143	6.5391	6.1467	7.3797	6.9755	6.5590
Expelled/suspended (%)	4.19	22.83	6.87	7.31	14.33	9.29	22.96

[*]The sample consists of all CDS children who were interviewed in 1997 and/or 2002/2003. Family members include all descendent PSID extended family members; using PSID incarceration history info through 2005.

All descriptive statistics are sample-weighted to account for the oversampling of blacks and low-income families, to generate nationally-representative estimates.

Table 9. Other characteristics of childhood families classified by parent's most severe deviant behavior offense

	No Family History of Deviant Behavior	Father's most severe offense			Mother's most severe offense		
Children born b/w 1985-2000, Data: PSID-CDS*		Incarceration	Criminal History	Expelled	Incarceration	Criminal History	Expelled
Family Background:							
Family Income (1997$)	$75,406	$52,500	$74,237	$48,571	$58,389	$58,021	$53,976
Income-to-Needs Ratio	4.55	3.19	4.45	2.96	3.76	3.96	3.26
In Poverty (%)	4.98	19.33	5.83	10.77	11.10	7.12	8.31
Mother's Background:							
Currently Married	86.52	68.56	89.87	82.54	71.82	72.11	75.83
Mother's education							
(if mother is present)	14.01	13.02	13.66	12.65	13.78	12.78	12.69
Father's education							
(if father is present)	14.09	12.51	13.32	12.51	13.77	13.55	12.67
Religious							
Very	23.95	8.55	7.14	23.02	50.82	0.85	1.44
Moderately	26.69	20.79	35.94	14.71	8.60	18.11	38.77
Not at all	49.36	54.10	40.54	51.33	27.21	55.94	45.19
Family member w/alcohol problem	8.96	16.56	16.38	10.94	13.37	25.10	14.60
Neighborhood Characteristics:							
Neighborhood quality (self-rated)							
Excellent	43.49	22.46	40.41	40.58	58.29	37.1	29.42
Very good	36.44	45.10	33.41	38.80	16.82	42.79	34.50
Good	14.38	22.85	19.32	13.50	23.52	10.82	20.40
Fair	4.12	8.20	6.80	6.22	0.95	6.56	8.48
Poor	1.57	1.39	0.06	0.90	0.42	2.73	7.20
Neighbor Policing of Drugs							
Very High	33.17	33.99	27.94	29.69	22.68	28.65	22.57
High	8.38	10.95	14.24	10.10	0.42	8.17	9.81
Moderate	13.95	13.39	19.70	13.82	24.64	14.83	8.91
Low	44.50	41.67	38.12	46.39	52.26	48.35	58.71

*The sample consists of all CDS children who were interviewed in 1997 and/or 2002/2003. Family members include all descendent PSID extended family members; using PSID incarceration history info through 2005.

All descriptive statistics are sample-weighted to account for the oversampling of blacks and low-income families, to generate nationally-representative estimates.

Table 10. Child Family Income Immediately Before, During, and After Father's Prison Release

Children born b/w 1985-2000, Data: PSID-CDS*

Child Family Income (1997$)

Year before father's incarceration	$38,960
Avg during incarceration	$30,234
Year after release	$33,100
Difference*** (During - Before)	-$8,726

Income-to-Needs Ratio

Year before father's incarceration	2.41
Avg during incarceration	2.08
Year after release	2.43
Difference* (During - Before)	-0.33

In Poverty (%)

Year before father's incarceration	22.34
Avg during incarceration	30.87
Year after release	24.40
Difference*** (During - Before)	8.53***

***p<.01; **p<.05; *p<.10

Results use sample-weights to generate nationally-representative estimates.

Table 11. Intergenerational relationship of parental deviant behavior history on child behavior problems

	BPI: Total Score	BPI: Internalizing	BPI: Externalizing	Prob(Expelled) Marg Efx (Probit)
	(1)	(2)	(3)	(4)
Father's Most Severe Offense				
(ref cat.: none)				
Expelled from School	0.6865*	0.2289+	0.4477*	-0.0035
	(0.3819)	(0.1747)	(0.2590)	(0.0168)
Criminal History	1.4157**	0.3753+	1.0788***	0.0355
	(0.5705)	(0.2603)	(0.3775)	(0.0293)
Incarceration History	1.0782**	0.3930*	0.7094**	0.0804***
	(0.4215)	(0.2022)	(0.2764)	(0.0257)
Mother's Most Severe Offense				
(ref cat.: none)				
Expelled from School	0.5340+	0.2063	0.3559+	0.0556***
	(0.3657)	(0.1716)	(0.2344)	(0.0171)
Criminal History	1.8190**	0.7572*	1.2141**	0.0441
	(0.9069)	(0.4383)	(0.5750)	(0.0392)
Incarceration History	1.9130**	0.8193**	1.2157**	0.0429+
	(0.7890)	(0.3902)	(0.4841)	(0.0311)
Other Family Members' Most Severe Offense				
(ref cat.: none)				
Expelled from School	-0.2912	-0.1347	-0.1824	0.0024
	(0.3544)	(0.1710)	(0.2295)	(0.0142)
Criminal History	-0.1528	-0.1524	-0.0230	0.0549+
	(0.5959)	(0.2680)	(0.4256)	(0.0337)
Incarceration History	0.1736	0.1254	0.0336	0.0043
	(0.2825)	(0.1327)	(0.1840)	(0.0104)
Neighborhood quality (self-rated)				
(ref cat. Excellent)				
Very Good	0.6077***	0.1856*	0.4510***	0.0067
	(0.2325)	(0.1123)	(0.1516)	(0.0112)
Good	1.2953***	0.4868***	0.8433***	0.0202+
	(0.2695)	(0.1286)	(0.1754)	(0.0128)
Fair	1.8134***	0.6238***	1.2485***	0.0176
	(0.3394)	(0.1676)	(0.2171)	(0.0140)
Poor	2.1535***	0.8429***	1.4180***	0.0267
	(0.6044)	(0.2885)	(0.3923)	(0.0245)
Neighbor policing for drugs				
(ref cat. Very likely)				
Likely	0.4301+	0.2906**	0.1191	-0.0110
	(0.3017)	(0.1450)	(0.1963)	(0.0125)
Unlikely	0.0593	0.0572	0.0180	-0.0144+
	(0.3039)	(0.1482)	(0.1974)	(0.0111)
Very Unlikely	0.1897	0.0923	0.0960	-0.0104
	(0.2387)	(0.1162)	(0.1550)	(0.0105)
Family member w/alcohol problem	1.6100***	0.7448***	0.9120***	0.0239+
	(0.3511)	(0.1751)	(0.2256)	(0.0152)
Religiosity (ref cat. very)				
Somewhat	0.3299	0.1994+	0.1223	0.0090
	(0.2698)	(0.1300)	(0.1793)	(0.0140)
Not at all	0.5145**	0.2205*	0.2742*	0.0027
	(0.2347)	(0.1150)	(0.1526)	(0.0111)
Mother's Education	-0.1788***	-0.0614**	-0.1233***	-0.0064***
	(0.0583)	(0.0271)	(0.0387)	(0.0023)
Father's Education (if present)	-0.1311**	-0.0391+	-0.0953**	-0.0018
	(0.0598)	(0.0275)	(0.0402)	(0.0024)
Mother married	-1.0474***	-0.4349***	-0.6480***	-0.0232**
	(0.2263)	(0.1090)	(0.1474)	(0.0090)
Boy	0.8805***	0.1014	0.8023***	0.0639***
	(0.1875)	(0.0885)	(0.1225)	(0.0078)
Child age	0.0386+	0.0829***	-0.0451***	0.0180***
	(0.0248)	(0.0118)	(0.0164)	(0.0012)
Black (ref cat. white)	-1.4361***	-0.7982***	-0.7018***	0.1072***
	(0.2372)	(0.1130)	(0.1547)	(0.0119)
Constant	11.0090***	3.0873***	8.2235***	
	(0.9581)	(0.4400)	(0.6364)	
Child-Year Observations	5542	5542	5542	4766

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Table 12. OLS estimates of impact of parental incarceration on child behavior problems

	Dependent variable:		
	BPI: Total Score	BPI: Internalizing	BPI: Externalizing
	(1)	(2)	(3)
Parental incarceration prior to birth	0.4201	0.0837	0.3630
	(0.5179)	(0.2463)	(0.3365)
Parental incarceration sometime during childhood	2.3433***	1.0604***	1.3864***
	(0.6229)	(0.3093)	(0.3887)
Neighborhood quality (self-rated)			
(ref cat. Excellent)			
Very Good	0.5786**	0.1781+	0.4259***
	(0.2314)	(0.1115)	(0.1512)
Good	1.2369***	0.4627***	0.8049***
	(0.2695)	(0.1286)	(0.1756)
Fair	1.8097***	0.6160***	1.2510***
	(0.3373)	(0.1668)	(0.2159)
Poor	2.1817***	0.8505***	1.4409***
	(0.6123)	(0.2922)	(0.3963)
Neighbor policing for drugs			
(ref cat. Very likely)			
Likely	0.4619+	0.3073**	0.1350
	(0.3019)	(0.1448)	(0.1968)
Unlikely	0.1446	0.0916	0.0730
	(0.3036)	(0.1479)	(0.1975)
Very Unlikely	0.2466	0.1189	0.1279
	(0.2401)	(0.1164)	(0.1561)
Family member w/alcohol problem	1.7205***	0.7910***	0.9809***
	(0.3525)	(0.1752)	(0.2266)
Religiosity (ref cat. very)			
Somewhat	0.2667	0.1673	0.0880
	(0.2714)	(0.1306)	(0.1804)
Not at all	0.4830**	0.2048*	0.2554*
	(0.2360)	(0.1150)	(0.1537)
Mother's Education	-0.2083***	-0.0734***	-0.1422***
	(0.0578)	(0.0269)	(0.0385)
Father's Education (if present)	-0.1370**	-0.0404+	-0.0988**
	(0.0594)	(0.0274)	(0.0397)
Mother married	-1.3012***	-0.5093***	-0.8417***
	(0.2174)	(0.1054)	(0.1405)
Boy	0.8832***	0.1010	0.8049***
	(0.1881)	(0.0886)	(0.1229)
Child age	0.0286	0.0788***	-0.0511***
	(0.0249)	(0.0118)	(0.0165)
Black (ref cat. white)	-1.4489***	-0.8107***	-0.7006***
	(0.2330)	(0.1105)	(0.1524)
Constant	12.0184***	3.4504***	8.8909***
	(0.9166)	(0.4230)	(0.6088)
Child-year Observations	5542	5542	5542

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Table 13. Family- and mother fixed effect estimates of impact of parental incarceration on BPI by childhood life stage

	Dependent variable:		
	BPI: Total Score		
	(1)	(2)	(3)	(4)

	(1)	(2)	(3)	(4)
Parental Incarceration exposure				
Parental Incarceration prior to birth	0.4128			
	(0.5217)			
Parental Incarceration b/w Age 0-5	2.0423**			
	(0.8782)			
Parental Incarceration b/w Age 6-10	1.1947+			
	(0.8846)			
Parental Incarceration b/w Age 11-16	3.9885***			
	(1.4554)			
Father Incarceration prior to birth		0.3661	-0.3940	0.3680
		(0.7423)	(1.8582)	(0.7400)
Father Incarceration b/w Age 0-5		0.8137	0.4401	
		(0.8858)	(1.8880)	
Father Incarceration b/w Age 6-10		1.1079	1.4200	
		(0.9657)	(1.4582)	
Father Incarceration b/w Age 11-16		2.8852*	2.4182+	
		(1.5459)	(1.5984)	
Father Incarceration sometime during childhood				1.6436**
				(0.7059)
Mother Incarceration prior to birth				1.3295
				(1.1516)
Mother Incarceration sometime during childhood				3.0167***
				(1.1233)
Neighborhood quality (self-rated)				
(ref cat. Excellent)				
Very Good	0.5771**	0.3149	-0.0765	0.3209
	(0.2313)	(0.2711)	(0.3001)	(0.2709)
Good	1.2560***	0.9125***	0.3546	0.8947***
	(0.2692)	(0.3043)	(0.3565)	(0.3041)
Fair	1.8186***	1.1848***	0.9529**	1.1443***
	(0.3367)	(0.3714)	(0.4369)	(0.3711)
Poor	2.2003***	1.4251**	2.0536***	1.4483**
	(0.6105)	(0.6111)	(0.7127)	(0.6112)
Neighbor policing for drugs				
(ref cat. Very likely)				
Likely	0.4719+	0.4035	-0.2044	0.3898
	(0.3016)	(0.3460)	(0.3729)	(0.3459)
Unlikely	0.1574	0.0517	-0.5313+	0.0650
	(0.3031)	(0.3319)	(0.3640)	(0.3320)
Very Unlikely	0.2324	0.2045	0.0819	0.2018
	(0.2390)	(0.2689)	(0.2846)	(0.2691)
Family member w/alcohol problem	1.7194***	1.0244***	0.9298**	1.0622***
	(0.3515)	(0.3617)	(0.4097)	(0.3613)
Religiosity (ref cat. very)				
Somewhat	0.2899	0.2605	0.1017	0.2267
	(0.2700)	(0.3303)	(0.3825)	(0.3300)
Not at all	0.5102**	0.3354	-0.0010	0.3157
	(0.2354)	(0.2676)	(0.2797)	(0.2674)
Mother's Education	-0.2092***	0.0030		0.0018
	(0.0577)	(0.0782)		(0.0781)
Father's Education (if present)	-0.1325**	-0.1094+		-0.1198+
	(0.0593)	(0.0815)		(0.0814)
Mother married	-1.2921***	-0.6390***		-0.6409***
	(0.2170)	(0.2470)		(0.2466)
Boy	0.8911***	1.2014***	1.2986***	1.2137***
	(0.1884)	(0.1890)	(0.2268)	(0.1884)
Child age	0.0784	0.0847	0.0926+	0.0801
	(0.0667)	(0.0673)	(0.0695)	(0.0670)
Black (ref cat. white)	-1.4283***			
	(0.2324)			
Constant	10.7154***	7.0061***	6.3789***	7.2445***
	(1.4620)	(1.7425)	(1.1518)	(1.7347)
Descendent Family Fixed Effects?	No	Yes	--	Yes
Mother Fixed Effects?	No	No	Yes	No
# of Descendant Families		1374		1374
# of Mothers			2294	
Child-year Observations	5542	5542	5486	5542

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Table 14. Family- and mother fixed effect estimates of impact of parental incarceration on internalizing behavior problems by childhood life stage

| | Dependent variable: | | | |
| | BPI: Internalizing | | | |
	(1)	(2)	(3)	(4)
Parental Incarceration exposure				
Parental Incarceration prior to birth	0.0467			
	(0.2475)			
Parental Incarceration b/w Age 0-5	0.9604**			
	(0.4503)			
Parental Incarceration b/w Age 6-10	0.5774+			
	(0.4252)			
Parental Incarceration b/w Age 11-16	1.5753**			
	(0.7334)			
Father Incarceration prior to birth		0.0991	-0.1837	0.1131
		(0.3615)	(0.9242)	(0.3603)
Father Incarceration b/w Age 0-5		0.3753	0.1499	
		(0.4313)	(0.9391)	
Father Incarceration b/w Age 6-10		0.5220	0.8552	
		(0.4702)	(0.7253)	
Father Incarceration b/w Age 11-16		1.0281+	0.7255	
		(0.7528)	(0.7950)	
Father Incarceration sometime during childhood				0.7047**
				(0.3437)
Mother Incarceration prior to birth				0.3520
				(0.5607)
Mother Incarceration sometime during childhood				1.4931***
				(0.5470)
Neighborhood quality (self-rated)				
(ref cat. Excellent)				
Very Good	0.1817+	0.0828	-0.0823	0.0862
	(0.1111)	(0.1320)	(0.1492)	(0.1319)
Good	0.4904***	0.3188**	0.1772	0.3115**
	(0.1283)	(0.1482)	(0.1773)	(0.1481)
Fair	0.6286***	0.3432*	0.3486+	0.3280*
	(0.1664)	(0.1808)	(0.2173)	(0.1807)
Poor	0.8683***	0.5877**	1.0356***	0.6048**
	(0.2915)	(0.2976)	(0.3545)	(0.2976)
Neighbor policing for drugs				
(ref cat. Very likely)				
Likely	0.3139**	0.2372+	-0.1406	0.2320+
	(0.1439)	(0.1685)	(0.1855)	(0.1684)
Unlikely	0.0948	0.0829	-0.1712	0.0921
	(0.1473)	(0.1616)	(0.1811)	(0.1617)
Very Unlikely	0.1006	0.0926	0.0363	0.0942
	(0.1152)	(0.1310)	(0.1415)	(0.1310)
Family member w/alcohol problem	0.8011***	0.5607***	0.6266***	0.5770***
	(0.1741)	(0.1761)	(0.2038)	(0.1759)
Religiosity (ref cat. very)				
Somewhat	0.1753+	0.1870	0.0085	0.1723
	(0.1294)	(0.1608)	(0.1903)	(0.1607)
Not at all	0.2150*	0.1234	-0.0392	0.1128
	(0.1139)	(0.1303)	(0.1391)	(0.1302)
Mother's Education	-0.0724***	0.0104		0.0094
	(0.0268)	(0.0381)		(0.0380)
Father's Education (if present)	-0.0385+	0.0043		0.0004
	(0.0273)	(0.0397)		(0.0396)
Mother married	-0.5099***	-0.2282*		-0.2288*
	(0.1050)	(0.1203)		(0.1201)
Boy	0.1128	0.2867***	0.3843***	0.2926***
	(0.0886)	(0.0920)	(0.1128)	(0.0918)
Child age	0.1082***	0.1256***	0.1369***	0.1241***
	(0.0327)	(0.0328)	(0.0346)	(0.0326)
Black (ref cat. white)	-0.8042***			
	(0.1102)			
Constant	2.5439***	0.3437	0.6926	0.4328
	(0.7035)	(0.8485)	(0.5729)	(0.8447)
Descendent Family Fixed Effects?	No	Yes	--	Yes
Mother Fixed Effects?	No	No	Yes	No
# of Descendant Families		1374		1374
# of Mothers			2294	
Child-year Observations	5542	5542	5486	5542

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Table 15. Family- and mother fixed effect estimates of impact of parental incarceration on externalizing behavior problems by childhood life stage

	Dependent variable:			
	BPI: Externalizing			
	(1)	(2)	(3)	(4)
Parental Incarceration exposure				
Parental Incarceration prior to birth	0.3929			
	(0.3384)			
Parental Incarceration b/w Age 0-5	1.1650**			
	(0.5396)			
Parental Incarceration b/w Age 6-10	0.6896			
	(0.5592)			
Parental Incarceration b/w Age 11-16	2.5866***			
	(0.9484)			
Father Incarceration prior to birth		0.2643	-0.1343	0.2551
		(0.4939)	(1.2582)	(0.4924)
Father Incarceration b/w Age 0-5		0.4682	0.3603	
		(0.5894)	(1.2784)	
Father Incarceration b/w Age 6-10		0.6355	0.6342	
		(0.6425)	(0.9874)	
Father Incarceration b/w Age 11-16		1.8534*	1.6918+	
		(1.0287)	(1.0823)	
Father Incarceration sometime during childhood				0.9513**
				(0.4698)
Mother Incarceration prior to birth				1.1663+
				(0.7663)
Mother Incarceration sometime during childhood				1.8093**
				(0.7475)
Neighborhood quality (self-rated)				
(ref cat. Excellent)				
Very Good	0.4203***	0.2385+	-0.0009	0.2399+
	(0.1511)	(0.1804)	(0.2032)	(0.1803)
Good	0.7963***	0.6168***	0.2094	0.6037***
	(0.1754)	(0.2025)	(0.2414)	(0.2024)
Fair	1.2470***	0.8511***	0.6177**	0.8239***
	(0.2154)	(0.2471)	(0.2958)	(0.2469)
Poor	1.4421***	0.9075**	1.1488**	0.9147**
	(0.3954)	(0.4066)	(0.4826)	(0.4067)
Neighbor policing for drugs				
(ref cat. Very likely)				
Likely	0.1390	0.1618	-0.0831	0.1505
	(0.1965)	(0.2302)	(0.2525)	(0.2302)
Unlikely	0.0831	-0.0062	-0.3351+	-0.0029
	(0.1975)	(0.2209)	(0.2465)	(0.2209)
Very Unlikely	0.1319	0.1114	0.0569	0.1049
	(0.1558)	(0.1789)	(0.1927)	(0.1791)
Family member w/alcohol problem	0.9690***	0.5010**	0.3544	0.5244**
	(0.2256)	(0.2407)	(0.2774)	(0.2404)
Religiosity (ref cat. very)				
Somewhat	0.1041	0.0683	0.0752	0.0475
	(0.1797)	(0.2198)	(0.2590)	(0.2196)
Not at all	0.2739*	0.1854	0.0124	0.1746
	(0.1538)	(0.1781)	(0.1894)	(0.1780)
Mother's Education	-0.1442***	-0.0084		-0.0084
	(0.0384)	(0.0520)		(0.0520)
Father's Education (if present)	-0.0959**	-0.1176**		-0.1251**
	(0.0396)	(0.0542)		(0.0542)
Mother married	-0.8311***	-0.4345***		-0.4349***
	(0.1403)	(0.1643)		(0.1641)
Boy	0.8008***	0.9200***	0.9288***	0.9279***
	(0.1233)	(0.1257)	(0.1535)	(0.1254)
Child age	-0.0315	-0.0439	-0.0500	-0.0471
	(0.0430)	(0.0448)	(0.0471)	(0.0446)
Black (ref cat. white)	-0.6861***			
	(0.1521)			
Constant	8.4921***	6.9389***	5.9176***	7.1021***
	(0.9497)	(1.1594)	(0.7799)	(1.1544)
Descendent Family Fixed Effects?	No	Yes	--	Yes
Mother Fixed Effects?	No	No	Yes	No
# of Descendant Families		1374		1374
# of Mothers			2294	
Child-year Observations	5542	5542	5486	5542

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Table 16. Family- and child fixed effect estimates of impact of duration of parental incarceration on BPI

	Dependent variable:			
	BPI: Total Score			
	(1)	(2)	(3)	(4)
Parental Incarceration exposure				
Father Incarcerated during childhood	1.5105**	1.8429**	2.9451*	3.3424+
	(0.7617)	(0.7499)	(1.6985)	(2.0681)
Father Incarcerated*(Duration of Incarceration - 1)	0.1397	-0.3006	-0.0307	1.5449+
	(1.0089)	(0.7671)	(0.8169)	(1.0631)
Mother Incarcerated during childhood	3.0675**	2.6142**	6.1051***	7.8933***
	(1.2241)	(1.1870)	(2.2502)	(2.5266)
Mother Incarcerated*(Duration of Incarceration - 1)	4.4243*	4.5376	1.0632	-0.7169
	(2.4738)	(3.6890)	(4.5656)	(4.4690)
Neighborhood quality (self-rated)				
(ref cat. Excellent)				
Very Good	0.4958**	0.3243	-0.0668	-0.0590
	(0.2326)	(0.2708)	(0.2999)	(0.2866)
Good	1.0150***	0.8646***	0.2669	0.2620
	(0.2699)	(0.3038)	(0.3563)	(0.3386)
Fair	1.4763***	1.1036***	0.8575**	0.9812**
	(0.3364)	(0.3713)	(0.4371)	(0.4182)
Poor	1.7953***	1.3879**	1.9930***	1.6029**
	(0.6133)	(0.6116)	(0.7124)	(0.6809)
Neighbor policing for drugs				
(ref cat. Very likely)				
Likely	0.4801+	0.3498	-0.2668	-0.1496
	(0.3005)	(0.3461)	(0.3731)	(0.3548)
Unlikely	0.1640	0.0555	-0.4433	-0.4479
	(0.3049)	(0.3316)	(0.3650)	(0.3665)
Very Unlikely	0.3345+	0.2483	0.1397	0.0542
	(0.2408)	(0.2684)	(0.2841)	(0.3006)
Family member w/alcohol problem	1.7835***	1.0235***	0.9371**	0.9441**
	(0.3535)	(0.3612)	(0.4092)	(0.3924)
Religiosity (ref cat. very)				
Somewhat	0.5164*	0.2084	0.0591	0.2616
	(0.2693)	(0.3302)	(0.3837)	(0.3788)
Not at all	0.4046*	0.2717	-0.0326	-0.0852
	(0.2367)	(0.2667)	(0.2798)	(0.3166)
Mother's Education	-0.1822***	-0.0040	0.0000	0.0000
	(0.0580)	(0.0781)	(0.0000)	(0.0000)
Father's Education (if present)	-0.1122*	-0.1267+	-0.3302	0.0000
	(0.0589)	(0.0807)	(0.5083)	(0.0000)
Mother married	-0.8454***	-0.5295**	-0.2956	0.0405
	(0.2253)	(0.2526)	(0.3219)	(0.3094)
Boy	0.8406***	1.2320***	1.3020***	
	(0.1890)	(0.1884)	(0.2261)	
Child age	0.0206	0.0915***	0.1267***	0.1383**
	(0.0249)	(0.0274)	(0.0356)	(0.0554)
Constant	10.7026***	7.5498***	9.9427+	6.4224***
	(0.8793)	(1.3231)	(6.5327)	(0.5409)
Child Fixed Effects?	No	No	No	Yes
Mother Fixed Effects?	No	No	Yes	--
Descendent Family Fixed Effects?	No	Yes	--	--
# of Descendant Families		1374		
# of Mothers			2294	
# of Children				3393
Child-year Observations	5542	5542	5486	5542

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.10$, + $p<0.20$

Note: Duration of incarceration measured in years.

Table 17. Family- and child fixed effect estimates of impact of duration of parental incarceration on internalizing behavior problems

		Dependent variable:		
		BPI: Internalizing		
	(1)	(2)	(3)	(4)
Parental Incarceration exposure				
Father Incarcerated during childhood	0.6831*	0.8284**	1.6712**	2.2229**
	(0.3644)	(0.3672)	(0.8515)	(1.0797)
Father Incarcerated*(Duration of Incarceration - 1)	-0.1086	-0.2811	-0.2558	0.2060
	(0.4199)	(0.3757)	(0.4096)	(0.5550)
Mother Incarcerated during childhood	1.4534**	1.4229**	3.2426***	4.6081***
	(0.6545)	(0.5812)	(1.1281)	(1.3190)
Mother Incarcerated*(Duration of Incarceration - 1)	1.3932	1.1709	-2.1494	-3.4786+
	(1.2516)	(1.8065)	(2.2890)	(2.3330)
Neighborhood quality (self-rated)				
(ref cat. Excellent)				
Very Good	0.1357	0.0716	-0.0890	-0.0788
	(0.1123)	(0.1326)	(0.1503)	(0.1496)
Good	0.3494***	0.2616*	0.0874	0.1004
	(0.1289)	(0.1488)	(0.1786)	(0.1768)
Fair	0.4528***	0.3083*	0.2769	0.2848+
	(0.1660)	(0.1818)	(0.2192)	(0.2183)
Poor	0.6424**	0.5704*	0.9553***	0.7139**
	(0.2945)	(0.2995)	(0.3572)	(0.3554)
Neighbor policing for drugs				
(ref cat. Very likely)				
Likely	0.3170**	0.2049	-0.1773	-0.1438
	(0.1443)	(0.1695)	(0.1870)	(0.1852)
Unlikely	0.1051	0.0877	-0.1463	-0.1346
	(0.1488)	(0.1624)	(0.1830)	(0.1913)
Very Unlikely	0.1548+	0.1190	0.0741	0.0505
	(0.1172)	(0.1314)	(0.1425)	(0.1569)
Family member w/alcohol problem	0.8320***	0.5495***	0.6184***	0.6227***
	(0.1749)	(0.1769)	(0.2052)	(0.2048)
Religiosity (ref cat. very)				
Somewhat	0.2977**	0.1662	0.0150	0.0799
	(0.1299)	(0.1617)	(0.1924)	(0.1977)
Not at all	0.1628+	0.0924	-0.0473	-0.0824
	(0.1153)	(0.1306)	(0.1403)	(0.1653)
Mother's Education	-0.0597**	0.0031	0.0000	0.0000
	(0.0271)	(0.0382)	(0.0000)	(0.0000)
Father's Education (if present)	-0.0250	-0.0037	-0.2236	0.0000
	(0.0271)	(0.0395)	(0.2548)	(0.0000)
Mother married	-0.3030***	-0.2025+	-0.0753	0.0750
	(0.1090)	(0.1237)	(0.1614)	(0.1615)
Boy	0.0781	0.2848***	0.3735***	
	(0.0893)	(0.0922)	(0.1134)	
Child age	0.0753***	0.1100***	0.1311***	0.1298***
	(0.0118)	(0.0134)	(0.0179)	(0.0289)
Constant	2.7293***	1.1828*	3.7844	1.2210***
	(0.4064)	(0.6479)	(3.2752)	(0.2824)
Child Fixed Effects?	No	No	No	Yes
Mother Fixed Effects?	No	No	Yes	--
Descendent Family Fixed Effects?	No	Yes	--	--
# of Descendant Families		1374		
# of Mothers			2294	
# of Children				3393
Child-year Observations	5542	5542	5486	5542

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10, + p<0.20
Note: Duration of incarceration measured in years.

Table 18. Family- and child fixed effect estimates of impact of duration of parental incarceration on externalizing behavior problems

	Dependent variable:			
	BPI: Externalizing			
	(1)	(2)	(3)	(4)
Parental Incarceration exposure				
Father Incarcerated during childhood	0.8758*	1.0493**	1.0825	0.8599
	(0.4866)	(0.4987)	(1.1506)	(1.3451)
Father Incarcerated*(Duration of Incarceration - 1)	0.2703	-0.0609	0.2909	1.4681**
	(0.6862)	(0.5101)	(0.5534)	(0.6914)
Mother Incarcerated during childhood	1.7433**	1.4477*	3.4161**	3.9833**
	(0.7155)	(0.7893)	(1.5244)	(1.6433)
Mother Incarcerated*(Duration of Incarceration - 1)	3.6934**	3.7478+	3.1138	2.5036
	(1.6308)	(2.4531)	(3.0929)	(2.9066)
Neighborhood quality (self-rated)				
(ref cat. Excellent)				
Very Good	0.3817**	0.2597+	0.0160	0.0161
	(0.1517)	(0.1801)	(0.2031)	(0.1864)
Good	0.6858***	0.6241***	0.2079	0.1893
	(0.1756)	(0.2020)	(0.2414)	(0.2203)
Fair	1.0644***	0.8018***	0.5860**	0.7035***
	(0.2151)	(0.2469)	(0.2961)	(0.2720)
Poor	1.2458***	0.8884**	1.1671**	0.9985**
	(0.3949)	(0.4067)	(0.4826)	(0.4428)
Neighbor policing for drugs				
(ref cat. Very likely)				
Likely	0.1430	0.1364	-0.1116	-0.0159
	(0.1962)	(0.2302)	(0.2527)	(0.2308)
Unlikely	0.0801	-0.0059	-0.2629	-0.2778
	(0.1979)	(0.2205)	(0.2472)	(0.2384)
Very Unlikely	0.1853	0.1306	0.0818	0.0184
	(0.1559)	(0.1785)	(0.1925)	(0.1955)
Family member w/alcohol problem	1.0051***	0.5123**	0.3689+	0.3728+
	(0.2271)	(0.2402)	(0.2772)	(0.2552)
Religiosity (ref cat. very)				
Somewhat	0.2183	0.0334	0.0241	0.1702
	(0.1784)	(0.2196)	(0.2600)	(0.2464)
Not at all	0.2153+	0.1489	-0.0135	-0.0366
	(0.1543)	(0.1773)	(0.1896)	(0.2059)
Mother's Education	-0.1285***	-0.0082	0.0000	0.0000
	(0.0385)	(0.0519)	(0.0000)	(0.0000)
Father's Education (if present)	-0.0884**	-0.1277**	-0.1513	0.0000
	(0.0395)	(0.0536)	(0.3443)	(0.0000)
Mother married	-0.5696***	-0.3447**	-0.2255	-0.0246
	(0.1459)	(0.1679)	(0.2181)	(0.2012)
Boy	0.7833***	0.9547***	0.9420***	
	(0.1233)	(0.1253)	(0.1532)	
Child age	-0.0561***	-0.0183	-0.0062	0.0065
	(0.0164)	(0.0182)	(0.0241)	(0.0361)
Constant	8.2376***	6.6078***	6.8587+	5.3750***
	(0.5844)	(0.8798)	(4.4256)	(0.3518)
Child Fixed Effects?	No	No	No	Yes
Mother Fixed Effects?	No	No	Yes	--
Descendent Family Fixed Effects?	No	Yes	--	--
# of Descendant Families		1374		
# of Mothers			2294	
# of Children				3393
Child-year Observations	5542	5542	5486	5542

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10, + p<0.20
Note: Duration of incarceration measured in years.

Table 19. First-Stage and Reduced-Form Estimates of Effects of 1997 State Incarceration Rate on Paternal Incarceration History and Child Behavior Problems

	Blacks: PSID-CDS			
	Dependent variables:			
	Prob(Father Ever Incarcerated) Probit--Marg Effects	BPI-Total Score	BPI-Internalizing	BPI-Externalizing
	(1)	(2)	(3)	(4)
State Incarceration Rate $_{1997}$	0.0417**	0.3992+	0.3076**	0.1161
	(0.0193)	(0.3163)	(0.1472)	(0.2043)

Robust standard errors in parentheses (clustered on person)

*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Note: Columns (1) display the first-stage estimates of the effects of state incarceration rates on paternal incarceration history among blacks; columns (2)-(4) display the reduced form effects of state incarceration rates on child behavioral problem outcomes.

Table 20. IV/2SLS Estimates of Effects of Paternal Incarceration History and Child Behavior Problems

	BPI-Total Score	BPI-Internalizing	BPI-Externalizing
	(1)	(2)	(3)
Paternal Incarceration History	14.5941+	9.5067+	6.3307
	(11.2748)	(6.6874)	(6.4486)

Robust standard errors in parentheses (clustered on child)

*** p<0.01, ** p<0.05, * p<0.10, + p<0.20

Note: Column (1) display the 2SLS/IV estimates of the effects of paternal incarceration history on child behavioral outcomes among blacks using blacks' state incarceration rates as an instrument; first-stage results shown in Table 19.