Children's Genetic Sensitivity to the Effects of Parental Incarceration

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Extended abstract

The dramatic rise in incarceration in the late twentieth century, coupled with high rates of fatherhood among incarcerated men, has made the role of incarceration in families a pressing concern. A growing literature has identified paternal incarceration as a driver of several family stressors, including reduced household income (Geller, Garfinkel, and Western, 2011), compromised mental health among mothers (Wildeman, Turney, and Schnittker, 2012), material hardship (Schwartz-Soicher, Geller, and Garfinkel, 2011), and residential instability (Geller and Curtis, 2011). Each of these has independently been shown to compromise child wellbeing, and several studies show associations between paternal incarceration and children's adverse behavioral outcomes (Wildeman, 2010; Geller, Cooper, Garfinkel, Schwartz-Soicher, and Mincy, 2012).

In this paper we use diathesis stress models to examine heterogeneity in estimated effects of paternal incarceration on child behavior. Diasthesis-stress models of gene-environment interactions stipulate that some individuals are more susceptible to the negative consequences of adverse experiences than others (Burmeister, McInnis, and Zollner, 2008). The expectation is that individuals carrying particular alleles – known as "risk alleles" or "vulnerability genes" – will function more poorly than those with other genotypes under conditions of contextual adversity (Belsky, Pluess, and Widaman, 2013). Risk alleles include the dopamine D4 receptor, associated with novelty seeking (Manuck and McCaffery, 2014) and the 5-HTTLPR sequence related to the production of serotonin, and associated with the regulation of thought, movement, mood, attention, motivation, and learning (Mitchell et al., 2013).

In this paper we test whether estimated effects of paternal incarceration are modified by children's genetic sensitivity to environmental stressors, using the genetic supplement to the Fragile Families and Child Wellbeing Study (FFCWS). The FFCWS is a population-based birth cohort study of nearly 5,000 families children born in large U.S. cities between 1998 and 2000 (See Reichman et al., 2001), and includes five waves of survey data from both parents, and genetic data (collected through non-invasive saliva samples) on more than 2000 mothers and their "focal" children. We thus combine rich measures of children's social environments (including their father's incarceration histories) with their indicators of genetic sensitivity to environmental stressors.

Examining the presence of sensitive alleles related to the production of dopamine and serotonin, we test for genetic moderation, based on established estimates of parental incarceration effects. Geller et al. (2012) examined the FFCWS when the focal children were five years old, and found that children whose fathers were recently incarcerated displayed significantly elevated levels of aggressive behaviors and attention problems, but no difference between children with and without parental incarceration in internalizing behaviors. We hypothesize that observed associations between fathers' incarceration and children's externalizing behaviors will be concentrated among children with greater genetic sensitivity. We also anticipate that the insignificant relationship observed with children's internalizing behavior masks a gene-environment interaction in which effects exist, but only for children with greater genetic sensitivity.

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