Incarceration and Health in a Life Course Perspective: A Semiparametric Approach

Extended Abstract [*]

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1 Introduction

An emerging consensus across the social sciences places mass incarceration at the center of American social inequality, with wide-ranging and persistent consequences for inmates and those around them (Wakefield and Uggen, 2010). More recently, researchers have also identified a substantial role of incarceration in health disparities (Schnittker et al., 2011; Wildeman and Muller, 2012; Dumont et al., 2012). Yet there are unresolved questions closely tied to explanations invoked for the effect of incarceration on health. It is not clear whether the bulk of the effect is due to a one-off contact with the penal system (Schnittker and John, 2007) or duration, frequency, and timing of incarceration paint a more complex picture. If the adverse effects on health are mainly due to stigma attached to a criminal record (Pager, 2003), we would not expect to find different outcomes between a brief single episode and long and frequent episodes of incarceration. The effects may be more pronounced, however, when incarceration is prolonged and recurring - an effect implied by the notion of prisonization introduced in the pioneering days of prison sociology (Clemmer, 1940). Yet there can also be a middle ground: instead of a linear relationship, in reality there might be a threshold effect of incarceration, after which health is no longer substantially affected. With theory and empirical evidence offering little or contradictory guidance, in this paper I will use a semiparametric approach to modeling the impact of incarceration on health (Keele, 2008; Berk, 2008).

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2 Background

In an analysis of the National Longitudinal Survey of Youth 1979, upon release from prison, strong effects of incarceration on health limitations were identified among first time inmates but not among recidivists (Schnittker and John, 2007). A single prior interview in prison was associated with a twofold increase in the odds of reporting severe health limitations. As important, however, is that the odds did not increase significantly with multiple episodes of incarceration. The findings led authors to conclude that "the effects of any incarceration are such that contact with the prison system is generally more important than the amount" (Schnittker and John, 2007: 125). Using the same data, Massoglia (2008) found that having been incarcerated leads to stress stress-related illnesses such as hypertension and depression as well as infections including hepatitis virus and tuberculosis. In addition to exposure to infections inside prison, the author concluded that the rapid life change associated with incarceration is a substantial stress for the individual. Coming to a similar conclusion, a California-based study using regression discontinuity design found that placement in high security prison has psychological effects on inmates with little or no prior involvement with the criminal justice system (Lerman, 2009). Having been imprisoned only once, these studies suggest, carries a stigma and shock whose effects do not change with further spells behind bars.

Social stress theory plays a central role in understanding health disparities, and it may also inform our understanding of the impact of incarceration on health in a life course perspective. In contrast to viewing incarceration as a one-off stressful experience, incarceration can be described as a chronic stress (Aneshensel, 1992) that exerts persistent and ongoing effect on inmates. From that point of view, longer time in prison and more frequent spells of incarceration may lead to more stress and thus worse health outcomes. Traumas or extreme threats to one's physical or psychological well-being, including sexual or physical abuse and witnessing violence (Thoits, 2010), are likely to accumulate and proliferate in prison; over time, inmates might be exposed to an accumulation of stressors through daily social interactions characterized by violence, distrust, and social isolation (Rideau and Wikberg, 1992). But there is also room for a threshold effect. After some time in prison, inmates may have developed a set of psychological tools to neutralize the negative effects of stressors tied to incarceration. They may have also gained a social status within the prison society that guarantees some safety and less exposure to the more severe stressors (Sykes, 2007). Similar to arguments invoking stigma to explain the effects of incarceration, cumulative disadvantage and chronic stress perspectives also have empirical backing.

Using administrative data from New York State parole, a study by Patterson (2013) found a dose-response relationship between prison time and mortality, with each additional year of incarceration increasing mortality risk by about 16%. In a supplementary analysis of the National Comorbidity Survey, details of which were not reported in the paper, Schnittker et al. (2012) found that length of incarceration is related to psychiatric disorders in a non-linear fashion, increasing with years incarcerated and then declining for terms beyond five years, indicating a possible threshold effect. This implies, as authors noted, that long-term

inmates may cope better with the stress of incarceration. In the main analysis, the authors nevertheless used a binary indicator of incarceration. If nonlinearities such as these, however, are not systematically modeled, we may be missing a more nuanced role of time in the effect of incarceration. Not appropriately capturing the functional form between duration of incarceration and health might also bias the estimates for other independent variables in the model (Keele, 2008). In part, studies have not been able to systematically address the question of time due to data limitations. In the National Longitudinal Survey of Youth 1979, for instance, participants were coded as incarcerated if their reported place of residence at the time of the survey was a jail or prison, thus missing spells of incarceration shorter than one year. The 1997 cohort of the National Longitudinal Survey (NLSY97) is better suited for the task.

3   Methods and Data

3.1   Sample

The NLSY97 is a nationally representative panel survey administered annually, with a total of 14 waves of data currently available. In the first wave of data collected in 1997, the survey was administered to 8,984 12-16 year old participants (born between 1980 and 1984) and it included interviews with parents. The NLSY97 data is ideal for the purposes of this study for several reasons. First, the survey contains detailed measures of incarceration, including timing, frequency, and length of incarceration. Second, because of the panel design of the survey, I can use methods that are better suited for causal analysis compared to cross-sectional data. Third, the survey regularly collected information on a variety of individual and household characteristics that are potential confounders on the causal pathway between incarceration and health. There is, for instance, comprehensive information on employment status and earnings, as well as measures of criminal history, including offending and arrests. Finally, NLSY97 has unusually rich measures of health. Response rate varied around 90% throughout all waves of data collection.

3.2   Measures

Timing, duration, and frequency of incarceration will be the three focal independent variables. Duration was measured in months and it will combine all the spells of incarceration that a participant experienced throughout the 14 waves of data collection. Timing will be indicated by age at which first incarceration occured. A number of control variables will be used and specified parametrically. Most importantly, similar to other studies on the effects of incarceration, these will include information on the number of arrests and the types of offenses as well as key demographic variables such as age and race/ethnicity. As outcomes, I will examine multiple indicators of mental and physical health. A composite measure of mental health will consist of variables such as frequency of being nervous, feeling calm and peaceful, and feeling downhearted and blue. A variety of measures of physical health will be used, including indicators of diabetes, heart diseases, and functional limitations, as well as the number of hospitalizations.

4   Analytic Strategy

To address nonlinearity, researchers usually employ a power transformation of one or multiple independent variables, most often adding a quadratic or a cubic term. While useful, power transformations have serious limitations (Keele, 2008) because they assume a global form of nonlinearity where the relationship between two variables is strictly, for instance, quadratic for all the values of the independent variable. The choice of power transformation, furthermore, is often arbitrary and may lead to data snooping (Berk, 2008). While sometimes helpful, standard measures of model fit such as R-squared and the Akaike Information Criterion (AIC) can be misleading in adjudicating between different power transformations (Keele, 2008). Yet not employing a transformation that was used in the data generating process can result in biased parametric estimates for the effects of all the independent variables (Keele, 2008; Yatchew, 2003). Thoughtful theory and rigorous research are the best guide for specifying the right transformation, yet these are rarely available. Since it is not clear what functional form timing, duration, and frequency of incarceration take with respect to various indicators of health, I will specify a series of semiparametric models. While other predictors will be specified in the standard parametric fashion, the functional form for the three focal variables will be determined inductively. I will use a fixed effects version of the generalized additive model - the generalized additive mixed models (GAMMs) (Wood, 2006). All the analysis will be carried out using the `mgcv` package available in the R computing environment (Wood, 2006).

4.1   Preliminary Descriptive Results

Altogether, there have been 657 individuals who were incarcerated at least once during the study. Figure 1 shows the distribution for age at first incarceration, the total number of months a person was incarcerated, and frequency of incarceration spells. With respect to timing, the mean age at first incarceration was 21 years, the same as the median age. Distribution is very much normal, unlike the distribution of the total number of months incarcerated. As we see in Figure 1, the distribution is highly skewed. The median amount of time spent in jail or prison was eight months, while the mean is 18 months. These results indicate that typical incarceration is not very short, nor is it exceptionally long. Measuring incarceration in months might thus give us a clearer perspective on the impact of incarceration on health.

[Figure 1 here]

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Figure 1: Distribution of Timing, Amount, and Frequency of Incarceration, n=657, NLSY97