



# Variation in the incarceration length–recidivism dose–response relationship



Jason Rydberg\*, Kyleigh Clark

School of Criminology and Justice Studies, University of Massachusetts Lowell, Health and Social Sciences Building, 113 Wilder St, Lowell, MA 01854, United States

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## ABSTRACT

**Purpose:** This research seeks to examine whether the dose–response relationship between incarceration length and recidivism varies across different conviction offense categories and measures of parole failure.

**Methods:** We approximate a large fixed panel of parolees from the National Corrections Reporting Program (NCRP) to implement a dose–response analysis of the relationship between incarceration length and the prevalence and timing of recidivism. Marginal mean weighting through stratification (MMW-S) is utilized to limit confounding effects from selection bias.

**Results:** We observe that incremental doses of incarceration length increase the likelihood and hasten the timing of parole revocations, and reduce the likelihood and slow the timing of new sentences. Considerable heterogeneity was observed in these effects across conviction offenses, as the direction of effects changed beyond certain thresholds, and was not constant across offender groups.

**Conclusions:** These results do not provide consistent support for a suppressive, criminogenic, or null effect for incarceration length on recidivism.

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## 1. Introduction

Patterns in incarceration and recidivism over the past several decades have drawn increased attention from criminologists to the effects of the incarceration experience on offenders. Relative to previous decades, prisoners at the turn of the century were experiencing significantly longer periods of incarceration before release (Petersilia, 2003). This trend has continued into the current decade, particularly for certain offender groups, as the median length of stay for homicide offenders increased by 150% between 2002 and 2012, and sex offenders experiencing a 26% increase (Carson, 2014). Despite the relatively longer periods of incarceration, unprecedented incarceration rates are producing high rates of release and turnover among correctional populations. The vast majority of those incarcerated will eventually be released, as approximately 2% of prison admissions are sentenced to life or death (Carson & Golinelli, 2014). Additionally, more than half of those currently incarcerated will be released within a year, and nearly three-quarters of current inmates will be released within two years (West & Sabol, 2011). These high rates of release and turnover have been accompanied by high rates of failure, with successful discharges decreasing from 70% in 1984 to just over 50% in 2012, although successes had dropped as low as 49% in 2008 (Maruschak & Bonczar, 2015).

Given these troubling trends in incarceration, release, and recidivism, criminologists have begun to take a more critical view towards the relationship between incarceration and crime reduction (Verma, 2016; Lofstrom & Raphael, 2016), and more specifically incarceration length and subsequent reoffending (Nagin, Cullen, & Jonson, 2009). Recent research examining the incremental contribution of incarceration length to criminal reoffending has produced mixed results (Loughran et al., 2009; Meade, Steiner, Makarios, & Travis, 2012). Utilizing data from the National Corrections Reporting Program (NCRP), the current inquiry attempts to contribute to knowledge on the relationship between incarceration length and recidivism in two ways. First, previous research has left reason to suspect that the effect of incarceration is not uniform across inmates (e.g., Listwan, Colvin, Hanley, & Flannery, 2010). We consider whether the relationship between incarceration length and parole failure varies across different instant offense types. Second, previous research has focused solely on the effect of incarceration length on criminal reoffending. The current inquiry takes an explicitly prisoner reentry oriented perspective (Rydberg & Grommon, 2016), considering how variation in incarceration length is associated with variation in indicators of parole failure (i.e., new sentences and technical revocations).

These issues are pursued using a dose–response framework, examining how incremental increases in incarceration length affects the probability and timing of failure. Building on the strengths of recent research, efforts are made to reduce selection bias through the application of marginal mean weighting through stratification (Hong, 2012), subsequently improving internal validity of the findings so that they may be of increased utility to scholars and policymakers.

\* Corresponding author.

E-mail address: Jason\_Rydberg@uml.edu (J. Rydberg).

## 2. Literature review

### 2.1. The effect of incarceration length on recidivism

#### 2.1.1. Incarceration length as suppressive

Classically, incarceration length has been theorized to have a specific deterrent, or suppressive, effect on offending behavior (Nagin et al., 2009). Specific deterrence holds that more severe sanctions (i.e., longer sentences) will more effectively deter future criminal behavior by intensifying the perception of the severity of punishment (Orsagh & Chen, 1988). This perspective would predict that those offenders who experience longer prison terms would be less willing to recidivate in the future and face a similarly long incarceration again. However, lacking explicit data on how prisoners perceive the proportionality and severity of their incarceration (i.e., as with most studies utilizing secondary or official record data to examine recidivism) implies that research has only been able to assess whether incarceration length demonstrates an effect consistent with specific deterrence, rather than testing deterrence itself. To this extent, we refer to this as a suppressive effect.

Existing empirical research to date has produced mixed support for a suppression effect of incarceration length, generally recognizing either a drop off or null effect of length of stay on recidivism (Nagin et al., 2009; Nagin, 2013). More recently, researchers have attempted to utilize dose–response research designs capable of capturing non-linear relationships between incarceration length and reoffending. Research conducted by Meade et al. (2012) on adult recidivism found that incarceration length produced a modest but significant decrease in recidivism only among those serving the relatively longest periods of incarceration (i.e., adults serving >5 years).

#### 2.1.2. Incarceration length as criminogenic

Conversely, incarceration length has been posited to serve as a catalyst for reoffending behavior, rather than a suppressor of future crime (Sykes, 1958). This criminogenic effect is thought to occur through the adaptation of inmates to the prison environment over extended periods of time, as well as strain resulting from the exposure of inmates to deleterious conditions (Massoglia, 2008). In terms of adaptation, prison has been referred to as a “school of crime,” where conditions necessitate conforming to codes of violence (Sykes, 1958; cf. Irwin & Cressey, 1962), while deprived of positive social outlets and ties to conventional society (Gendreau, Goggin, & Cullen, 1999). As such, those incarcerated for longer periods may view the prison climate more positively (Casey, Day, & Reynolds, 2016).

Further, using general strain theory as a framework (Agnew, 1992, 2001), researchers have posited that lengthy terms of incarceration may increase the likelihood of subsequent offending. Studies conducted by Blevins, Listwan, Cullen, and Jonson (2010) and Zweig, Yahner, Visser, and Lattimore (2014) concluded that these attributes foster negative emotions that encourage inmates to act out and adopt antisocial behavior and attitudes. These propositions are consistent with existing knowledge on the primary correlates of recidivism, as prisons require near-constant exposure to anti-social peers (Blevins et al., 2010; Nagin et al., 2009), potentially resulting in low risk inmates becoming worse (Andrews & Bonta, 2006). Additionally, incarceration can lead to a number of negative effects that encourage criminality, including stigmatization of released prisoners (Nagin, 2013), a lower likelihood of employment (van der Geest, Bijleveld, Blokland, & Nagin, 2016), or poor health outcomes (Kim, 2015).

To date, there is little research to suggest that incarceration length has a systematic criminogenic effect on recidivism (Cullen, Jonson, & Nagin, 2011; Meade et al., 2012). A small number of quasi-experimental inquiries have observed a criminogenic effect for incarceration length on recidivism, but these estimated effects have been weak and could not be distinguished from chance variation (Berecochea & Jaman, 1981; Jaman, Dickover, & Bennett, 1972; Nagin et al., 2009).

Comparing across levels of recidivism risk, Gottfredson, Gottfredson, and Garofalo (1977) noted a curvilinear effect of incarceration length, in which increases in the length of stay increased returns to prison, but only up until just over 4 years of confinement.

#### 2.1.3. Incarceration length as having a minimal effect

A third perspective contends that incarceration length may have little to no discernable effect on reoffending (Gendreau et al., 1999). In this view, prison is seen as neither a suppressor nor a catalyst for criminal behavior; but rather that reoffending is dependent on salient characteristics which the inmates bring with them into prison (Gendreau, Goggin, & Law, 1997). That is, recidivism is considered a function of pre-incarceration risk factors on which incarceration length has little effect. Contrary to a criminogenic perspective, among these risk factors are coping deficits which inmates import into prison, such as number of prior incarcerations (Toman, Cochran, Cochran, & Bales, 2015) or psychological disorders (Boduszek, Dhingra, & Debowska, 2016), change little during incarceration, and then influence recidivism following release (Zamble & Porporino, 1988). On the other hand, even to the extent those incarcerated for long periods of time may reoffend at lower rates, such a reduction in recidivism may be due to aging rather than a suppressive effect. The curvilinear-decreasing relationship between age and crime (Hirschi & Gottfredson, 1983) is consistent with an incapacitation effect, in that a lower proportion of those serving very long periods of incarceration may be expected to offend simply because they have aged, as they were incapacitated for their years at the highest risk of recidivism. As such, an inverse relationship between incarceration length and recidivism may instead be due to confounding factors, such as maturation (Doherty & Ensminger, 2014) or incapacitation (Levitt, 2004).

Given that the minimalist perspective posits the impact of incarceration length on recidivism is likely confounded with other factors, conclusions about its empirical support are problematic. The majority of the regression-based studies identified by Nagin et al. (2009) observed null effects. By comparing arrest trajectories of individuals prior to and following incarceration, Bhati and Piquero (2008) found that prison most likely has no effect on subsequent offending. Additionally, Loughran et al. (2009) observed a null dose–response curve for a sample of juvenile detainees, with increased duration making little difference in reoffending.

#### 2.1.4. Methodological challenges

In their review of the existing research on the incarceration length–recidivism relationship, Nagin et al. (2009) note that previous literature has typically suffered from methodological shortcomings. Specifically, few inquiries have made adjustments to account for selection bias – meaning that the average inmate receiving a relatively long period of incarceration differs significantly from the average inmate receiving a relatively short period of incarceration. These pre-incarceration differences confound the estimated association between incarceration length and recidivism (Shadish, Cook, & Campbell, 2002). Such shortcomings are to be expected in existing studies, given that researchers have no control over the incarceration terms that offenders are sentenced to and eventually serve.

To compensate, recent inquiries have made use of propensity score methods to adjust for selection as a threat to internal validity. The propensity score reflects the estimated probability of a unit receiving a treatment (or dosage level of a treatment) given a set of observed covariates (Rosenbaum & Rubin, 1983). Once estimated, the researcher can then stratify the sample on the propensity score, essentially comparing treatment and comparison units that are otherwise similar. When properly estimated, stratifying on the propensity score produces covariate balance between each of the different levels of treatment dosage, approximating random assignment, and producing less biased estimates of treatment effects (Joffe & Rosenbaum, 1999). Loughran et al. (2009) use this approach to estimate a dose–response relationship between

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