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Disciplinary Segregation's Effects on Inmate Behavior: Institutional and Community Outcomes

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Abstract

Disciplinary segregation (DS) is practiced in a variety of correctional settings and a growing body of research explores its subsequent effects among offenders. The present study contributes to this literature by analyzing the impact of short-term disciplinary segregation (DS) on violent infractions and community recidivism among a sample of inmates in Washington State. We assessed the impact of DS on these outcomes from deterrence and strain theory perspectives while controlling for social support variables such as visitations and correctional programming. Mentally ill offenders were excluded, as their abilities to make rational choices may be inconsistent with deterrence theory. Results show DS does not significantly affect post-DS infractions. Social supports significantly reduced inmates' odds of violent infractions while incarcerated. Community models indicate no substantive differences between the DS and non-DS groups on post-prison convictions three years after release. Overall, DS exhibited limited effects on offenders' institutional or community outcomes.

Key Words: disciplinary segregation, violent infractions, recidivism, deterrence, strain, and social support

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Disciplinary Segregation's Effects on Inmate Behavior: Institutional and Community
Outcomes

Corrections personnel across the United States use inmate isolation techniques to maintain or reestablish institutional security (Labrecque & Mears, 2019; Mears et al., 2019; Morgan et al., 2016; Shames, Wilcox, & Subramanian, 2015). Most prisons and jails in the United States utilize some type of solitary confinement (SC) to achieve this objective. Recent institutional "snapshot" data indicate approximately 80,000 prisoners are in SC on any given day (Shames et al., 2015; Stephan, 2008); and use of SC increased by 42 percent between 1995 and 2005 (Shames et al., 2015: 6). In 2010, the VERA Institute initiated research partnerships with selected state correctional authorities to more closely study the implementation of SC policy among selected US prisons (VERA Institute of Justice, n.d.). These research efforts articulated two areas of concern among prisoners' rights advocates and scholars; namely the overreliance of an extreme form of punishment – isolation – to maintain institutional control and the negative consequences of isolation on offenders after completing SC.

Such concerns underscore distinct areas of scholarship on the effects of inmate isolation within correctional facilities. Consistent with the abovementioned themes, one area emphasizes the negative psychological effects of extreme applications of this isolation technique (e.g. Grassian & Friedman, 1986; Haney, 2018, 2003; Haney & Lynch, 1997; Rhodes, 2004; Shalev, 2009). While the implications of such intensive isolation on inmates prompts legitimate cause for concern, drawing broad conclusions from such cases is not warranted on scientific grounds. Some of these works are qualitative studies relying on small samples of individuals isolated from others for years or even decades in a few instances.

Recent research suggests the impact of inmate isolation on mental health is modest at

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5 best when studies evaluating this relationship possess a high degree of methodological rigor
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7 (Morgan et al., 2016). Additionally, criminal justice scholars' renewed interest in
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10 investigating the effects of inmate isolation on inmates' subsequent behaviors within prison
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12 and in the community has generated recent work on the topic. The simplicity of such an
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14 exercise belies its complexity. Inmate isolation ranges from 24 hours or less to 23 hours of
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16 isolation per day with limited physical activity (e.g., supermaximum confinement). Recent
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18 evidence indicates that correctional authorities typically segregate inmates away from the
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20 general prison population for considerably briefer periods of time than 'supermax'
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22 confinement (e.g., Barack-Glantz, 1983; Beck, 2015; Labrecque & Mears 2019; Mears, 2013;
23
24 Mears & Bales, 2010); yet academic studies assessing supermax's effects on inmates has
25
26 outpaced that of more routine applications of solitary confinement (e.g., Butler, Steiner,
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28 Makarios, & Travis, 2017; Mears & Bales, 2009; Mears & Reisig, 2006; Lovell, Johnson, &
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30 Cain, 2007; Morgan et al., 2016; Pizarro & Narang, 2008; Smith, 2006).

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33 An emerging body of scholarship shows that limited durations of inmate isolation from
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35 the general population does not significantly affect subsequent inmate misconduct (Huebner,
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37 2003; Labrecque 2019, 2015; Lucas & Jones, 2017; Morris, 2016). Other evidence indicates
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39 that longer-term stays in solitary confinement has limited (Bales & Mears, 2009; Lovell et al.,
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41 2007) or null effects (Clark & Duwe, 2017) on recidivism in the community after release.
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44 The present study contributes to this growing body of literature by assessing the effects of
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46 short-term inmate isolation on these two outcomes. We focus on disciplinary segregation
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48 (DS), conceptualizing this type of solitary confinement as punishment for inmate misconduct
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50 and examine its effects from deterrence and strain theory perspectives net of social support
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52 variables such as visitations and rehabilitative programming.
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Literature Review**Solitary Confinement (SC): Theoretical Perspectives and Prior Research**

Most states define solitary confinement (SC) as the physical isolation of an inmate through segregation from the general population for a specified period of time (Metcalf et al., 2013); with heavily restricted human contact and limited physical activity (Fathi, 2015; Haney, 2003; Pizarro & Narag, 2008; Shalev, 2015; Shames et al., 2015). Solitary confinement (SC) is often used interchangeably with restrictive segregation (RS), administrative segregation (AS), disciplinary segregation (DS), special management unit (SMU), protective custody (PC), and security housing unit (SHU) (Fathi, 2015; Mears et al., 2019; Shames et al., 2015). Regardless of the variation in such labels or definitions, corrections officials are ultimately concerned with using isolation to maintain institutional order and facility security (Labrecque & Mears, 2019).

Theoretical Perspectives: Deterrence, General Strain, and Social Support Theories

Scholars have limited theoretical understanding of how inmate isolation affects subsequent behavior. As Mears and Bales (2009) note, studies of prisons, especially studies on DS and/or supermaxes have not questioned the theoretical reasons why such segregated and punitive housing might either increase or decrease violent misconduct in prisons and recidivism following release. When theory is applied, deterrence or general strain theory perspectives are often used to explain the effects of inmate isolation on institutional or community outcomes (Barak-Glantz, 1983; Butler et al., 2017; Labrecque, 2019, 2015; Lucas & Jones, 2017; Mears & Bales, 2009; Morris, 2016) as well as inmate misconduct in general (e.g., Blevins, Listwan, Cullen, & Lero Jonson, 2010; Listwan, Sullivan, Agnew, Cullen, & Colvin, 2013; Mears & Bales, 2009; Morris, 2016; Morris, Carriaga, Diamond, Piquero, & Piquero, 2012). In keeping with this literature, we apply such perspectives to the current

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study of DS on institutional and community outcomes. Though we do not test these theoretical frameworks *per se*, we summarize them to provide context for understanding DS experiences and offender behavior both in and out of the prison environment.

Deterrence theory. Hypotheses emanating from deterrence theory (Beccaria, 1764/1986) predict that offenders will not engage in crime if they are certainly, swiftly, and severely punished by the criminal justice system (*specific deterrence*). In turn, public knowledge about official punishments of offenders is expected to deter others from engaging in the same deviance thereby deterring crime (*general deterrence*). Prisoners tend to have a negative view of the SC experience (Haney, 2003; Haney & Lynch, 1997; Kurki & Morris, 2001; Mears & Reisig, 2006; Valera & Kates-Benman, 2016) possibly because DS is utilized as a type of official punishment when offenders engage in misconduct or violate rules (Shames et al., 2015; Smith, 2006). Specific deterrence theory anticipates that offenders who experienced sufficient pains through exposure to DS for violating regulations would not engage in subsequent misbehavior (Mears & Reisig, 2006). Given that prisons, and DS placement in particular, is structured to be a severe punishment and that certainty of punishment and the swiftness with which it is meted out would appear to be more likely in a prison environment than in the larger community, it would not be surprising if it deterred offenders from committing further infractions while incarcerated and reduced their recidivism upon release to the community.

General Strain Theory (GST). Certainly, imprisonment itself is a painful event and offenders are often exposed to experiences and harsh environments that may lead to “strain” for them (Listwan et al., 2013; Morris et al., 2012). The isolation, restrained social contact, and exposure to additional deprivations associated with solitary confinement may not enhance prison security and safety; instead the exposure to SC may result in several

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unintended adverse outcomes, such as mental health problems, violence and misconduct, and victimization. In this respect, general strain theory (GST) could be employed to explain offenders' post-SC criminogenic engagement.

As opposed to deterrence theory's assumption that operating SC as a means of punishment in correctional settings would be beneficial, strain perspectives entertain the possibility that such a punishment could backfire, as such exposure might lead to the breakdown of the relationship with fellow offenders, the staff, family, and friends (Kurki & Morris, 2001). Moreover, being isolated in SC housing might exacerbate offenders' physical and psychological harm including mental health issues, depression, self-injuries, and suicides (Dye, 2010; Listwan, Colvin, Haney, & Flannery, 2010; Lovell, 2008; Shalev, 2015; Shames et al., 2015; Smith, 2006; Toch, 2003).

Social Support Theory. In addition to the potentially strain-inducing effects of SC placement, the offender also loses out on positively valued stimuli such as participation in programs and the opportunity to interact with friends and family from outside of the institution (e.g., cognitive behavioral, counseling, educational and vocational programs, religious activities, calls, letters, and visitation, etc.). Cullen and colleagues have argued that social support serves as a protective factor for reducing not only crime and recidivism but also fear of crime and victimization risk (Cullen, 1994; Cullen, Wright, & Chamlin, 1999; Hochstetler, DeLisi, & Pratt, 2010). The concept of social support contains two primary dimensions: instrumental and expressive (Cullen, 1994). Instrumental social support involves establishing relationships that enhance an individual's capacity to achieve a desired goal (e.g., getting a job, obtaining financial assistance, receiving training). Expressive social support refers to the intrinsic quality of relationships; such as meeting one another's needs for love, affection, and emotional validation. Both types of social support have formal and

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informal dimensions.

Treatment and intervention programs provided by correctional institutions are viewed by offenders as offering both formal and informal instrumental support; as well as formal and informal expressive social support. Many well-designed and well-implemented rehabilitation programs characterized as formal sources of institutional social support have demonstrated efficacy at reducing inmate misconduct and recidivism (see Andrews & Bonta, 2010; Cullen, 2013; MacKenzie, 2000; Petersilia, 2003; Smith, Gendreau, & Swartz, 2009).

Informal expressive social support – such as inmates receiving calls, visits, and letters from significant others while incarcerated or having family members place money in the inmates' commissary accounts also reduces these behaviors (Cochran & Mears, 2013; Duwe & Clark, 2013; Duwe & Clark, 2014; Mears, Cochran, Siennick, & Bales, 2012; Tewksbury & DeMichele 2005) – in some instances even more than formal institutional supports (Woo, Stohr, Hemmens, Lutze, Hamilton, & Yoon, 2016). Inmates experiencing short-term DS also have access to informal and formal sources of social support in prisons that are expected to decrease subsequent negative behaviors.

Research on Post-SC Behavioral Outcomes: Misconduct and Recidivism

An emerging body of scholarly research on the impact of both long-term and short-term inmate isolation on correctional and community outcomes suggests it has little to no effect on subsequent misconducts and community recidivism. Lovell, Johnson, and Cain (2007) found that the timing of supermax inmates release to the community affected recidivism to a greater degree than supermax inmate status *per se*. Using a retrospective matched control design of Washington state inmates, results showed supermax inmates directly released to the community from prison had significantly higher odds of felony recidivism in the community; as well as shorter time to first reoffense in the community,

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5 relative to their non-supermax counterparts. Supermax inmates who returned to the general
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7 prison population for 90 days or more before release to the community (later-release)
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9 exhibited recidivism rates comparable to that of general population inmates.
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12 Mears and Bales (2009) examined the effect of supermax incarceration on community-
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14 based recidivism (operationalized as a new conviction for a felony crime) to determine
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16 whether supermax incarceration affects criminal behavior after release. In their sample of
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18 Florida inmates, they employed propensity score modeling to find appropriate comparison
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20 subjects and found that supermax incarceration increased rates of violent recidivism but had
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22 no effect on other types of recidivism (e.g., property, drug). Another study employing
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24 propensity score matching between supermax and general population inmates in Ohio also
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26 found a null effect of this type of confinement on rearrests or returns to prison up to seven
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28 years after release (Butler et al., 2017).
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33 Clark and Duwe (2017) evaluated the impact of inmate isolation while incarcerated on
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35 community recidivism (returns to prison due to revocation, new arrest, and new felony-level
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37 conviction) up to three years after release. Relative to inmates who spent no time in isolation,
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39 higher proportions of a sentence served in isolation significantly increased the incidence of
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41 revocation but did not affect new arrests or new felony convictions. In contrast to Lovell et al.
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43 (2007) but consistent with Mears and Bales (2009), direct release from the prison isolation
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45 unit to the community did not affect revocations or new crimes.
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49 Systematic empirical study of shorter-term stays in SC on subsequent inmate
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51 misconduct is also a relatively recent development in the corrections literature (e.g., Huebner,
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53 2003; Labrecque 2019, 2015; Lucas & Jones, 2017; Morris, 2016). Generally speaking,
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55 studies assessing short-term isolation on subsequent inmate misconduct show a null effect.
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57 For example, Huebner (2003) explored the effect of rewards and punishments through
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remunerative and coercive controls on subsequent offender violence based on an administrative control approach. Using a sample of 4,168 male offenders in 185 state prisons, findings indicated that disciplinary segregation (DS) as a coercive control strategy did not significantly predict future assaultive behavior, either on other offenders or correctional staff. Similarly, Labrecque's (2015) analysis of DS on 14,311 offenders in the Ohio Department of Rehabilitation and Correction (ODRC) prison system indicated DS did not influence subsequent misconduct in prison. However, offenders' mental health statuses interacted with DS in some cases to influence certain types of subsequent misconduct in prison—but to a lesser degree than expected. The length of time an inmate spent in DS was not significantly related to influence subsequent misconduct in prison. Drawing on 9,016 inmates from a correctional authority in a Midwestern state, Labrecque (2019) also observed no significant effect of the number of days in isolation on either subsequent violent or non-violent inmate misconduct; but did find that inmates who served time in isolation had significantly reduced odds of a subsequent placement in SC during the study period.

Morris (2016) examined the effect of short-term DS on subsequent violent infractions among offenders incarcerated in a large southern state. Using propensity score matching (PSM) to match SC offenders with non-SC offenders, findings indicated that short-term SC as a punishment for violent misconduct did not significantly affect the odds of future violent misconduct while incarcerated. Similarly, Lucas and Jones (2017) examined the effects of disciplinary segregation on institutional rule violations among a sample of 228 male offenders incarcerated by the Oregon Department of Corrections. They also found that disciplinary segregation did not significantly predict subsequent institutional misconduct.

We contribute to this emerging literature by assessing the effect of a certain type of SC – disciplinary segregation or DS – on inmate misconduct for subsequent violent infractions as

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well as community-based recidivism after release. Our short-term time frame – anywhere from 30 to 60 days solitary confinement as a disciplinary response to an inmate’s infraction – provides an opportunity to measure the limited dosage effects of DS on offenders’ later institutional breaches and longer-term law-violating behavior once they are residing in the community after release.

Generally speaking, correctional authorities determine DS placement through formal disciplinary procedures resulting from behavioral misconduct. Such disciplinary committees have discretion to determine guilt and levy sanctions to maintain prison security and safety; thus, disciplinary isolation may, as opposed to the primary purpose of the use of DS, constitute a threat to prison order and security if it intensifies prisoner maladjustment (Butler & Steiner, 2017; Howard, Winfree, Mays, Stohr, & Clason, 1994; Irwin, 1980; Sykes, 1958). On the other hand and consistent with deterrence theory, DS may decrease subsequent violent misconduct among inmates due to one’s desire to avoid such strain and stress in the future.

Both theories may be relevant. Morris (2016) noted: “..results suggest that exposure to solitary confinement for acts of violence tends to have no substantive effect on continuity in violent behavior among offenders engaging in an initial act of violence, but for approximately 2 percent of exposed offenders we would expect that exposure to solitary may have increased their tendency for continued violence and for an equivalent proportion, the opposite might be expected, for a total of 4 percent being affected by the solitary experience, on average” (15). Based on these mixed findings from previous studies, we hypothesize that exposure to short-term disciplinary segregation as a punishment will have little effect on offenders’ odds of committing a violent infraction while incarcerated and the odds of committing a new crime in the community.

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Data and Methods**Research Setting**

A single state correctional system (Washington State Department of Corrections [WADOC]) is the focus of our analyses. WADOC considers SC ‘restrictive housing’; or “a form of housing for individuals whose continued presence in the general population would pose a serious threat to life, property, self, staff or other inmates, or to the security or orderly operation of a correctional facility” (Washington State Department of Corrections, 2015: 1). WADOC employs four types of restrictive housing: administrative segregation, pre-hearing confinement, disciplinary segregation (DS), and intensive management status/intensive treatment status. DS is a sanction that results from an institutional guilty finding for a serious misconduct and the only form of restrictive housing that is issued as a punishment; which by Washington State law cannot exceed 30 consecutive days (Washington State Department of Corrections, 2013). Offenders who were placed in all types of segregation were identified through the WADOC data. While many in our sample were subject to various forms of segregation throughout their incarceration, pinpointing the exact dosage of non-DS placements in segregation proved difficult. Nonetheless, our preliminary models (not presented) included a measure of non-DS segregation, and removing the measure improved model fit considerably, thus we do not include it in the final model (Table 3).

Data

We collected retrospective data on inmates who served DS sanctions between August 2008 and March 2016. Data elements included bed placements, misconducts, sanctions, visitation records, admission and release records, programming, demographics, and raw risk/needs assessment scores. Other data was obtained from the Washington State Administrative Office of the Courts (AOC) to measure new crimes after release.

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Sample 1. We test the institutional and community effects of DS with separate samples of individuals. Sample 1 includes all individuals who were incarcerated at any point between August 1, 2008 and March 31, 2016 (N = 82,201). This timeframe was chosen for its increased accuracy in agency records due to a new records system implemented in 2008 and for the availability of the needs assessment, also implemented in 2008. Individuals convicted of capital crimes, sentenced to death, life or life without parole, and individuals who were deported or deceased during our study period were excluded since they had no opportunity for release to the community. Individuals identified as having a mental health disorder were excluded, as their decreased abilities to make rational choices conflict considerably with core assumptions of deterrence theory. Keeping them in our sample could potentially add unnecessary measurement error to our study. After these inmates were eliminated, the resulting sample contained 43,202 individuals.

Sample 1 was then limited to offenders who recorded a violent infraction in their lifetime (n = 3,144), creating a subsample to test the relationship between the exposure to DS and subsequent violent infractions. Each offender was assigned five six-month intervals beginning on March 31, 2013 and ending on September 30, 2015. DS days were counted when maximum custody bed start dates coincided with sanction start dates for segregation. While this does not include the entire population of those sanctioned to DS due to the pragmatics of offender management, we have no reason to believe offenders sent to DS before the sanction finding was finalized or those sent to DS even a few days after the sanction finding was finalized were any different than those sent to DS on the same date as their sanction to segregation was finalized. There were 303 offenders who experienced DS, representing 9.6 percent of the 3,144 in the sample. Of these 303, there were 360 six-month

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periods that contained at least one DS placement, and the average number of days per six month interval was 18.3 days.

This sample shares demographic similarities with those of other studies. Prior research has used male offenders exclusively (Huebner, 2003; Lucas & Jones, 2017); and the average age in this sample (32.8 years old) is also similar to that of other studies in this area (e.g., Butler & Steiner, 2017; Butler et al., 2017; Cochran, Toman, Mears, & Bales, 2018; Walters, 2015). The percentage of Hispanics (19%) in the sample is comparable to those in other studies (Butler & Steiner, 2017; Walters, 2015). There are differences between our sample and those in the literature, however. While the majority of DS offenders in prior research samples are Black (Butler & Steiner, 2017; Butler et al., 2017; Cochran et al., 2018; Walters, 2015), the majority of DS offenders in the current study are White.

Sample 2. In the second sample, which we use to test the effects of DS on community-based recidivism, 834 offenders who experienced DS within our full study period were identified by matching maximum custody bed start dates with start dates for applied sanctions of segregation. Next, we matched them to the remaining offenders in our sample using the three-to-one nearest neighbor method. Nearest-neighbor matching involves selecting treatment and control cases within a specified caliper, leading to similar propensities between the two groups. Each offender's final exposure to DS during the six-month period was selected to reduce the confounding effects of multiple in-and-out periods of DS. After matching, non-DS offenders were assigned the start and end dates of DS of their closest match. Dependent variables include convictions for new felonies and misdemeanors of five offense types (i.e., violent, property, drug, sex, and other crimes). Counts began after the end date for DS and were converted into rates accounting for time eligible to recidivate.

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Measures. Consistent with previous research and WADOC policy, we operationalize DS as “confinement to an isolated cell for the overwhelming portion of each day, often 23 hours a day, with limited human interaction and minimal, if any, constructive activity” (Shames et al., 2015, p.2). Duration of DS was calculated as the number of days spent in a maximum custody bed¹ (e.g., for cases where the maximum custody bed start dates coincided with the disciplinary sanction start date, we took the difference between that date and the bed end date). To test the institutional effects of DS, all measurements were taken on the final day of the pre-defined six-month interval. Over 50 percent of the intervals included days incarcerated for offenders. Days in DS were cumulated for each six-month period to represent our primary test variable.

The dependent variable was whether or not a violent infraction was committed in the *following* six-month period after DS. The independent variables include age, African-American, Hispanic, gang affiliation, familial relationship influence, drug problems (within the last six months), risk class based on the institution’s classification, length of time served (days), visit by blood family members, visit by non-blood family members, visit by spouse, vocational programming, rehabilitation programming, family meeting programming, volunteer work programming, and job programming. These control variables are consistent with prior research on disciplinary infractions (Huebner, 2003; Labrecque, 2015; Morris, 2016). These data are set forth in Table 1.

----- Insert Table 1 about here -----

¹ Those with fewer than four days were excluded as they may have been held for transfer to another facility.

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Method

This study employs two separate analyses to understand how DS affects offenders' conduct. For the first analysis, we tested institutionalized effects of SC using a generalized estimating equations (GEE) technique to examine the effects of DS on subsequent violent infractions.² The second analysis uses Sample 2 to examine new crimes committed in the community after release from prison. The effect of exposure to DS on recidivism outcomes in the analyses were assessed using propensity score modeling (PSM).³ The procedure for the PSM analysis included three steps. First, we selected 20 covariates for the matching procedure that were theoretically relevant and significantly related to DS at a bivariate level (Haney, 2003; Morris, 2016). A binary logistic regression model was then used to estimate propensity scores. A set of demographic measures were included as covariates: age (in years); race (dummy variables for each African-American and Hispanic = 1; other = 0); marital status (married: yes = 1; no = 0); gang affiliation (gang: yes = 1; no = 0); visitation (ever had visits during the study period: yes = 1; no = 0); risk class based on the institution's classification (ranged from 0 to 3 where 0 refers to low risk class and 3 refers to high violent risk class); length of time incarcerated (ranged from 1 to 8 where 1 refers to less than one month and 8 refers to over eight years' time served); prior incarceration history (ranged from 0 to 4 where 0 refers to no history and 4 refers to more than 7 times); lifetime types of

² GEE is useful when data are *nested* within aggregates (e.g., offenders in a prison) in which the data (and coinciding residuals) are often correlated across time (Liang & Zeger, 1986). GEE does not allow variations in residual errors within individuals to affect the population average, therefore ignoring individual variations across time from the population intercept.

³ In the present study, DS subjects (treatment group) were matched to non- DS subjects (comparison group) in terms of near-identical probabilities of exposure to disciplinary segregation. The nearest neighbor matching within a caliper is typically utilized if the sample is suitably large (Guo & Fraser, 2015). The smaller caliper setting indicates the better match quality (Rosenbaum & Rubin, 1985). We utilized a three-to-one nearest neighbor matching algorithm for the two groups with a caliper of .05.

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convictions (dummy variables for each of violent, property, drug, and sex convictions = 1; no = 0); violent infractions history (violent infractions: yes = 1; no = 0); drug problems (yes = 1; no = 0); institutional programs (vocational, rehabilitation, job, family meeting, life skills: hours of participation in these programs). Before the match, Area Under the Curve (AUC) estimate was .81, which showed the model was strongly predicting group assignment.

----- Insert Table 2 about here -----

As shown in Table 2, our PSM diagnostics indicate a substantial reduction in selection bias and a robust balance between the two groups was achieved on nearly all covariates in terms of bivariate difference tests, standardized differences (STD), and AUC (see Austin, 2008; Rice & Harris, 2005; Rosenbaum & Rubin, 1985).

Results

Misconduct Outcomes

Findings for the binary multinomial GEE model using the first sample are presented in Table 3. The time variable was ordinal (using the first observation as the reference category) and results show no significant change in the odds of committing a violent infraction across the four intervals. Additionally, days in DS did not significantly change violent infractions over time (the initial log odds = $-.01$, $p = .152$). That is, being exposed to DS did not significantly affect violent infractions in the subsequent six-month period; a finding consistent with prior research (Huebner, 2003; Labrecque, 2019, 2015; Morris, 2016). Such a finding is inconsistent with both deterrence and strain theory perspectives of DS on subsequent violent infractions while incarcerated.

----- Insert Table 3 about here -----

Furthermore, age, African-American race, presence of drug problems, length of time served, visits by blood family members, rehabilitation and job program involvement

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5 significantly affected the odds of committing a subsequent violent infraction. As in other
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7 studies, we found an “aging-out effect,” in that for every year older there was a 5 percent
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9 decrease in the odds of committing a violent infraction ($OR = .95, p < .001$) (Bench & Allen,
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11 2003; Gendreau, Goggin, & Law, 1997; Griffin & Hepburn, 2006; Howard et al., 1994;
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13 Huebner, 2003; Lahm, 2008; Steiner & Wooldredge, 2008; 2009; 2014; Walters, 2015;
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15 Wooldredge, Griffin, & Pratt, 2001).

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19 Our measure of race indicated that African-American offenders had a 21 percent
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21 decrease in the odds of committing a violent infraction after exposure to DS, compared to
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23 other racial or ethnic groups over time ($OR = .79, p < .009$). This finding differs from
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25 previous studies showing an enhanced effect of DS on violent misconduct among minority
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27 race offenders (e.g., Griffin & Hepburn, 2013; Huebner, 2003; Steiner & Wooldredge, 2008;
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29 2009). To further explore why African American offenders had lower odds of violent
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31 infractions, we conducted difference tests on measures of risk and protective factors for
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33 inmate infractions (data not shown). Protective factors measured social support (rehabilitation
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35 program, vocation program, job program, family meeting program, volunteer work, and
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37 visitations), and risk factors measured gang affiliation, drug problems, and prior
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39 incarcerations. Results from the difference tests show that African American offenders have
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41 significantly fewer drug problems, fewer gang affiliations, and more prior incarceration
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43 experiences than other race/ethnicity groups; but did not differ from other offenders on social
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45 support measures. This intriguing finding suggests further exploration is warranted.

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51 Offenders with drug problems had a 20 percent increase in the odds of committing a
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53 violent infraction in the subsequent months or years while incarcerated ($OR = 1.20, p < .01$).
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55 We note that this measure of drug use history from the ONA is inexact and does not mean
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57 that offenders were currently involved in drugs while incarcerated or that they had an
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addiction to drugs prior to incarceration, rather it was just a question about use of an array of drugs within six months of incarceration. We speculate that those who were using prior to incarceration may be more deviant and more likely to engage in activity or behavior that would land them in disciplinary segregation.

Length of time served was found to be a significant predictor of committing a subsequent violent infraction. That is, for every day incarcerated, offenders had a 1 percent increase in the odds of engaging in a violent infraction ($OR = 1.01, p < .001$). This finding is consistent with many prior studies (Cunningham, Sorensen, & Reidy, 2005; Gover, Pérez, & Jennings, 2008; Sorensen & Wrinkle, 1996; Steiner, Butler, & Ellison, 2014; Zamble, 1992).

Surprisingly, offenders who were identified as affiliated with a gang were not significantly more likely to commit a violent infraction in the subsequent months or years while incarcerated ($\log\text{ odds} = -.02, p = .832$), a finding inconsistent with prior studies (see Griffin & Hepburn, 2006; Huebner, 2003; Worrall & Morris, 2012). For example, Griffin and Hepburn (2006) and Worrall and Morris (2012) found that gang affiliation is associated with violence among offenders. It is possible that this finding might be explained by an overuse of the appellation 'gang member' or by the fact that if it did apply at one time, it no longer does. On the other hand, we used 'gang affiliates' and not solely gang members, which may have different meanings and/or measured differently in other jurisdictions.

Findings also indicated that social support—measured as visits by blood-related family members, participating in rehabilitation programs, and participating in job programs—significantly reduced the odds of committing a violent infraction. Offenders who had at least one visit by blood-related family members had a 19 percent decrease in the odds of engaging in a violent infraction ($OR = .81, p = .041$) and offenders who participated in rehabilitation had 14 percent fewer odds of engaging in a violent infraction ($OR = .86, p < .001$) and

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offenders who attended a job program had a 6 percent reduction in the odds of engaging in a violent infraction (OR = .94, $p < .05$).

Scholars have suggested the use of remunerative controls (e.g., work assignments, prison programming) rather than the use of coercive controls (e.g., segregation) to enhance inmates' adherence to prison rules and garner their support of the prison system (Butler & Steiner, 2017; Colvin, 1992; Huebner, 2003). Provisions of instrumental as well as expressive social supports such as clinical interventions and rehabilitative programs may also enhance inmates' willingness to recognize the legitimacy of authority figures inside prisons. These findings are consistent with prior studies of visitation, rehabilitation, and job programs on future offending (Cullen & Jonson, 2012; Duwe & Clark, 2013; Mears et al., 2012; Mears, Wang, & Bales, 2014; Wilson, Bouffard, & MacKenzie, 2005).

Recidivism Outcomes

We used our second sample (described above) to assess the effects of DS on community-based recidivism. We compared mean differences in conviction rate outcomes between the two groups following the PSM match using Student's t-Tests. A three-year follow-up period was established based on prior literature that has shown that recidivism occurs primarily within the first three years following release (Griffin & Hepburn, 2006; Petersilia, 2003).⁴ As shown in Table 4 and consistent with findings from other research (see, Hamilton & Campbell, 2013; Petersilia, 2003), the highest risk period for conviction rates is within the initial year following release and the trend gradually decreased over time.

⁴ Year 1 represents conviction rates (per year) within the first year following release. Year 2 measures contain the cumulative rates for the first two years of the follow-up period. Year 3 represents the cumulative rate outcomes for all three follow-up years.

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-----Insert Table 4 about here-----

Results show that exposure to DS did not affect offender conviction rates within the three- year follow-up period when compared to non-SC subjects. Aside from felony sex crimes and ‘other’ misdemeanors measured at year two, DS and non-DS offenders did not significantly differ for all remaining convictions. Generally speaking, exposure to DS while incarcerated did not affect subsequent offending among former inmates once they re-enter their communities. These results are consistent with other studies showing institutional segregation of inmates has little effect on recidivism after release (e.g., Duwe & Clark, 2017); but contradict others showing higher rates of some types of felony recidivism among offenders who experienced solitary confinement while incarcerated (Mears & Bales, 2009; Lovell et al., 2007). Our findings are not consistent with either deterrence or strain theory perspectives.

Discussion and Conclusion

Scholarly debate on the impact of inmate segregation has a lengthy history in corrections research (King, 1999; Listwan, Johnson, Cullen, & Latessa, 2008; Morgan et al., 2016; Smith, 2006). Drawing on studies suggesting a deleterious effect on offenders’ physical and mental health (Arrigo & Bullock, 2008; Haney, 2018; Haney, 2003; Haney & Lynch, 1997), scholars have initiated new studies to more thoroughly examine the effects of isolation on offenders in correctional institutions (Browne, Cambier, & Agha, 2011). We assessed the short-term and long-term effects of DS on institutional and community outcomes among a cohort of offenders incarcerated by the Washington State Department of Corrections. Using two samples of offenders, we employed a multi-level regression technique (GEE) and a propensity score model (PSM) to examine whether the exposure to DS affects institutional outcomes such as violent infractions and community outcomes such as felony and

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5 misdemeanor conviction rates. Results indicate that exposure to DS does not significantly
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7 affect involvement in violent infractions; a finding consistent with similar investigations of
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9 isolation on subsequent inmate misconduct (Huebner, 2003; Labrecque, 2015, 2019; Lucas &
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11 Jones, 2017; Morris, 2016). In terms of institutional behavior, being older, African-American,
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13 participating in visits with family, and participating in rehabilitation and jobs programming
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15 reduced the odds of committing a violent infraction over time; possession of a drug history
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17 increased those odds. For community outcomes, results showed no difference on subsequent
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19 felony conviction rates in the community between the DS group and non-DS groups, with the
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21 exception of those convicted of sex offenses and misdemeanors (and only in the second year
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23 of release to the community). This finding is consistent with other research showing a limited
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25 effect of inmate isolation on recidivism (Clark & Duwe, 2017; Lovell et al., 2007; Mears &
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27 Bales, 2009).

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33 In addition to these findings, our results are consistent with research showing that
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35 visitation reduces offenders' infractions while incarcerated and improves their outcomes
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37 when re-entering the community (Cochran & Mears, 2013; Duwe & Clark, 2013; Duwe &
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39 Clark, 2014; Mears et al., 2012; Tewksbury & DeMichele 2005). A recent meta-analysis
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41 examining the predictors of restrictive housing shows that offenders receiving this type of
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43 segregation are likely to be younger, have more extensive criminal records, poorer
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45 institutional behavior, and more criminogenic needs than the general prison population
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47 (Labrecque, 2018a). In light of our findings, offenders in DS potentially need more
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49 rehabilitation and social support than general population offenders to enhance prosocial
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51 adaptations to prison and increase facility safety (Labrecque & Smith, 2019). In sum, DS
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53 exhibited mostly null effects on both institutional and most community outcomes, while
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55 social supports – both instrumental and expressive - significantly reduced the odds of
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subsequent infractions for violence while incarcerated as well as recidivism in the community.

Study Limitations

As with all studies, ours possesses some weaknesses that must be acknowledged. The use of the GEE technique strengthened the rigor of the study by allowing assessment of repeated measures over a period of time—providing the opportunity to review effects multiple times. However, GEE only provides an average of effects over the number of intervals and that might mask findings associated with individual intervals. Moreover, the selection of six month intervals for this study was based on the need to ensure that a risk assessment had been completed for each interval, but it might be that shorter or longer periods between intervals would have resulted in different findings.

Further, this study uses a quasi-experimental design rather than a true experimental design; thus there may be variables that should have been included in our covariate matrix. While the propensity score modelling technique mitigates the vulnerabilities of a quasi-experimental design, the technique has some challenges. Foremost among them is unavoidable selection bias due to lack of appropriate measures for all offenders, excluding some inmates from participating in our study. Nonetheless, the large sample size, use of propensity score matching to provide valid matched cases to our treatment subjects, and seven year study period underscore a robust set of findings that will enrich the debate on the use of DS.

Finally, we excluded inmates with a designated mental health condition as their cognitive abilities were potentially mismatched with the rationality assumptions of deterrence theory. While this may have introduced some bias into our findings (recent research shows that inmates with psychological problems comprise up to 30% of inmates in some restrictive

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housing units – see Beck, 2015); the results of our study are consistent with those of similar research designs including mentally ill offenders (e.g., Clark & Duwe, 2017; Labrecque, 2019, 2015) as well as those that did not include these offenders (e.g., Butler et al., 2017; Lucas & Jones, 2017; Mears & Bales, 2009; Morris, 2016). Prior research indicates that the greater the methodological rigor of study designs assessing solitary confinement and subsequent inmate behavior, the weaker its effects (Morgan et al., 2016) and our results are consistent with this finding. Yet, if serious mental illness (SMI) functions as a risk factor for entering solitary confinement (Labrecque & Smith, 2019), counterfactual research designs excluding inmates with these conditions may present an incomplete assessment of the relationship between solitary confinement and subsequent inmate misconduct. Future research should explore the causal linkages between mental illness, correctional confinement, and prison adjustment to advise correctional authorities as to best practices with this vulnerable population (Morgan et al., 2016) and researchers should adjust study designs accordingly.

Organizational Practice and Policies

Our findings replicate other studies showing inmate segregation does not substantively affect inmates' subsequent infractions or reconvictions once in the community (e.g., Clark & Duwe, 2017; Labrecque, 2019; 2015; Lucas & Jones, 2017; Morris, 2016). Taken together, this emerging literature demonstrates that limited applications of inmate isolation from the general population of prisoners – thirty days at a time, for example – satisfy short-term institutional goals such as facility and staff safety without posing substantive long-term psychological damage to offenders (Morgan et al., 2016). Moreover, our research validates prior studies showing offenders' decreased risks of infractions and

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5 community recidivism with participation in social support activities (Duwe & Clark, 2013;
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7 Duwe & Clark, 2014; Mears et al., 2012; Woo et al., 2016).

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10 Corrections policies sanctioning offenders by curtailing their abilities to receive visits
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12 from family or participate in employment or other rehabilitative skill building programs
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14 inadvertently weaken a safe environment for staff and inmates. Instead, correctional
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16 authorities applying the principles of effective treatment among those currently within
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18 solitary confinement (Butler, Solomon, & Spohn, 2018; Labrecque, 2018b) or those at
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20 highest risk for this sanction (Labrecque & Smith, 2019) could enhance facility safety and
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22 inmates' adjustment to prison in the following ways: 1) adjusting treatment dosage for these
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24 high risk offenders; 2) engaging criminogenic risk through rehabilitative programming; and
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26 3) delivering services in a way congruent with neuroatypical cognitive functioning. Our study
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28 suggests holding inmates accountable in prison while maintaining institutional control
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30 promoting facility safety is the product of *both* proximate responses to inmate misconduct
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32 (like short-term disciplinary segregation) as well as distal mechanisms such as sustained
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34 contact with social support activities enhancing their prosocial behaviors.
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INSTITUTIONAL AND COMMUNITY EFFECTS OF DISCIPLINARY SEGREGATION IN PRISONS

**Table 1: Sample 1 descriptive statistics - 15,720 pooled observations,
3,144 offenders**

Variables	Mean/%	SE
<i>Outcome measure</i>		
Violent infractions	0.05	0.00
<i>Static predictors</i>		
Age (year)	32.87	0.08
Black	0.23	0.00
Hispanic	0.19	0.00
Gang affiliation	0.10	0.00
<i>Risk class</i>		
<i>Low</i>	5.1	
<i>Moderate</i>	22.1	
<i>High non-violent</i>	30.3	
<i>High violent</i>	42.6	
<i>Dynamic predictors</i>		
Days disciplinary segregation	0.42	0.03
Familial relationship influence	0.29	0.00
Drug problems	0.37	0.00
Length of time served (days)	67.39	0.65
Visits by blood family members	0.13	0.00
Visits by non-blood family members	0.05	0.00
Visits by spouse	0.02	0.00
Rehabilitation program (hours)	10.83	0.53
Vocation program (hours)	14.13	0.50
Job program (hours)	111.82	2.17
Family meeting program (hours)	0.60	0.08
Volunteer work (hours)	0.29	0.03

Note: SE = standard error

INSTITUTIONAL AND COMMUNITY EFFECTS OF DISCIPLINARY SEGREGATION IN PRISONS

Table 2: Sample 2 balancing statistics (N = 43,202)

Variable	Before PSM				After PSM (3-to-1)			
	Non-DS Mean	DS Mean	<i>t</i> for Difference in Means	STD	Non-DS Mean	DS Mean	<i>t</i> for Difference in Means	STD
Age	30.41	27.26	8.80**	2.7	27.54	27.26	0.67	0.3
Black	0.16	0.25	-5.84**	54.5	0.26	0.25	0.63	5.2
Hispanic	0.12	0.19	-5.10**	52.2	0.18	0.19	-0.98	6.6
Married	0.65	0.55	5.62**	42.2	0.56	0.55	0.49	4.6
Gang affiliation	0.17	0.47	-17.61**	148.3	0.45	0.47	-0.89	8.3
Visits	0.45	0.55	-5.94**	40.4	0.58	0.55	1.55	12.2
Risk class								
Low	0.10	0.05	7.78**	78.7	0.05	0.05	0.52	9.6
Moderate	0.26	0.20	4.24**	33.7	0.20	0.20	0.35	3.6
High non-violent	0.33	0.28	3.58**	26.5	0.28	0.28	0.32	2.8
High violent	0.30	0.48	-9.94**	75.0	0.46	0.48	-0.79	6.4
Prior incarceration	0.73	0.95	-4.80**	14.3	1.00	0.95	0.99	3.0
Violent conviction	0.41	0.58	-9.95**	70.0	0.56	0.58	-1.01	8.1
Property conviction	0.30	0.35	-2.81**	17.8	0.35	0.35	-0.01	0.0
Drug conviction	0.51	0.44	3.84**	28.2	0.47	0.44	1.12	12.1
Sex conviction	0.11	0.13	-1.68	18.6	0.15	0.13	1.08	16.7
Length of time served	4.19	5.58	-22.45**	35.1	5.67	5.58	1.21	2.7
Drug problems	0.31	0.32	-0.64	4.7	0.32	0.32	0.15	0.0
Violent infraction records	0.15	0.59	-25.66**	226.9	0.56	0.59	-1.43	12.3
Vocational hours	0.82	1.28	-9.25**	19.1	1.29	1.28	0.13	0.5
Rehabilitation hours	1.97	2.30	-5.11**	10.1	2.41	2.30	1.56	3.4
Job hours	2.03	2.48	-7.08**	12.9	2.64	2.48	2.19*	4.6
Family meeting hours	0.28	0.36	-3.68**	19.1	0.36	0.36	-0.25	0.0
Life skills hours	1.20	1.97	-14.26**	34.6	1.96	1.97	-0.15	0.4
AUC		.81				.52		
<i>n</i>	42,368	834			2,240	834		

Note: PSM = propensity score matching; DS = disciplinary segregation; STD = standardized differences; AUC = area under the curve.

p* < .05. *p* < .01.

Table 3: Binary generalized estimating equations predicting violent infractions
($n_I = 3,144$)

Variables	<i>b</i>	SE	Exp(B)
<i>Intercept</i>	-2.15***	.22	0.12
<i>Time points</i>			
Observation 5	-.06	.13	0.94
Observation 4	.09	.13	1.09
Observation 3	.04	.13	1.04
Observation 2	-.19	.14	0.83
Observation 1 (reference)	--	--	--
<i>Static predictors</i>			
Age	-.05***	.01	0.95
Black	-.24**	.09	0.79
Hispanic	.05	.09	1.05
Gang affiliation	-.02	.10	0.98
Risk class	.02	.04	1.02
<i>Dynamic predictors</i>			
Days disciplinary segregation	-.01	.01	0.99
Familial relationship influence	-.11	.08	0.89
Drug problems	.18**	.07	1.20
Length of time served (days)	.01***	.00	1.01
Visits by blood family members	-.21*	.10	0.81
Visits by non-blood family members	.12	.14	1.13
Visits by spouse	-.28	.29	0.76
Rehabilitation program	-.16***	.04	0.86
Vocation program	-.01	.06	0.99
Job program	-.06**	.03	0.94
Family meeting program	-.39	.24	0.69
Volunteer work	-.33	.27	0.72

Note: Institutional programs were originally measured in hours, but they were converted into ordinal or dichotomous level due to high skewness of the distribution. SE = standard error.

* $p < .05$, ** $p < .01$, *** $p < .001$

**Table 4: Cumulative yearly conviction rate outcome comparisons by study group
($n_2 = 3,074$)**

Outcome	Year 1%			Year 2%			Year 3%		
	Non-DS	DS	p value	Non-DS	DS	p value	Non-DS	DS	p value
Felony	1.05	1.10	.853	0.82	0.65	.451	0.46	0.49	.800
Violent Felony	0.25	0.39	.146	0.24	0.20	.660	0.14	0.16	.753
Property Felony	0.38	0.40	.906	0.22	0.18	.504	0.14	0.20	.558
Drug Felony	0.25	0.16	.051	0.15	0.15	.930	0.10	0.07	.321
Sex Felony	0.01	0.00	.496	0.01	0.00	.046*	0.00	0.00	.549
Violent Msdr	0.14	0.12	.568	0.09	0.09	.861	0.07	0.09	.419
Property Msdr	0.19	0.24	.284	0.12	0.15	.256	0.08	0.14	.106
Drug Msdr	0.19	.021	.605	0.12	0.18	.051	0.09	0.15	.064
Sex Msdr	0.00	0.00	.529	0.00	0.00	.085	0.00	0.00	.426
Other Msdr	0.12	0.14	.474	0.07	0.13	.011*	0.05	0.09	.149

Note: DS = disciplinary segregation. 'Felony' represents the sum of violent, property, drug, and sex felony convictions.

* $p < .05$