The Impact of Restrictive Housing on Inmate Behavior: A Systematic Review of the Evidence

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Abstract

Restrictive housing (RH) is one of the most controversial of contemporary correctional practices. It represents one of the most severe sanctions that correctional authorities can impose upon inmates. Policy makers and corrections officials often justify the use of RH on the premise that it makes institutions and communities safer. Critics of the practice vehemently disagree, arguing instead that RH causes substantial psychological damage and increases crime. Despite the fact that U.S. and Canadian correctional systems routinely use RH, there is remarkably little known about what impact this practice has on inmates, facilities, or communities. This essay contributes to this gap in knowledge by conducting a systematic review of the empirical evidence on the impact of RH on behavioral outcomes, including aggregate-level measures of institutional violence, and individual-level measures of institutional adjustment and post-release recidivism. The main finding of this investigation is that RH does not appear to be an effective means of reducing criminal behavior. This review also reveals that the evaluation literature, particularly those studies with stronger methodological designs, tends to report null to weak effects of RH on behavioral measures. This essay further discusses the policy and practical implications of these findings.

Keywords: restrictive housing, solitary confinement, administrative segregation, disciplinary segregation, institutional misconduct, recidivism

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Introduction

Restrictive housing (RH)—often referred to as solitary confinement—is one of the most severe punishments that justice officials can impose upon inmates in the modern correctional era (Butler & Steiner, 2017). Although corrections officials and researchers often refer to RH by a variety of names, prior scholarship suggests there are three distinct sub-types, including *disciplinary segregation* (i.e., punishment for serious misconduct), *protective custody* (i.e., protection of vulnerable inmates), and *administrative segregation* (i.e., isolation of disruptive or dangerous inmates; Mears, 2016). Regardless of terminology, however, this type of housing typically involves seclusion in a closed cell for 20 or more hours per day with little to no access to services, programming, privileges, or other people (Cochran, Toman, Mears, & Bales, 2017).

Proponents often justify the use of RH on the premise that it deters violence and misbehavior within correctional institutions, and further reduces criminal behavior after release (see Mears & Castro, 2006). Its prevalence in U.S. and Canadian correctional facilities indicate a high level of administrative support for RH. To illustrate, a recent Bureau of Justice Statistics report reveals that nearly 20% of prison inmates and 18% of jail inmates in the U.S. spent time in RH in the previous year (see Beck, 2015). Another report from the Office of the Correctional Investigator finds that more than 24% of inmates in the Canadian federal prison system spent some time in a RH setting over the course of one year (see Zinger, 2013).

Despite its widespread use, there are growing concerns about the collateral consequences of RH. Critics contend, for example, that the use of RH violates inmates' constitutional rights, contributes to physical and psychological problems, and increases criminal behavior (e.g., Haney, 2003; Kupers, 2008; Lovell, 2008; Shalev, 2009). Although a full analysis of the many

potential collateral consequences is beyond the scope of the current essay, we focus here on the impact of RH on inmate behavior by systematically reviewing the available empirical literature. This work builds upon the prior attempts to summarize this research (e.g., Gendreau & Goggin, 2017; Steiner & Cain, 2016) in three important ways: (1) it includes a more extensive body of research; (2) it provides a more comprehensive analysis of the research findings separated by outcome type and methodological quality; and (3) it identifies gaps in knowledge and sets an agenda for future research in this area.

Assessing the Impact of Restrictive Housing

Despite the ongoing and frequently contentious debate regarding the use and effects of RH, the theoretical underpinnings of this correctional practice remain unclear and without agreement (Mears, 2016). This is problematic because research shows that interventions are most effective when grounded in a well-supported theory (Rossi, Lipsey, & Freeman, 2004). Theories explain what a particular strategy seeks to achieve and provide a rationale for the expected pattern of results. In the absence of theoretical guidance, however, "there is little prospect that the program will be effective" (Rossi et al., 2004, p. 135). Although a full analysis of the many possible criminological theories underlying the use and effect of RH is beyond the scope of the current essay, we begin with a brief review of three opposing theoretical perspectives as a means to contextualize the potential impact this practice might have on inmate behavior.[1]

The first perspective contends that RH is necessary for ensuring safety, order, and control within the institution and beyond. This position aligns with the philosophy of deterrence and rests on the assumption that the unpleasant nature of RH is the antidote for antisocial behavior

[1] For the interested reader, we recommend the reviews on the theories of RH by Gendreau and Goggin (2017), Mears and Reisig (2006), Morris (2016), Pizarro and Stenius (2004), as well as Steiner and Cain (2016).

(Nagin, 2013). From this view, the existence of RH reminds inmates that noncompliance with institutional rules and expectations will result in their placement in this aversive environment (i.e., general deterrent). Further, due to the negative experiences in RH, inmates held in such settings will refrain from misbehavior out a desire to return to and remain in the general population (i.e., specific deterrent). As such, this perspective argues that RH operates as a punisher by decreasing criminal behavior.

The second perspective holds that RH is criminogenic. This position aligns with several general criminological theories, including deprivation (Clemmer, 1940; Sykes, 1958), social bonds (Hirschi, 1969), social learning (Akers, 1973), labeling (Braithwaite, 1989), strain (Agnew, 1992), and defiance (Sherman, 1993). From this view, the harsh conditions and idleness of RH intensify the pains of imprisonment, which cause its inhabitants to adopt antisocial values as a coping response. Restrictive housing further weakens social bonds, decreases perceptions of fairness and respect, bestows a negative label, isolates from social networks that might promote prosocial behavior, and provides few if any opportunities for rehabilitation. Accordingly, this perspective insists that RH has the unintended consequence of increasing criminal behavior.

The third perspective suggests that RH has little meaningful effect on inmate behavior. This position aligns with the importation and behavioral deep freeze theories, which describe institutional adjustment as an extension of one's previously held values and motivations (see Irwin & Cressey, 1962; Thomas & Foster, 1973; Zamble & Porporino, 1990). From this view, one's behavior is determined by preexisting socialization factors (e.g., antisocial attitude, on-going community ties, post-prison expectations), and is not influenced by the experience or existence of RH. Subsequently, this perspective maintains that RH has a null effect on criminal behavior.

It is important to acknowledge that it is also possible for two or more of these perspectives to be correct. For example, RH may differentially impact certain inmates, with some positively affected, others adversely affected, and yet others still unaffected. For example, the effect of RH might be conditioned by inmate characteristics (e.g., age, gender, race, mental health status, risk for recidivism), conditions in RH (e.g., physical structure, correctional climate, how inmates are treated by staff, type/severity of restrictions imposed), or the nature of the placement (e.g., length of time in RH, reason for placement, opportunities to earn release). It is of significant scholarly and policy relevance to determine if, with whom, and under what conditions, RH produces either positive, negative, or null effects (Frost & Monteiro, 2016). Such knowledge would certainly be helpful to correctional authorities in devising the best policies for reducing criminal activity both in and out of prison. Likewise, there is a critical need to take stock of what is known about the effects of RH on inmate behavior.

Systematic Review of the Evidence

There exist few empirical investigations that directly assesses any of the previous theoretical perspectives, and even less research that examines if there are certain inmate characteristics that differentially influence the impact of RH on behavioral outcomes. In order to cumulate knowledge on the impact of RH, this study systematically reviews the existing evaluation literature. Scholarship in this area varies greatly on many dimensions that are important to understanding its effect, including the type of methodology used, the setting and sample characteristics included, and the types of RH and outcomes evaluated. In light of these considerations, we chose not to use meta-analysis to summarize the literature. As an alternative, a systematic review provides the opportunity to discuss in greater detail the differences in the research design, methodological quality, and analytical strategy of the research in the current

literature base (Nagin, Cullen, & Jonson, 2009). It also serves as a mechanism to identify gaps in knowledge and provide direction to researchers on areas in need of further empirical inquiry. Nonetheless, it is our contention that as more methodologically rigorous studies become available, a quantitative synthesis of the research is essential to generate mean effect size (ES) estimates.

Research Design and Method

Literature Retrieval

The current investigation identifies relevant studies though several steps. This involves a keyword search using the terms "restrictive housing," "solitary confinement," "administrative segregation," "disciplinary segregation," and "supermax" in multiple computerized database systems, including the National Criminal Justice Reference Service, Criminal Justice Abstracts, PsycINFO, Sociological Abstracts, Dissertation Abstracts, and Google Scholar. This also includes a search of the indexes in the journals that frequently publish research on RH, such as *Criminology*, *Justice Quarterly*, *Journal of Criminal Justice*, *Canadian Journal of Criminology,* and *The Prison Journal.* It further involves a search in the resource libraries of the National Institute of Justice and National Institute of Corrections and the annual conference programs of the American Society of Criminology and Academy of Criminal Justice Sciences for non-peer reviewed research. Finally, it includes a review of the reference lists from each of the identified studies to determine if there are other relevant works not discovered by the other means.

Eligibility Criteria

The inclusion criteria of this review require a primary study to involve a quantitative analysis of the effects of RH on any one of three categories of behavioral outcomes: *aggregate measures of institutional violence*, *individual measures of post-release recidivism*, or *individual*

measures of institutional adjustment. This process excludes studies examining non-behavioral outcomes, such as physiological and psychological indices (for more information on the effects of RH on medical and mental health outcomes, see the reviews by Kapoor & Trestman, 2016; and Morgan et al., 2016). It also omits discussions of ethical and legal issues related to the use of RH (for more information on RH constitutionality concerns, see the reviews by Cohen, 2016; and Collins, 2004). As discussed above, the operationalization of RH in the current investigation broadly includes placement for punitive, protective, or other management purposes. Wherever possible, however, this review makes distinctions between the type of RH evaluated and provides descriptions of the specific correctional system in which the study took place. We organize this evidence review by outcome type and describe the findings by methodological approach and scientific rigor.

Results

This review of the evidence identifies 37 empirical evaluations on the behavioral effects of RH. Among these studies, eight examine the impact of RH on aggregate measures of institutional violence, including indicators of inmate-on-inmate and inmate-on-staff violence (e.g., stabbings, homicides, assaults). Three of the institutional violence studies take place in a single state prison system and five occur in multiple states. Fifteen evaluations assess the influence of RH on post-release recidivism, including measures of revocation, re-arrest, re-conviction, and re-incarceration. Seven of the recidivism studies investigate the effects of RH generally, six focus on the impact of the supermax exclusively, and two involve the effects of disciplinary segregation. Eleven of the recidivism investigations occur within a single state prison system, one occurs in the U.S. federal prison system, and three take place in the Canadian federal prison system.

Sixteen evaluations examine the impact of RH on indicators of institutional adjustment.[2] Five of the institutional adjustment studies include measures of attitude or emotions related to criminal behavior, three involve administrative decisions to release inmates early, five involve measures of institutional misconduct, and three focus on assessing the influence of moderators on misbehavior in prison. Within these works, seven use a broad measure of RH, eight limit their investigation to only disciplinary segregation, and one involves separate analyses for disciplinary and administrative segregation. Ten of the institutional adjustment studies take place in a single state prison system, one occurs in the U.S. federal prison system, four take place in the Canadian federal prison system, and one includes prisons from the U.S. and Canada.

In the current investigation, we use the Maryland Scientific Methods Scale to assess the methodological rigor of the research design in these RH evaluations (see Sherman et al., 1997). Accordingly, this review includes two "Level 1" study (i.e., correlation); 15 "Level 2" studies (i.e., nonequivalent comparison group design, or a pre-post comparison without a comparison group); 11 "Level 3" studies (i.e., quasi-experimental design with the use of a regression technique to account for group differences, or a repeated measures design without a comparison group); and nine "Level 4" studies (i.e., quasi-experimental design with the use of a matching technique to account for group differences, or a repeated measures design with a comparison group). This review does not include any "Level 5" studies (i.e., randomized control trial). For the purposes of this review, we categorize Level 1 and Level 2 studies as "low quality," Level 3 studies as "medium quality," and Level 4 studies as "high quality."

[2] The investigations by Motiuk and Blanchette (2001) and Thompson and Rubenfeld (2013) include measures of post-release recidivism and institutional adjustment.

From the 37 studies included in this systematic review, we uncover a total of 119 separate effect sizes, with 40 involving an institutional violence outcome, 39 involving a recidivism outcome, 31 involving an institutional adjustment outcome, and nine involving a moderator analysis between two different types of inmates who are both exposed to an RH condition. Our analysis focuses on two aspects of each effect size: direction and statistical significance. More specifically, we code the direction of an effect size as "negative" if the sign of the effect indicates an improvement on the variable of interest (e.g., reduces violence, recidivism, misconduct) and as "positive" if the sign of the effect indicates a detriment on the variable of interest (e.g., increases violence, recidivism, misconduct). We use $p < .05$ as our threshold for determining statistical significance.

Table 1 summarizes the effect size information for the studies included in this review. As can be seen in the table, two-thirds of the effect sizes are positive. This suggests that the majority of the empirical research finds the experience of RH to be iatrogenic toward inmate behavioral outcomes. The table also reveals, however, that only a little more than a third of these effect sizes reach statistical significance at the .05 level. Further, the percentage of statistically significant effect sizes drops appreciably when examined by methodological quality, with 50% of the low quality, 32% of medium quality, and 28% of high quality effect sizes reaching statistical significance.

(Insert Table 1 about here)

Table 1 also separates these findings by outcome type. All three subcategories indicate a greater proportion of positive effects than negative effects. Recidivism outcomes report the highest level of detriment, with 85% of the effect sizes falling in the positive category. A general pattern also emerges within these subcategories with higher quality studies reporting fewer

statistically significant findings. The one exception is with respect to the institutional adjustment outcomes, where medium quality studies possess fewer significant effects compared to high quality studies (18% compared to 33%). The relatively small number of studies and effect sizes included in both of these categories, however, likely has some bearing on these results. For more detail on study and effect size information refer to the Appendix. Next, we provide a more detailed review of this research separated by outcome type and methodological strategy.

Institutional Violence

Early research on the impact of RH examines the impact of policy changes (e.g., prison lock down) on measures of institutional violence. For example, a study in California compares estimates of violence throughout the state prison system before and after the implementation of a policy change in 1973 to "lock down" the four highest security facilities (Bidna, 1975). This investigation reports a reduction in the rates of stabbings (Mean of .10 per 100 inmates before the lock down versus .07 after) and inmate-on-staff assaults (Mean of .05 per 100 inmates before the lock down versus .03 after); however, this study also reveals an increase in the rate of stabbings within the higher security settings (Mean of .25 per 100 inmates before the lock down versus .56 after).

A similar investigation in Texas examines the trends in institutional violence before and after a massive lock down in 1985 of the state's gang members and other inmates with records of violence (Crouch & Marquart, 1989). This research describes the decrease in the number of homicides following the lock down—25 homicides in 1985, 5 in 1986, and 3 in 1987—as evidence of the success of this policy change (see also Ralph & Marquart, 1991). Further, a survey of 416 men inmates incarcerated during these reform efforts indicates an increase in inmates' perception of safety in the general population in the aftermath of the lock down (Crouch

& Marquart, 1990). The conclusion from these two works is that the use of RH helps to reduce violence and improve inmates' feelings of safety throughout the general prison system; however, this management strategy also increases the number of inmates in RH and transfers violence to these higher security settings. One must interpret these findings cautiously as these investigations involve only two states and include a relatively short observation period before and after a major policy change.

Another investigation using national-level prison data over two decades shows that the decrease in prison riots, inmate and staff homicides, inmate and staff assaults, escapes, and disturbances and arsons between the 1980s and early 2000s does not correlate with the changes in the use of RH during this time (Useem & Piehl, 2006). To illustrate, the authors point out that in 1982, there are 5.4 inmates per 1,000 in RH, and in 2011, there are 5.2 inmates per 1,000. This study argues that if RH is an effective deterrent of institutional violence, this reduction in its use during this period should increase, not decrease, such violence. This suggests that RH may not be directly responsible for improving prison order. As with the two previous studies, however, the research design of this investigation remains speculative because it fails to consider historical threats to validity. That is, this design type cannot rule out the possibility that other policies and practices occurring in tandem with changes in the use of RH may influence these results.

Other research employs more sophisticated research designs and statistical techniques to assess the effect of RH on measures of institutional violence; however, the findings from this group of works remains mixed. For example, a study using a multiple interrupted time series design to assess if the opening of a new supermax facility in three states (Arizona, Illinois, and Minnesota) led to different levels of violence in comparison to a state without a supermax prison (Utah) during the same time period (Briggs, Sundt, & Castellano, 2003). This investigation

reports that the addition of a supermax prison has no effect on levels of inmate-on-inmate violence throughout the state prison systems; however, it also reveals conflicting findings of inmate-on-staff assaults between states (see also Sundt, Castellano, & Briggs, 2008). More specifically, the analyses suggest no difference in staff assaults in Minnesota, a temporary increase in Arizona, and a reduction in Illinois. These findings call into question the ability of RH to reduce institutional violence. This investigation, however, includes only the four jurisdictions with sufficient data to conduct the longitudinal time series analysis, which raises some concerns about the generalizability of these study locations.

Another analytic approach involves the use of multilevel structural equation modeling. For example, one study examines the effect of different administrative control strategies on inmate assaults using a nationally representative sample of 4,168 adult men inmates from 185 state correctional facilities (Huebner, 2003). This study finds that the percent of the inmate population in RH is not related to the number of inmate-on-inmate or inmate-on-staff assaults. Another investigation examines the influence of different facility-level characteristics on inmate levels of violence at two time points (1995 and 2000) in 512 state-operated prisons spread across 45 states (Steiner, 2009). This study finds that the proportion of inmates held in disciplinary segregation within a facility is not statistically related to the number of inmate-on-inmate assaults or the occurrence of a collective violence[3] incident in 1995, but is positively associated with these outcomes in 2000. This investigation further shows that an increase in the use of disciplinary segregation from 1995 to 2000 reduces the likelihood of both the individual and group violence measures in 2000. This study also reports that the proportion of inmates held in

[3] This study defines collective violence as any incident, excluding fires, that involves five or more inmates and results in serious injury to a person or significant property damage.

protective custody within a facility is generally not statistically related to levels of institutional violence, with the exception that the use of protective custody in 2000, and an increase in its use from 1995 to 2000, positively relates to the number of inmate-on-inmate assaults in 2000. Finally, another study investigates the impact of different types of administrative controls on measures of inmate deviance in 247 state prisons for men and women across 40 states (Wooldredge & Steiner, 2015). This study finds that the proportion of inmates held in RH has a positive relationship with both violent and non-violent misconduct offense levels; however, the magnitude of these relationships is considerably weaker when the authors control for the population composition.

Post-release recidivism

Research comparing recidivism rates suggests that inmates who experience RH while in custody are more likely to recidivate than those who do not experience such a placement. For example, a recidivism study in Connecticut finds that of a random sample of inmates discharged from the state prison system in 1997 (n = 423), 92% of those who experienced RH during their commitment were re-arrested within three years compared to 66% of those with no such experience in custody (Legislative Program Review and Investigations Committee, 2001). Another study in Colorado reveals that of inmates held in RH at some point between 1995 and 2003 and also released from the states' custody during this same time period (n = 639), 64% were returned to prison within three years of release (O'Keefe, 2005), which is higher than the average state recidivism rate of 50% for all inmates during this same time period (Rosten, 2004). Similarly, a California study indicates that of the 115,254 inmates paroled from the state prison system in fiscal year 2006-2007, nearly 70% of those who spent time in RH during their

commitment returned to prison within three years compared to 65% of those with no RH experience (Seale et al., 2011).

Support for higher rates of recidivism among RH inmates is not limited to research conducted in state correctional systems or the United States. For example, a study in the United States federal prison system finds that of the 1,550 inmates released from the Alcatraz Federal Penitentiary between 1934 and 1964 (i.e., RH group), 50% were returned to federal custody during follow-up compared to 37% of a random sample of 257 inmates released from the Leavenworth Federal Penitentiary during the same time period (i.e., non-RH comparison group; Ward & Werlich, 2003). Further, three studies in the Canadian federal prison system also indicate higher recidivism rates among inmates exposed to RH. The first study compares post-release outcomes between inmates held in voluntary or involuntary RH on November 9, 1996 (n = 478) to a random sample of inmates from the general population incarcerated on the same day (n = 453; Motiuk & Blanchette, 2001). This study reports that 62% of the RH inmates were re-incarcerated for a new offense compared to 38% of the non-RH inmates. The second study involves a cohort of 5,469 inmates released from the Canadian federal system between 1999 and 2001 (Smith, 2006). This investigation reveals that placement in involuntary RH is positively associated with re-incarceration for a new criminal offense within two years of release from prison (r = .14, 95% CI = .11 to .17). The third study involves 2,255 women inmates admitted to the Canadian federal system after March 31, 2002 and were released before April 1, 2012 (Thompson & Rubenfeld, 2013). This investigation shows that 59% of the 687 women who experienced RH in custody had their post-release supervision revoked compared to only 29% of the 1,568 women who did not experience RH. This study further shows that RH has a more deleterious effect on post-release supervision revocations of non-Aboriginal women (i.e., 32%

more revocations among RH group than non-RH group) than of Aboriginal women (i.e., 22% more revocations among RH group than non-RH group.

Although it may be tempting to conclude from such research that RH has a criminogenic effect, these findings should be interpreted cautiously as these studies involve nonequivalent comparison groups. Recall that correctional administrators place inmates in RH for chronic or serious misbehavior, or when administrators feel it is unsafe to manage them in the general population (Metcalf et al., 2013). Inmates in RH thus tend to possess more extensive criminal histories and other criminogenic risk factors than the inmates in the general population (Labrecque, 2017). It is therefore not surprising that direct comparisons made between these two groups find RH inmates to have higher recidivism rates. Nonetheless, it remains possible that the experience of RH may increase one's propensity toward post-release recidivism. This causal determination, however, warrants the need for empirical research that can account for these underlying group differences. Failure to control for these confounding variables may inadvertently lead to the interpretation of the cause of RH as its effect.

One way for research to account for potential confounders is to employ multivariate regression techniques, including logistic and linear regression. A study in a Northeastern state department of corrections system, for example, uses binary logistic regression and ordinary least-squares regression to assess the influence of duration in RH on the occurrence of post-release recidivism and the timing to recidivism, while controlling for measures of inmate demographic characteristics, criminal history, and institutional behavior (Pizarro, Zgoba, & Haugebrook, 2014). This investigation reveals that among a sample of 610 men inmates confined in a supermax unit on January 1, 2004 and also released from custody in 2004, the length of time spent in RH confinement is not statistically associated with return to prison or length of time

until return to prison during an approximately five-year follow-up period. This study further shows that direct release from RH to the community is also not statistically related to the two types of recidivism examined. While an improvement over the nonequivalent comparison group investigations, regression-based studies are also not without limitations, including having to meet difficult assumptions and not being able to estimate causal effects.

Other studies attempt to address the issue of group selection bias by using more advanced statistical matching techniques (e.g., frequency matching, propensity score matching) to construct a control group of non-RH inmates that are similar to the RH inmates on a multitude of criminogenic factors (e.g., offender demographics, criminal history). The matching process helps account for the potential influence of the included covariates on the outcome of interest. This type of research primarily investigates the effect of long-term RH (i.e., supermax) on post-release outcomes and suggests that this experience has a weak to null effect on recidivism.

A study in Washington identifies 200 men inmates released from the state department of corrections custody in 1997 and 1998 who spent at least 12 weeks in supermax confinement during their commitment (Lovell, Johnson, & Cain, 2007). In this investigation, the researchers use nine demographic and criminal history variables to construct a one-to-one matched control group from the 6,453 inmates released during the same time period who did not experience RH during their prison term. Although the RH group has more new felony convictions after three-years from release than the non-RH group (53% compared to 46%), this difference is not statistically significant. The study further reports that length of time spent in RH does not make a significant independent contribution to felony recidivism beyond that of the control variables. This investigation does, however, find that inmates released directly from RH to the community have a higher recidivism rate than those returned to the general population at least three months

before being released to the community (69% compared to 46%, respectively). It is worth noting that the direct release inmates are also younger and have more extensive criminal histories in comparison to the gradual release group; and when these two groups are matched on age and criminal history, the difference in outcome is no longer statistically significant.

Another evaluation in Washington state examines differences in three-year post-release recidivism outcomes of inmates with and without evidence of a serious mental illness (Lovell & Johnson, 2004). This study reports that spending 90 days or more in RH (i.e., supermax) during one's sentence leads to a 9% increase in new felony convictions among inmates without a serious mental illness ($p < .05$) and a 4% decrease among inmates with a serious mental illness ($p > .05$). This study also reveals that this differential influence also applies to new-person offense outcomes, where the negative relationship among the non-mentally ill is statistically significant at the .01 level, but the association among those with a serious mental illness is not statistically significant.[4]

A study in Florida involves 1,247 men inmates released from the state department of corrections between July 1996 and June 2001 who spent at least one year in prison with 90 days or more in supermax confinement (Mears & Bales, 2009). This study uses propensity score matching to select a control group from the 58,752 inmates released during this time period who did not experience RH, but were similar to the supermax group on 13 demographic, criminal history, and institutional behavior variables. This investigation reveals no significant difference in the number of three-year post-release new felony convictions between the RH and non-RH matched groups (59% versus 58%, respectively); however, it finds RH inmates are more likely to

[4] This report does not provide information on the number or percentage of inmates in either group who recidivate.

receive a new conviction for a violent offense than non-RH inmates (24% versus 21%, respectively). This study further reveals that duration spent in RH and timing of release from RH (i.e., direct or later release) does not have any influence on any of the recidivism outcomes examined.

Finally, an investigation of post-release supervision in Ohio identifies 57 men inmates released from the state department of corrections custody between July and September of 2003 or May and July of 2005 who served any amount of time in supermax confinement during their sentence (Butler, Steiner, Makarios, & Travis, 2017). This study employs propensity score matching to identify a non-RH comparison group from the 1,661 inmates also released during the same time periods who are similar on 16 demographic, social, and criminal history variables. Although the findings indicate RH inmates are more likely than matched non-RH inmates to be arrested within one-year post-release for a new felony offense (25% compared to 16%, respectively) and to be returned to prison within seven-years post-release (67% compared to 56%, respectively), these differences are not statistically significant.

In sum, the available regression-based and matching literature indicates that the experience of supermax, the length of time spent in supermax, and the timing of release from supermax are *not* statistically associated with post-release recidivism measures in two-thirds of the effects sizes in this study. One should not interpret this as evidence that supermax necessarily has no effect on recidivism. For one, this research includes only one regression-based study and four matching evaluations and is further limited to only four state jurisdictions. Secondly, the relatively small sample sizes in three of these four matching investigations (i.e., $N = 114$ in Butler et al., 2017; $N = 242$ in Lovell & Johnson; $N = 362$ in Lovell et al., 2007) likely influence the non-significance in the findings. Finally, all four matching investigations generally report

higher recidivism rates among the inmates from the supermax group in comparison to the inmates from the matched control group, regardless of how the outcome variable is operationalized (e.g., arrest, conviction, incarceration). Although this seems to indicate that supermax may produce a slight criminogenic effect, one should also interpret this conclusion with caution, as these studies match the RH and non-RH groups primarily on demographic and criminal history indicators. As such, these works fail to account for other potential factors that may influence placement in RH, such as institutional behavior, prior segregation experience, and mental health status, which raise questions about the comparability of the two groups and the validity of the findings.

The research on the effects of supermax may or may not generalize to other variants of RH confinement, such as when it is used for punitive, protective, or for other administrative purposes. Two recent investigations, however, tackle this question by assessing the impact of disciplinary segregation on recidivism outcomes. The first study takes place in Ohio and involves a random sample of 1,983 men and women inmates released from state custody during a three-month period in 2003 or three-month period in 2005 (Butler, Steiner, Makarios, & Travis, 2014). Approximately half of the inmates in this study experienced a stay in disciplinary segregation at some point during their commitment and were more likely to be arrested for a new felony within one-year of release compared to the non-RH group (26% compared to 22%, respectively). A multivariate logistic regression analyses further reveals that RH placement is associated with a 40% increase in the odds of a new felony re-arrest.

The second study in Minnesota includes 6,504 men and women inmates released from the states custody in 2014 (Clark & Duwe, 2016). Approximately one-third of these inmates spent time in RH for disciplinary purposes. The investigation uses event history analysis and finds that

direct release from RH to the community did not have a significant or substantial effect on post-release supervision revocations, new arrests, or new convictions. The proportion of one's sentence spent in RH was statistically related to supervision revocations, but not arrests and convictions. These findings generally fall in line with the supermax evaluations described above, but work in this area is far from definitive. Although these two studies attempt to control for confounding variables in their multivariate analyses (e.g., demographics, criminal history), they too suffer from the reliance of data collected by the state correctional departments for other purposes.

Finally, the recidivism research in this area focuses primarily on the general effect of RH, and much less on the differential impact this setting has among various subpopulations of offenders. One exception involves an investigation that separates its findings by inmate age group. This study uses longitudinal survey and administrative data from 1,354 adolescents who were adjudicated of a criminal offense in Philadelphia and Phoenix between November 2000 and January 2003 and completed a pre-release interview to assess if RH has a differential effect on juvenile offenders (Clark & Pyrooz, 2016). This study finds that inmates who experience RH as a juvenile (ages 14 to 17) have nearly identical counts of arrest during the duration of the study as those who experience RH as an adult (ages 18 to 26; 2.86 compared to 2.89, respectively). One should interpret this finding cautiously it is limited to just one investigation and in need of replication. This continued line of research on moderators will be invaluable for identifying if there are certain inmates who may be especially susceptible to that iatrogenic effects of RH.

Institutional adjustment

Attitudinal/emotional outcomes. There are several ways to assess institutional adjustment, one of which includes indicators of antisocial attitude and negative emotions, such as

anger and hostility. The RH research using cross-sectional designs is mixed, with some findings suggesting a null effect and others indicating an iatrogenic effect. A study in three prisons in the U.S. and Canada compares the psychological reactions to the experience of confinement between 71 men and women inmates with experience in RH and 49 inmates with no experience in RH (Suedfeld, Ramirez, Deaton, & Baker-Brown, 1982). Among the battery of assessments given to the offenders in this investigation is the Multiple Affect Adjective Checklist (MAACL), which provides separate scores for feelings of anxiety, depression, and hostility (Zuckerman & Lubin, 1965). In two of the institutions, the investigators find no statistically significant difference between groups on the hostility scale, and in the other facility the RH inmates report higher scores on the hostility scale than the non-RH control group (11.1 versus 6.9).

Another study in a federal prison in Kentucky compares levels of psychological distress between 30 men inmates in three types of housing, general population (i.e., least restrictive), administrative segregation, and disciplinary segregation (i.e., most restrictive; Miller & Young, 1997). This investigation uses the Brief Symptom Inventory (Derogatis, 1975), which provides information on nine primary symptom dimensions, including hostility (see also Miller, 1994). This study reveals a statistically significant relationship between level of restriction and the dimension of hostility, where the mean score for general population inmates is 38.5, administrative segregation is 43.8, and disciplinary segregation is 71.0.

Finally, an investigation in a single state department of corrections system examines the attitudes and orientation of 3,880 men and 217 women inmates within 24 months of parole eligibility or maximum sentence date (Wolff, Morgan, & Shi, 2013). This study uses the Criminal Sentiments Scale-Modified (CSS-M; Simourd, 1997) to measure attitudes, values and beliefs related to criminal behavior, the Buss-Perry Aggression Questionnaire-Short Form

(BPAQ-SF; Bryant & Smith, 2001) to measures violence, aggression and anger, and the Brief Self-Control Scale (BSCS; Tangney, Baumeister, & Boone, 2004) to measure self-control. This evaluation includes multilevel modeling and finds that the number of days spent in RH has a significant, positive, and weak effect on criminal sentiments, aggression, and self-control among men, and finds no statistically significant difference among women.

This cross-sectional research is informative; however, it only provides information on inmates at one point in time. As mentioned above, inmates in RH tend to possess a higher prevalence of certain criminogenic characteristics, including mental illness. Likewise, these investigations suffer from the same control group issues we note in the previous section. In response, more recent research undertakes longer-term investigations that assess individuals at multiple points in time. This strategy allows researchers to speak more directly about the causal effects of RH and it provides the opportunity to compare rates of change between the RH and non-RH groups.

A longitudinal investigation in three Canadian prisons, for example, examines the psychological effects of 23 inmates in RH and 37 random inmates from the general population at three time points: baseline, 30 days later, and 60 days later (Zinger, Wichmann, & Andrews, 2001). This investigation involves a battery of psychological measures, including the Aggression Questionnaire (AQ; Buss & Perry, 1992). Although the RH group reports higher levels of aggression across all three assessment periods than the non-RH control group, both groups show a reduction in AQ score after 60 days. Another longitudinal study in Colorado involves 247 men inmates from three settings: RH, general population, and a psychiatric facility (O'Keefe, Klebe, Stucker, Sturm, & Leggett, 2010). The study assesses for differences in psychological symptoms using 12 constructs between the RH inmates in comparison to the control groups during regular

interviews for one-year (see also O'Keefe et al., 2013). This investigation reveals that among mentally ill inmates, RH did not statistically influence scores on a composite anger-hostility scale; however, this experience led to a significant increase in anger-hostility among non-mentally ill inmates. On the whole, the findings from these longitudinal investigations suggest that RH produces a similar effect on inmate attitude and emotions as placement in the general prison environment (see also Gendreau & Labrecque, 2017).

Discretionary release outcomes. Another indicator of institutional adjustment involves the administrative decision to release an inmate early from custody to community supervision (e.g., parole). Correctional authorities use discretion in this process based in part on their perception of how successful they believe the inmate will be in the community. Three investigations in the Canadian federal prison system find that inmates who experience RH are less likely to be granted discretionary release than those who do not. The first suggests that among men inmates incarcerated between 1995 and 2000, those who experience voluntary or involuntary RH during this time are less likely than their non-RH counterparts to receive a discretionary release (63% versus 85%; Wichmann & Nafekh, 2001). A second study finds that men inmates incarcerated on November 9, 1996 (n = 1,598) with experience in voluntary or involuntary RH are also less likely than their non-RH counterparts to receive a discretionary release (24% compared to 76%; Motiuk & Blanchette, 2001). The third investigation reports that among a 10-year admission cohort of women inmates, those who experience RH for any reason are less likely to have an early release on community supervision than those without such an experience (49.6% compared to 88.9%; Thompson & Rubenfeld, 2013). These results should be interpreted cautiously as misbehavior in prison often justifies placement in RH, and the parole board often relies on institutional behavior as a basis for making release decisions. Nonetheless it

remains possible that if RH increases one's antisocial behavior in prison, or the perception that one will not be successful if released to the community, this experience may negatively impact an inmate's probability for early release.

Institutional misconduct outcomes. More recently, RH research involves evaluations on measures of institutional misconduct. The majority of which involves short-term disciplinary segregation and finds that the setting produces a null effect. A study in Oregon identifies 2,111 men inmates incarcerated in one of the states five prison facilities from 2011 throughout 2014 (Lucas & Jones, 2017). In this investigation, the authors exclude 1,883 (or 89%) of these inmates from the analysis due to missing risk assessment information (see also Lucas, 2015). This final sample includes 191 inmates who experience disciplinary segregation between 2011 and 2012, and 37 who do not. A multivariate linear regression analyses controlling for other known correlates of misbehavior (e.g., age, length of time spent on current sentence, risk assessment score, number of prior major and minor rule violations) reveals that the experience of disciplinary segregation is not a statistically significant predictor of the total rule violations incurred between 2013 and 2014. This regression-based study is important, but also suffers from issues related to attrition and group selection bias.

Another study in Ohio involves 14,311 men and women inmates admitted into the state prison system between 2007 and 2010 who spent at least a year in custody and also experienced at least one stay in disciplinary segregation within the first three-years of their commitment (Labrecque, 2015). This investigation uses pooled time series analysis to assess the impact of this experience during a three-month time wave on the probability of being found guilty for a rule infraction in the subsequent three-month time wave. This study finds that neither the experience of disciplinary segregation, nor the number of days spent in disciplinary segregation in one wave,

has any statistically significant effect on the prevalence or incidence of violent, nonviolent, or drug infractions in the preceding time wave. Another investigation in Ohio using logistic regression reveals that the length of time spent in disciplinary segregation has no statistically significant effect on subsequent violent, non-violent, or drug misconduct among gang affiliated or non-gang affiliated inmates (Motz, Labrecque, & Smith, 2017).

An investigation in Texas examines the effect of disciplinary segregation as a response to an initial act of violent misconduct on the occurrence and timing of subsequent violent behavior in custody (Morris, 2016). This study identifies 3,808 inmates admitted into the state prison system between 2004 and 2006 who engaged in a violent infraction, 1,076 (or 28%) of which received disciplinary segregation as a response to the first violation. This evaluation uses propensity score matching to select a control group from the inmates who did not receive disciplinary segregation, but were similar to those that did on 27 demographic, criminal history, misconduct, and unit variables. This study reveals no statistically significant group differences on either the occurrence (27% compared to 25%, respectively) or timing of subsequent violent infractions during the first two years of their sentence (306 days compared to 304 days, respectively). Another study in Texas assesses the impact of disciplinary segregation among a sample of 1,236 capital inmates incarcerated between 1970 and 2005 (Medrano, Ozkan, & Morris, 2017). This investigation compares the total counts of punishment (i.e., reprimand, reduce class level, extra duty, cell restriction, loss of privileges) before placement in disciplinary segregation to those incurred upon release and finds no evidence of a deterrent effect.

In sum, the available regression-based and matching literature indicates that the experience of short-term disciplinary segregation is *not* statistically associated with subsequent institutional misconduct, including violations that are serious/violent, less serious/nonviolent,

and drug-related, in more than 90% of the effect sizes in this study. While informative, one should interpret these findings cautiously as the research base includes only five studies from three state jurisdictions. These works also rely on the use of records collected for other administrative purposes, which limits what variables researchers can include in their analyses to either control for or match on.

Moderator analyses. Some recent research examines whether or not disciplinary segregation has a differential impact on institutional misconduct based on inmate gender, race, and mental health status. This research primarily uses propensity score matching techniques with data from the Ohio investigation described above (see Labrecque, 2015). In general, this work concludes that disciplinary segregation has a relatively similar effect on behavioral outcomes across these dimensions, with some noteworthy exceptions. A study examining gender-based differences, for example, reports statistically similar rates of non-violent misconduct between men and women (49% versus 46%), lower rates of violent misconduct for men compared to women (21% versus 29%), and higher rates of drug misconduct for men compared to women (10% versus 3%) during a one-year post-segregation follow-up period (Labrecque, Smith, & Gendreau, 2015). Another investigation reveals there are statistically similar rates of violent misconduct between white and non-white inmates (17% versus 17%), and higher rates of non-violent misconduct for white inmates compared to non-white inmates (34% versus 29%) during a one-year post-segregation follow-up period (Labrecque, 2016). Finally, another study reports statistically similar rates of post-segregation violent misconduct between inmates with a record of a serious mental health condition and those without evidence of such disorders (41% versus 41%), and lower rates of non-violent (67% versus 71%) and drug misconduct between the

mentally ill and the non-mentally ill inmates (27% versus 30%) during follow-up (Smith, Labrecque, & Gendreau, 2015).

This research on potential moderators in this area is important, but comes from one dataset in a single state jurisdiction. The findings are therefore in need of further replication. There is also a need for more investigations into other variables of possible interest, including age, risk level, other types of RH (e.g., protective), as well as for research that assesses group interactions.

Discussion

Restrictive housing remains a highly controversial correctional practice. Its proponents contend that it is an effective deterrent, which dissuades inmates from criminal activity. There are growing concerns, however, by many human rights activists, scholars, and correctional authorities that RH has many damaging collateral consequences, including increasing criminal behavior. Despite its widespread use in U.S. and Canadian correctional institutions, there is a notable lack of empirical research on the impact of RH on behavioral outcomes (Labrecque & Smith, 2013). In response, several criminal justice organizations and correctional scholars urge researchers to study RH (see e.g., Garcia, 2016). This essay responds to these calls by systematically reviewing the empirical literature on the behavioral effects of RH.

The results of this investigation reveal that contrary to what the deterrence position holds, RH does not appear to be an effective means of reducing criminal behavior. Indeed, only one-third of the effect sizes included in this review indicate an improvement on these behavioral indicators. Although the finding that the direction of the effect sizes is overwhelming positive may seemingly provide support for the criminogenic perspective, one should keep in mind that only one-third of the total effect size estimates are statistically significant at the .05 level.

Further, estimates from the high-quality studies, which more effectively account for confounding variables than low quality studies, report approximately half the amount of statistically significant findings as the low-quality studies. This provides some support for the null perspective; however, the true test lies in the assessment of the magnitude of these relationships (Cumming, 2012).

Although we did not quantitatively analyze the strength of the effect sizes in this investigation, our subjective interpretation from this review is that most of the effects—and particularly those from higher quality studies—suggest that RH is associated with a null to weak effect on behavioral measures. As this literature base continues to expand, we encourage scholars to meta-analyze this research in order to help determine with more precision the magnitude of the impact of RH on criminal behavioral outcomes.

This review also highlights the need for more research to assess if RH affects certain subgroups of inmates differently. It is possible that some types of inmates are more vulnerable to suffering the adverse effects of this experience (e.g., young, women, mentally ill). This investigation, however, uncovers only nine effect sizes from four unpublished works on this topic. Therefore, we are unable to say much from an empirical standpoint about the influence of individual moderators on these outcomes. The research base is also replete of empirical analyses that assess for the influence of key situational factors, such as prison management strategies and institutional culture, which may also moderate the effects of RH (see Gendreau & Labrecque, 2017). It is important that future research accounts for these theoretically relevant constructs.

Regardless of the impact of RH on inmate behavior, there are many other factors that corrections officials must consider in choosing whether or not to use RH. For example, even if RH prevents institutional misconducts by temporarily incapacitating certain inmates, it may do

so at a cost, such as by reducing access to medical, mental health, and other treatment services; blocking opportunities for social interaction, recreation, and family visitation; increasing anger, frustration, and risk for self-harm; causing or exacerbating physical and psychological problems; and imposing a negative label. Although a full discussion of these many potential collateral consequences of RH is beyond the scope of the current investigation, we contend that decisions to use RH should not rest solely on its ability to influence behavior.

In closing, this systematic review of the empirical literature finds limited evidence to suggest that RH is effective in improving inmate behavior, which make its continued use, especially at its current levels, a tough correctional policy to defend. It is also noteworthy that several initiatives are currently in progress to examine the effectiveness of interventions and services specifically designed for inmates in RH settings (see Smith, 2016). The development, implementation and evaluation of such programs in RH settings should be a priority for the field of corrections in order to improve behavioral outcomes for inmates, thereby making prisons and communities safer.

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Table 1

Summary of Effect Size Estimates, by Outcome Type and Methodological Rigor

	# studies	# effect sizes	% neg.	% pos.	% sig.
All behavioral outcomes	33	110	34.0	66.0	36.1
Low quality	16	39	27.8	72.2	50.0
Medium quality	11	53	40.8	59.2	32.1
High quality	6	18	27.8	72.2	27.8
Inmate violence	8	40	47.2	52.8	44.4
Low quality	4	18	55.6	44.4	60.0
Medium quality	4	22	38.9	61.1	40.9
Recidivism	14	39	15.4	84.6	33.3
Low quality	7	10	0.0	100.0	40.0
Medium quality	3	14	14.3	85.7	35.7
High quality	4	15	26.7	73.3	26.7
Institutional adjustment	13	31	42.9	57.1	32.3
Low quality	7	11	0.0	100.0	54.6
Medium quality	4	17	64.7	35.3	17.7
High quality	2	3	33.3	66.7	33.3

Appendix

Summary of Aggregate Institutional Violence Outcomes

Authors	Design	Setting	Sample	Independent variable	Dependent variable	Effect / Sig.
Bidna (1975)	Pre-post	California state prison system	Prison population	1973 lock down of four prisons	Total stabbings	Neg. / *
					Fatal stabbings	Neg. / ns
					Staff assaults	Neg. / ns
					Stabbings in GP	Neg. / *
					Stabbings in RH	Pos. / *
Crouch & Marquart (1990)	Pre-post	Texas state prison system	Prison population	1985 lock down of gang members	Homicides	Neg. / nr
					Perceptions of safety	Neg. / nr
Ralph & Marquart (1991)	Pre-post	Texas state prison system	888 gang members	1985 lock down of gang members	Homicides	Neg. / nr
					Assaults	Neg. / nr
					Weapons assaults	Neg. / nr
					Sexual assaults	Neg. / nr
Useem & Piehl (2006)	Correlational	U.S. prison system	Prison population	Trend in the use of RH between 1980s and 2003	Riots	Pos. / nr
					Inmate homicides	Pos. / nr
					Staff homicides	Pos. / nr
					Inmate assaults	Pos. / nr
					Staff assaults	Pos. / nr
					Escapes	Pos. / nr
					Disturbances and arsons	Pos. / nr
Briggs et al. (2003)	Repeated measures	Arizona, Illinois, Minnesota, and Utah state prison systems	Prison population	Construction of supermax in three states	Inmate assaults (Arizona)	nr / ns
					Inmate assaults (Illinois)	nr / ns
					Inmate assaults (Minnesota)	nr / ns
					Staff assaults (Arizona)	Neg. / *
					Staff assaults (Illinois)	Pos. / *
					Staff assaults (Minnesota)	nr / ns
Huebner (2003)	Regression	U.S. state prison system	4,168 men inmates from 185 prisons	% of inmate pop. in RH	Inmate assaults	Neg. / ns
					Inmate assaults	Pos. / ns
Steiner (2009)	Regression	U.S. state prison system	512 men prisons across 45 states	% of inmate pop. in RH (DS)	Inmate assaults (1995)	Pos. / ns
					Inmate assaults (2000)	Neg. / *
					Inmate assaults (2000)	Neg. / ns
					Collective violence (1995)	Pos. / ns
					Collective violence (2000)	Neg. / *
					Collective violence (2000)	Neg. / *
				% of inmate pop. in RH (PC)	Inmate assaults (1995)	Pos. / ns
					Inmate assaults (2000)	Pos. / *

					Inmate assaults (2000)	Pos. / *
					Collective violence (1995)	Neg. / ns
					Collective violence (2000)	Pos. / ns
					Collective violence (2000)	Pos. / ns
Wooldredge & Steiner (2015)	Regression	U.S. state prison system	247 prisons across 40 states	% of inmate pop. in RH	Assaults	Pos. / *
					Nonviolent misconducts	Pos. / *

Note: RH = restrictive housing. GP = general population. Pos. = positive effect. Neg. = negative effect. * = $p < .05$. ns = not significant ($p > .05$). nr = not reported.

Summary of Recidivism Outcomes

Authors	Design	Setting	Treatment	Control	Dependent variable	Effect / Sig.
LPRIC (2001)	NECG	Connecticut state prison system	Any RH	No RH	Re-arrest	Pos. / nr
O'Keefe (2005)	NECG	Colorado state prison system	Any RH	No RH	Re-incarceration	Pos. / nr
Seale et al. (2011)	NECG	California state prison system	Any RH	No RH	Re-incarceration	Pos. / nr
Ward & Werlich (2003)	NECG	U.S federal prison system	RH (Alcatraz)	No RH (Leavenworth)	Re-incarceration	Pos. / nr
Motiuk & Blanchette (2001)	NECG	Canadian federal prison system	Any RH	No RH	Re-incarceration	Pos. / *
					Re-incarceration (new offense)	Pos. / *
Smith (2006)	Correlational	Canadian federal prison system	Any RH	No RH	Re-incarceration	Pos. / *
					Revocation	Pos. / *
Thompson & Rubenfeld (2013)	NECG	Canadian federal prison System	Any RH (Aboriginal women)	No RH (Aboriginal women)	Revocation	Pos. / *
			Any RH (non-Aboriginal women)	No RH (non-Aboriginal women)	Revocation	Pos. / *
Pizarro et al. (2014)	Regression	Northeastern state prison system	*Months in RH (supermax)*		Re-incarceration	Neg. / ns
					Months until re-incarceration	Pos. / ns
			Direct release from RH (supermax)		Re-incarceration	Pos. / ns
					Months until re-incarceration	Pos. / ns
Lovell et al. (2007)	Matching	Washington state prison system	≥ 90 days in RH (supermax)	No RH (supermax)	New felony	Pos. / ns
			Direct release from RH (supermax)	Later release from RH (supermax)	New felony	Pos. / *
Lovell & Johnson (2004)	Matching	Washington state prison system	≥ 90 days in RH (MI in supermax)	No RH (MI in supermax)	New felony	Neg. / ns
			≥ 90 days in RH (NMI in supermax)	No RH (NMI in supermax)	New felony	Pos. / *
			≥ 90 days in RH (MI in supermax)	No RH (MI in supermax)	New felony (person offense)	Neg. / ns
			≥ 90 days in RH (NMI in supermax)	No RH (NMI in supermax)	New felony (person offense)	Pos. / *
Mears & Bales (2009)	Matching	Florida state prison system	≥ 90 days in RH (supermax)	No RH (supermax)	New felony	Pos. / ns

					New felony (violent offense)	Pos. / *
					New felony (property offense)	Pos. / ns
					New felony (drug offense)	Neg. / ns
					New felony (other offense)	Neg. / ns
Butler et al. (2017)	Matching	Ohio state prison system	Any RH (supermax)	No RH (supermax)	Re-arrest	Pos. / ns
					Re-arrest (felony offense)	Pos. / ns
					Re-incarceration	Pos. / ns
					Re-incarceration (new offense)	Pos. / ns
Butler et al. (2015)	Regression	Ohio state prison system	*Any RH (DS)*		Re-arrest	Pos. / *
					Re-arrest (felony)	Pos. / *
			Days in RH (DS)		Re-arrest	Pos. / *
					Re-arrest (felony)	Pos. / *
Clark & Duwe (2016)	Regression	Minnesota state prison system	*Direct release from RH (DS)*		Revocation	Pos. / ns
					Re-arrest	Neg. / ns
					New felony	Pos. / ns
			Proportion of sentence in RH (DS)		Revocation	Pos. / *
					Re-arrest	Pos. / ns
					New felony	Pos. / ns
Moderator analyses						
Clark & Pyrooz (2016)	NECG	Adjudicated delinquents in Philadelphia and Phoenix	Any RH (juvenile)	No RH (adult)	Number of new arrests	Neg. / ns

Note: LPRIC = Legislative Program Review and Investigations Committee. NECG = nonequivalent comparison group. RH = restrictive housing. *Italics* = RH variable used in regression analyses. DS = disciplinary segregation. PC = protective custody. MI = mentally ill. NMI = non-mentally ill. Pos. = positive effect. Neg. = negative effect. * = $p < .05$. ns = not significant ($p > .05$). nr = not reported.

Summary of Institutional Adjustment Outcomes

Authors	Design	Setting	Treatment	Control	Dependent variable	Effect / Sig.
Attitudinal/emotional outcomes						
Suedfeld et al. (1982)	NECG	3 prisons in U.S. and Canada	Any RH	No RH	MAACL-hostility (Inst. A)	nr / ns
					MAACL-hostility (Inst. B)	nr / ns
					MAACL-hostility (Inst. C)	Pos. / *
Miller & Young (1997)	NECG	Kentucky federal prison	Any RH (AS)	No RH	BSI-hostility	Pos. / *
			Any RH (DS)	No RH	BSI-hostility	Pos. / *
Wolff et al. (2013)	Regression	A state prison system	*Days in RH (men)*		CSS-M	Pos. / *
					BPAQ-SF	Pos. / *
			Days in RH (women)		CSS-M	Neg. / ns
					BPAQ-SF	Neg. / ns
Zinger et al. (2001)	NECG	3 Canadian federal prisons	Any RH	No RH	AQ	nr / ns
O'Keefe et al. (2010)	Repeated measures with control group	Colorado state prison system	One year in RH (NMI)	No RH (NMI)	Hostility-Anger Control	Pos. / *
			One year in RH (MI)	No RH (MI)	Hostility-Anger Control	Pos. / ns
Discretionary release outcomes						
Wichmann & Nafekh (2001)	NECG	Canadian federal prison system	Any RH	No RH	Discretionary release	Pos. / ns
Motiuk & Blanchette (2001)	NECG	Canadian federal prison system	Any RH	No RH	Discretionary release	Pos. / *
Thompson & Rubenfeld (2013)	NECG	Canadian federal prison system	Any RH (Aboriginal women)	No RH (Aboriginal women)	Discretionary release	Pos. / *
			Any RH (non-Aboriginal women)	No RH (non-Aboriginal women)	Discretionary release	Pos. / *
Institutional misconduct outcomes						
Lucas & Jones (2017)	Regression	Oregon state prison system	*Days in RH (DS)*		Total rules violations	Neg. / ns
Labrecque (2015)	Repeated measures	Ohio state prison system	*Any RH (DS)*		Violent misconduct	Neg. / ns
					Nonviolent misconduct	Neg. / ns
					Drug misconduct	Pos. / ns
			Days in RH (DS)		Violent misconduct	Neg. / ns
					Nonviolent misconduct	Neg. / ns
					Drug misconduct	Pos. / ns

Morris (2016)	Matching	Texas state prison system	Any RH (violent inmate in DS)	No RH (violent inmates)	Violent misconduct	Neg. / ns
Medrano et al. (2017)	Pre-post	Texas state prison system	*Any RH (capital inmates in DS)*		Total punishments	Pos. / nr
Motz et al. (2017)	Regression	Ohio state prison system	*Days in RH (gang-affiliated in DS)*		Violent misconduct	Neg. / ns
					Nonviolent misconduct	Neg. / *
					Drug misconduct	Neg. / ns
			Days in RH (non gang-affiliated in DS)		Violent misconduct	Pos. / ns
					Nonviolent misconduct	Neg. / ns
					Drug misconduct	Pos. / ns
Moderator analyses						
Labrecque et al. (2015)	Matching	Ohio state prison system	Any RH (women in DS)	Any RH (men in DS)	Violent misconduct	Pos. / *
					Nonviolent misconduct	Neg. / ns
					Drug misconduct	Neg. / *
Labrecque (2016)	Matching	Ohio state prison system	Any RH (non-white in DS)	Any RH (white in DS)	Violent misconduct	Pos. / ns
					Nonviolent misconduct	Neg. / *
Smith et al. (2015)	Matching	Ohio state prison system	Any RH (MI in DS)	Any RH (NMI in DS)	Violent misconduct	Pos. / ns
					Nonviolent misconduct	Neg. / *
					Drug misconduct	Neg. / *

Note: NECG = nonequivalent comparison group. RH = restrictive housing. *Italics* = RH variable used in regression analyses. DS = disciplinary segregation. AS = administrative segregation. MI = mentally ill. NMI = non-mentally ill. Pos. = positive effect. Neg. = negative effect. * = $p < .05$. ns = not significant ($p > .05$). nr = not reported.