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ORIGINAL PAPER

The Effect of Facility Security Classification on Serious Rules Violation Reports in California Prisons: A Regression Discontinuity Design

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Abstract

Objectives Prison facility security classification is intended to recognize differences across inmates with regard to the propensity to commit misconduct and to appropriately house inmates with varying levels of violent and/or antisocial behavior while they are incarcerated. The intent of security classification is to increase safety for staff and other inmates, but little is known about the effect of security classification on prison misconduct.

Methods Using administrative records of roughly 60,000 inmates in the California Department of Corrections and Rehabilitation (CDCR), this study attempts to identify the relationship between security classification and rules violation reports using a regression discontinuity design.

Results Results indicate that inmates placed in Level II (medium security) prisons are approximately 11 percentage points more likely to be written up than inmates placed in Level III (close security) prisons, and that the difference is driven almost entirely by a higher likelihood of write ups for the lowest level offenses like bartering and gambling. In contrast to prior work, this study does not detect an effect of Level IV (maximum security) prisons on rules violation reports.

Conclusions The fuzzy regression discontinuity design allows for a rigorous way to estimate the causal effect of facility security classification on rules violation reports in California prisons, providing an evidence base for policy-makers facing capacity constraints within the prison system while at the same time updating the extant literature on the effects of an important feature of prison structure on inmate outcomes.

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Introduction

In 2006, California's prison population had reached more than 205% of design capacity. Then-Governor Arnold Schwarzenegger declared a state of emergency, explaining that the severe overcrowding conditions in the state's prisons presented substantial health and safety risks to inmates and prison staff (Schwarzenegger 2006). Four years later, a three-judge panel ordered California to reduce its prison population to 137.5% of design capacity in order to alleviate the Eighth Amendment violations resulting from severe overcrowding (*Brown v. Plata* 131 S.Ct. 1910 (2011)). To comply with the court order, the State of California implemented a number of approaches to drastically reduce the prison population without substantially compromising public safety. Since public safety was a key concern, most of the population reduction strategies targeted low-risk releasees. However, there were concerns among prison administrators that the population reduction measures would free up capacity at lower security facilities, leaving higher security facilities overburdened with high-risk inmates, the same conditions that resulted in Eighth Amendment violations in the first place (Farabee et al. 2011).

Policymakers in California wondered whether it would be possible to move higher-risk inmates down in security level without compromising the safety and security of the prisons. The question confronting policymakers in California was a practical expression of a long-standing criminological question about the behaviors that result from inmate adjustment to the prison environment.

Both living conditions and interactions with other inmates and staff are predominately determined by security classification. In a low security level facility, inmates may be housed in dormitory settings and may have access to group programming or work assignments. In a high security facility, inmates may be housed in cells (alone or with a cellmate) and may spend most of their time confined to their cells with limited opportunities for recreation which might be with a group, but might also be solitary (each individual confined to a separate cage for recreation).

Security classification is intended to recognize differences across inmates with regard to propensity to commit misconduct and to appropriately house inmates with varying levels of violent and/or antisocial behavior while they are incarcerated. The intent of security classification tools is to increase safety for staff and other inmates, but the effect of prison facility security level on inmate misconduct is an open question (Wooldredge and Steiner 2015). The goal of this study is to identify the relationship between facility security level and the prevalence of serious rules violation reports using a regression discontinuity design. In doing so, the results of this study speak directly to the policy question of whether or not higher-risk inmates in California prisons could be moved down in security level to alleviate overcrowding without disrupting the safety and security of the prisons as well as to the criminological question regarding ways the prison environment affects behavior. Based on the findings in the existing empirical literature, correctional policymakers in California had reasons to be concerned that moving inmates down in security level would increase misconduct. Prior studies on the effect of prison security level on inmate behavior found that, all else equal, the highest security level prisons demonstrably suppressed inmate misconduct (Berk and de Leeuw 1999). However, the extreme crowding conditions in California prisons necessitated a renewed investigation of the relationship between facility security level placement and inmate misconduct, which could take into account the changes in classification policies and methodological advances that had occurred in the intervening years since the pioneering work on security classification. Theoretically, it also presented an opportunity to examine what would happen when the system classified inmates into a lower level, which is a rare occurrence since most correctional policies tend to ratchet up in severity as opposed to down.

Identifying the relationship between prison security level and misconduct is challenging, because inmates are systematically assigned to each security level based on their predicted risk of misconduct. As a consequence, it would not be prudent to simply compare average levels of reported misconduct across security levels because we would expect, a priori, that levels of misconduct would differ on average. However, it is possible to use certain features of the classification system to identify the causal relationship of facility security level on write ups for serious rules violations. Specifically, this paper employs a regression discontinuity design to estimate the relationship between prison facility security level and serious rules violation reports.

In their seminal study on the effect of security classification on prison misconduct, Berk and de Leeuw (1999) used an early application of regression discontinuity to analyze a sample of 3000 California inmates. They found that inmates with scores that would place them in Level IV (maximum security) had a higher propensity to commit misconduct, but that the suppression effects of Level IV prisons reduced misconduct. Although I do not observe an effect of maximum security facilities on rules violation reports, I do find that inmates placed in a Level II "medium" security facility are 10 percentage points *more* likely to incur a rules violation reports than inmates placed in higher security Level III "close" security facilities, and that this result is driven almost entirely by a higher likelihood of write ups for Division E or F violations (i.e. gambling, refusing to work, altering a uniform), which are the lowest level of violations eligible for write up as rules violation reports.

In the following sections of this paper, I discuss the prior literature on the effects of the prison environment on misconduct as well as the relevance of regression discontinuity for estimating potential treatment effects generated by correctional policy. I then describe the inmate classification system in California along with reasons to suspect that different levels of facility security classification might influence inmate behavior before describing the data, measures, empirical strategy and results. I conclude with a discussion of how the results might be suggestive with respect to theory and directly relevant to correctional policy as well as how we might reconcile the results in this paper with the seminal work by Berk and de Leeuw (1999).

The Relationship Between Facility Security Classification and Serious Rules Violation Reports

Prison security classification processes sort inmates into prison facilities based on underlying risk of misconduct. Consequently, the notion of moving inmates down in security level raises concerns about the safety and security of prisons. There are a number of reasons to suspect that moving marginal inmates down in security level might affect their behavior, because facility security classification determines so many of the dimensions of prison life. In fact, classification

> affects not just housing but sets the tone for every aspect of an inmate's highly regulated existence: from the safety of an inmate's day-to-day environment to the amount of cell space that individual will have to the opportunities to participate in educational programs and employment...Depending on the facility to which an inmate is

> assigned, the chances for participating in education, work, and rehabilitation programs, associating with other inmates, maintaining family connections, and so on will range from fairly significant to virtually nonexistent (Petersilia 2006, 11).

In the case of California prisons, placement in a lower security facility may affect misconduct in two ways: 1) situational factors such as staffing levels and the dominant housing type and 2) through the overall composition of the set of inmate peers.

With regard to differences in situational factors, while dorms exist at all prisons lower security facilities have almost exclusively dormitory housing, which generally includes many double or sometimes triple bunks arranged together in a single room as opposed to celled housing with just two inmates per cell. Dormitory housing creates open living environments which tend to be louder and less predictable. Bunks are more exposed and offer little privacy. In addition to the relatively more chaotic setting, there are also fewer staff members per inmate. From a routine activities perspective, the prison dormitory has a confluence of the situational factors that predict misconduct (Cohen and Felson 1979; Wortley 2002); so it is possible that lower security facilities, which have much more dormitory housing, would also create more opportunities for conflict and, therefore, more misconduct.

In addition to the fact that the dormitory setting generates perhaps more opportunity for altercations, the inmates living in dormitory settings pass their time in activities that most closely resemble "unstructured socializing" (Osgood et al. 1996). The profound lack of privacy means that the interactive aspect of the prison dormitory is virtually unavoidable. More forced interaction implies that relative exposure to opportunities to commit lower level misconduct (i.e. status violations), should also be higher in a lower security facility. The near ubiquity of dorms in lower level prisons creates greater potential for lower-level violations.

While the situational factors would predict more misconduct, theory would suggest that the peer effects will have a negative affect on misconduct behavior because lower security facilities house less risky inmate peers. To the extent that peers influence misconduct risk lower security facilities should have less misconduct. Kreager et al. (2017) found that inmates who were older and had spent more time in prison functioned in a "mentoring" role among men on a good behavior unit in a Pennsylvania prison and that their age and prison experience conveyed power and influence among their peers. If the inmates in lower security facilities are older and have more time served in prison, there may be more "old heads" to discourage misconduct resulting in less misconduct in lower security facilities. In addition to any affect of direct discouragement of misconduct behavior through mentoring, there might be indirect spillover effects of being incarcerated with less risky peers. Placement in a lower security facility should prevent the enhancement of anti-social attitudes associated with being housed with a more hardened population (i.e. the concept of "prisons as schools for crime") (Bayer et al. 2009; Nguyen et al. 2016).

Unfortunately, it is not possible to empirically differentiate between the competing predictions of situational factors and peer effects for two reasons. First, while routine activities would predict more *actual* misconduct, lower numbers of staff per inmate should make detection more challenging in a dormitory environment resulting in an overall lower rate of *observed* misconduct. As a consequence, using official data it is not possible to make a definitive prediction about the direction of the effect of situational factors on misconduct, because the observed misconduct will be the net of more misconduct due to more opportunities for misconduct and less observed misconduct due to lower levels of detection. Second, differences in rates of observed misconduct across levels might be driven not by differences in misconduct, but by differences in *detected* but not *reported* misconduct

(Hewitt et al. 1984). If correctional officers practice differential levels of discretion in write ups at different security levels then one might observe differences in reported misconduct across levels that is not driven by differences in misconduct behavior. The results in this paper represent the net effect of security level placement on observed behavior. I am unable to adjudicate between the predictions of competing theoretical mechanisms because the contribution of situational factors is ambiguous (could be positive or negative) and because it is not possible to discern the relative contribution of differences in actual misconduct behavior and differences in observed misconduct behavior across levels.

Although I am unable to test specific theoretical mechanisms, the results in this paper will provide insight regarding whether it is possible to move inmates down in security level without compromising the safety and security of the prison environment. Correctional administrators were particularly concerned about shifting the inmate population *down* in security level, because prior empirical evidence suggested that inmates in maximum security facilities consistently showed higher propensities for misconduct and that, all else equal, only the highest security facilities were able to significantly suppress misconduct. In short, the concern was that the less secure facilities would not suppress the misconduct of higher risk inmates. Indeed, as Wooldredge and Steiner (2015, 232) observed "it remains to be seen whether more secure environments generate lower levels of inmate misconduct (or at least comparable levels) compared to less secure environments." By comparing the experiences of inmates with similar levels of underlying risk housed at different security levels, this study will produce valid estimates of the relative contribution of the prison security level to misconduct for the set of inmates on the misconduct risk margin.

Empirical Findings

Early empirical studies of prison misconduct predominately focused on individual level findings, attempting to attribute predictors to the theoretical traditions of deprivation and importation (see meta-analysis by Gendreau et al. 1997). Descriptive analyses of the predictors of inmate violence found more inmate on inmate assaults and homicides in higher level facilities (MacDonald 1999; McCorkle et al. 1995; Porporino et al. 1987). Studies using only individual level predictors were later critiqued for failing to account for institution-level characteristics in a multi-level framework. A number of studies followed that used multi-level modeling techniques to account for the nested relationship of individual and facility level factors (Camp et al. 2003; Huebner 2003; Steiner and Wooldredge 2008). By and large these studies found that security level was a facility level factor that predicted misconduct, though in some cases results varied by type of misconduct.

A systematic review by Steiner et al. (2014) found that the association between prison security level and misconduct varied by security level. Reviewing close to 100 studies comprising more than 300 model specifications, Steiner and colleagues found that maximum security placement had the strongest and most consistent association with misconduct. In 78% percent of the models reviewed, authors estimated a positive association between maximum security placement and misconduct behavior. Results were less consistent for lower security levels. On the one hand minimum security placement was most likely to be significantly inversely related to misconduct (50% of models) but were nearly as likely to result in a null finding. The results for medium security placement were the most mixed, placement in medium security facilities was found to be fairly evenly split between positive (38%), inverse (33%) and nonsignificant (29%) correlations (Steiner et al. 2014). Importantly, although many of the studies reviewed by Steiner et al. (2014) purport to examine the "effect" of security level placement methodological issues limit the interpretation of the findings to evidence of association as opposed to effect.

A smaller subset of the extant literature has used experimental and quasi-experimental techniques to try and identify not just the association but the causal relationship between prison facility security level and misconduct. These studies comprise the foundation of the evidence base on the relationship between prison security classification and misconduct. The earliest of these is Berk and de Leeuw (1999) who applied a regression discontinuity approach to a sample of 3000 California inmates. They found that inmates with scores that would place them in Level IV (maximum security) were more likely to commit misconduct, but that the suppression effects of Level IV reduced misconduct. Although they note the presence of administrative overrides, their early application of regression discontinuity utilizes a sharp design in which classification score is the only determinant of facility placement. In an attempt to account for the administrative overrides,[1] they perform sensitivity analysis by "misallocating" inmates who would have been treatment observations as control observations. They find a treatment effect up to the point at which 20% of the sample has been "misallocated." It is worth noting that their estimates of the treatment effect begin to vary widely as they "misallocate" observations. In this paper, the application of a fuzzy regression discontinuity design will account for the fact that classification score does not entirely determine facility security level placement. Furthermore, since the Berk and DeLeeuw study, the California Department of Corrections and Rehabilitation (CDCR) has redesigned both the objective classification instrument and the classification process.

The update of the classification instrument resulted in changes in the way some inmates would be classified. In order to test the effect of the change in the system, for a period of time, inmates were randomly assigned to be classified under the old or the new system (Camp and Gaes 2005). In practice, this created experimental variation in security level that could be used to estimate the relationship between Level I (minimum security) and Level III (close security) inmates. Using a sample of 561 inmates, Camp and Gaes found that 60% inmates classified under the new system as Level III engaged in misconduct of some kind within a two year follow-up period from initial classification whether they were housed in Level I (minimum security) or in Level III (close security). They also found that inmates who were classified as Level III but housed in Level I were no more likely to commit serious misconduct than the inmates who were classified as Level III and also housed in Level III. The authors did not find this to be a surprising result because of previous work (Berecochea and Gibbs 1991; Berk and de Leeuw 1999; Berk et al. 2003) which suggested that the only meaningful suppression effects in the California prison system were found in Level IV (maximum security). While the authors emphasize the statistical power of their estimates given the relatively small sample size, they do not discuss the threat to external validity posed by the sample population. The authors note that the two-level increase in security classification under the new system experienced by their sample is unusual, but they do not explore the differences between their sample inmates and other inmates in the California prison system (who experienced either no change under the new or old classification system or moved up or down one level).

[1] Administrative overrides occur when classification staff place an inmate in a facility that does not match the security level indicated by the classification instrument. Administrative overrides can result in an inmate being placed either above or below the placement suggested by the classification score, but *almost always* results in placement in a higher level than the classification instrument suggests.

Other studies have used regression discontinuity designs to identify the effect of security classification on other inmate outcomes like recidivism, criminal personality and criminal cognitions. Chen and Shapiro (2007) use regression discontinuity to estimate the effect of security classification in federal prisons on recidivism. They found no evidence that the increased suppression measures in higher security prisons reduced post-release crime, and that higher security levels might, in fact, lead to more recidivism. However, they were inhibited by small sample size resulting in low statistical power at the cutoff points.

Lerman (2009) used regression discontinuity to study the impact of security classification on criminal personality and criminal cognitions in a sample of California inmates. She found that, among only those inmates with low prior criminal involvement, those just above the Level II/III cutoff (medium/close security levels) had higher scores for criminal personality and criminal cognitions than those just below the cutoff. She also investigated the impact of security level placement on self-reported in-prison social network, finding that inmates with classification scores immediately above the Level II/III cutoff had significantly more friends who were arrested, jailed and involved in gangs (Lerman 2009). In support of her argument that this result is not from associations outside prison, Lerman demonstrates that inmates assigned to a higher facility security level were more likely to join a gang in prison. In addition, those who were identified during reception as gang members were much more willing to self-identify as a gang member when assigned to a Level III prison as opposed to a Level II prison. According to Lerman, placement in a higher facility security level increases inmate risk of adopting anti-social norms.

Even more recently, researchers have used novel approaches to identify the effects of facility security level on prison misconduct. Using a sample of more than 8,000 federal inmates, Shermer et al. (2012) compared pooled regressions and fixed-effects models to differentiate the effects of being housed in a given facility security level from underlying risks of misconduct. Their analysis, which compared inmates with different underlying risks of misconduct within a given prison facility level, found that within a given prison substantial misconduct is likely attributable to the prison environment over and above a given inmate's underlying propensity for misconduct. Worrall and Morris (2011) analyzed a sample of more than 70,000 inmates housed across five levels in 47 Texas prisons. Instrumenting custody level with prior good time lost, Worrall and Morris estimate instrumental variables probit models with prison level clustered standard errors. Using this technique they find that custody level is positively related to all types of misconduct. However, it is likely that their instrument, good time lost, is correlated with past (and, therefore, also future) misconduct. As a result, it is possible that their estimates were confounded.

The Inmate Classification System in California

In studying the California prison system, this study follows much of the previous work on the effect of facility security level on inmate outcomes. The California Department of Corrections and Rehabilitation is one of the largest prison systems in the United States. The State of California has allocated \$11.23 billion of General Fund monies to CDCR in the 2017–2018 budget cycle, which accounts for almost about 8% of General Fund expenditures (Brown 2017). Of the CDCR budget allocation approximately \$10 billion is allocated to adult prisons alone (State of California Legislative Analysts Office 2017). When the data for this paper was collected in 2009, the California prison system housed over 166,000 inmates in 33 adult prisons, 39 conservation camps, and 13 Community Correctional Facilities across the state.

The California prison system houses inmates in four different "security levels" ranging from Level I (minimum security) to Level IV (maximum security). Like many states, California uses an "objective" classification system to place prison inmates into security levels. "Objective" classification systems assign weighted values to characteristics that predict prison misconduct and combine the values into a single score. In 2003, California revised its inmate classification system. Under the revised system, inmates are assigned a preliminary classification score based on background characteristics and prior behavior while incarcerated using an "objective classification instrument" called CDCR Form 840. The classification tool assigns weights to each of the predictive factors that comprise the preliminary score; for example, inmates are assigned points for sentence length (in years) multiplied by 2 with a 50 point maximum.[2] Prison term in years, age at first arrest, and age at reception are weighted most heavily. For most inmates, the preliminary classification score is the final classification score, but approximately 28% of inmates have their preliminary score replaced with a "mandatory minimum point allocation." Mandatory minimum point allocations are triggered by certain characteristics including having a life sentence, a sex offense, and inmates with a history of escape.

The two-tiered system which includes mandatory minimum point allocations was developed to make administrative determinations about inmate risk factors more transparent. Prior to the mandatory minimum point allocation system, correctional administrators in California would override the "objective" classification tool, when their notions about the factors that contributed to inmate risk conflicted with the prediction of the classification instrument. Under the updated system, these determinations have, by and large, been incorporated into the mandatory minimum allocations.

To determine assignment to one of four facility security levels, inmates are assigned a final classification score, or "placement score," which is the maximum of preliminary score or the mandatory minimum points. The mandatory minimum score is only binding for placement if it is greater than the preliminary score. For example, an inmate with a preliminary score of 32 who is sentenced to life without the possibility of parole would be assigned a placement score of 52,[3] because the mandatory minimum score (52) is higher than the preliminary score. Whereas, an inmate with a preliminary score of 32 who has an Immigration and Customs Enforcement hold would be assigned a placement score of 32, because the mandatory minimum score (19) is lower than the preliminary score. The inmate is then assigned to a facility of the level determined by the final classification score. Table 1 describes the four security levels and the associated point ranges. As can be seen in the table, higher security levels require increasing amounts of custody staff supervision and more infrastructure per inmate. These measures are designed to suppress the potential misconduct of higher risk inmates.

In this paper, I estimate the relationship between facility security level placement and the prevalence of rules violation reports between adjacent levels in California prisons. However, because of the differences between the adjacent facility security levels there

[2] Section 1 of the Online Supplement includes examples of CDCR classification forms, a complete list of the factors that comprise the preliminary classification score, the factors that trigger mandatory minimum placement, as well as detailed explanations on how classification scores are calculated.

[3] The cutoff values have changed since the data were collected, for simplicity and clarity the text refers to the cutoff values that were in place when the data was collected.

may be different effects of placement at each of the three thresholds: Level I (minimum)/ Level II (medium), Level II (medium)/ Level III (close), and Level III (close)/Level IV (maximum).

Level I/II

There are substantial differences between Level I (minimum security) and Level II (medium security) facilities. The principle difference between these two types of facilities is that Level II (medium security) facilities have a secure perimeter and Level I (minimum security) facilities do not. Inmates in Level I are housed outside a secure perimeter, meaning that the perimeter of the facility is often an unguarded chain link fence as opposed to a prison wall with armed guard-tower coverage. Furthermore, the maximum level of supervision for work and program assignments in Level I facilities is hourly supervision if the inmate is assigned outside the facility security perimeter, otherwise Level I facilities provide “sufficient staff supervision...to ensure the inmate is present” (Title 15, California Code of Regulations 2012, 216). In both types of facilities inmates are generally housed in open dormitories, inmates in Level I housing are exclusively housed in dormitory settings whereas some Level II facilities have celled housing. Unfortunately, reliable COMPSTAT data is not available for Level I facilities so it is not possible to compare average staffing or average violence levels for these two types of institutions (Lerman 2013).

Level II/III

There are also significant differences between Level II (medium security) and Level III (close security) facilities. Level II and III facilities have different housing types, staffing levels, levels of violence, and availability and participation in programming. Inmates in Level II (medium security) facilities are predominately housed in open dormitories whereas inmates housed in Level III (close security) facilities are primarily housed in cells (Title 15, California Code of Regulations 2012). Level III facilities have 3 more custody staff per 100 inmates than Level II facilities (Lerman 2013). Although Levels II and III have similar capacity in vocational programming, Level II inmates successfully complete these programs at a much higher rate (Lerman 2013). Level II facilities have much more capacity in substance abuse treatment programs (Lerman 2013). Finally, and perhaps most importantly, Level III facilities have more than double the number of violent disciplinary reports per 100 inmates than Level II facilities (Lerman 2013).

Level III/IV

By contrast to the lower security thresholds, there are fewer infrastructure differences between Level III (close security) and Level IV (maximum security) facilities. Inmates in both levels live in celled housing and most of these facilities are surrounded by lethal electrified fencing. All Level III and IV facilities have a secure perimeter that is staffed with armed officers. However, despite similarities in the physical environments, there are many differences between Level III (close security) and IV (maximum security) facilities. Just as Level III facilities are twice as violent as Level II facilities, Level IV facilities are substantially more violent than Level III facilities. According to the COMPSTAT data analyzed by Lerman (2013), Level IV facilities average 25.8 violent disciplinary reports per 100

Table 1 CDCR facility security levels and associated placement score ranges

Point range	Security level
0–18 points	Level I facilities-minimum security
	Low security perimeter like a chain link fence
	Housing consists of mostly open dormitories
19–27 points	Level II facilities-medium security
	Secure perimeter, which may include armed coverage
	Housing consists primarily of open dormitories
	Average 15 custody staff per 100 inmates
	Average 5 violent disciplinary reports per 100 inmates
	Average 2 lockdowns per month
28–51 points	Level III facilities-close security
	Secure perimeter with armed coverage
	Predominately celled housing, cells may be adjacent to exterior walls
	Celled housing units are either 180° or 270°, which refers to the view from a central elevated control booth.
	Average 18 custody staff per 100 inmates
	Average 11.25 violent disciplinary reports per 100 inmates
	Average 2 lockdowns per month
52 or more points	Level IV facilities-maximum security
	Secure perimeter with internal and external armed coverage
	Cell block housing with cells non-adjacent to exterior walls
	Celled housing units are either 180° or 270°, which refers to the view from a central elevated control booth.
	Average 22 custody staff per 100 inmates
	Average 25.8 violent disciplinary report per 100 inmates
	Average 5 lockdowns per month

Features of CDCR facility security levels and corresponding placement score values from Title 15, California Code of Regulations (2012). Custody staff averages from COMPSTAT data referenced in Lerman (2013)

inmates compared to an average of 11.25 violent disciplinary reports per 100 inmates in Level III facilities. Level IV facilities have more than double the number of lockdowns, which substantially affect prison life because programs are canceled and inmates can be confined to cells for most or all of the day (Lerman 2013).[4] Level IV institutions have approximately half the vocational program capacity of Level III facilities as well as much lower success rates. Additionally, though Level III institutions have limited capacity for substance abuse treatment programs, Level IV facilities have no opportunities for participation in substance abuse treatment. Finally, participation in inmate groups is much lower at Level IV facilities. On average at Level IV facilities inmates participate in groups at a rate of 18.5 per 100 inmates compared to an average participation of 50.6 per 100 inmates at Level III facilities (Lerman 2013).

[4] During lockdowns programs are canceled for at least 24 hours. Full lockdowns affect all inmates in the facility, whereas partial lockdowns might include a particular housing unit or all inmates in a given race.

These differences between adjacent security levels in California comprise the "treatment" of placement in adjacent security levels. The analysis to follow attempts to estimate the effect of this treatment on the likelihood of rules violation reports.

Data and Empirical Strategy

Data

The data for this paper include all male inmates housed in a California prison for all of FY08/09 that are not on death row and for whom we can observe a complete review period between reclassification hearings. For this paper, I have limited the sample to inmates housed in-state who are housed in Level I through Level IV. Inmates in reception centers either have not been classified or have been classified but have not been moved to a security level. Inmates in other types of housing including Security Housing Units (SHU), administrative segregation, the hospital, or Mental Health Crisis Bed have been excluded because the security classification points are not used as the assignment mechanism for those housing types. The total sample consists of just over 60,000 inmates. For each inmate, the data set includes information on all rules violation reports acquired during the review period, demographic information about each inmate, information regarding sentencing and controlling offense, on housing and security level, and on several other personal and institutional characteristics.

Table 2 presents some descriptive statistics pertaining to inmates that are housed in Levels II (medium security) through IV (maximum security). Inmates in the higher security levels (III and IV) are more likely to suffer from serious mental illness; whereas, sex offenders are more heavily represented in Levels II (medium security) and III (close security). As facility security level decreases there are lower proportions of inmates in Sensitive Needs Yard[5]; and inmates are less likely to be in a street gang. Importantly, with respect to the increased likelihood of mentoring in lower level facilities inmates in lower security facilities are substantially older and have served substantially more time in prison (Kreager et al. 2017).

The misconduct distributions reveal that inmates with violent commitment crimes are more heavily represented among those in the higher security facilities, while inmates with non-violent commitment crimes are more likely to be housed in lower facility security levels. This is to be expected, because violent crimes usually carry longer sentence lengths which result in higher preliminary scores.

[5] Though there is no formal definition in the Department Operations Manual or in Title 15, Sensitive Needs Yards are separate areas within facility security levels where some inmates are segregated from the "mainline" population. More than 16,000 inmates in the sample are housed on a sensitive needs yard. Sensitive Needs Yard is sometimes colloquially referred to as "protective custody." Inmates can either be assigned or can request to be housed on a sensitive needs yard. Inmates may be housed in a sensitive needs yard for several reasons, including, but not limited to, because they have dropped out of a gang, have been convicted of a sex offense (especially one involving children), because of their sexual orientation, or because they have a high-notoriety case.

Empirical Strategy

A major methodological challenge in measuring the effect of security level placement on rules violation reports concerns the fact that inmate assignment to facility levels is not random; in fact, the process assigns those inmates with a high likelihood of misconduct to higher security facilities. We expect that inmates at different security levels will differ on both observed and unobserved characteristics, making it impossible to attribute differences in outcomes to any one factor. An ideal research design would randomly assign inmates to security levels and then observe their behavior over an evaluation period. Random assignment would ensure that inmate characteristics (both observed and unobserved) are not systematically related to facility level assignment and that any observable differences in behavior between inmates in different security levels could be attributed to differences induced by incarceration in different facility security levels. Of course, random assignment is neither appropriate nor desirable in this context.

In the absence of random assignment, I am able to use features of the facility security level assignment process to identify the effect of security level on rules violation reports using a regression discontinuity design. The regression discontinuity design was introduced by Thistlethwaite and Campbell (1960) and then further developed by Trochim (1984). The premise of the design is that whether or not an individual observation receives the treatment of interest is either completely or partially determined by whether or not some predictor variable, X_i, lies above or below a certain threshold, c. The idea is that inmates with similar values of X_i, also known as the running variable, are comparable on both observed and unobserved characteristics, but that they will experience discretely different treatments because they fall on either side of the cutoff value, c. As a consequence, observed differences in the outcome at the threshold value can be attributed to the treatment.

In the context of this study, because facility level assignment is determined in large part by an inmate's preliminary score,[6] we would expect that inmates who are just above and just below a given point threshold will be quite similar to one another in terms of observed and unobserved characteristics, but will experience discretely different treatments. Since misconduct should have a smooth relationship along the values of the preliminary score, if we observe discontinuous changes in the likelihood of rules violation reports occurring at the point thresholds, those differences can be attributed to the effect of the facility security level. In this study, I estimate the effect of assignment to the lower of two adjacent facility security levels; that is, for example, the effect of being incarcerated in a Level III relative to a Level IV prison; there is a potential treatment effect at each of the security score thresholds.[7]

The two-stage inmate classification system means that the relationship between the risk score as determined by the CDCR Form 840 does not perfectly determine placement into facility security level. As a consequence, a fuzzy regression discontinuity approach is necessary (Trochim 1984). The fuzzy regression discontinuity accounts for the fact that assignment to the treatment, facility placement, is not perfectly determined by the running variable. The fuzzy regression discontinuity functions much like an instrumental variables

[6] In the context of California prisons, it is essential to use preliminary classification score and not final placement score as the running variable in the regression discontinuity design. A detailed explanation is included in the online supplement (Section 2).

[7] In this case, the treatment is moving to the lower of two adjacent facility levels compared to the "control condition" which is to remain at the higher of two levels.

Table 2 Descriptive statistics

Variable	Mean			Difference	
	Level II	Level III	Level IV	III – II	IV – III
Rules violation reports					
Any RVR	0.169	0.243	0.309	0.074**	0.066**
				(0.004)	(0.004)
A1 or A2 RVR	0.008	0.013	0.030	0.005**	0.017**
				(0.001)	(0.001)
B, C, or D RVR	0.059	0.115	0.174	0.055**	0.060**
				(0.003)	(0.003)
E or F RVR	0.119	0.146	0.150	0.027**	0.005
				(0.004)	(0.003)
Age	43.512	40.089	35.843	− 3.423**	− 4.246**
	[11.084]	[12.039]	[10.134]	(0.120)	(0.110)
Sentence length (years)	11.001	15.581	20.709	4.579**	5.129**
	[10.243]	[23.244]	[21.003]	(0.248)	(0.318)
Time served (years)	9.168	7.429	8.263	− 1.739**	0.835**
	[8.320]	[6.784]	[6.503]	(0.077)	(0.066)
Race/ethnicity					
Asian	0.012	0.010	0.009	− 0.002*	− 0.002+
				(0.001)	(0.001)
Black	0.298	0.322	0.364	0.025**	0.042**
				(0.005)	(0.005)
Hispanic	0.357	0.349	0.401	− 0.009+	0.052**
				(0 .005)	(0.005)
White	0.272	0.260	0.173	− 0.013**	− 0.086**
				(0.005)	(0.004)
Offense type					
Violent	0.585	0.626	0.828	0.040**	0.202**
				(0.005)	(0.004)
Property	0.107	0.120	0.070	0.013**	− 0.050**
				(0.003)	(0.003)
Drug	0.114	0.098	0.036	− 0.017**	− 0.061**
				(0.003)	(0.002)
Serious mental health	0.019	0.083	0.073	0.063**	− 0.010**
				(0.002)	(0.003)
Sensitive needs yard	0.224	0.278	0.334	0.054**	0.056**
				(0.004)	(0.005)
Current or prior serious or violent conviction	0.934	0.949	0.988	0.016**	0.039**
				(0. 002)	(0.002)
Sex offender	0.258	0.226	0.139	− 0.033**	− 0.086**
				(0.004)	(0.004)
Known street gang member	0.125	0.365	0.612	0.240**	0.247**
				(0.007)	(0.008)
Observations	15,868	22,886	18,775		

Standard deviations of the means in brackets. Standard error of the difference in parentheses. $^{**}p < 0.01$, $^{*}p < 0.05$, and $+p < 0.10$

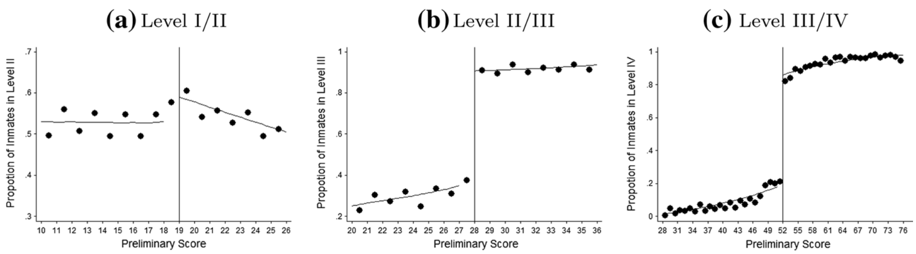

Fig. 1 First stage relationship between preliminary score and facility security classification. *Note* The line fit for all of the graphs was conducted using a local linear regression with a triangle kernel. **a** The density of placement in Level II relative to Level I has been plotted using a bandwidth of 8 and a binwidth of 1. The sample was restricted to all inmates housed in Levels I–IV with preliminary scores between 0 and 27 points. **b** The density of placement in Level III relative to Level II has been plotted using a bandwidth of 8 and a binwidth of 1. The sample was restricted to all inmates housed in Levels I–IV with preliminary scores between 19 and 51 points. **c** The density of placement in Level IV relative to Level III has been plotted using a bandwidth of 24 and a binwidth of 1. The sample was restricted to all inmates housed in Levels I–IV with preliminary scores between 28 points and 75 points

estimator (Angrist et al. 1996), weighting the reduced form estimates by the extent to which the running variable, X_i, predicts treatment assignment.

This research design depends crucially on there being discontinuous treatment at the score cutoffs. The larger the proportion of inmates experiencing a change in facility security level assignment as the preliminary score crosses the cutoff, the more precise the estimates of the effect of facility security level on behavior will be. Figure 1 shows the relationship between the preliminary classification score and facility security level placement.[8]

As shown in Panels B and C there is a strong relationship between preliminary classification and facility security classification between Levels II (medium security) and III (close security) and Levels III (close security) and IV (maximum security). However, Panel A shows that preliminary score does not have a strong relationship with placement in Level II (medium security) relative to Level I (minimum security). Since the estimates do not show a sufficiently strong relationship between preliminary score and assignment to medium and minimum security, I omitted that threshold from the analysis.[9]

To estimate the causal effect of the treatment, placement in the lower of two adjacent security levels, it must be the case that there is no reason to expect a discontinuous change in the outcome as the values of the preliminary score cross the threshold for any reason other than the treatment. In other words, while the likelihood of serious rule violation reports may be increasing as the value of the preliminary score increases, it should

[8] Formal estimates of the first stage relationship between preliminary score and facility security level placement are available on request.

[9] As can be seen from the distribution of the preliminary and placement scores (Online Supplement, Section 2). There are so many inmates who qualify for the mandatory minimum at the Level II threshold there are often inmates with scores just above the threshold who are moved down because they are eligible. This is most likely because they are often seeking as many inmates as possible for minimum custody status (Level I). These inmates are generally used for labor at the Level IV prisons (most Level IVs have an adjoining Level I) and because of the turnover of Level I inmates (non-violent, non-sex offenses with relatively short sentences) they are often looking for eligible inmates. It is most likely the case that California prison administrators will assign inmates with Level II points if they meet all the other requirements for being housed outside the secure perimeter— especially if there is need for a specific project at a prison.

be increasing smoothly. Provided that the assumption holds, the average causal effect of the treatment (τ_i) is given by the fuzzy RD estimator as specified in Imbens and Lemieux (2008).

There are several approaches to this estimation, in this paper I use local linear regressions[10] (Imbens and Lemieux 2008), because the local linear regression nonparametrically provides a consistent estimator for the treatment effect in the context of a regression discontinuity design.[11] Another appealing feature of estimation using local linear regressions that the associated analytic standard errors allow for straightforward inference.[12]

Importantly, the choice of the running variable bandwidth to include in the models can have substantial effects on the regression discontinuity estimates. This is somewhat intuitive, because the key assumption of the regression discontinuity design relies on the similarity of the observations close to the cutoff. This assumption is most likely to hold at small values of the bandwidth, where the inmates are most similar in terms of the running variable, preliminary score. For example, at a bandwidth of 2, the estimation compares inmates with scores of 28 or 29 to inmates with scores of 26 or 27. At the extreme this compares inmates with a score of 26 to inmates with a score of 29, which is a close range. That said, it is rare to have sufficient statistical power at small values of the bandwidth. Higher values of the bandwidth allow for the inclusion of a greater number of observations, and therefore, more statistical power. However, at higher values of bandwidth, a wider range of inmates would be included in the estimation, meaning that the assumption that the inmates are similar is less plausible.[13] As a consequence, there is often a trade off between precision and bias in regression discontinuity estimation.[14] It is important to show the regression discontinuity estimates over a range of bandwidths in order to establish that the results are not contingent on the choice of bandwidth. When displaying the results of the analysis, I present the sensitivity of the estimates to the choice of bandwidth.[15]

[10] As a robustness check, I also estimated the results using local polynomial regressions and the results are consistent. Results are available upon request.

[11] Local linear regression estimation of the regression discontinuity is appropriate in this context despite the discrete nature of the running variable. Lee and Lemieux (2010) note that estimating the conditional expectation of the outcome at the cutoff requires extrapolation to some extent, even in the case of a continuous running variable. As a consequence, "the fact that we must do so in the case of a discrete assignment variable does not introduce particular complications from an econometric point of view, provided the discrete variable is not too coarsely distributed" (Lee and Lemieux 2010, 336).

[12] In order to estimate the regression discontinuity design using local linear regressions, I need to choose the kernel, the weighting function used to estimate the density of a random variable, and the bandwidth, the range of the running variable to be included in the analysis. As noted in the extant literature, the choice of the kernel has little impact on the regression discontinuity estimate. Though, Fan and Irene (1996) show that the triangle kernel is optimal for estimating the local linear regression at the cutoff. Following their suggestion, I use the triangle kernel throughout the study.

[13] Because the California prison system has multiple thresholds along the range of the running variable, the maximum bandwidth for the estimation is constrained by the distance between the threshold values. Selection of bandwidth for the II/III cutoff is constrained by the score distance between the Level I/II cutoff at 19 and the Level II/III cutoff at 28. So, bandwidth cannot exceed 8 without extending to the margin of the next threshold. Because preliminary scores have no upper bound, the maximum potential bandwidth of 24 for the Level III/IV cutoff is constrained by the lower bound, the Level III cutoff at 28 points.

[14] In the context of this analysis, the statistical significance of the results does not depend on the choice of bandwidth, when the results are significant they are significant at all values of the bandwidth.

[15] Though there is no optimal bandwidth in the case of the regression discontinuity using a discrete running variable, in some ways the discrete nature of the assignment variable simplifies the problem of bandwidth choice because estimates can be computed at all possible values of the running variable (Lee and Lemieux 2010).

There are two requirements to derive valid causal estimates from a regression discontinuity design. The first requirement is that it must be the case that observations have imprecise control over the running variable (Lee and Lemieux 2010) and that all other variables that may determine behavioral infractions (age, offense history, mental health status, etc.) vary continuously across the cutoffs. Regarding the first requirement, in the context of this paper, this requires that inmates are not able to precisely manipulate their preliminary score. To formally test for bunching on either side of the threshold, I use the density test proposed by Frandsen (2016)[16] that tests for unusual curvature in the probability mass of the running variable as it crosses the score cutoff. Results of the Frandsen Test show no evidence of manipulation at the score cutoff. However, McCrary (2008) also notes that an empirical test designed to detect bunching at the threshold can still fail to detect the manipulation of the assignment variable if it is the case that the number of inmates manipulating their preliminary score upward is offset by the number of inmates manipulating the their preliminary score downward. In this case, both the formal density test and the institutional background indicate that the current study does not suffer from sorting of inmates with respect to the running variable, preliminary classification score.[17]

The second requirement for the regression discontinuity to derive valid causal estimates is continuity in the baseline covariates at the cutoff. The rationale behind this idea is that if assignment to a higher facility security level is locally randomized, the baseline covariates should not show discontinuities at the threshold. I test a number of baseline covariates for continuity at the cutoff points, including inmate age, race, sentence length, time served, offense type, street gang affiliation, as well as mental health, sex offender, and Sensitive Needs Yard statuses. These variables are likely to be highly correlated with the likelihood of misconduct, and since these covariates are determined a priori, they should not show discontinuities at the threshold if the local randomization is valid.[18] To provide a formal analysis of the discontinuity estimate in the baseline covariates, I present regression discontinuity estimates of the density of the covariates at the cutoff points (Table 3). As can be seen from the estimates in Table 3 the density of the baseline covariates is very well balanced across the Level II/III (medium/close security) cutoff. By contrast, there are some significant discontinuities in the density of the baseline covariates across the Level III/IV (closes/maximum security) cutoff. Inmates in Level IV are discontinuously approximately 2 percentage points less likely to be Asian and they have served between 2 and 3 years longer in prison on their current sentence.

The formal regression discontinuity estimates of the density of the baseline covariates imply that these predetermined characteristics are balanced across the score cutoffs for Level II/III between medium and close security, but slightly less so for Level III/IV the close/maximum security cutoff. As a result, I argue that the regression discontinuity design will generate strong causal estimates at the Level II/III cutoff of the effect of facility security level placement on the likelihood of serious rule violations in California prisons. The relative imbalance of the covariates across the Level III/IV cutoff should be viewed somewhat more cautiously. That said, the differences in the covariates for the smaller values of

[16] McCrary (2008) is perhaps the more well known test for continuity in the running variable, but I do not use it here because it is best suited for continuous running variables. In cases where the running variable is discrete, the McCrary Test can over- or under-reject the smoothness condition (Frandsen 2016).

[17] A detailed explanation of the density test is included in the online supplement (Section 3).

[18] Graphical representation of the continuity in the baseline covariates is shown in the online supplement (Section 4).

the bandwidth are relatively small in magnitude so these estimates are still likely worth considering within a causal framework.

Outcome Measures

To estimate the causal relationship between facility security placement on the prevalence of prison misconduct I use the presence of a "serious rules violation report" as the outcome variable.[19] California Code of Regulations Title 15 § 3315 defines a serious rules violation report as

> a serious disciplinary offense not specified as administrative in section 3314(a)(3), an offense punishable as a misdemeanor, whether or not prosecution is undertaken, or is a felony, whether or not prosecution is undertaken. It involves any one or more of the following circumstances: (A) Use of force or violence against another person; (B) A breach of or hazard to facility security; (C) A serious disruption of facility operations; (D) The introduction, distribution, possession, or use of controlled substances, alcohol, or dangerous contraband; (E) An attempt or threat to commit any act listed in Sections (A) through (D), coupled with a present ability to carry out the threat or attempt if not prevented from doing so (Title 15, California Code of Regulations 2016, 214).

Examples of serious rules violation reports include any activity that would qualify as a crime outside the prison; as well as, hideout, preparation to escape, or possession of escape paraphernalia; possession of contraband or controlled substances; bartering; manufacture of alcohol; and refusing to work or participate in programs.

Throughout the analysis to follow, I estimate the effect of placement in the lower of two adjacent security levels on the prevalence of any serious rules violation report[20] (defined as a Division A through F violation), acquiring an A1 or A2 violation, acquiring a B, C, or D violation, or acquiring an E or F violation.[21] Rules violation reports range from the most serious A1 violations like murder, attempted murder, rape and other offenses resulting in serious bodily injury as well as distribution of a controlled substance to the least serious E and F violations which include bartering, possession of alcohol, refusal to work, engaging in consensual sexual acts and gambling. In addition to consequences imposed by prison administrators, most rules violation reports can be referred for criminal prosecution; Division A-D offenses all qualify as felonies, Division E offenses qualify as misdemeanors and

[19] "Serious rules violation report" is the technical term for the misconduct reports in this administrative data set. Although the reports range in severity by class, all the reports are considered serious by the California Department of Corrections and Rehabilitation.

[20] Though I do not present the results here, I also tested the effect of security level assignment on the number of rules violation reports acquired over the course of the review period. However, given that there is very little variation in the number of rules violation reports (more than 99% of the sample has 3 or fewer rules violation reports) the estimate of the effect of facility level placement on the number of violations may not be meaningful from a policy standpoint. Given that only 8% of the distribution has two or more rules violation reports during the review period, the policy relevant question would appear to be to estimate the effect of facility level placement on the likelihood of a rules violation report. Placement in Level II (medium security) relative to Level III (close security) does have a significant positive effect on the number of rules violation reports, but the effect is very small. Formal results are available on request.

[21] This is the finest level of detail available in the data. A detailed listing of examples of A-F violations can be found in California Code of Regulations, Title 15 §3323.

Table 3 Regression discontinuity estimates of the baseline covariates

	Bandwidth					
	Level II/III			Level III/IV		
	2	4	8	2	4	8
Variable						
Age	– 0.553	– 0.004	0.918	– 1.784+	– 0.316	– 1.935*
	(1.023)	(1.394)	(0.810)	(1.086)	(1.357)	(0.900)
Sentence length (years)	– 5.033	– 5.978	– 2.619	0.955	1.300	0.259
	(2.531)	(3.820)	(1.808)	(1.823)	(2.077)	(1.602)
Time served (years)	– 1.589**	– 0.776	0.439	– 2.927**	– 1.962**	– 1.224
	(0.449)	(0.611)	(0.347)	(0.473)	(0.626)	(0.397)
Race/ethnicity						
Asian	– 0.009	– 0.007	– 0.006	– 0.019*	– 0.024*	– 0.016*
	(0.006)	(0.009)	(0.005)	(0.008)	(0.012)	(0.008)
Black	0.015	0.036	0.017	– 0.065	– 0.054	– 0.043
	(0.041)	(0.054)	(0.032)	(0.049)	(0.063)	(0.040)
Hispanic	– 0.002	– 0.016	– 0.026	0.54	0.058	0.079*
	(0.044)	(0.056)	(0.035)	(0.050)	(0.063)	(0.041)
White	0.019	0.014	0.027	0.053	– 0.052	– 0.011
	(0.039)	(0.052)	(0.031)	(0.041)	(0.051)	(0.033)
Offense Type						
Violent	– 0.116**	– 0.057	– 0.069	– 0.065	– 0.100+	– 0.004
	(0.045)	(0.060)	(0.036)	(0.045)	(0.057)	(0.037)
Property	0.030	0.053	0.039	– 0.009	– 0.006	– 0.037
	(0.030)	(0.040)	(0.024)	(0.031)	(0.039)	(0.025)
Drug	0.061+	0.019	0.009	– 0.020	– 0.022	0.001
	(0.033)	(0.043)	(0.026)	(0.022)	(0.028)	(0.018)
Serious mental health	– 0.030	– 0.038	– 0.035*	– 0.038	– 0.041	– 0.029
	(0.020)	(0.028)	(0.017)	(0.027)	(0.036)	(0.022)
Sensitive needs yard	0.037	0.011	0.044	0.074	0.083	0.056
	(0.040)	(0.053)	(0.031)	(0.048)	(0.060)	(0.039)
Current or prior serious	0.008	0.029	0.015	0.012	0.007	0.007
or violent conviction	(0.028)	(0.038)	(0.022)	(0.015)	(0.020)	(0.013)
Sex offender	0.009	– 0.010	0.015	0.075	0.103*	0.013
	(0.038)	(0.050)	(0.029)	(0.040)	(0.050)	(0.033)
Known street gang member	0.054	0.039	0.053	0.076+	0.150	0.144
	(0.042)	(0.057)	(0.035)	(0.079)	(0.118)	(0.066)
Observations	3520	7093	13,707	2121	4221	8512

Standard errors in parentheses. Regression discontinuity estimates are from local linear regressions estimated using a triangle kernel and a binwidth of 1. $^{**}p < 0.01$, $^{*}p < 0.05$, and $^{+}p < 0.10$

Division F offenses are not eligible for further criminal prosecution. All types of rules violation reports can result in loss of credit, effectively extending an inmate's prison sentence.

Results

To examine the treatment effect, I first show the density of the outcome variables across the cutoff. When illustrating the density, I use a bandwidth of 8 and a binwidth of 1. The choice of bandwidth and binwidth rarely changes the graphical presentation of the data. So, for the sake of consistency, I use the same bandwidth and the binwidth on the graphs throughout the results. For the regression discontinuity estimation, I use the local linear regression estimator with a triangle kernel. Since regression discontinuity estimates can be sensitive to the choice of bandwidth I present the sensitivity of the discontinuity estimates at varying bandwidths.

Level II/III Cutoff

Figure 2 shows the treatment effect of placement in Level II (medium security) relative to Level III (close security) on the likelihood of any rules violation report. The left column of Fig. 2 presents regression discontinuity estimates of the proportion of inmates with any rules violation report and the right column plots the regression discontinuity estimates (with 95% confidence intervals) obtained from varying bandwidths to test the sensitivity of the regression discontinuity estimate. As can be seen from the figure, there is a clear visual break at the cutoff between Levels II/III. Based on a bandwidth of 8, the regression discontinuity estimate is 0.107 with a standard error of 0.043 implying that inmates in Level II prisons had a significantly higher likelihood of a serious rules violation report. In other words, placement in Level II (medium security) relative to placement in Level III (close security) facilities (hereafter, placement in Level II) increased the likelihood of being written up for a rules violation report by approximately 11 percentage points. On the right side, I present the sensitivity of the regression discontinuity estimate using varying bandwidths. As it turns out, the regression discontinuity estimates are quite stable across the possible range of bandwidths. The effect is most pronounced at smallest values of bandwidth, where the assumptions are most credible.

At first glance, the results appear to indicate that placement in a medium security facility relative to a close security facility exacerbates misconduct. To explore the result further, I estimate the effect of placement in Level II on the likelihood of different types of rule violation reports to see which, if any, types of reports are more likely in Level II facilities. There are substantial differences between different types of rules violation reports ranging from Division A1/A2 rules violation reports for murder or battery causing serious injury to Division E or F violations like bartering or gambling. It is quite possible that the effect of facility security level differs for different types of rules violation reports. Figure 3 shows the regression discontinuity estimates of the proportion of inmates with Division A1 or A2; B, C, or D; and E or F rules violation reports along with the sensitivity of the regression discontinuity estimates with varying bandwidths. The goal of breaking the analysis down in this way is to explore whether or not the treatment effect differs by the severity of the rules violation report.[22]

[22] It is worth noting, that the most severe A1/A2 violations are a rare outcome and despite the large sample sizes at small values of the bandwidth, I would be under-powered to detect anything short of a very large effect size for this outcome.

As can been seen from the graphs, the results in Fig. 2 are driven almost entirely by a higher likelihood of Division E or F rules violation reports. There is a clear visual break in Fig. 3e at the cutoff between Level II/III. Based on a bandwidth of 8, the regression discontinuity estimate is 0.095 with a standard error of 0.038 implying that inmates in Level II (medium security) prisons had a significantly higher likelihood of a Division E or F rules violation report. In other words, inmates in Level II were significantly more likely to be written up for offenses like refusal to participate in a work assignment, altering a uniform, or gambling. As with the result for any rules violation report, the result is stable across the range of possible bandwidths and bandwidth of 8 gives the smallest estimate of the effect magnitude. As with the estimate of any rules violation report, the effect is most pronounced at smallest values of the bandwidth where the assumptions are most likely to hold. As can be seen from the other graphs in Fig. 3, placement in medium relative to close security does not significantly affect any other type of rules violation report.

Table 4 presents the formal coefficient estimates and standard errors obtained by estimating the regression discontinuity using various bandwidths. All of the coefficient estimates of the effect of placement in Level II on the likelihood of a Divsion E or F rules violation reports are significant across bandwidths, showing that the likelihood of being written up is significantly higher in Level II (medium security) as compared to Level III (close security).

To probe the robustness of the results at the Level II/III cutoff I estimate the regression discontinuity again using local polynomial regressions up to the third order term to test whether the estimates are sensitive to the functional form of the specification.[23] Local polynomial regressions allow for greater flexibility in line fit. The results suggest that the models are not sensitive to the degree of the polynomial, they are substantively similar to those derived using the local linear regression specification. If anything, they suggest a greater magnitude in the effect of placement in Level II on the likelihood of a serious rules violation report.

Another way to probe the results at the Level II/III cutoff is to check for discontinuities at other values of the running variable. Since my assertion is that the observed differences in the density of the outcome variable are attributable to the differences in facility security level assignment, it would be problematic for the results of this paper if there were discontinuities in the density of the outcome variables that were not associated with differences in treatment. There are no discontinuities in the outcome variables associated with arbitrary cutoff values.[24] The results support the principle claim of this paper, that the discontinuities found at the cutoff values between facility security levels represent the treatment effect of placement in Level II.

Level III/IV Cutoff

Having established that placement in a Level II facility increases the likelihood of rules violation reports, which is driven by a higher likelihood of lower level (Division E or F) violations, I turn to estimates of the effect of placement in Level III (close security) facilities relative to Level IV (maximum security) facilities (Fig. 4).

[23] All models were estimated with up to a third order polynomial with the exception of bandwidth equal to 2 which could only accommodate a quadratic term. Formal results are available upon request.

[24] Formal results are available in the online supplement (Section 5).

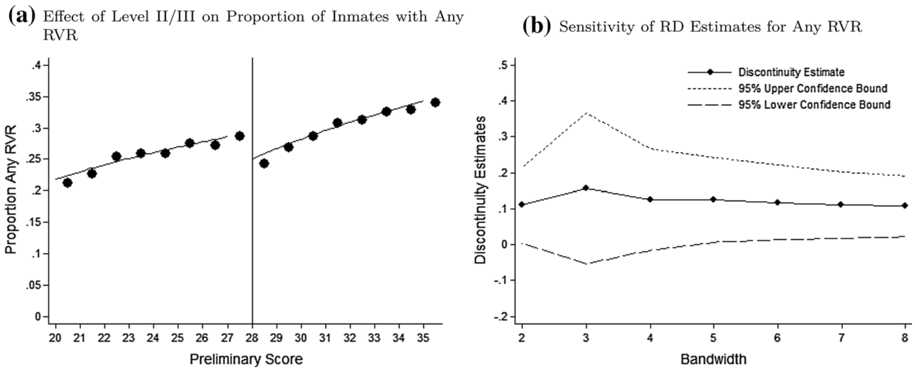

Fig. 2 The effect of facility security level on the likelihood of a rules violation report (RVR) at the Level II/III cutoff. *Note*: For the graph on the left, the density has been plotted with the following: bandwidth of 8, binwidth of 1. The line fit has been conducted with the LLR using triangle kernel. The graph on the right shows discontinuity estimates for varying bandwidths all derived using the LLR with a triangle kernel and a binwidth of 1

The left column of Fig. 4 presents the regression discontinuity estimate of the proportion of inmates with any rules violation report and the right column plots the regression discontinuity estimates (with 95% confidence intervals) obtained from varying bandwidths to test the sensitivity of the regression discontinuity estimates. As can be seen from the figure, unlike at the Level II/III cutoff there is no apparent visual break at the cutoff between Levels III/IV.[25] As the graph shows, though none of the estimates are significant the magnitudes of the regression discontinuity estimates are sensitive to the choice of bandwidth and the range of the estimates includes zero (ranging from approximately 3.5 to − 5 percentage points). Focusing on bandwidths close to the threshold value, where the assumptions of the regression discontinuity are most plausible, I do not detect an effect of placement in Level III facilities relative to Level IV facilities.

Discussion

The results presented in this paper are robust to the choice of bandwidth and to different functional form specifications. The conditions generated by the classification system used by the California Department of Corrections and Rehabilitation and sizeable inmate population allow for relatively precise estimation of the effect of facility security level on rules violation reports in California prisons. The estimation strategy in this paper is designed to most closely mimic the policy question: what would be the effect of moving inmates down from overcrowded higher security facilities? The results suggest that there is little evidence that *at the margin* moving inmates down in level would be a significant disruption to the safety and security of California prisons. The results at the

[25] As can be seen in Fig. 4 there is a change in slope on either side of the cutoff. Changes in slope can suggest an interaction effect, or a nonlinearity in the relationship between the running variable and the outcome. Concerns about nonlinearity can be assuaged by modeling the regression discontinuity using local polynomial regressions. The substantive conclusions at the Level III/IV cutoff do not change based on the local polynomial regressions. Results are available on request.

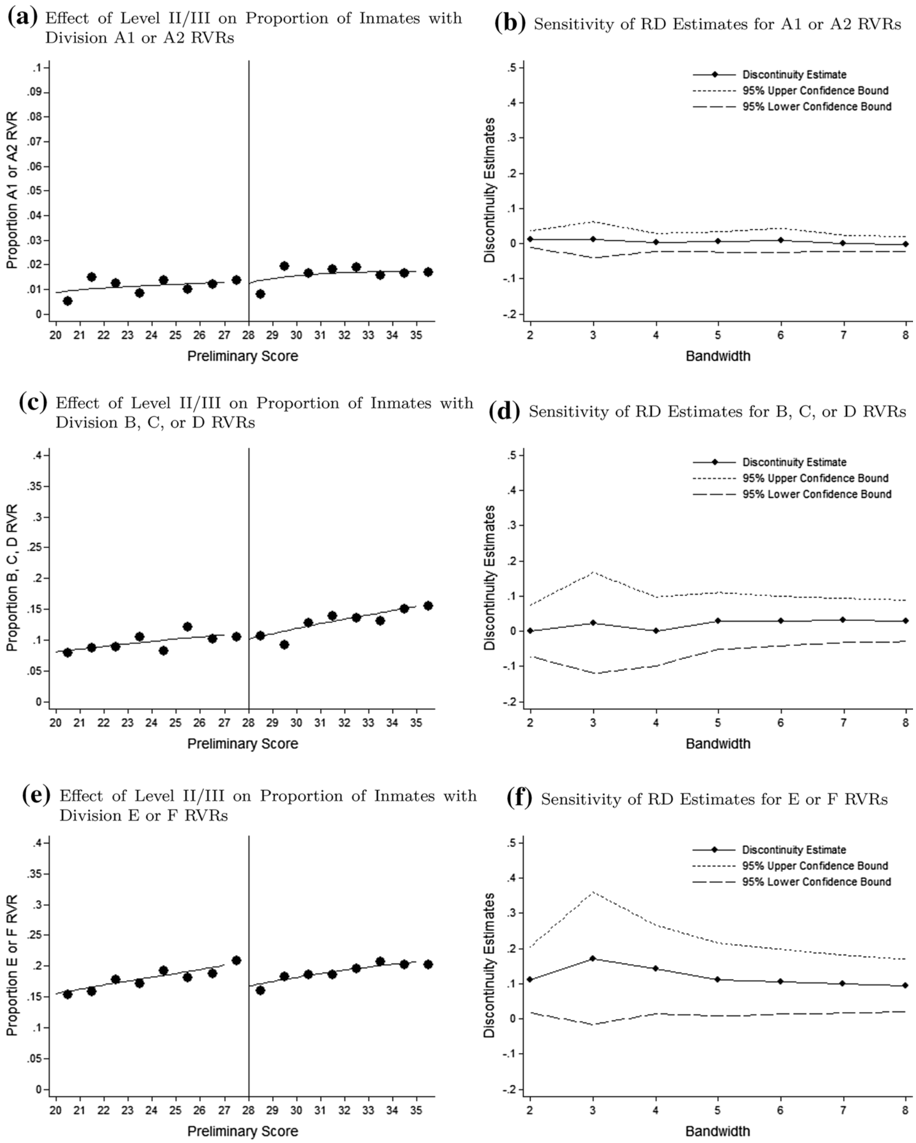

Fig. 3 The effect of facility security level on the likelihood of specific types of rules violation reports (RVRs) at the Level II/III cutoff. *Note*: For the graph on the left, the density has been plotted with the following: bandwidth of 8, binwidth of 1. The line fit has been conducted with the LLR using triangle kernel. The graph on the right shows discontinuity estimates for varying bandwidths all derived using the LLR with a triangle kernel and a binwidth of 1

Level III/IV threshold fail to detect an effect of security level placement on the prevalence of serious rules violation reports and the results at the Level II/III threshold show that the effect of facility security level placement is concentrated among the lowest level violations.

Table 4 Regression discontinuity estimates under varying bandwidths

Variable	Level II/III				Level III/IV			
	2	4	6	8	2	4	6	8
Any RVR	0.11*	0.126+	0.118*	0.107*	0.034	0.027	0.012	0.014
	(0.054)	(0.072)	(0.053)	(0.043)	(0.045)	(0.058)	(0.044)	(0.038)
A1 or A2	0.012	0.010	0.004	− 0.001				
	(0.012)	(0.018)	(0.013)	(0.011)				
B, C, D	0.002	− 0.001	0.029	0.030				
	(0.038)	(0.050)	(0.036)	(0.030)				
E, F	0.112*	0.141*	0.106*	0.095*				
	(0.048)	(0.064)	(0.047)	(0.038)				
Observations	3520	7093	10,483	13,707	3460	6979	10,315	13,490

Coefficient estimates from local linear regression models estimating the effect of moving to the lower of two adjacent security levels on the prevalence of misconduct. Standard errors in parentheses. All local linear regressions have been estimated using a triangle kernel and binwidth of 1. $^{**}p < 0.01$, $^{*}p < 0.05$, and $+p < 0.10$

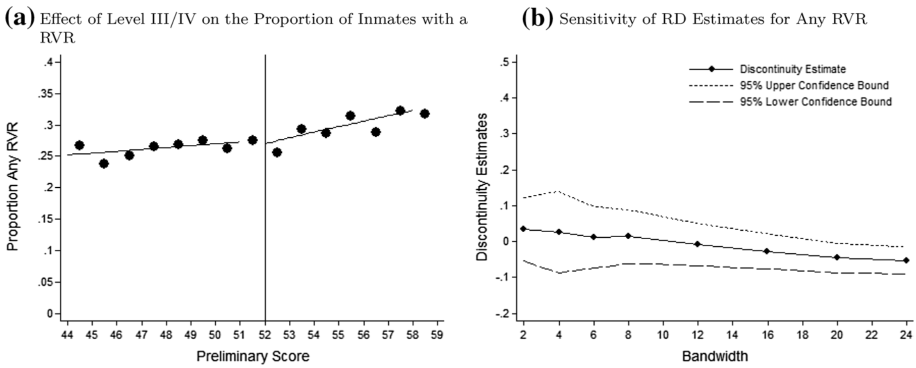

Fig. 4 The effect of facility security level on the likelihood of a rules violation report (RVR) at the Level III/IV cutoff. *Note*: For the graph on the left, the density has been plotted with the following: bandwidth of 8, binwidth of 1. The line fit has been conducted with the LLR using triangle kernel. The graph on the right shows discontinuity estimates for varying bandwidths all derived using the LLR with a triangle kernel and a binwidth of 1

While the design and the data for this paper do not allow me to test theoretical mechanisms directly, it is worthwhile to consider whether the results are suggestive with respect to theory. The regression discontinuity analysis assumes that the inmates being compared are similar in terms of their baseline risk of misconduct. As a consequence, we would predict that being housed with less risky peers on average should result in lower rates of misconduct in lower level facilities. Specifically, Level II (medium security) facilities have populations that are substantially older and have served substantially more time in prison, which suggests that relative to similar inmates placed in Level III facilities, inmates placed in Level II (medium security) facilities are incarcerated with more "old heads" (Kreager et al. 2017). However, contrary to what theory might predict, I do not observe evidence of a mentoring effect on the prevalence of misconduct. There are several potential explanations for this result. Since the effect of placement in Level II facilities is driven by low level violations, it could be that the "old heads" view lower level restrictions as arbitrary (Sykes 1958) and so make less of an attempt to exert social control to encourage compliance with those rules. On the other hand, one might posit that since the Division E and F violations still trigger punishments such as time in isolation and good time loss, then a pure mentoring effect should still discourage these kinds of violations.

It could be that I do not observe a mentoring effect because of differences in the way mentors respond to the unit context. The mentoring effect observed in the Pennsylvania Inmate Network Study (PINS) might be enhanced by the context of the good behavior unit. It could be that, on the good behavior unit in PINS, "old heads" function as "place managers" (Eck 1995) meaning that the discrete nature of the good behavior unit concentrates the power and influence of the "old heads" and might also generate a sense of obligation that compels "old heads" to exert social control in the unit environment. The unit context in this study varies substantially from the one in PINS. A general population Level II yard in California prisons is less concentrated. The accompanying social structure of the general population yard might diffuse the influence of "old heads" or, alternatively, might diffuse the sense of obligations "old heads" feel to exert social control on the yard. Importantly, the evidence presented here does not necessarily rule out a mentoring effect, but it does suggest that the magnitude of any mentoring effect is not strong enough to overcome countervailing forces in Level II prisons, resulting in a higher rate of the lowest level infractions.

While the results in this study are inconsistent with a mentoring effect, they are consistent with an individual level conceptualization of routine activities theory. Specifically, one of the principle differences between Levels II and III is the difference in the dominant housing type. Inmates in Level II are much more likely to be housed in open dormitories as opposed to cells. The more open environment of the dormitory provides more opportunities to engage in low level rules violations and fewer opportunities to conceal misconduct activity, which would result in more write ups in Level II relative to Level III. This explanation would be consistent with the situational prison control perspective (Wortley 2002) in that the features of the prison environment might be driving behavior. Furthermore, the open environment of the prison dormitory also increases relative exposure to opportunities for interactions that can be likened to Osgood et al. (1996)'s "unstructured socializing." The results are consistent with Osgood and colleagues formulation of routine activities. Namely, that a relative increase in exposure to opportunities for unstructured socializing should lead to more deviant behaviors. Indeed, the kinds of behaviors that are *more likely* as a result of placement in Level II are much closer to "deviance" (i.e. failure to report to work, altering a uniform, gambling, etc.) than they are to crime.[26] Unfortunately, given the nature of the data it is not possible to attribute the observed effect to a specific theoretical mechanism. For example, we might expect different mechanisms to differentially affect the different types of misconduct within the severity categories (i.e. theft vs. gambling), but since the data do not contain that level of detail it is not possible to further interrogate the mechanisms along that line of reasoning. It is of further concern that higher number of Division E or F violations in Level II prisons may not be driven by differences in inmate behavior.

[26] Unfortunately, the data cannot accommodate a specific breakdown of the violations in Division E and F.

The observed result could be driven, not by differences in rates of observed misconduct, but by differences in the exercise of discretion among correctional officers across facility security levels. It is important to note that in these data we observe rules violation reports, which are an indicator of misconduct activity, but not direct measures of inmate behavior. Not all misconduct is observed by correctional officers and among observed incidents of misconduct only some portion are written up as rules violation reports at the discretion of the officer that observes the behavior (Hewitt et al. 1984).

Because I am not able to observe inmate behavior directly, it is at least possible that rates of Division E or F violations are more or less constant between Levels II (medium security) and III (close security), but that officers are less likely to write inmates up for Division E or F violations in Level III.[27] As Hewitt et al. (1984, 446) note, "the central dilemma faced by guards is that they can neither expect inmate cooperation nor govern without it." According to Hewitt et al. (1984), the pattern that emerges as a result is that correctional officers attempt to maintain control and minimize their own personal risk by selective non-enforcement of the rules. Prior research suggests that this selective non-enforcement of the rules might be driven by differences across security levels in terms of officers' concerns for their personal safety. According to survey results in Lerman (2013), officers are much more likely to be assaulted or injured at work in Level III facilities relative to Level II facilities. In addition to higher rates of on the job injury in Level III facilities, officers reportedly feel significantly less safe at higher facility security levels (Lerman 2013). As a consequence, they may be selecting away from writing up inmates for lower level violations in order to remain aware and available to address relatively more serious violations, or it might also be driven by a desire to not disrupt the status quo and agitate the inmates unless it is absolutely necessary.

If, indeed, the result shown in this paper is driven by officers exercising discretion in Level III facilities and not writing up inmates for Division E or F violations then it is not necessarily incongruous that we do not observe a similar result at the Level III/IV cutoff, despite Level IV facilities being even more violent than Level III facilities. It would be the case that we would not observe a result at the Level III/IV cutoff if the de-prioritization of Division E or F violations happened after staff perceptions of safety cross a certain threshold of feeling unsafe on average. In that case, we would observe the result at the Level II/III cutoff but not again at the Level III/IV cutoff.

While this study cannot directly test the mechanisms for the observed effects of facility security placement on the prevalence of serious rules violation reports, it does provide rigorous causal estimates of the effect of security classification on misconduct, which raises a question about how to make sense of these results in light of the seminal work by Berk and de Leeuw (1999) on this topic. There are a number of reasons to re-visit this question.

First, the Berk and Deleeuw paper was written prior to major changes in the classification system (implemented with Berk's assistance). The system differences include a different classification instrument and reduced discretion in administrative overrides that could have changed in the mix of inmates incarcerated at the cutoff values. Second, Berk and DeLeeuw had different inclusion criteria for the analytic samples, which could drive

[27] Under-reporting by correctional officers in Level III is consistent with the data and seems to be most plausible *if* the observed difference is driven by officer and not inmate behavior, given that the only other explanation that would be consistent with the data pattern is that officers in Level II are over-reporting inmate misconduct. Under reporting in Level III is not only consistent with the data patterns, but also keeps the measurement vs. inmate behavior explanation in the realm of officer discretion.

differences in the findings. The "non-striker" sample in Berk and Deleeuw consisted of inmates admitted starting in January 1994. In many ways, a sample of recently admitted inmates (like the one in Berk & DeLeeuw) is the optimal sample for this estimation, because the classification scores are entirely based on pre-prison characteristics. The sample of inmates in this paper consists of all the male, non-death row felons imprisoned for at least one year continuously starting on January 1, 2008. As a consequence, the vast majority of inmates in the sample have had their classification scores re-assessed at least once.[28] Finally, the exercise of discretion may have changed over the 10 years between the observed samples; changes that may be attributable to the growing power of the prison guard union in California over that time period (Page 2011). To summarize, in combination with the specific policy problem facing CDCR the substantial changes in context between the Berk and de Leeuw (1999) study and the present investigation warrants renewed examination of the relationship between facility security level placement and inmate misconduct. Despite the substantial contextual differences, the results are not *as* different as might be expected. One of the key takeaways from Berk's results was that the increased odds of misconduct associated with an increase in classification score were almost entirely offset by the "suppressor effect" of the maximum security prisons. The results here are relatively consistent with that story. Berk and DeLeeuw did not test the adjacent lower level thresholds (only maximum security against all other levels) so there is no direct comparison to be made at the lower levels. That being said, the takeaway point that has proliferated in this line of inquiry (see explicit statements to this effect in Berk et al. 2003; Camp and Gaes 2005) is that only maximum security facilities suppress misconduct, and I would argue that the results in this paper provide rigorous evidence that there are substantive effects at lower thresholds.

That said, discussion of a couple of caveats is in order. When interpreting the results in terms of both theory and practice, it is important to note that the results of a regression discontinuity are highly localized. As a consequence, the assumptions, and therefore, the estimated causal effects are only expected to hold at the margins not in general. The regression discontinuity design is not able to estimate the effect of placement in the next higher security level for all inmates, but rather for the similar inmates at the margin. These inmates can be considered the "compliers," the inmates within a certain distance from the score threshold for whom their preliminary classification score determines their facility security level placement. The results cannot estimate the effect of facility security level placement for those inmates whose preliminary classification score does not determine their facility security level placement.[29] However, despite the localized nature of the estimated effect, it

[28] As previously demonstrated, there is no evidence of manipulation across the cutoff at the score threshold between the levels, and while inmates had some control over their classification score once they have been re-assessed (in the sense that they have some control over their behavior), they still have imprecise control over the running variable, which is what is required for a valid regression discontinuity design (Lee and Lemieux 2010).

[29] For example, inmates who have a lower preliminary score but are placed in the higher facility security level because of a binding mandatory minimum. In the language of Angrist et al. (1996), those with a binding mandatory minimum would be the "always takers," because they will always be housed in the higher security level regardless of their preliminary score. The "never takers", those with preliminary scores who are not housed in some other housing unit, the hospital or a treatment unit, have been excluded from the sample. Finally, the "defiers" are those with a preliminary score which would suggest a higher level and they are actually housed in a lower level. "Defiers" are uncommon at the Level II/III and Level III/IV threshold. They are most common at the Level I/II threshold because so many inmates are held at the Level II because of binding mandatory minimums (see the online supplement).

is important to note that there are several thousand inmates within a relatively small bandwidth range of the cutoff value. The estimates suggest that moving inmates at the margin down in facility security level is not going to compromise safety and security of the institutions, which has substantive implications for administrators who were concerned about prison crowding at the higher level facilities.

In addition the being a highly localized estimation, the estimates are not as precise as would be ideal. This is predominately due to the substantive choice to estimate the effect of moving *down* in security level. Because there are four total security levels and a fuzzy design, estimating the effect of moving down in level is not the direct inverse of the effect of moving up in level. The predictive power of having a score just above the cutoff value on placement in the higher level is stronger than the predictive power of having a score just below the cutoff value on placement in the lower level, because administrators will override a lower placement with a higher one more often than they would override a higher placement with a lower one (Berk et al. 2003; Farabee et al. 2011). Consequently, the choice to estimate the effect of moving down had an effect on the precision (although not the validity) of the estimates reported here.

Finally, with respect to demographic generalizability, the data for this paper consisted of only male inmates, because I only had access to data for male inmates. There may be gender differences in the likelihood of misconduct across levels, in which case the results may differ for female inmates. Differences are particularly likely if the result is driven by the exercise of discretion in correctional officers write ups. Perhaps future work could estimate the effect of facility security classification on rules violation reports for female inmates.

Conclusion

To test whether placement in a lower facility security level affects the likelihood of rules violation reports, this study is able to capitalize on features of California Department of Corrections and Rehabilitation inmate classification system which assigns prison inmates to facility security levels based on cutoffs in risk scores derived using an “objective” classification instrument. The assignment variable, preliminary score, is a very strong predictor of security level placement. After carefully checking the validity of the regression discontinuity design and executing the regression discontinuity estimator, I find that placement in Level II (medium security) facilities relative to Level III (close security) facilities significantly increases the likelihood of rules violation reports. On average, inmates in Level II were 8.1 percentage points more likely to be written up. Estimating the results by type of rules violation report, results showed that the higher levels of rules violation reports appears to be driven almost entirely by a lower likelihood of Division E or F violations.

I am unable to detect an effect of Level IV (maximum security) facilities on rules violation reports, which contrasts with prior studies studies which found that *only* maximum security facilities suppress misconduct. The findings of this study provide contradictory evidence to the prevailing wisdom of more than 15 years about the effects of facility security classification. Given the massive changes in California’s prison population maximum security facilities may no longer have the effect on inmate behavior that prior work suggests (Berk and de Leeuw 1999; Camp and Gaes 2005). Given the differences in context and sample, it is not entirely out of the ordinary that the analysis in this paper finds a different result than the seminal paper by Berk and DeLeeuw. However, given that this result is derived from relatively current data using the most up to date implementation of regression discontinuity estimation, it is worth considering how to put the results in context for both theory and practice.

In terms of theory, while traditionally studies have investigated the determinants of prison misconduct drawing on prison specific theoretical frameworks. There has been a more recent trend of scholars leveraging general theories of crime and deviance (i.e. strain (Blevins et al. 2010; Morris et al. 2012) and control (Steiner and Wooldredge 2009)) to investigate prison misconduct. In this paper, by considering the effect of security classification in the context of routine activities (Osgood et al. 1996) and positive peer influence (Kreager et al. 2017), I draw on both general theories as well as prison specific theories to frame this exploration of the effect of security classification on misconduct.

The results show no net "mentoring" effect on marginal inmates in lower security facilities despite having a higher probability of exposure to "old heads" who might serve as potential mentors. On the other hand, the effect of housing marginal inmates at a lower security level appears to be consistent with an individual interpretation of routine activities theory whereby inmates at lower levels have more exposure to "unstructured socializing" and, therefore, a higher likelihood of engaging in deviant behaviors. The increase in rules violation reports is driven, almost entirely, by the most minor infractions, which might be more aptly characterized as deviant than as criminal. However, while the results are suggestive with respect to these theories, whether the results are driven by characteristics of the facilities on inmate behavior or differences in the exercise of discretion across different security levels remains an open question that cannot be adjudicated by these data.

In terms of practice, estimates of the effect of security classification on rules violation reports in California prisons have direct policy relevance. As a result of this analysis and recommendations from the Expert Panel on the Inmate Classification Score System, California prison administrators increased the maximum point value for placement in Level II prisons from 28 to 35 points and the maximum value for placement in Level III prisons from 51 to 59 points (Title 15, California Code of Regulations 2016).[30] The results of this analysis suggest that this kind of movement could be made without compromising the safety and security of the institutions. That said, the regression discontinuity estimates also rely on "all else being equal." That is, that if staff behavior changes as a result of mass movement of inmates down in security level, we might also observe differing results, because the estimates in this study are derived using rules violation reports which are an indicator of misconduct, but do not measure misconduct directly.

In sum, the fuzzy regression discontinuity design allows for a rigorous way to estimate the causal effect of facility security classification on rules violation reports in California prisons, providing an evidence base for policy-makers facing capacity constraints within the prison system while at the same time updating the extant literature on the effects of an important feature of prison structure on inmate outcomes.

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[30] This resulted in substantial numbers of inmates moving down in facility security level, which likely had major budget implications. Unfortunately, there was no information available to calculate the security level specific costs that would allow for interpretation of the results in a cost-benefit framework.

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