THE INFLUENCE OF SENTENCE LENGTH ON THE COMMISSION OF SERIOUS AND VIOLENT PRISON INFRACTIONS BY FEMALE INMATES

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This study examined the relationship between sentence length and time to commission of serious and violent disciplinary infractions by female inmates divided into short (2 years or less), intermediate (2-8 years), and long-term (8 or more years) groups. Relying on the intermediate-term group as a referent, a Cox regression model demonstrated that short-term inmates were most likely, and long-term inmates least likely, to commit serious and violent infractions across monthly time intervals during the 2-year study period. All three groups exhibited a low base rate of violent behavior directed toward inmates and staff. Predictors associated with the time to commission of serious and violent acts included age, education, mental health, and custody level. Findings point to the potential for over-classification to more secure custody assignments for some inmates, particularly for long-term female prisoners. Policy, institutional, and clinical implications are discussed, including the need for specialized programming and mental health treatment.

Keywords: sentence length; incarcerated women; female inmate misconduct; female prisoners; survival analysis

INTRODUCTION

Women constitute 7% of the total U.S. prison population, with more than one third of female inmates (36%) convicted of violent crimes that typically result in lengthy sentences (Carson & Anderson, 2016). The extent of violent crime convictions combined with extended periods of confinement raises issues related to the adaptation and adjustment of female prisoners during incarceration. Although lengthy sentences could plausibly encourage maladaptive behavior in prison, an extensive review of empirical studies reported in major journals between 1980 and 2013 found sentence length to be directly and positively associated with inmate misconduct in only 28% of the models, inversely associated to inmate misconduct in 19% of the models, and not significantly related to inmate misconduct in 53% of the models (Steiner, Butler, & Ellison, 2014). Most of these studies included all male samples but less often consisted of pooled samples of male and female inmates, or the rare female study.

While research on factors influencing prison adjustment focuses mainly on male inmates, these findings cannot unquestionably be generalized to women whose pre-prison socialization and life experiences diverge from their male counterparts. Women also behave differently in prison (Harer & Langan, 2001; Steiner & Wooldredge, 2009), and utilize distinctive adaptation and coping methods relative to men (Celinska & Sung, 2014; Fox, 1992; Jiang & Winfree, 2006; MacKenzie, Robinson, & Campbell, 1989; Warren, 2003; Wright, Salisbury, & Van Voorhis, 2007). Such findings suggest a greater need to examine women separately to gain an understanding of gender-specific influences on prison adaptation and misconduct to more effectively address this understudied population (Berg & DeLisi, 2006; Celinska & Sung, 2014; Craddock, 1996; Harer & Langan, 2001). No large-scale study to date has addressed the temporal relationship between sentence length and the emergence of serious and violent disciplinary infractions and related predictors among female prison inmates.

The present study sought to investigate this gap in the literature by considering methodological shortcomings in prior studies of female inmates, including small and unrepresentative samples, differential times at risk, and variable measures of sentence length and disciplinary outcomes. Specifically, this study explores the relationship between long-term versus short-term inmates and the time to commission of serious and violent misconduct, along with related predictors influencing major misconduct by female inmates.

SERIOUS AND VIOLENT DISCIPLINARY INFRACTIONS AMONG FEMALE INMATES

Research has emerged in recent years examining individual- and institutional-level effects on adjustment patterns among imprisoned women (e.g., Lahm, 2017; Leigey, 2010; Thompson & Loper, 2005; Warren, 2003; Wright et al., 2007). A substantial number of studies have examined the individual correlates of aggregated measures of prison misconduct (see Steiner et al., 2014; Wright et al., 2007), yet few studies have specifically evaluated the correlates of serious institutional misconduct or violence committed by female inmates against other inmates or staff (see Lahm, 2017). An increasing number of more recent studies devoted to female inmates emphasize gender-specific adaptation methods for coping with the stresses and deprivations of imprisonment (Celinska & Sung, 2014; Jiang & Winfree, 2006; Leigey, 2010, 2015; Salisbury, Van Voorhis, & Spiropoulos, 2009; Wright et al., 2007).

Imprisoned women can engage in aggression and other acts of serious misconduct with the potential for injury to staff and inmates. Studies have shown that women are disciplined at a rate similar to men for assaultive violations, although they are far less likely than men to engage in serious acts of violence leading to injury or death (Harer & Langan, 2001; Lahm, 2017; Reidy, Sorensen, & Cunningham, 2012; Tischler & Marquart, 1989). In one of the most comprehensive comparisons of violence committed by male and female inmates, Harer and Langan (2001) found that women in federal prisons were cited for fighting at a rate comparable with men, yet only 2.8% of the assaultive acts committed by women reached the threshold considered to be "serious," in comparison with 18.5% of the assaultive acts committed by men. Furthermore, none of the nearly 25,000 female inmates in the Harer and Langan (2001) study committed a homicide while in federal custody.

Relying on self-report survey data from a nationally representative sample of more than 11,000 male and nearly 3,000 female state-prison inmates, the 2004 Survey of Inmates in State and Federal Correctional Facilities (SISFCF), Solinas-Saunders and Stacer (2012) considered the effects of gender on verbal and/or physical assault within the context of social supports. Female inmates were shown to be significantly less inclined than male inmates to engage in verbal and/or physical assault on inmates and staff, with prevalence rates of 13.8% versus 20%, respectively, differences that remained even after controlling for demographic factors, prison experiences, and institutional characteristics. Reduced levels of violence were related to prison employment and housing in lower security levels. Violence was less likely for male and female inmates maintaining telephone contact with others, and when housed in prisons within close proximity to their family, yet actual visitation had no effect on misconduct for either gender.

INFLUENCE OF SENTENCE LENGTH ON DISCIPLINARY PATTERNS OF MISCONDUCT AMONG FEMALE INMATES

Few studies have directly investigated the specific influence of sentence length on the adjustment of female inmates, particularly as it relates to serious or violent behavior. Findings from these studies have yielded contradictory results. Some investigations revealed a direct link between sentence length and elevated rule violations (Collie & Polaschek, 2003; Craddock, 1996), whereas Gover, Perez, and Jennings (2008) reported inmates serving longer sentences were less likely to engage in disciplinary violations. Other analyses, however, have found either no significant relationship between sentence length and institutional adjustment (Lahm, 2017; Reidy, Cihan, & Sorensen, 2017) or mixed results (Gover et al., 2008; Steiner & Wooldredge, 2009; Thompson & Loper, 2005). Such contradictory findings may be due to actual differences in offending behaviors but may also result from methodological choices made by various authors.

Using SISFCF self-report data from 1991 and 1997 representing incarcerated women housed in state prisons across the nation, Steiner and Wooldredge (2009) determined that sentence length (as a continuous measure) was significant and positively related to violent infractions only for the 1991 sample but was related to nonviolent infractions only in the 1997 group. Importantly, these findings demonstrate that the type and severity of infractions are influenced by sentence length, which emphasizes the need to disaggregate misconduct measures. Relying on self-report surveys from a small sample of 300 female inmate volunteers, Lahm (2017) reported that sentence length was unrelated to prison violence among the women, as were other predictors including a prior adult prison term, education, crowding, program attendance, marital status, and having children. In marked contrast, Gover and colleagues (2008), relying on a small sample of female inmates ($n = 57$), noted that as sentence length (measured continuously in months) increased by one standard deviation, the mean number of infractions was reduced by 43%. However, the use of small, and likely unrepresentative, samples raises concerns about interpreting and generalizing the findings.

In a study relating the impact of sentence length to adjustment patterns, including serious and violent infractions among incarcerated women, Thompson and Loper (2005) divided nearly 700 female inmates in a maximum-security prison into three groups based on sentence length: short-term (sentences less than 2 years), medium-term (sentences ranging

from 2 years up to 10 years), and long-term (sentences of 10 years or more). The authors disaggregated misconduct into categories of violent, serious nonviolent, and minor institutional violations. Results demonstrated no significant differences in emotional adjustment or violent infractions based on sentence length. However, for nonviolent infractions, both short- and medium-term inmates committed more serious nonviolent infractions but fewer minor institutional infractions. The authors pointed to the low mean base rate of less than 0.01 per month as an explanation for the lack of significant findings related to violent misconduct.

An investigation by Casey-Acevedo and Bakken (2001) considered temporal patterns associated with types of misconduct among a 2-year cohort of 222 female inmates in a maximum-security prison. Although the authors did not directly assess the effects of specific sentences, the inmates in this study were divided by time served into short-term (less than 18 months) and long-term (greater than 18 months) periods of confinement. Findings revealed different temporal patterns of misconduct, with the short-term group showing an increasing pattern of general misbehavior and serious infractions (e.g., those involving weapons, alcohol or drugs, contraband, and escape attempts) over the course of their confinement. The long-term group, by comparison, engaged in minor and serious misconduct early in their sentences, but such behavior declined as the inmates progressed through their terms. A different pattern emerged when considering violent behavior (assault, attempted assault, fighting), with the long-term inmates incurring violent infractions at a higher rate than short-term inmates.

Recent research using trajectory analysis to study the misconduct of female inmates provides insight into variability among studies investigating the relationship between sentence length and institutional adjustment (Reidy et al., 2017). The authors demonstrated heterogeneity in trajectory profiles illuminating discrete patterns associated with serious misconduct occurring over a 3-year period. Although more women committed no infractions, certain groups were identified by their trajectories of misconduct consisting of a stable but limited group of offenders, a delayed-onset group that escalated seriously disruptive behavior during the course of the study period, and an early-onset group that started out with an elevated level of serious misconduct that diminished over time. Sentence length, however, was not predictive of membership in any of the offending trajectory groups relative to the "innocent" group of inmates who had not committed an act of institutional misconduct during the study period. These findings suggest that consideration of inmate behavior in relation to time served and sentence length is complex and a worthy subject of further inquiry.

CURRENT STUDY

Overall, empirical research examining predictors of prison misconduct for female inmates is contradictory, limited, and complicated by methodological differences, including sample selection, time at risk, and the operational definitions of sentence length and outcomes. Sentence length, as one such predictor of these disciplinary outcomes, has been inadequately studied with samples of female inmates. Based on limited and conflicting prior research, the current study examined the relationship between sentence length, using various operational definitions suggested by the literature, and the time to commission of two major types of rule violations—serious and violent infractions—as outcome measures relying on a sample of female inmates from one large state prison.

METHOD

SAMPLE

The Arizona Department of Corrections (ADC) provided data on female inmates. Electronic files were available on all female inmates incarcerated in Perryville, the state women's prison, as of November 2016. The beginning of the observation period was January 2009, the date that marked the implementation of a new inmate disciplinary violation classification scheme. For the purpose of the present study, the sample was restricted to inmates who had served at least 6 consecutive months of their current custodial confinement. Inmates admitted during January 2009 through June 2016 were selected for the sample. The final sample included 2,777 female inmates.

MEASURES

Two outcomes to be modeled were based on (a) an omnibus measure of serious disciplinary violations and (b) a measure restricted to acts of overt violence. The ADC considers serious violations to be felonies. Such violations include both "A"-level infractions, Felony Classes 1 through 3, and "B"-level infractions, Felony Classes 4 through 6. The definitions of these infractions closely mimic the language of the criminal code, and include such acts as assault, drug possession, stalking, rioting, obstruction, forgery, fraud, and indecent exposure. Less serious "C"-level infractions, such as disrespecting staff, malingering, and hand-holding were not included in the database. Violent infractions include A-level "aggravated" assaults, those involving weapons or serious physical injury to other inmates or staff. Also included in the violent outcome category are lesser B-level "simple" assaults on inmates or staff, assaults on staff with bodily fluids, and mutual fights involving inmates.

Predictor variables include an array of correlates found to influence the rate of disciplinary misconduct in previous studies (Steiner et al., 2014). Demographic variables include inmate race/ethnicity, level of education, and age at entrance to prison. Race/ethnicity was coded as an indicator variable, wherein White was coded as 1, and the remaining racial and ethnic categories were coded as 0. Age at intake was included as a continuous predictor variable. Reported level of education was merged with completion of a general education development (GED) to create an indicator for the attainment of a high school diploma or its equivalent. A dichotomous indicator of prior prison incarceration was also extracted from the database as a measure of prior experience in the correctional system.

Several variables related to the inmates' current confinement were also included in the model. Custody classification scores at prison intake ranged from 2 through 5, indicating minimum, medium, close, and maximum custody levels. Two indexes created by the prison system based on staff review of an inmate's history during the initial custody classification process were also extracted from the database: (a) mental health score and (b) violent risk score. Mental health scores for female inmates range from 1 through 4. A score of 1 indicates no history of mental health issues or treatment, while a score of 2 indicates inmates without current mental health needs who have been treated in the past. A score of 3 refers to inmates whose mental health needs are met by outpatient treatment, while a score of 4 refers to inmates with mental health needs who have been admitted to a specialized mental health program. Violent risk score ranges from 1 to 5, with 1 indicating the lowest risk and 5 the highest risk. The score is based on a matrix that takes into account several factors, including the number and type of felony convictions, prior ADC offenses, and gang affiliation.

The primary predictor of interest was the length of sentence. Inmates were divided into three groups on the basis of their time to be served: (a) short-term inmates serving 2 years or less, (b) long-term inmates serving 8 years or more, and (c) those serving intermediate sentences between 2 and 8 years. The bottom and top quartiles were chosen as the cutting points for considering inmates to be either short-term or long-term inmates, while those in the middle two quartiles were selected for the intermediate category. Reliance on these cut points and the inclusion of "intermediates" allows for a natural reference category, and comports with the suggestion of some prior authors that the operational definition of short-term versus long-term inmate includes a degree of separation between the two groups (MacKenzie et al., 1989; Thompson & Loper, 2005), as differentiated from studies that either include a linear variable for sentence length or a single cut off separating short-term and long-term inmates (Casey-Acevedo & Bakken, 2001; Gover et al., 2008; Lahm, 2017; Steiner & Wooldredge, 2009).

ANALYTICAL PROCEDURE

Varying sentence lengths among the term-sentenced length groups resulted in substantial differences in time served at the point of data collection in November 2016. Although a number of methods could have been employed to control for time at risk, survival analysis was selected as the most appropriate statistical technique. Survival analysis simultaneously takes into account time at risk, along with the fact that some inmates had not committed an act of serious or violent misconduct through the end of the observation period. For those who survived, meaning that they had not committed an act of serious or violent misconduct while incarcerated, the at-risk period included the time served in ADC until being "censored" at the end of the observation period. In this context, censored refers to the inmate being treated as a success in the analysis through the end of the observation period, and regarded as neither a success nor failure thereafter. The time to failure for those who committed either type of act was coded in months. A multivariate Cox regression was employed to model the likelihood of failure, or hazard rate, controlling for continuous and categorical predictor variables.

RESULTS

The sample characteristics are reported in Table 1 for the short-term and long-term inmates, and those sentenced to terms of intermediate length. As noted previously, comparisons utilize intermediates as a reference category. Figures presented in Table 1 generally concur with our expectations given the literature in this area. For instance, long-term inmates tend to be older, 1 year on average, than the reference category, while short-term inmates tend to be younger, also about 1 year on average, than the reference category of intermediates. Custody levels were also substantially higher among the long-term inmates, most likely owing to the types of crimes for which they were convicted. The most blatant difference among the groups was in the amount of time served. While long-term inmates had served nearly 4 years at the time of observation, intermediates had served just over 2 years and short-term inmates 14 to 15 months, on average.

Categorical comparisons showed that inmates were similar in terms of race/ethnicity, although long-term inmates were slightly more likely to be Black, and short-term inmates slightly more likely to be Native American, in comparison with intermediates. No

TABLE 1: Demographic Characteristics of Participants by Sentence Term Length

	Short-term (n = 683)	Long-term (n = 646)	Intermediate[a] (n = 1,448)
Sample size			
Characteristics	M (SD)	M (SD)	M (SD)
Age at commitment	34.0** (9.5)	36.4* (10.3)	35.4 (9.8)
Mental health score	2.2 (0.9)	2.3 (0.8)	2.2 (0.8)
Violent risk score	1.8*** (1.2)	2.0 (1.3)	2.0 (1.3)
Custody level	2.4 (0.7)	2.9*** (0.7)	2.4 (0.7)
Time at risk (in years)	1.2*** (0.8)	3.9*** (2.1)	2.1 (1.2)
Race, %			
White	53.0	52.8	51.2
Black	7.5*	12.5*	9.9
Hispanic	27.2	25.9	29.2
Native American	10.7*	7.0	7.4
Other	1.6	1.9	2.3
High school/GED, %	59.3**	72.4***	65.3
Prior incarcerations, %	40.6*	42.4	46.4
Crime of Conviction, %			
Homicide[b]	0.0	24.0***	1.8
Sex Offense	1.0	6.3***	0.9
Violent[c]	15.4**	26.3**	20.7
Property	34.1	20.0***	32.7
Drugs	44.7*	19.2***	39.3
Statutory	4.8	4.2	4.6

Note. Categorical comparisons are based on χ^2; means comparisons are based on *t*-tests. GED = general education development.
[a]Reference category = Intermediate. [b]Statistical significance cannot be calculated when zero cells are present. [c]Includes all other violent crimes aside from homicide and sex offenses (assault, robbery, domestic violence, weapons offenses, kidnapping, and miscellaneous violence).
*$p < .05$. **$p < .01$. ***$p < .001$.

significant differences were noted among Hispanics or the small category of inmates of "other" races. In terms of the level of education, long-term inmates were more likely than intermediates to have completed high school or its equivalent, while short-term inmates were less likely than intermediates to have completed the high school degree/GED. Short-term inmates were less likely to have had prior prison experience in comparison with intermediates. Long-term inmates were more often convicted of violent crimes, particularly homicide and sex crimes, whereas they were less likely to have been convicted of property or drug offenses. Short-term inmates, alternately, were much less likely to have been convicted of violent offenses relative to intermediates and more likely to be convicted of drug offenses.

Table 2 presents the rate of serious and violent disciplinary violations by length of sentence term. While the long-term group is similar to the intermediates in the cumulative number of years served, long-term inmates had served about 3 times as many years, collectively, as the short-term inmates. Because of differential times at risk, the figures presented in Table 2 are the rates of infractions per 100 inmates annually for each of the groups. The overall rate for the omnibus measure of serious rule violations shows that short-term inmates commit infractions at a higher rate than intermediates, while long-term inmates commit infractions at a lower rate. The same pattern exists for the commission of violent

TABLE 2:   Disciplinary Outcomes by Sentence Term Length

Total inmate years at risk	Short-term (803.7)	Long-term (2,489.2)	Intermediate (2,996.8)
Disciplinary Outcomes	Rate[a] (*n*)	Rate (*n*)	Rate (*n*)
Serious infractions	85.7 (689)	53.4 (1,328)	61.6 (1,847)
Violent infractions	11.8 (95)	6.4 (160)	8.9 (266)
Aggravated assault on inmate	0.0 (0)	0.1 (3)	0.2 (6)
Aggravated assault on staff	0.4 (3)	0.04 (1)	0.03 (1)
Assault on inmate	2.2 (18)	2.5 (62)	2.1 (62)
Assault on staff	0.6 (5)	0.3 (8)	0.6 (17)
Assault on staff w/bodily fluid	0.4 (3)	0.1 (3)	0.5 (14)
Fighting	8.2 (66)	3.3 (83)	5.5 (166)

[a]Annual rate per 100 inmates.

infractions. The breakdown for violent offenses shows that fights involving inmates were the most common variety of assaultive infractions, while "A" level aggravated assaults were rare among all of the groups. Aggravated assaults accounted for less than 3% (14 of 521) of the total violent infractions committed by all of the female inmates in the sample. It is also important to note that no murders, manslaughters, sexual assaults, kidnapping, or hostage taking were reported among the entire sample of female inmates.

Although the findings from Table 2 indicate that long-term inmates were among the best behaved group in the institution, these overall findings do not take into account the fact that long-term inmates may have mellowed during the course of their incarceration, leading to lower rates of infraction during the latter portion of their sentences. Table 3 presents results from two Cox regression models designed specifically to test whether long-term inmates failed (committed infractions) at the same rate over time as the short-term inmates and the reference category of intermediates. Both of the Cox regression models, one modeling serious infractions generally, and one modeling violent infractions, were statistically significant, an indication that the predictor variables, collectively, were successful in predicting the outcomes. Unfortunately, it was not possible to include crime of conviction in the models due to its strong correlation with length of sentence term.

Results from the Cox regression models presented in Table 3 indicate the association between length of term sentence and the rate of failure, time to commission of a serious or assaultive disciplinary infraction, controlling for other potential predictor variables. The *exp(B)* in Table 3 may be interpreted as the expected increase or decrease in the hazard rate for each unit increase in the predictor variable. For instance, the coefficient for the continuous covariate age in the hazard model predicting serious infractions of 0.972 means that each yearly increase in age results in a 3% reduction in the likelihood of failure during a given time interval. Similarly, the coefficient for age in the hazard model predicting violent infractions (0.984) suggests that each yearly increase in age results in a 2% reduction in the likelihood of failure during a given time interval. For categorical covariates, the *exp(B)* may be interpreted as the increase or decrease in the hazard rate for the presence of a particular attribute. Having attained a high school diploma or its equivalent, for instance, decreased the hazard rate by 22% in the model predicting serious infractions (0.777) and 31% in the model predicting violent infractions (0.685).

TABLE 3: Cox Regression Models Predicting Months to Initial Disciplinary Infractions

Predictors	Serious	Violent
	$Exp(B)$ (SE)	$Exp(B)$ (SE)
Age at commitment	0.972*** (.004)	0.984* (.007)
Race—White	0.812*** (.063)	0.823 (.139)
High school/GED	0.777*** (.062)	0.685*** (.115)
Prior incarcerations	1.096 (.068)	1.120 (.137)
Mental health score	1.253*** (.038)	1.267*** (.076)
Violent risk score	1.018 (.025)	1.001 (.048)
Custody level	2.369*** (.040)	4.207*** (.075)
Short-term sentence[a]	1.510*** (.076)	1.415* (.149)
Long-term sentence[a]	0.594*** (.074)	0.477*** (.141)
Models	$\chi^2 = 1,118.377$***	$\chi^2 = 866.600$***

Note. GED = general education development.
[a]Reference category = intermediate sentence.
*$p < .05$. **$p < .01$. ***$p < .001$.

The direction of the relationship among predictors and outcomes was consistent with expectations. Mental health scores were directly correlated with the hazard rate in both models, indicating that female inmates suffering from higher levels of mental illness were more likely to fail during a given time interval. Similarly, higher custody levels were strongly associated with the higher hazard rates in each of the models. The lack of significance of coefficients for prior prison incarceration and violent risk score is likely due to the fact that each is a precursor to placement by custody level.

Polytomous categorical predictors must be converted to dummy variables, with the omitted category serving as a referent. Since our primary interest herein concerns the behavior of inmates in relation to length of sentence term, the variable has been dummy coded with an indicator for short term and an indicator for long term explicitly reported, while intermediates serve as the reference category. As expected, the coefficients for the indicators of length of sentence term included in the model show that short-term inmates have significantly higher hazard rates in both models, whereas long-term inmates have significantly lower rates in both models. Short-term inmates had hazard rates 51% higher than intermediates in the model predicting serious infractions and 42% higher than intermediates in the model predicting violent infractions. Alternately, long-term inmates had hazard rates 41% lower than intermediates in the model predicting serious infractions and 52% lower than intermediates in the model predicting violent infractions. In relation to those serving short-term sentences, the hazard rate for serious rule infractions among those serving long terms of imprisonment was reduced by 154% ([1.510 − 0.594] / 0.594), and the hazard rate for violent rule infractions was reduced by 197% ([1.415 − 0.477] / 0.477). Stated alternately, when other factors were held constant, inmates serving sentences of 8 years or more were 39% (0.594 / 1.510) as likely to commit a serious rule infraction during any particular month as inmates serving sentences of 2 years or less, and 34% (0.477 / 1.415) as likely to commit a violent rule infraction.

Robustness checks were completed to determine whether the current operationalization of sentence length influenced results. When included as a continuous variable, consistent with the operationalization in many previous studies (Gover et al., 2008; Lahm, 2017;
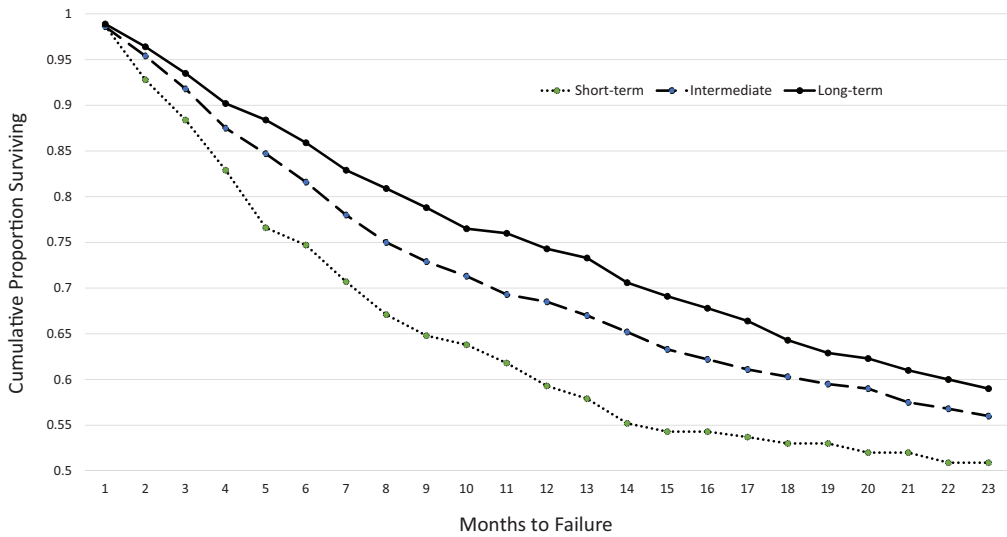
Figure 1:   Cumulative Proportion of Inmates Surviving (Refraining From Serious Rule Violations) During the First Two Years of Their Incarceration by Sentence Term Length

Steiner & Wooldredge, 2009), sentence length remained significantly and negatively associated with time to failure in the Cox regression model. When dichotomized at two different cut points, splitting them at 2 years and at the median sentence length of 5 years, sentence length was significantly and negatively associated with serious violations but not assaultive violations. This suggests that the overall relationship found between sentence length and disciplinary outcomes in this exercise is, on measure, consistent with the models presented in Table 3. The results also show that relying on specific cut points to operationalize sentence length could influence the results of models analyzing lower base rate events, specifically violence. This exercise also suggests that separating short-term from long-term inmates by a margin when operationally defining outcomes, such as the first and fourth quartiles as in the current study, is not only conceptually but also computationally justified.

Figure 1 presents a graphic display of the cumulative proportion of inmates surviving (refraining from serious rule violations) during their first 2 years of incarceration by length of sentence. A graphic display of survival rates for violent infractions revealed a similar pattern and, as such, was not included herein. Results from the graph can be compared horizontally or vertically, and in terms of survival or failure. For instance, one could compare the number of months that three quarters of each group "survived," or the number of months that it took for one quarter of each group to fail. The intersection of the cumulative survival marker of 0.75 and months to failure shows that it took long-term inmates 12 months for one quarter of the group to fail, whereas it took the short-term inmates only 6 months for one quarter of the group to fail. Comparing groups vertically at the 14-month marker, it can be seen that 55% of the short-term inmates survived up to that point, whereas 70% of the long-term inmates had survived without committing an infraction.

DISCUSSION AND CONCLUSION

The present study relied on survival analysis to predict the time to the commission of serious and violent institutional misconduct among a large sample ($N = 2,777$) of female inmates incarcerated in Arizona's sole prison for women. Hazard models allowed for the identification of inmate characteristics and circumstances associated with inmates who committed a serious or violent act sooner than others. The primary focus of the study was on the relationship between sentence length and time to failure. Consistent with Gover and colleagues (2008), our study indicated that female inmates facing a lengthy prison sentence committed serious or violent acts of misconduct during a given month at a rate of only about one third that of the short-term group, controlling for other factors. The results are broadly similar to studies of male inmates convicted of violent crimes and facing long sentences or a lifetime in prison (Cunningham & Sorensen, 2006; Reidy et al., 2012) but refute studies indicating female inmates sentenced to long prison terms are a disproportionate risk for major misconduct (Collie & Polaschek, 2003; Craddock, 1996). Furthermore, our results compare favorably with perspectives emphasizing the tendency of most inmates facing long prison terms to refrain from violence, confrontation, and institutional disruption to obtain or retain privileges (e.g., work, program participation, commissary, visitation) gained by cooperating with correctional staff (Cunningham, Reidy, & Sorensen, 2016; Flanagan, 1980, 1995; Morris, Longmire, Buffington-Vollum, & Vollum, 2010; Sorensen & Reidy, 2018).

Additional findings of interest relate to the prevalence and correlates of major disciplinary outcomes among the incarcerated women. The base rate of violent infractions in this study was generally much lower than serious violations. When violence was disaggregated by severity, the current findings show that women are less prone to engage in the more serious types of violence (see Berg & DeLisi, 2006; Celinska & Sung, 2014; Craddock, 1996; Harer & Langan, 2001; Reidy et al., 2012). The low rate of assaults, particularly aggravated assaults, against inmates and staff by female inmates held true across the three sentencing groups. Consistent with prior literature on female inmates, significant predictors of the time to commission of serious or violent acts included age, education, mental health, and custody level (Reidy et al., 2017; Steiner & Wooldredge, 2009; Worrall & Morris, 2011). These findings are also consistent with studies relying on males and gender-pooled samples, and supported by a large body of literature (Schenk & Fremouw, 2012; Steiner et al., 2014).

That age and the mental health of women entering prison were significant predictors of both serious and violent infractions in this study suggests that these variables may directly or indirectly influence the response of female inmates to the deprivations of prison living (Steiner et al., 2014; Sykes, 1958). The association between higher mental health scores, younger age, and risk for failure is consistent with a number of studies demonstrating that female inmates, particularly younger ones, experience increased levels of emotional distress and trauma prior to and during incarceration, which in turn can influence prison adjustment, including higher levels of major misconduct (James & Glaze, 2006; Reidy et al., 2017; Warren, 2003). Studies have shown that female inmates adapt and cope differently with the stresses and strains of prison in comparison with male inmates, and such factors are predictive of institutional misconduct (Salisbury et al., 2009; Steiner & Wooldredge, 2009; Warren et al., 2002; Wright et al., 2007).

Of the remaining correlates, education has been shown to insulate against prison misconduct in general, and assaultive acts in particular, among samples of female and male inmates (Berg & DeLisi, 2006; Gover et al., 2008; Lahm, 2017; Schenk & Fremouw, 2012). The relationship between education and major misconduct may indicate that women with a higher level of education have a greater commitment to conventional values, and hence a greater commitment to conformity in behavior while incarcerated (Lahm, 2017; Steiner & Wooldredge, 2009). The remaining correlate identified as having a strong direct effect on both serious and violent outcomes is custody level. Inmates at higher custody levels experienced higher hazard rates consistent with studies of male inmates or pooled inmates (e.g., Gover et al., 2008; Worrall & Morris, 2011). Given the seriousness of outcomes, the results suggest that real differences in offending exist between custody levels; however, variations in the enforcement of rules at different custody levels likely accounts for some of the differences (Worrall & Morris, 2011).

This study has relevant policy, institutional, and clinical implications for prisons housing female inmates. For decades, classification systems designed for males, the population constituting the vast majority of prison inmates, have also been applied to female prisoners (Harer & Langan, 2001). Although sentence length is considered in assigning inmates to various custody levels, the data from this study and others indicate that some long-term female inmates may be over-classified into higher levels of custody than is warranted (Hardyman & Van Voorhis, 2004; Reidy et al., 2017; Wright et al., 2007), suggesting the need for prison officials to carefully consider re-assessment of custody assignments for female inmates, especially in view of emerging evidence about gender-specific needs of women directly influencing rates of misconduct (Salisbury et al., 2009; Steiner & Wooldredge, 2009; Thompson & Loper, 2005; Warren, 2003; Wright et al., 2007).

In line with these considerations, our study identified mental health factors as predictive of the most egregious types of misconduct. These findings have clinical implications, particularly in view of evidence of prison maladjustment related to pre-prison gender-specific risk factors such as trauma, dysfunctional relationships, lack of family support, and mental illness that increase the chances of women engaging in institutional misconduct. Clinical intervention may be particularly critical during the early stages of incarceration when inmates are first facing the deprivations of prison life (Sykes, 1958). By differentiating inmate mental health needs according to sentence length, prison officials can offer different forms of programming and treatment (Salisbury et al., 2009; Wright et al., 2007).

This study had certain methodological advantages over many of the prior studies, which strengthen our confidence in the findings. First, the study included a large sample, a universe of nearly 3,000 inmates. As such, the likelihood of sample selection bias is reduced. Second, the fact that all of the inmates were incarcerated in the same prison reduced the potential confounding influence of institutional-level factors on the modeled relationships. Third, the grouping of inmates by sentence length separated short-term from long-term inmates by a margin. Robustness checks specifying various operational measures of sentence length add further support to the findings presented in the models. Fourth, models based on two outcome measures of most concern to correctional officials, serious and violent rule violations, identified consistent relationships with sentence length. Finally, the present study employed survival analysis in modeling time to commission of an initial act of serious or violent misconduct. This method allowed us to determine that short-term and long-term inmates behaved differently based on the length of their sentence, as opposed to

the stage of their incarceration and the associated mellowing effect that could occur among long-term inmates with additional time served.

The present study has methodological limitations. One such limitation is the absence of minor infractions in the ADC database, which might be considered both a strength and weakness to our study. On one hand, violence in prison is extremely consequential because it erodes safety and security for inmates and staff alike. On the other hand, the focus on only serious and violent infractions in this study may not have fully illuminated inmate heterogeneity in offending. Many women enter prison with histories of childhood and adult trauma, dysfunctional relationships, and mental health symptoms that may be reflected in minor misconduct not captured by the emphasis on serious and violent infractions in this study (MacKenzie & Goodstein, 1985; MacKenzie et al., 1989; Salisbury et al., 2009; Thompson & Loper, 2005; Wright et al., 2007). Future research should focus on gender-responsive predictors and their influence on various forms of misconduct not included in this study, which may be relevant to explaining hazard rates.

Further limiting the findings is the reliance on a categorical mental health score at intake emphasizing the need for various levels of service. Using such a grossly defined mental health indicator likely does not explain the full range of gender-specific trauma and related dysfunction likely to result in a variety of maladaptive behaviors in prison, perhaps even acts of violence. Future researchers should endeavor to focus on the influence of more specific mental health symptoms, support structure, and pre-incarceration victimization experiences to better elucidate the effect of psychological factors and trauma on prison adjustment of female inmates, particularly as they relate to sentence length.

The use of official records to identify inmate misconduct is a further limitation of studies considering inmate misconduct. This method is subject to underreporting and unreliable reporting by correctional staff (Daggett & Camp, 2009; Wolff, Blitz, Shi, Siegel, & Bachman, 2007). A number of other factors also influence recorded infractions, including discretionary decisions by staff in not only reporting but also defining the level of infraction charged. Unequal treatment of particular inmate groups, reduced staffing levels, and different tolerance levels and degrees of supervision within units and prisons may also influence officially recorded "misconduct" (Gover et al., 2008; Harer & Langan, 2001). Although such potential limitations related to the use of official records are omnipresent in all studies, the types of misconduct included in the present study, particularly assaults on staff and aggravated assaults on other inmates, are not likely to be handled "off the books" by staff members. Cases involving felonious acts, particularly those resulting in injury, are far more likely to be observed and documented than less serious violations.

Several conclusions can be drawn from this study. First, findings from the survival analysis underscore the heterogeneity of the female inmate population, demonstrating that sentence length substantially and differentially contributes to the emergence of serious and assaultive misconduct. Hazard models indicated a higher percentage of short-term inmates are quicker to commit serious or violent infractions in comparison with intermediates and long-term inmates. Alternately, women serving long prison terms are at significantly lower risk of engaging in serious or violent behavior. Second, serious and violent misconduct is influenced by certain inmate predictor characteristics in the expected direction, notably age, education, mental health, and custody level. Third, base rates of violent rule infractions committed by female inmates are extraordinarily low regardless of sentence length,

suggesting women as a group do not represent a high risk for assaultive behaviors, particularly of the variety resulting in harm to other inmates or staff.

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