



Proliferation or adaptation? Differences across race and sex in the relationship between time served in prison and mental health symptoms

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ABSTRACT

Guided by stress proliferation and adaptation perspectives, this study investigates competing hypotheses for the relationship between time served in prison and mental health symptoms. Drawing on data from the Survey of Inmates in State Correctional Facilities in 2004 (N = 12,118), our findings suggest that time served is correlated with mental health symptoms, but that the association differs across race and sex. White males exhibit fewer mental health symptoms at longer exposures to prison, while black males and black females exhibit more symptoms. We conclude that both incarceration dosage (*treatment heterogeneity*) and differences across groups (*effect heterogeneity*) may be important considerations in understanding the relationship between incarceration and mental health.

American prisons are often called “the new asylums,” with 56.2 percent of people in state prisons and 45 percent of people in federal prison reporting symptoms consistent with at least one mental health condition (James and Glaze 2006). While many of those imprisoned are already in poor mental health prior to admission, the incarceration experience also exacerbates psychological wellbeing (Bacak et al., 2018; Porter and DeMarco 2019; Schnittker et al., 2012). However, relatively little is known about how the mental health of incarcerated persons varies across incarceration experiences or across demographic groups. Incarceration “dosage” may be particularly relevant for understanding mental health impacts, since the length of exposure to stressors may be correlated with the level of harm inflicted. Additionally, research suggests that the relationship between incarceration and mental health may be contingent on race or sex, yet little is known about the extent or nature of this variation and research seldom considers the intersection of race and sex (Chetiotis and Liebling 2005; Patterson 2010; Wildeman 2010; Wooldredge and Steiner 2012; Jiang and Winfree 2006). Thus, in the current study we build on prior research by analyzing the relationship between time served and mental health among currently incarcerated persons. We also examine whether these relationships are contingent on the intersectionality of race and sex.

1. Background

1.1. The criminal justice-health nexus

Research on the health and wellbeing of correctional populations can be situated within a broader literature examining the criminal justice and health nexus. A number of studies link criminal justice contact – including being stopped by police, arrested, incarcerated, or serving probation or parole – to both mental and physical health outcomes (Jackson et al., 2019, 2020; Turney et al., 2012; Sugie and Turney, 2017; Del Toro et al., 2019; Massoglia, 2008; Bryson et al., 2020; Malcome et al., 2020). This overlap represents a mixture of selection and causal processes. The risk of criminal justice contact differs substantially across groups, with those who are in poor health having relatively high rates of exposure. For example, socioeconomically disadvantaged segments of the population are more likely to be in poor health and to be criminally involved – and are more likely to have their criminal involvement detected and punished (Heimer, 1997; Pampel et al., 2010). Marriage and social ties are consistent correlates of health and crime as well, with those who are more socially embedded tending to be in better health and to be less delinquent (Hughes and Waite 2009; King et al., 2007).

This “striking degree of overlap between the risk factors for crime and those for disease” has been noted by scholars investigating the link between incarceration and health in particular (Schnittker and John,

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2007: 118). To that end, studies consistently find that those who have been incarcerated are in worse health, on average, compared to those who have not (see [Massoglia and Pridemore, 2015](#) for a review). Studies on the association between incarceration and mental health in particular find convincing evidence of a causal association ([Massoglia, 2008](#); [Schnittker et al., 2012](#); [Porter and DeMarco, 2019](#)). In the next section, we review extant literature related to the association between incarceration and mental health – which is most germane to our current study.

1.2. Incarceration and mental health

A number of studies highlight the “pains of imprisonment” ([Sykes 1958](#)), finding that levels of distress among incarcerated persons are high and that life in prison exposes individuals to numerous stressors ([Haney 2012](#); [Liebling et al., 2005](#)). For example, correctional populations exhibit relatively high rates of suicide and mental health problems such as post-traumatic stress disorder, depression, anxiety, and mania ([Haney 2012](#); [James and Glaze 2006](#)). The stressors of being incarcerated may include behavioral adjustments, a loss of autonomy and control, and the need to navigate a violent setting ([Douglas et al., 2009](#); [Sykes 1958](#)). In addition, incarcerated persons may experience chronic uncertainty and stress in their interactions with other prisoners and staff ([Porter 2019](#)). These conditions may be difficult to cope with ([Jones et al., 2000](#); [Zamble and Porporino 1988](#)), especially considering that many are separated from families and friends who might otherwise provide emotional or instrumental support ([Braman 2004](#); [Douglas et al., 2009](#)). The stressors of incarceration may also include social psychological considerations such as feeling stigmatized or de-valued. In his classic study on prison culture, [Sykes \(1958\)](#) describes the role of a prisoner as that of “a semi-human object, an organism with a number” (p. 6). Similarly, [Goffman \(1963\)](#) argues that prison involves a “curtailment of self,” or the stripping of an individual’s past roles with which he or she identifies (p. 14). For example, someone who is a father, a husband, and a teacher may be restricted from fulfilling those roles while incarcerated.

Prior research supports the hypothesis that incarceration should be associated with higher levels of stress-related mental health issues such as depression and anxiety ([Massoglia, 2008](#); [Schnittker et al., 2012](#); [Turney et al., 2012](#); [Porter and Novisky, 2017](#)). However, while prisons disproportionately expose individuals to stressors, individuals also have the tendency to adapt to adverse events and circumstances. In the current context, [Clemmer \(1940\)](#) refers to this process as prisonization or the “taking on in greater or less degree of the folkways, mores, customs, and general culture of the penitentiary” (p. 299). Taking this concept a step further, those who become successfully “prisonized” may experience some relief from the negative effects of prison on mental health. Notably, [Clemmer \(1940\)](#) argued that mental health should deteriorate steadily with increased time behind bars, but adaptation may be more or less likely to occur, or may be more or less successful, at various durations of incarceration.

1.3. Incarceration (length) and mental health

Theory and research suggest competing hypotheses for the relationship between time served and mental health symptoms. While a stress proliferation perspective suggests a positive relationship, an adaptation perspective suggests a negative relationship. According to stress proliferation perspectives, longer durations in prison should lead to deteriorations in mental health due to prolonged and repeated exposure to stressors, which has a cumulative effect on allostatic load, or the amount of wear and tear on the body ([Pearlin et al., 2005](#)). A handful of studies provide support for this perspective. For example, [Dhami and colleagues \(2007\)](#) find a positive association between time served and hopelessness among incarcerated persons. [Thompson and Loper \(2005\)](#) also find that prison infractions increase with time served among female

prisoners, which they infer as being indicative of poor adjustment and wellbeing.

Relatedly, research pertaining to the effects of stressors beyond incarceration suggests a positive relationship between length of exposure and distress. For example, [Kahn and Pearlin \(2006\)](#) find that persistent economic strain is more detrimental to mental health than episodic hardships. Lengthier military deployments are also associated with relatively poor mental health, including depression, post-traumatic stress disorder, and alcohol abuse ([Adler et al., 2005](#); [Buckman et al., 2010](#)).

Though stress proliferation perspectives suggest a positive relationship between time served and mental health symptoms, adaptation perspectives suggest that shorter sentences may be more stressful than longer ones. Individuals may possess a “psychological immune system,” leading negative experiences to result in only brief departure from a person’s standard point of wellbeing ([Brickman and Campbell 1971](#); [Gilbert et al., 1998](#), p. 619). Translated to the incarceration experience, research shows that the initial stages of incarceration pose the largest risk to incarcerated individuals in terms of suicide ([Shaw et al., 2004](#); [Nock and Marzuk 2000](#)). [Zamble \(1992\)](#) also finds that longer durations in prison are correlated with decreases in the incidence of stress-related illnesses and improvements in adaptation skills. Particularly relevant is a recent study in which [Porter and DeMarco \(2019\)](#) find that time served is negatively related to depressive symptoms among those who are currently incarcerated.

In addition to dosage being a critical variable for understanding the mental health consequences of incarceration, prior work on the stress response suggests that the average impact of stressors may vary depending on the race and sex of individuals exposed to them ([American Psychological Association 2017](#); [Ptacek et al., 1994](#); [Tamres et al., 2002](#)). Thus, while there is a great deal of heterogeneity in incarceration lengths, there may also be considerable heterogeneity in the effects of incarceration lengths across individuals. In the next section, we lay out a theoretical rationale for expected differences across race and sex in the relationship between time served and mental health.

1.4. Considering race and sex

Prison populations are characterized by inequalities across race and sex. Those who are Non-Hispanic black and/or female tend to be more disadvantaged than Non-Hispanic white and/or males. With respect to sex differences, females are 6.5 percent more likely to report serious psychological distress than males ([Bronson and Berzofsky 2017](#)). They are also twice as likely to report a history of mental health problems, with 65.8 percent reporting problems at intake ([Bronson and Berzofsky 2017](#)). The fact that females are more likely to have a history of mental health problems suggests they may be more vulnerable to the stressors of incarceration. Further, mothers who are incarcerated are more likely than fathers to have their children placed in foster care ([Mumola, 2000](#)) and are more likely to be the primary caregivers of their children at the time of admission ([Dellaire 2007](#); [Glaze and Maruschak 2008](#); [Travis et al., 2014](#)).

Prisons are also microcosms in terms of racial inequality. For example, blacks tend to be more socioeconomically disadvantaged, on average, compared to whites ([Wakefield and Uggan 2010](#)). In the prison context, these racial inequalities can have repercussions in terms of support and visitation in particular. For example, [Tewksbury and colleagues \(2012\)](#) find that whites in prison are more likely to receive visits than blacks. In addition, black individuals who struggle with mental health issues may carry a double stigma which can lead to avoiding or delaying treatment of any symptoms ([Gary 2005](#)). In general, black individuals are also more likely to distrust medical and mental health services, so treatment avoidance may be rooted in several factors ([Armstrong et al., 2007](#)). Relative to whites, blacks are also more likely to reside in marginalized communities, have fewer resources, and fewer job opportunities that offer comprehensive health insurance ([Muntaner](#)

1999; Mutchler and Burr 1991). Thus, lower rates of reported or diagnosed mental health problems in the black population could be biased by both under-reporting and under-diagnosing.

As noted, there are reasons to expect race and sex differences in the relationship between time served and mental health among currently incarcerated individuals. However, a more instructive examination should consider the *intersection* of race and sex. Studies on the relationship between incarceration and mortality find that young black males in prison exhibit lower than expected mortality rates compared to young black males outside of prison (Patterson 2010; Wildeman 2010). This “protective effect” of prison has been traced to the availability of healthcare, the unavailability of firearms, and is specific to this group. Extrapolating from these findings to the current study, we may expect black males to be relatively less impacted by the stressors of the prison environment, yielding either a negative or null relationship between time served and mental health symptoms.

The above findings on the relationship between incarceration and mortality suggest that black males fare better in prison precisely *because* of the structural inequalities which threaten their health on the outside. While these findings should not be interpreted as prison being beneficial for this group, the findings do suggest that the level of harm inflicted by prison may depend on the level of harm and adversity individuals are exposed to outside of prison. This contention has also been supported by a few studies looking at racial differences in the effects of incarceration for residential attainment (Massoglia et al., 2013) and employment (Pettit and Lyons 2007). Additionally, some inequalities may be more muted in the carceral setting. Youman and colleagues (2010) find that racial differences in mental health service utilization and access do not extend to the prison context, possibly because of universal access as well as court-ordered treatment. Taking this a step further, there may be less racial inequality in mental health outcomes in prison than in the general population, given (hypothetically) more equal access to psychiatric healthcare in this setting. Indeed, in a study examining race and sex differences in depressive symptoms among formerly incarcerated persons, Porter and Novisky (2017) find no significant differences in the association between incarceration and symptoms across race or sex (examined separately). If prison mutes some inequalities rather than magnifying them, we may expect those who fare worse on the outside to fare better on the inside relative to other groups. Alternatively, we may expect no significant differences.

In the above paragraphs we postulate that time served may be differentially experienced across race and sex, but that this difference can theoretically go in either direction. On the one hand, prison may alleviate some hardships by offering access to counseling, healthcare, and other rehabilitative services – and these services may be most helpful for groups that are most disadvantaged. On the other hand, relatively disadvantaged groups – such as black males and black females – may be more vulnerable to the stressors of incarceration. Black females may be particularly burdened, given they often serve as both the primary breadwinners and caregivers in families and also have the highest rates of prior trauma and disadvantage compared to other demographic groups in prison (Dellaire 2007; Richie, 2012).

Thus, led by theory and prior literature, we expect there to be differences across race and sex in the relationship between time served and mental health outcomes of currently incarcerated persons. However, the direction of these differences is uncertain.

2. Current study

Based on prior work, we put forward competing hypotheses about the relationship between time served and mental health symptoms for the full sample and across race-sex groups. Thus, we carry out two-tailed tests for the full sample and to assess differences across black females, black males, white females, and white males. We also note that although our data do not allow us to establish causality between these variables, our hypotheses are nevertheless based on potential causal processes

suggested by prior literature.

3. Data and methods

The current study uses the Survey of Inmates in State Correctional Facilities in 2004, a publicly available data source on prisoners in the United States. State prisons hold the majority of prisoners in the U.S. (87% in 2004), and the most recent wave of data (2004) includes detailed information on 14,499 incarcerated persons. We use this survey year only, given that this is the first wave prisoners who were asked detailed questions about mental health symptoms. We exclude from our sample those who indicated that they never expect to leave prison, a response attributed almost entirely to life or death sentences (about 3% of respondents). Our rationale for excluding these individuals is two-fold. For one, they have much longer sentences, on average, which heavily skews the distribution of time served. Second, the psychological impact of time served should vary considerably for individuals spending the rest of their lives in prison. We use listwise deletion for missing data, which removes those from the sample who are missing information on one or more covariates. This is another 13% of the sample, leaving us with a final analytic sample of 12,118 respondents. Notably, listwise deletion can be more robust to violations of the Missing Completely at Random (MCAR) and Missing at Random (MAR) assumptions than imputation methods (Allison, 2001). This method is especially preferred in situations where the loss of cases does not raise issues of statistical power.

3.1. Dependent variable

The Survey of Inmates includes a modified clinical interview consistent with the Diagnostic and Statistical Manual of Mental Disorders-IV, which clinicians use to make mental health diagnoses. While the survey includes information on formally diagnosed mental health disorders, we do not use diagnosis as our outcome variable, as we are interested in the worsening or improvement of symptoms over time spent in prison. There are also well-established biases in diagnoses of mental health problems given differences in help-seeking, access, and treatment (Alang et al., 2020). Survey items indicate symptoms of depression, bipolar disorder, anger, psychotic disorders, anxiety disorders, and personality disorders over the past year. For each symptom, respondents reported whether they experienced its occurrence during the past year. We create a summary measure that combines all items into an index to represent overall mental wellbeing ($\alpha = 0.88$). In each case, a person’s response was coded as “1” if he or she experienced a symptom in the last year, and “0” if he or she had not. Thus, our summary measure represents an index of the number of mental health symptoms experienced over the last year. We also note that the symptoms themselves cannot be validly broken down into subscales reflecting specific mental health disorders (e.g. a depression scale).

3.2. Independent variable

Time served is measured as the total number of years served between the respondent’s admission for the current offense and the date of the interview, including any prior jail time since the most recent arrest. In order to test for differences in the association between time served and mental health, we include an interaction term between race and time served. Models are run separately for males and females with the inclusion of the interaction term. This approach allows us to apply survey weights to our analysis, which are provided for male and female samples separately.

3.3. Controls

The analysis controls for variables that may confound the relationship between time served and mental wellbeing. Specifically, estimates

adjust for demographic variables including age (at the time of interview) in years (range: 16–84), race/ethnicity (White [reference group], Black, Hispanic, and Other), and sex (1 = male). A handful of items were also included to account for socioeconomic status, given that socioeconomic conditions are associated with both mental health and criminal behavior. Specifically, we adjust for educational attainment, which is the highest grade in school attended (range: 0–18). Data suggest that mental illness is negatively related to educational attainment (Breslau et al., 2008). Researchers have also concluded that incarceration risk is inversely stratified by educational attainment, especially among minoritized racial groups (Pettit and Western 2004; Ewert et al., 2013). We also include employment status at arrest (1 = employed), marital status (1 = married) and the number of minor children the respondent has (range: 0–6). In addition to the established relationship between unemployment and crime (Farrington et al., 1986), researchers have also uncovered associations between unemployment and punishment (Chiricos and Bales, 1991). Evidence also shows that psychiatric disorders are positively related to unemployment (McAlpine and Warner, 2002).

We also control for measures of social ties. Social ties tend to be positively related to mental wellbeing (Thoits, 2011) and negatively related to delinquency and subsequent punishment (Wright et al., 2001). Of course, given the conditions of confinement, family ties on the outside could be a source of mental anguish as well as provide protection from it (Turano and Tasca, 2019). We control for whether the respondent used any illegal drugs in the month prior to arrest (1 = yes) and alcohol dependency during the year prior to arrest using a five point scale (range: 0–4), in which those who were coded as a “4” gave positive responses to at least 4 out of 11 questions assessing dependency. Substance and alcohol use are inexorably linked with criminal behavior as well as the specific conviction and sentence in question (Spohn et al., 2014). In addition, substance use is highly co-occurring with mental health issues, especially among correctional populations (James and Glaze, 2006; Wood and Buttaro, 2013).

Given that child abuse is a known correlate of mental health issues later in life (Leeb et al., 2011), we also include controls for whether the respondent ever experienced physical abuse and/or sexual abuse as a child (1 = yes). Finally, we control for whether the respondent is serving time for a violent offense (1 = yes), since violent offending is positively related to time served and some research has linked certain mental health conditions – such as personality disorders – with violent behavior (Teplin, 1990; Monahan, 1992).

Finally, and importantly, we control for whether they received any mental health treatment prior to their current incarceration (1 = yes). Unfortunately, the survey does not include specific measures of prior mental health symptoms like those used to create our dependent variable. Therefore, we cannot control for prior mental health itself and thus cannot examine change in mental health symptoms from before incarceration. We further discuss this limitation in our conclusion.

3.4. Analytic approach

To analyze the relationship between time served and mental health symptoms, we employ a negative binomial regression. The distribution of the dependent variable is positively skewed, but most respondents have experienced at least one symptom (80%), meaning there is not an over-abundance of zero values. The main analyses (Table 3) apply survey weights, which were calculated as the inverse of the probability of being selected into the sample. Because survey weights were provided for the male and female samples separately, weights were not applied when analyzing the full sample. Further, because our hypotheses relate to racial differences across Non-Hispanic white and Non-Hispanic black individuals, these models exclude other racial/ethnic groups (23% of full sample). Examining race-sex differences across other racial/ethnic groups also presents methodological challenges since there are low numbers of individuals in certain groups – especially in the female

prison sample. This leaves us with an analytic sample of 9364 respondents.

4. Results

Table 1 displays descriptive statistics for the full sample as well as the following groups of interest to the present study: black females, white females, black males, and white males. These descriptives show systematic differences across race/sex categories in key risk factors. For example, we find that females report more mental health problems than males, on average. For both males and females, white prisoners are relatively more educated than black prisoners and were also more likely to be employed at the time of their arrest. White females are almost twice as likely to be married compared to black females, although black females report more children under age 18. Females are more likely to report receiving mental health treatment prior to admission, although it is 15 percent more likely for white females compared to black females. As expected from prior literature, females report higher levels of child abuse and males are much more likely to be serving time for a violent offense.

Table 2 shows results of our mental health symptom index regressed on time served and other covariates for the full sample. Incidence rate ratios are displayed across models. In Model 1, we show results for mental health regressed on time served. Findings indicate that the bivariate relationship for the full sample is negative and statistically significant ($\alpha = .05$), meaning that those who have served more time in prison have a lower expected rate of mental health symptoms. In Model 2 we add controls, which reduces the negative effect to almost zero. These findings suggest that when accounting for prior demographic and risk factors, the relationship between time served and mental health washes out. The associations between control variables and mental health symptoms are also instructive. Being older, male, Hispanic, more

Table 1
Mean values of variables across samples.

	Full Sample (N = 12,118)	Black Females (N = 886)	White Females (N = 1152)	Black Males (N = 3952)	Whites Males (N = 3374)
Independent and Dependent					
Mental Health Index	4.775	6.042	6.151	4.387	4.674
Years Served	4.421	2.892	2.723	5.375	4.709
Controls					
Black	.523	–	–	–	–
Hispanic	.170	–	–	–	–
Other	.057	–	–	–	–
Male	.788	–	–	–	–
Age	34.941	35.313	35.715	34.241	36.510
Educational Attainment	10.873	11.198	11.401	10.920	11.099
Employed at Arrest	.660	.549	.576	.638	.744
Currently Married	.166	.126	.217	.136	.154
Substance Use	.585	.574	.624	.586	.596
Alcohol Dependency	1.101	.823	1.196	.899	1.394
Children Under 18	1.151	1.435	1.256	1.212	.889
Violent Offense	.447	.339	.283	.496	.469
Prior MH Treatment	.143	.203	.347	.069	.167
Victim of Phys Abuse	.122	.166	.212	.066	.146
Victim of Sex Abuse	.047	.132	.117	.021	.036
Victim of Both Abuse	.088	.193	.365	.018	.054

Table 2
Mental health symptoms regressed on years served, full sample (N = 12,118).

Independent Variable	Model 1	Model 2
Years Served	.987** (.002)	.999 (.002)
Controls		
Black		1.074** (.023)
Hispanic		.887** (.024)
Other		1.061 (.043)
Male		.928* (.024)
Age		.985** (.001)
Educational Attainment		.998** (.004)
Employed at Arrest		.932** (.018)
Currently Married		1.003 (.025)
Substance Use		1.239** (.024)
Alcohol Dependency		1.097** (.007)
Children Under 18		1.004 (.007)
Violent Offense		1.057* (.022)
Prior MH Treatment		1.580** (.041)
Victim of Phys Abuse		1.381** (.039)
Victim of Sex Abuse		1.368** (.060)
Victim of Both Abuse		1.594** (.056)
Constant	5.056** (.066)	5.615** (.373)

educated, and employed at the time of arrest are associated with fewer expected symptoms. On the other hand, those with a history of substance use, history of abuse, or who are serving time for a violent offense have a higher expected rate of symptoms. Taken together, these findings support the perspective that being disadvantaged before prison is associated with worse mental health in prison.

We next analyze the relationship between time served and mental health across race and sex. In Table 3, we present two sets of models: one for females and one for males. Each model includes an interaction between years served and race (black = 1). Results show clear evidence of racial differences. Notably, the relationship between time served and symptoms is significantly positive for black males and females compared to white males and females, for whom the relationship is negative. To depict this graphically, Figs. 1 and 2 (generated using estimates from Models 2 and 4) show the predicted relationship for each of these four groups. The x-axis in each graph reflects the 1 standard deviation mark above and below the mean years served for each sex. In Fig. 1, it can be observed that black females have a higher expected rate of symptoms with more time served, while the relationship is relatively flat although slightly negative for white females. Conversely, in Fig. 2, white males have a lower expected rate of symptoms at longer times served, while the slope for black males is positive. Notably, our models do not directly test for statistically significant differences across all four groups. In order to investigate this related question, we carry out equality of coefficients tests (Paternoster et al., 1998). Results reveal that the relationship between time served and symptoms for black females is significantly different than the relationship for white males ($z = 2.37$), as is the difference between black males and white males ($z = 3.95$).

For both females and males, control variables in Models 2 and 4 exert

Table 3
Mental health symptoms regressed on years served and other covariates by race and sex.

Independent Variable	Females (N = 2038)		Males (N = 7326)	
	Model 1	Model 2	Model 3	Model 4
Years Served	.988 (.006)	.993 (.006)	.976*** (.003)	.986*** (.004)
Controls				
Black	.905 (.041)	1.077 (.048)	.860*** (.026)	.949 (.029)
Black*Years Served	1.029** (.010)	1.021* (.009)	1.021*** (.005)	1.020*** (.004)
Age		.986*** (.002)		.985*** (.001)
Educational Attainment		.985* (.007)		.988* (.005)
Employed at Arrest		.980 (.033)		.912*** (.021)
Currently Married		1.026 (.047)		1.045 (.033)
Substance Use		1.188*** (.045)		1.197*** (.028)
Alcohol Dependency		1.049*** (.012)		1.098*** (.008)
Children under 18		.987 (.012)		1.010 (.008)
Violent Offense		1.126** (.045)		1.035 (.025)
Prior MH Treatment		1.476*** (.050)		1.633*** (.048)
Victim of Phys Abuse		1.295*** (.063)		1.356*** (.041)
Victim of Sex Abuse		1.302*** (.075)		1.345*** (.075)
Victim of Both Abuse		1.530*** (.064)		1.633*** (.078)
Constant	6.340*** (.182)	6.628*** (.809)	5.204*** (.111)	6.429*** (.493)

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

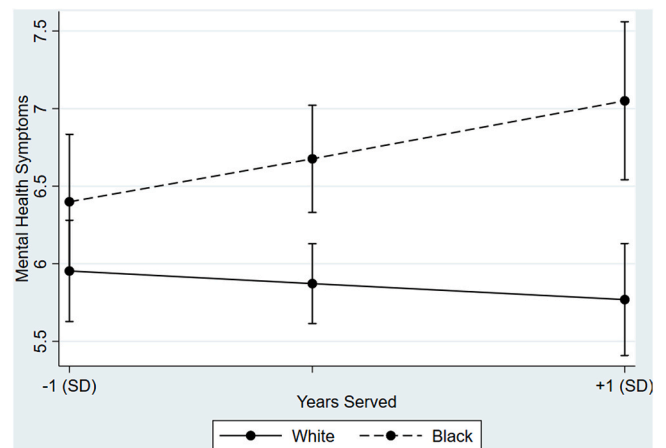


Fig. 1. Predicted mental health symptoms by years served and race, female sample.

little influence on the magnitude of interaction effects or main effects. However, there are interesting differences in the influence of controls on mental health. For females, serving time for a violent offense is linked with a higher expected rate of mental health symptoms, but not for males. Perhaps female offenders who have been convicted of a violent crime occupy a more counter-normative or stigmatizing status in the prison community, given that females are much less likely to commit a violent infraction than males (Lauritsen et al., 2009; Kruttschnitt and Carbone-Lopez, 2006). Thus, these female prisoners may be relatively

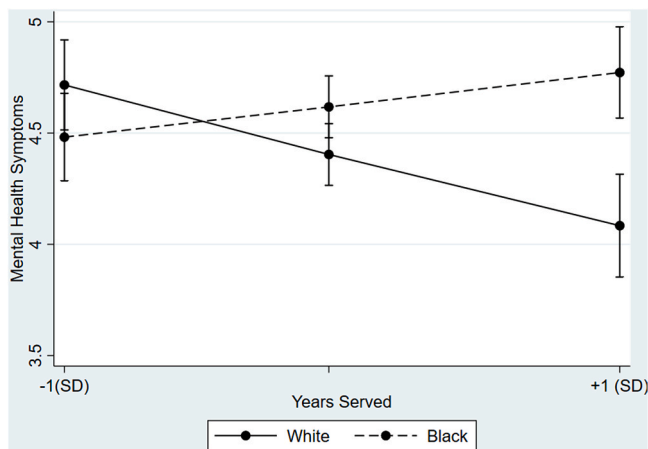


Fig. 2. Predicted mental health symptoms by years served, male sample.

isolated or treated with more animus by fellow inmates and staff. Further, being employed at the time of arrest appears to be a protective factor for males' mental health, but not for females. It is possible that incarceration is more expensive for women, on average, so that the benefits of pre-prison employment are lessened. For example, phone calls, internet access, and transportation for in-person visits present significant costs to maintaining contact with those on the outside (Comfort et al., 2016; Hairston 2002). Because most states have few women's prisons, women are more likely to be incarcerated away from their families and thus may be more burdened by such costs. Additionally, because they are not provided by correctional institutions, females must use their limited funds to pay for necessities like feminine hygiene products, a cost not incurred by males (Kraft-Solar 2015). In our conclusion, we further elaborate on these findings as well as provide suggestions for future research.

5. Conclusion

In this study we investigate the relationship between time served and mental health symptoms among individuals who were serving time in state correctional facilities in 2004. For the full sample, time served was associated with fewer mental health symptoms, but there is no statistically significant association after adjusting for controls. Further, these models mask important variations across race-sex groups: longer durations are associated with better mental health for white males, but worse mental health for black females and males. Thus, our results highlight racial inequality in the relationship between time served and mental health, supporting an adaptation perspective for white males, but a stress proliferation perspective for blacks. While it is beyond our data to ascertain the underlying forces driving these differences, we suggest some possibilities.

In general, our findings may indicate group differences in the typical prison experience or in available resources or abilities to cope. In particular, the relatively disadvantaged positions of blacks in society may equate to fewer resources and less support, on average, while in prison (Braithwaite et al., 2005; Mahaffey et al., 2016). Prior research also suggests that black individuals in prison, especially black females, exhibit the highest rates of prior trauma, health complications, and abuse (DeHart 2008; Richie, 2012). Negative life events such as these have been linked to poor anger control and higher levels of depression (Friestad et al., 2014; Lynch et al., 2012). Further, some epidemiologists have argued that blacks tend to use "high effort" coping strategies, defined as "persistent, sustained efforts to cope with racial barriers" (Hudson et al., 2016: 5), when confronted with stressors (James et al., 1983). These strategies are theoretically linked with more deleterious health outcomes because of the energy devoted to coping and because of the perceived control over stressors.

A closer look into the symptoms themselves also provides important insights. In Table A1, positive relationships are evidenced between time served and symptoms commonly linked with anxiety or mania among black respondents (e.g., not being able to sit still, having thoughts that race, changes in activity level). In addition, time served is positively related to the likelihood of feeling numb and empty inside among females, a symptom typically associated with depressive disorders. These findings provide tentative support for the interpretation that length of time may be associated with worse mental health for blacks via its connection with exposure to, or vulnerability to, stressors. Interestingly, the areas in which white males are faring better at longer durations differ somewhat and are more numerous compared to the areas in which blacks in prison are faring worse. For white males, longer sentences are associated with a lower likelihood of experiencing a change in appetite, change in sleep, change in libido, troubling dreams, feeling numb on the inside, or feeling like things are not real. Unlike blacks in prison, whites may have more support and resources to draw from to adjust to prison life. Occupying relatively advantaged positions outside of prison may also carry over to prison life, leading to a greater ability to cope and/or better treatment by staff or other prisoners.

We also investigated a related possibility to be further explored in future research. Given disproportionate sentence lengths across racial groups (Omori, 2019), differences in mental health may be driven by differences in the amount of time left to serve across groups. For example, the average black individual in prison may have more time left to serve than the average white individual who has served the same number of years. To explore this possibility, we predicted race-sex differences in mental health by the number of years left to serve and by the percent of a sentence that has been served (results available upon request). Notably, these variables were not highly correlated with the amount of time served ($r < 0.3$). Nevertheless, we find that the percent of a sentence served operates similarly to time served, being positively related to symptoms for black individuals and negatively related to symptoms among white individuals. Interestingly, the number of years left to serve was positively related to symptoms across all groups. Future research should continue delving into how duration of exposure and perceptions of endpoints factor into the mental health of those imprisoned.¹

There may also be key differences across these groups in help seeking, diagnosis, or treatment. Although the average number of symptoms reported by black v. white female prisoners is roughly the same (around 6), white females are more than 10 percent as likely to have received mental health care before their admission. This discrepancy is mirrored for males, with both blacks and whites reporting roughly 4 symptoms on average, but white males are 10 percent more likely to have received mental health treatment in the past.

Indeed, there are higher levels of distrust of the medical system in the black population (Armstrong et al., 2007) and seeking care for mental health problems is more stigmatized in black communities (Cooper et al., 1997) which may partially explain higher symptom levels among black prisoners. There may also be systematic differences in how those who do seek help are treated by psychiatric staff in prisons. Racial differences in mental health diagnoses and hospitalizations are well-documented (Delahanty et al., 2001). These inequities have been traced to differences in treatment rather than to differences in prevalence of mental health issues.

A few limitations of this study must be noted. First, our research design cannot establish causality between time served and mental

¹ These variables also present unique challenges in terms of measurement validity and reliability. Whereas time served is more straightforward, sentence lengths can be complex – with many individuals receiving indeterminate sentences (i.e. a range of years). This makes it difficult to calculate the percentage of a sentence that has been served since the endpoint is uncertain. In addition, some individuals end up serving more than their sentence, for example due to new convictions or added time because of prison infractions.

health. Although we control for a wide range of potential confounding variables, it remains possible that prisoners who serve longer sentences have unique dispositions from the outset, including a higher predisposition for mental health issues. Relatedly, we cannot assess changes in symptoms. Future studies would benefit from following prisoners over time and tracking their mental health with repeated observations. We include a control variable for whether respondents report any mental health treatment prior to their current stay in prison, but this is a limited measure of prior mental health and should not be considered a “pre-test” of our dependent variable. Moreover, we use listwise deletion to address missing data, resulting in about 13 percent of cases being dropped from our analysis. Though satisfying the assumption of data being missing at random (MAR) is untenable in survey research, we did explore the nature of missingness. For example, we investigated whether those who are missing on mental health symptoms are more likely to report receiving mental health treatment at some point prior to their incarceration. We do not find this to be the case (13% vs. 14% missing on symptom variables), but we acknowledge that data could be missing on variables for a variety of reasons we cannot observe, potentially affecting our results as well as the representativeness of our findings.² Next, while these data represent the most recent in the *Survey of Inmates* series, they are still 16 years old and somewhat dated. However, we cannot readily think of why the timing of this survey would produce unique results compared to more recent years. These data are also reflective of a time when mass incarceration was at its height, affecting a historically large percentage of Americans. Thus, it is an important time frame to be examining these research questions, especially considering that the effects of incarceration are not likely to stay confined to the time individuals spend in prison. Finally, our mental health measure captures symptoms within the last year and a portion of prisoners in our sample (about 21%) have not yet served a full year. Results from sensitivity analyses in which we excluded these individuals were not substantively different (results available upon request).

Our findings have a number of implications for future research and practice. With respect to research, studies on the collateral consequences of incarceration *post-release* would benefit from a less homogenous view of incarceration (Massoglia and Pridemore 2015) and from considering the intersectionality or race and sex. Incarceration is an experience which can last for days, months, or years, and this variation is likely influential for health as well as other outcomes. Similarly, research

should consider the conditions of confinement beyond time served. For example, exposure to jail is a more common experience than prison given that first time offenders, less serious offenders, and those awaiting court or sentencing largely comprise jail populations (Turney and Conner, 2019). Additionally, because jails are designed to accommodate shorter stays, there are fewer programs and inconsistent services available. Jails experience rapid turnover as well, meaning that interactions with other inmates may take on a special character compared to within prison populations. Further, while some studies examine whether race or sex moderates the consequences of incarceration, many of these studies overlook the importance of intersectionality. Indeed, the experiences of incarceration may be markedly different across race and sex, but also across race-sex groups. Consequences of incarceration are also unlikely to be confined to the individuals themselves. For example, a large and rich body of literature examines the consequences of incarceration for family members, including but not limited to romantic partners and children (Turney, 2014; Wildeman et al., 2019). In short, this research finds adverse outcomes for those attached to currently or formerly incarcerated persons, including for their health and wellbeing (Jackson and Vaughn, 2017; Wildeman et al., 2018). A couple of interesting avenues for research in this area could be to examine (1) whether dosage affects outcomes for family members, since more time separated from loved ones could be more damaging, and (2) the potential mediating role of a former or current prisoner’s mental health on the wellbeing of his or her family. To be sure, negative consequences have been consistently shown among children and romantic partners, but less is known about the specific factors driving these consequences.

Finally, given the results of the current study and the implications for policy and practice, research should continue delving into the conditions of confinement and the variation in prison experiences, linking these to health outcomes. Indeed, there is heterogeneity in *treatment* and heterogeneity in *effects*, and these are critical to unpack in future work.

Credit statement

Lauren C. Porter: Conceptualization; Methodology; Formal analysis; Investigation; Data curation; Writing; Visualization; Supervision. Meghan Kozlowski-Serra: Conceptualization; Formal analysis; Writing; Visualization. Hedwig Lee: Conceptualization; Writing.

APPENDIX A

Table A1
Relationships between Time Served and Specific Mental Health Symptoms

	Full Sample	White Females	Black Females	White Males	Black Males
Lose temper easily					
Hurt or broken things					
Revenge thoughts	+	+			
Not close to friends or family	+				
Talked/moved slowly					
Couldn't sit still	+		+		+
Thoughts raced				-	+
Change in activity			+		+
Change in sleep				-	
Change in appetite				-	
Troubling dreams				-	
No hope for future					
Change in libido				-	
Felt that no one cares					
Felt numb or empty			+	-	
Others can read mind					
Things don't seem real				-	

(continued on next page)

² We also run analyses using multiple imputation techniques and find that the results do not substantively differ (results available upon request).

Table A1 (continued)

	Full Sample	White Females	Black Females	White Males	Black Males
Mind being controlled					
Seeing things					
Hearing voices	-				
Felt spied on	+				

*+, positive and statistically significant at $p < .05$ level; -, negative and statistically significant at $p < .05$ level.

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Further reading

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