Physical Health, Social Support, and Reentry:

A Longitudinal Examination of Formerly Incarcerated Individuals

by

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ABSTRACT

Incarceration has a lasting and robust impact on individuals' health, social support networks, and general well-being. Yet the role of carceral or personal factors in health outcomes remains unclear, particularly for racial and ethnic minorities. Prisons, with crowded living areas and shared bathroom facilities, invite the spread of infectious diseases such as hepatitis C and HIV/AIDS. The overwhelming majority of incarcerated individuals will eventually be released back to their communities, bringing with them any health-related issues acquired in prison and beforehand. This makes ex-prisoners' health a correctional and public health and safety issue. Accordingly, this study seeks to advance our understanding and improve correctional policy by (1) assessing the factors that affect the adverse physical and mental health of returning prisoners, (2) determining how different types of social support (instrumental or emotional) and stress alter the relationship between health and positive reentry outcomes, and (3) examining how health, stress, and social support influence offending and drug use. The broader purpose of this research is to inform correctional policy and practice, engage public health concerns about ex-prisoners, and create a cost-effective model to decrease the stressors related to offender reentry, with the ultimate aim of reducing recidivism. The study includes 802 male ex-prisoners, with an original target sample size of 400 gang and 400 non-gang members identified using disproportionate stratified random sampling techniques. The study was conducted in cooperation with the Texas Department of Criminal Justice (TDCJ) in two prisons. Data come from the National Institute of Justice (NIJ) funded LoneStar Project and include a battery of survey questions about demographic information, physical and mental health, criminological theoretical constructs, release planning, criminogenic attitudes, and gang membership. The dissertation uses two waves of the LoneStar Project: an in-prison baseline interview,

administered a week before release, and an interview administered over the phone at one month post-release. After conducting descriptive analyses, regression modeling will be used to assess the effects of the key independent variables on physical health and later, self-reported offending, net of appropriate controls. Results and relevant policy implications are discussed and should appeal to criminologists, health scholars, policymakers, and practitioners.

DEDICATION

This dissertation is dedicated to all reintegrating ex-prisoners trying to right their past wrongs and move forward in their lives. Best of luck to you on this challenging journey.

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I finally understand why people say that writing acknowledgements is the most difficult part of completing your dissertation. How can I put into words all my gratitude and appreciation from the past six years? My graduate school experience and this culminating dissertation project would not have come to fruition without the support and guidance of a group of VIPs comprised of both professional and personal relationships.

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CHAPTER 1

STATEMENT OF THE PROBLEM

The United States is currently in an era of "mass reentry" generated by decades of mass incarceration. Nearly 709,000 inmates are released from state and federal prisons annually, amounting to roughly 2,000 people released *per day* nationwide (Guerino, Harrison, & Sabol, 2011). Though these numbers on releases are trending downward, stemming from an irregular time in the nation's penal history, an overwhelming majority (77%) will be rearrested within five years of their release (Durose, Cooper, & Snyder, 2014). Since many returning inmates cite health-related issues as a reason for failure, and subsequent reincarceration, it is critical that the health of former inmates, a topic that has received scant attention (Kirk & Wakefield, 2018; Vaughn, DeLisi, Beaver, Perron, & Abdon, 2012), be addressed. Although there has been a recent emphasis on prisoners' reintegration back to society, "the relative paucity of research on the health effects of imprisonment is surprising in light of the significant health problems faced by inmates" (Wakefield & Uggen, 2010, p. 396). The lack of research on the health of incarcerated individuals becomes a significant problem, creating a national public health crisis, when we consider the prevalence of infectious diseases prisoners bring back with them to the community via reentry (J. B. Glaser & Greifinger, 1993; Polonsky et al., 1994).

Compared to the general population, incarcerated and formerly incarcerated individuals face higher rates of chronic health conditions, mental health issues, and infectious diseases (Dumont, Brockmann, Dickman, Alexander, & Rich, 2012; Schnittker & John, 2007). In fact, a recent Bureau of Justice Statistics Special Report indicated that half of state and federal prisoners and local jail inmates reported having a chronic condition and nearly a quarter reported having an infectious disease (Maruschak,

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Berzofsky, & Unangst, 2015). Those reentering society often leave prison with their health problems unchanged or, more likely, exacerbated; with incarceration considered a "catalyst for worsening health" (Brinkley-Rubinstein, 2013, p. 3; Massoglia, 2008). Not only are researchers uninformed about how the health issues of returning prisoners may affect nearby citizens in the short term, but we are not up-to-date on the long term effects felt by family and friends of former inmates (e.g., Dumont, Brockmann, Dickman, Alexander, & Rich, 2012; Fazel & Baillargeon, 2011; Massoglia & Pridemore, 2015). As a result of this lack of knowledge, research has underestimated the potential for social support to impact positive and permanent reintegration success.

Social support is a cost-effective and powerful tool that individuals can use to withstand the stressors of reentry that may have implications for recidivism (Berg & Huebner, 2011; Spohr, Suzuki, Marshall, Taxman, & Walters, 2016). Social support manifests in many forms (e.g., showing love and encouragement or assistance with practical tasks) and can manifest in an emotional or instrumental way (Thoits, 2011). However, the literature in this area largely fails to demonstrate how social support can be leveraged during this stressful time to not only improve overall health and decrease recidivism, but ensure that the returning prisoner has access to the resources necessary to be successful in the community. Individual-level social support has been used as a compelling source of prosocial outcomes in countless studies of health and stressful situations, but scholars have yet to link health and social support in the criminological literature.[1] The relationship and measurement of health, social support, stress, and offending is crucial to understand if we are to reduce the recidivism rate.

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[1] Although Cullen (1994) discusses using social support as an organizing concept in criminology, he primarily refers to community-level support, support as an effective form of social control, and formal social support (e.g., from governmental bodies and the criminal justice system); whereas this dissertation will focus on individual-level support and the psychosocial traits of social support.

Generalizing about this unhealthy population of prisoners and released prisoners is difficult given that there are an abundance of individual, state-level, and prison-level factors contributing to correctional health care and release planning. Moreover, the extremely high stock and flow of admissions and releases through imprisonment and reentry—nearly 13 million a year —makes it difficult to focus on screening people and emphasizing universal best practices (Epperson et al., 2014). Racial and ethnic minorities are especially at risk for poor health status, finding themselves institutionalized at higher rates than Whites, and lacking basic health care outside of prison (D. R. Williams, Mohammed, Leavell, & Collins, 2010). Incarceration serves as an accelerator of poor health found in underserved communities and communities of color, with these groups already disproportionately bearing the burden of illness and disease (Golembeski & Fullilove, 2005; Graffam, Shinkfield, & Lavelle, 2004; Hammett, Roberts, & Kennedy, 2001). Consequently, then, subgroups of the population are overloaded with health issues and criminal justice contact; serving to add another layer to the inequalities found in the criminal justice system (Gaiter, Potter, & O'Leary, 2006; Willmott & van Olphen, 2005). The cycle of incarceration, reentry, and recidivism exacerbates disparities for people of color and their communities since they arguably have more health-related complications and fewer pathways to reintegration success (Henderson, 2016).

Although current reentry research has been able to establish other important needs of individuals reentering society—such as employment—the accuracy of prediction related to pre-incarceration risk factors and their subsequent health consequences after release is far less clear. Additionally, the stress of imprisonment (Sykes, 1958) can create cumulative impairment of physical and mental assets during incarceration that makes an individual more vulnerable to infection. This creates the capacity for irreparable harm,

not only for the individual, but for prison staff and the community at large (Massoglia, 2008b). The focus on health issues and reentry must begin even before the individual is first incarcerated. In fact, research shows that the inclusion of health-related variables in statistical models improves the likelihood of predicting recidivism compared to models with just criminal justice and demographic control variables (E. G. Thomas, Spittal, Taxman, & Kinner, 2015).

The considerable task at hand, then, is not only to work to reduce recidivism, as measured by lack of reincarceration or rearrest, but to ensure ex-inmates are ready to stop offending, leave prison prepared to surpass the challenges before them, and confidently contribute to society. In turn, this can lead to far-reaching reductions in the prevalence of infectious diseases and can augment national public health and welfare by reducing taxpayer costs for offender health care and reincarceration. If researchers only measure success via recidivism, we neglect other positive assessments of individual achievement (Lynch, 2006; Mears & Cochran, 2015). By including positive appraisals of success, we encourage the ex-prisoner to truly self-reflect and this practice may yield the greatest impact on recidivism rates. Accordingly, a comprehensive reintegration model that examines several facets of a returning prisoner's circumstances, including health, social support, minority status, and offending, is essential to determine what a successful reentry path looks like.

Although focusing on in-prison health and well-being may be normalized in other developed countries (see, e.g., Fernandes, Alvarenga, Dos Santos, & Pazin-Filho, 2014; Gallagher, 1990; Hoeymans, Garssen, Westert, & Verhaak, 2004; Semaille et al., 2013; Stürup-Toft, O'Moore, & Plugge, 2018; Vainionpää et al., 2017; Weston, McCarthy, Meyering, Hampton, & Mackinnon, 2018 for in-prison health data from Canada, Australia, the Netherlands, Finland, Brazil, the United Kingdom, and France), the United

States is behind in that regard. It is not because of a lack of knowledge on the subject or the lack of an understanding that inmate health is a large issue, but the sheer number of those incarcerated makes establishing standardized health care in prisons difficult, at best (The PEW Charitable Trusts, 2017). What the United States falters in, is the recognition that though this in-prison health care is for those deemed the "worst of the worst" in our society, it can and does affect the nation's health. Epidemiologically speaking, the vast majority of the "worst of the worst" will eventually be released and thousands of ex-prisoners with widespread and contagious diseases will certainly impact national public health. In fact, "the recognition that good prison health is important to general public health has led 28 countries in the European Region of the World Health Organization (WHO) to join a WHO network dedicated to improving health within prisons" (Gatherer, Moller, & Hayton, 2005, p. 1696). It is precisely this incongruity between what is perceived as important in prisoner health according to government agencies versus what is *actually* important in public health that drives this lack of research.

To that end, this dissertation summarizes the most current research on the topic of incarceration and health while increasing our knowledge in the literature regarding health outcomes and successful reintegration. Additionally, in this dissertation, I will ascertain what other conditions of reentry, such as social support and stress, have a moderating effect on physical health and offending. The dissertation seeks to answer these questions using data from the LoneStar Project, a study of trajectories, associations, and reentry of 802 inmates interviewed prior to their release from Texas state prisons and twice more in the community at one month and nine months post-release.

The roadmap for this dissertation is as follows: Chapter 2 reviews the literature on the topic by providing a summary of the health-related issues faced by inmates before, during, and after incarceration with an emphasis on the racial disparities in health outcomes attributable to mass incarceration. The literature review also focuses on how social support can be leveraged to combat the stressors of reintegration, particularly on one's health and well-being while concentrating on the reentry of previously incarcerated individuals as a volatile time period. Then, the literature review builds on the previous sections by emphasizing the role that health, stress, and social support play in later offending and drug use once the individual has been released from prison. Chapter 3 introduces the LoneStar Project with details on the research design and a general overview of the sample and data; which will not be repeated in subsequent chapters. Chapters 4-6 each begin with a current focus and discuss the particular research questions relevant to that chapter. Chapters 4-6 also contain the empirical core for each research question: measures, analytic strategy, and results. Specifically, Chapter 4 is the profile of inmate health which is exploratory in nature as it gives a general overview of in-prison physical health. Chapter 5 focuses on social support and how it may be used to combat the stressors of reentry on physical health for individuals exiting prison. Chapter 6 examines health, social support, and stress as variables that may condition the effect on offending and drug use once released. Chapter 7 is an overall discussion that brings together the entire dissertation. It incorporates the findings from previous chapters, reviews the status of ex-prisoner health, and discusses how physical health, social support, stress, reentry, race, offending, and drug use are interrelated. Moreover, Chapter 7 will consider the implications for policy and practice, discuss limitations of the dissertation, and describe directions for future research in this burgeoning area of study.

CHAPTER 2

LITERATURE REVIEW

Mass incarceration in the United States grew from complex social and political policies and can be primarily attributed to the War on Drugs, punitive sentencing policies such as mandatory minimum sentences, and the deinstitutionalization of the mentally ill (Bowman & Travis, 2012; P. Farmer, 2002; Western, 2006). There are more than two million individuals behind bars in state and federal correctional facilities (Allen et al., 2003; Greifinger, 2007; Willmott & van Olphen, 2005). More than 19 million adults are former or current felons, representing nearly 6% of the US population (Kirk & Wakefield, 2018; Shannon et al., 2017). In conjunction with the increase of incarcerated individuals, there has been a "dramatic rise and inter-relationship between incarceration, HIV, hepatitis C virus, and tuberculosis" and the reasons for this are multifactorial and have created "the perfect storm" (Altice et al., 2016, p. 1236), particularly regarding racial differences in health status (Krebs, 2006; Lichtenstein, 2009).

Incarcerated individuals have higher rates of mortality, morbidity, and utilization of health care than the general population, especially given their relatively young age (Baćak & Wildeman, 2015; Baillargeon et al., 2004; Baillargeon, Black, Pulvino, & Dunn, 2000; Binswanger, Krueger, & Steiner, 2009; Hammett, Harmon, & Rhodes, 2002; Rosen, Schoenbach, & Wohl, 2008; Schnittker, Massoglia, & Uggen, 2011). Rates of infectious diseases (e.g., hepatitis C, HIV/AIDS, and tuberculosis) are elevated in prison populations due to risk factors that come before and during incarceration which include poor access to health care, risky sexual behaviors, unsanitary conditions in impoverished neighborhoods, intravenous drug use, and overcrowded living spaces (Anno, 1993; Baillargeon et al., 2004; Braithwaite, Hammett, & Mayberry, 1996; Das & Horton, 2016;

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J. B. Glaser & Greifinger, 1993; Greifinger, 2007; Pridemore, 2014; Schnittker & John, 2007; Schnittker et al., 2011; Smedley, Stith, & Nelson, 2003).

Compared to the general population, the incarcerated population has a higher prevalence of substance use disorders, infectious diseases (including sexually transmitted diseases), chronic medical issues, mental health disorders, and are more deficient in Vitamin D (Fazel & Danesh, 2002; Nwosu et al., 2014; Wildeman & Wang, 2017; Wilper et al., 2009). A study of previously incarcerated individuals returning to the community revealed that *most* men (84%) reported having a mental health, physical health, or substance abuse problem and approximately 40% had multiple problematic health conditions (Mallik-Kane & Visher, 2008). Specifically for men who had a physical health condition, about one-fifth cited a mental health issue as well and nearly two-thirds reported substance abuse issues present prior to incarceration (Mallik-Kane & Visher, 2008). Though the exact proportion is unknown in the ex-prison population, dually and triply diagnosed individuals are common and require particularly challenging service needs (Hammett et al., 2001).

Other medical problems are common among inmates as well. Nearly 43% of state inmates and 39% of federal inmates indicate they have at least one chronic health condition including diabetes, cancer, asthma, hypertension, heart problems, HIV/AIDS, and seizure disorders among others (Wilper et al., 2009); and that these chronic conditions were diagnosed during incarceration (Wang et al., 2012; Wildeman & Wang, 2017). Additionally, approximately 80% reported needing to see a medical provider while they were incarcerated (Wildeman & Wang, 2017; Wilper et al., 2009), but regrettably, the quality of medical care they receive is inconsistent within facilities and unequable across facilities (Freudenberg & Heller, 2016; Hammett et al., 2001). About 56% of state prisoners reported they were either very satisfied or somewhat satisfied with

correctional health care services. Though that might sound promising, it means that 44% are *dissatisfied* with their health care while incarcerated, which is concerning given they have no other choice.

Moreover, some of the discrepancy in treatment seems to be occurring through specific conditions as well. For instance, a reentry study conducted in Texas and Ohio found that although the treatment rates for diabetes and HIV surpassed 80%, the treatment of conditions such as back pain, hepatitis, and tuberculosis were considerably lower—between 20% and 40%—for currently incarcerated inmates (Mallik-Kane & Visher, 2008). This disease-specific finding is alarming since infectious diseases can easily be transmitted to other prisoners, correctional officers, and to the communities ex-prisoners return to (Freudenberg, 2001; J. B. Glaser & Greifinger, 1993; Hammett et al., 2001). Correctional health programs must echo the needs of their incarcerated persons since this high prevalence of infectious diseases become an individual and public health problem if left untreated.

The structure of the literature review is as follows. First, a detailed overview of the profile of inmate health in the United States is summarized with a specific focus on infectious diseases, sexually-transmitted infections, chronic conditions, and the aging prisoner population. Next, some specific characterizations and contested issues inherent in studying and typifying prison health are discussed such as incarceration's direct effects on health, incarceration as a protective factor, and racial disparities in health for prisoners. These sections are followed by an outline of social support, social support's effects on health, social support and the family, and social support and reentry. The next sections emphasize the unstable transition period of prisoner reentry by looking at social support, stress, and health and how each relate to reintegration. Afterward a brief section dedicated to the spillover effects of prisoner health on their families, friends,

communities, and the United States population is presented. Finally, the literature review ends with a discussion of the importance of continuity of care between correctional health and public health to aid in this reintegration process and help create a healthier nation.

<p style="text-align:center">Profile of Inmate Health</p>

It is advantageous for public health and correctional health care officials alike to identify what diseases and illnesses plague the populations they serve. However, no national estimates of disease and illness exist that are standardized and released regularly (Ahalt, Binswanger, Steinman, Tulsky, & Williams, 2012). A special report by the Bureau of Justice Statistics highlights a few of the medical problems currently plaguing inmates. Using data from 2011-2012, half of the state and federal prisoners as well as jail inmates reported ever having a chronic condition, while 40% of that group report that this chronic condition is current (Maruschak et al., 2015). Nearly a quarter of this population reported ever having a chronic communicable disease such as tuberculosis, hepatitis B or C, or other sexually transmitted diseases (excluding HIV/AIDS), which is a consistent finding in subsamples (Mallik-Kane & Visher, 2008). Thus, an examination of the profile of inmate health, specifically the personal and carceral factors related to physical health, is the first major research question of this dissertation. Results of this analysis can be found in Chapter 4.

Infectious Diseases

Starting with the prevalence of infectious diseases in prison, tuberculosis (TB) is the most common (Moller, Stover, Jurgens, Gatherer, & Nikogosian, 2007). Tuberculosis has a long history associated with prisons since 80% of all inmate deaths were caused by it in the 19th century (P. Farmer, 2002). Up to 25% of the inmate population has a tuberculosis infection, with the incidence rate being 6-14 times higher than the non-

incarcerated population (Bick, 2007; Davis & Pacchiana, 2004; Freudenberg, 2001; Hammett et al., 2002); with other estimates saying it is 10 to 100 times higher (Stuckler, Basu, McKee, & King, 2008; Veen, 2007). Approximately 40% of the national population infected with active TB were released from a correctional facility into the community in 1997 (Hammett et al., 2001; Travis, 2004). California and Texas prisons accounted for nearly half the reported TB cases from 1993 to 2003 (MacNeil, Lobato, & Moore, 2005). Additionally, there is a 20 to 30 times higher risk of developing TB if one is already infected with the HIV virus (Edge, King, Dolan, & McKee, 2016; World Health Organization, 2015), but the magnitude of this risk varies by prisons and countries (Edge et al., 2016). Transmission for TB occurs via airborne droplets and is easily spread through coughing, sneezing, and the use of unventilated rooms—all which are common in prisons (Baillargeon et al., 2000; Naning, Al-Darraji, Mcdonald, Ismail, & Kamarulzaman, 2018; Veen, 2007). Tuberculosis screening is especially important in correctional facilities because inadequate treatment can spread drug-resistant TB strains (Freudenberg, 2001). In fact, the incidence of TB and the prevalence of a multi-drug resistant phenotype are strongly associated with differences in incarceration rates (Dolan et al., 2016; Stuckler et al., 2008).[2] Stuckler and colleagues (2008) conclude that changes in the incarceration rate are a major determinant of increases in TB incidence in prisoners, especially in eastern European and central Asian countries.

Research has focused on HIV/AIDS behind bars since the dramatic rise in this infectious disease worldwide correlated with the growth of mass incarceration. Estimates are uncertain partially because at least one quarter of HIV-infected individuals are unaware of their positive status (Centers for Disease Control and Prevention, 2017;

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[2] Incidence and prevalence are commonly confused terms used in describing disease epidemiology. Incidence is the rate of newly diagnosed cases of a disease. Prevalence refers to the number of cases of a disease that are in the population at a given time and can indicate how widespread the disease is.

Dumont et al., 2012; Villarosa, 2017). Recently, however, there has been a declining

trend since the late 1990s of HIV-positive inmates (Maruschak, 2012), with the number

of AIDS-related deaths in state and federal prisons in 2001 at 275 and in 2014 at 64

(Noonan, 2016).[3] In fact, year-end 2015 marked the first year that the number of state

prisoners with HIV fell below the estimated number from 1991 (Maruschak & Bronson,

2017).[4] Another estimate found that in 1997, as many as one in five of HIV-infected

Americans passed through correctional facilities that year, but in 2006, that number

decreased to one in every seven persons (Spaulding et al., 2009). Nonetheless, it remains

a somewhat familiar cause of illness-related deaths among inmates with nearly 1,800

deaths per year (Bick, 2007; Hammett et al., 2002).

Roughly 20-26% of all people with HIV pass through correctional facilities

(Dumont et al., 2012; Hammett et al., 2001; Travis, 2004), but less than half of these

facilities provided routinized HIV testing, which is a lost opportunity since there is an

approximate 75% reduction in AIDS-related mortality after effective treatment (Bick,

2007). Unsurprisingly, the greatest risk is felt by Black and Hispanic inmates who

accounted for more than half of all the AIDS cases reported, when the two groups only

make up 21% of the general population (Hammett, 2006; Maruschak, 2008; Polonsky et

al., 1994). Blacks and Hispanics in the non-incarcerated population do not fare much

better (Johnson & Raphael, 2009). Although new HIV diagnoses are on a downward

trend generally, there has been a 4% and 14% *increase* for Black and Latino gay and

bisexual men, respectively (Centers for Disease Control and Prevention, 2017). Put a

different way, Blacks make up 12% of the United States population, but 44% of new HIV

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[3] HIV is human immunodeficiency virus and AIDS is acquired immune deficiency syndrome.
AIDS is the advanced form of HIV.
[4] The Bureau of Justice Statistics (BJS) began data collection on HIV in prisons in 1991.

diagnoses while Latinos make up 18% of the United States population, but 25% of new

HIV diagnoses (Centers for Disease Control and Prevention, 2017).

Johnson and Raphael's (2009) rigorous analysis of incarceration, AIDS, and

racial disparities found that the "lion's share of the racial differentials in AIDS infections

rates for both men and women are attributable to racial differences in incarceration

trends" (p. 286). Compounded by poverty and inadequate local health care, these groups

tend to be from the same pool of those who end up in prison as well (Villarosa, 2017).

Indeed, the problem of HIV/AIDS in prisons remains a large enough issue today that

The Lancet recently published a special series on HIV and related infections in prisoners

(see Altice et al., 2016; Beyrer, Kamarulzaman, & McKee, 2016; Das & Horton, 2016;

Dolan et al., 2016; Kamarulzaman et al., 2016; Rich et al., 2016; Rubenstein et al., 2016;

Shrage, 2016).

Hepatitis B (HBV) and hepatitis C (HCV) have been cited as the most common

(11%) communicable diseases reported by reentering men (Mallik-Kane & Visher, 2008)

and at a rate nearly ten times higher than among the non-incarcerated population (Davis

& Pacchiana, 2004; Dumont et al., 2012; Freudenberg, 2001). Moreover, a common type

of comorbidity involves the co-occurrence of HIV and hepatitis B or hepatitis C (Davis &

Pacchiana, 2004). HBV and HCV chronic infections, though triggered by different

viruses, are major causes of liver cirrhosis, hepatocellular carcinoma (the most common

form of liver cancer), and end-stage liver disease (Khodadost, Maajani, Arabsalmani,

Mahdavi, & Tabrizi, 2017; Kiefer, 2018; Seeff, 2002). Epidemiologic data suggest that

more than a third of the estimated 4.5 million people infected with hepatitis C in the

United States have served time behind bars (Davis & Pacchiana, 2004; Reindollar, 1999).

Both the incidence rate and seroprevalence of HCV has been declining as of lately,

though the estimate is still a range between 25% and 41% (compared to 1.6% in the

general population);[5] due in no small part (72% - 86%) to injection drug users

(Khodadost et al., 2017; Kiefer, 2018; Maurer & Gondles, 2015; Poulin et al., 2007;

Reindollar, 1999). About one half of prisoners who are infected are likely ignorant of

their serological status; potentially spreading the disease without awareness through

close contact, drug needle sharing, and reusing tattoo needles (Visher & Mallik-Kane,

2007). Reusing needles for in-prison tattoos is relatively common and nearly half of

prisoners admit to this habit (Khodadost et al., 2017). In a systematic review and meta-

analysis, Khodadost et al. (2017) showed that the strongest associations between

tattooing and an increased risk of hepatitis C infection were among high-risk populations

such as prisoners, HIV-infected individuals, drug users, and homeless individuals.

Comparable to HIV/AIDS and tuberculosis, approximately 30% of Americans

with HBV and 40% with HCV have passed through prisons at some point (Bick, 2007;

Hammett et al., 2002; Post, Arain, & Lloyd, 2013; Ruiz et al., 1999; Weinbaum, Sabin, &

Santibanez, 2005). The in-prison hepatitis C rate is ten times higher than that of the

general population (Hammett et al., 2001; Kiefer, 2018) with a higher prevalence found

among men and black individuals (Weinbaum et al., 2005). For example, the medical

director of the Arizona prison complex testified that up to 80% of inmates in that

complex were infected with hepatitis C. In fact, since 2014, five death-row inmates have

died of natural causes (i.e., not by execution) all of which were related to HCV

complications (Kiefer, 2018). Similarly, the prevalence of infection for HBV is fivefold

greater for black compared to white persons (Weinbaum et al., 2005).

Sexually Transmitted Diseases

Studies have demonstrated that those entering correctional facilities have high

rates of sexually transmitted diseases (STDs), contracted through many of the same risk

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[5] Seroprevalence describes the level of a particular pathogen in the population, as measured by blood tests.

behaviors as communicable diseases, especially for those under age 35 (Centers for Disease Control and Prevention, 2014, 2015a). The most common sexually transmitted diseases found among prisoners are syphilis, gonorrhea, and chlamydia with prevalence rates ranging from 2.6% to 4.3% (Davis & Pacchiana, 2004). Men in juvenile or adult correctional facilities have higher rates of chlamydia (Joesoef et al., 2009) and gonorrhea (Centers for Disease Control and Prevention, 2014) than their non-incarcerated counterparts. Syphilis seroprevalence rates in the population are considerably higher for adult men than for women and adolescents, which is consistent with overall syphilis trends (Kahn, Peterman, Arno, Coursey, & Berman, 2006; Kahn, Voigt, Swint, & Weinstock, 2004). Though several studies have shown a high prevalence of trichomonas in incarcerated populations (Sosman et al., 2011),[6] none have yet to confirm the impact of screening at intake (see Centers for Disease Control and Prevention, 2015).

These STD and STI prevalence rates—like other physical health outcomes—are much higher in certain populations (Davis & Pacchiana, 2004), particularly Black men (J. C. Thomas & Torrone, 2006). For example, the gonorrhea rate among non-Hispanic Black males in 2000 was 40 times higher than among non-Hispanic Whites (Centers for Disease Control and Prevention, 2014). Thomas and Torrone (2006) found that although the chlamydia and gonorrhea rates decreased for the in-prison population between 1996 (51.50 per 100,000 and 62.46 per 100,000, respectively) and 2002 (30.26 per 100,000 and 32.16 per 100,000, respectively), the rates upon initial prison entry and exit were quite similar. Leading to the suggestion that, "high incarceration rates lead to negative community health effects, strengthening the argument for a causal relationship" (Thomas & Torrone, 2006, p. 1764). As like other infectious diseases, the ability for STDs to spread rapidly to the general population via incarceration and reentry is a sizable risk

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[6] Trichomonas is a sexually transmitted infection caused by a parasite.

and should be studied more systematically. For example, interviews with service providers of recently released men reported that these young men frequently practice risky sexual behavior upon release; owing it to themselves as a way to "make up for lost time" while incarcerated (Seal, Margolis, Sosman, Kacanek, & Binson, 2003). Moreover, another study indicated that 79% of their all-male sample reported unprotected sex within a few months of release (Sosman et al., 2011).

To date, there are no comprehensive national guidelines about how to manage, treat, and/or reduce the rates of STDs in correctional settings. But, evidence suggests that with targeted screening at intake, these infections can be detected and treated in all correctional settings (Centers for Disease Control and Prevention, 2014; Kahn et al., 2006). Moreover, because of the mobility of incarcerated populations into and out of the community, the impact of screening for these sexually transmitted diseases and infections at intake and upon release would have considerable positive results on public health (Owusu-Edusei, Gift, Chesson, & Kent, 2013). For example, in just six months post-release, 26% of a sample of young men (mean age of 22.5 years old) tested positive for one of more sexually transmitted infections (Sosman et al., 2011). Aside from sexually transmitted infections, tuberculosis, HIV, and all forms of hepatitis were pronounced as the four diseases needed to be given the most priority for preventative measures by the World Health Organization (Moller et al., 2007). However, more recently, the net has widened to include chronic illnesses in the group of conditions that should be focused on as well.

Chronic Conditions

Very few studies have assessed the prevalence of non-infectious diseases among prisoners (Fazel & Baillargeon, 2011), but that trend is changing in the coming years with a new emphasis on chronic conditions (Dumont et al., 2012). Physical ailments afflicting

inmates include hypertension, asthma, diabetes, post-traumatic stress disorder (PTSD), and obesity among others. High blood pressure or hypertension was the most common chronic condition reported by 30% of prisoners in 2012 (Maruschak et al., 2015) with an increased prevalence for anyone who has had a history of incarceration (Wang et al., 2012). Using multiple datasets and adjusting for age, Wilper and colleagues (2009) found that inmates had higher rates of diabetes, myocardial infarction (i.e., heart attack), asthma, and hypertension than the comparable noninstitutionalized population. Between 39% and 43% of inmates have diagnoses of asthma, hypertension, and diabetes; of which this rate is only increasing and is consistently higher than in the general population (Binswanger et al., 2009; Dumont et al., 2012; Schlanger, 2017; Wilper et al., 2009). Almost 9% of inmates have asthma, which is an elevated percentage relative to the United States population (Davis & Pacchiana, 2004; Freudenberg, Daniels, Crum, Perkins, & Richie, 2005; Schnittker et al., 2011). PTSD is just one of the many psychiatric disorders found at higher levels in incarcerated populations as well as depression and intermittent explosive disorder (Schnittker, Massoglia, & Uggen, 2012; Wildeman & Muller, 2012). Cardiovascular disease (CVD) in incarcerated populations is also higher compared to the general population (Wang et al., 2017). Specifically, CVD is a leading cause of death among incarcerated populations and is partially due to the higher rate of risk factors present in prisoners, such as smoking and hypertension—much of which is due to stress (Noonan, 2016; Wang et al., 2017).

The majority of prisoners (74%) are overweight, obese, or morbidly obese (Maruschak et al., 2015), of which the obesity epidemic is only becoming worse nationwide (Dumont et al., 2012). Incarceration increases body mass index (BMI) with the strongest effects found in Blacks and those with less education; which likely results in incarceration conditioning disparities of obesity across the life course (Houle, 2014).

Obesity is a "socially patterned epidemic" that has higher prevalence rates among those of lower socioeconomic status and for racial and ethnic minorities (Houle, 2014; Massoglia & Pridemore, 2015, p. 293).

Prisoners with disabilities—impairments that are cognitive, developmental, or physical—constitute yet another a sub-population of those incarcerated whose mental and physical ailments create an even more difficult prison experience. An estimated 32% of prisoners report having at least one disability and are three times more likely to have any disability compared to the general population (Bronson, Maruschak, & Berzofsky, 2015). More than 6% of state and federal prisoners report that they are deaf or have serious difficult hearing, more than 7% are blind or have low vision that cannot be corrected with eyeglasses, and more than 10% report inability to climb stairs and/or have serious difficulty walking (Bronson et al., 2015; Schlanger, 2017). Moreover, older prisoners had more than double the likelihood (44% versus 19%) of reporting *any* disability compared to their younger incarcerated counterparts (Bronson et al., 2015).

Aging Prisoners

Because of the imposition of longer prison sentences and other related social and political variables from the 1980s and 1990s, there is an aging incarcerated population that undeniably represents a larger, sicker fragment of prisoners today (Millemann, Bowman-Rivas, & Smith, 2017). Between 1990 and 2010, the number of incarcerated persons over the age of 55 increased by 300% nationwide (Bedard, Metzger, & Williams, 2017). Indeed, similar to the general US population, older incarcerated individuals make up the fastest growing segment of the prison population (Skarupski, Gross, Schrack, Deal, & Eber, 2018). In 1992, less than 4% of the prison population were considered older (Colsher, Wallace, Loeffelholz, & Sales, 1992), but as of 2016, 11% of prisoners were 55 and older (Carson, 2018). Typically the age of 65 is defined as geriatric, but

imprisoned populations use age 55[7] because of the notion of "accelerated aging" that must be taken into account for those in correctional custody (Bedard et al., 2017; B. A. Williams, Goodwin, Baillargeon, Ahalt, & Walter, 2012; B. A. Williams, Stern, Mellow, Safer, & Greifinger, 2012). Accelerated aging describes the unhealthy lifestyles and inadequate health care that can fast-track the onset and progression of disease; demographics which are typical for incarcerated individuals (Skarupski et al., 2018). There is certainly a shift in the median age of prisoners which poses some pressing financial and medical challenges (Bedard et al., 2017). Chronic conditions for imprisoned populations tend to be at more advanced stages compared to the age-adjusted general population's rates; making their care more difficult (Dumont et al., 2012).

Scholars estimate that by 2020, the older inmate population will be one-third of America's prison population (Millemann et al., 2017; Skarupski et al., 2018). Aside from the social and ethical considerations of housing older prisoners who have aged out of crime, the financial costs are immense. Older prisoners are certainly the most expensive prisoners costing up to or more than $60,000 a year per person or $16 billion a year in total; $8.2 billion of that which is strictly for medical care (American Civil Liberties Union, 2012). Put another way, it costs upwards of $1.5 million to imprison an elderly inmate from age 50 to 75 (Millemann et al., 2017). Moreover, in-prison direct health care costs aside, elderly inmates visit community health facilities five times more than their similarly-aged counterparts for appointments requiring expensive specialized procedures and enhanced security costs for transportation (American Civil Liberties Union, 2012). Additionally, older inmates recidivate a lot less than younger inmates upon release (approximately 4% of those 65 and older recidivate); adding to the public

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[7] This "older" or "geriatric" threshold varies by jurisdiction, but most use age 55 (Chiu, 2010; B. A. Williams, Goodwin, et al., 2012).

safety reasoning of minimizing the size of this population in prison (Millemann et al., 2017; Pew Center on the States, 2011).

Specifically for TDCJ (Texas Department of Criminal Justice), there has been an increase of 148% of inmates 55 years and older between 1994 and 2002 (Millemann et al., 2017; Raimer & Stobo, 2004). Infectious diseases in the Texas prison system are the most common category of health conditions reported (Baillargeon et al., 2000). During the one year study period, Baillargeon and colleagues (2000) found that more than half of the study population (155,947 male prisoners) exhibited at least one medical condition requiring assistance. In Texas, prisoners aged 55 and older account for almost 47% of those with three or more chronic conditions and, on average, are prescribed 7 classes of chronic medications (Harzke et al., 2010; B. A. Williams et al., 2010). Moreover, "among both male and female inmates, hypertension, diabetes, and arthritis all more than doubled in the 50 and over subgrouping" (Baillargeon et al., 2000, p. 77).

Incarceration as a Protective Factor?

Though it is apparent that incarceration influences physical and mental health in some ways, the research is mixed on whether imprisonment is protective or detrimental to one's health for certain subgroups of the population. Being incarcerated might, ironically, be momentarily protective for some groups by decreasing mortality and physical morbidity during incarceration (Binswanger et al., 2007; Patterson, 2010; Rosen et al., 2008; Rosen, Wohl, & Schoenbach, 2011; Spaulding et al., 2011; Wildeman & Muller, 2012). Prison may serve as a protective health influence, particularly for those who hail from violent homes or are homeless. Although it may be considered substandard living, "the system provides shelter and meals; it also enforces supervision and highly-structured routines, a stabilizing force for some" (Dumont et al., 2012, p. 329). Exclusively among Black men, incarceration may temporarily improve or shield

from deleterious health outcomes at least during the current term of imprisonment (London & Myers, 2006; Patterson, 2010; Spaulding et al., 2011; Wildeman & Wang, 2017). To be sure, the mortality rate for Black men in state prisons was 57% lower compared to Black men in the general population from 2001 to 2004 (Mumola, 2007).

Recent research, however, tested this "mortality advantage" for non-Blacks and found that it does exist for other racial groups as well (Wildeman, Carson, Golinelli, Noonan, & Emanuel, 2016). Namely, the mortality advantage was greatest for Black males, then Black females, followed by Hispanic males, white females, and then white males. Although the study pushed the literature forward with regard to the imprisonment-mortality relationship, the authors urged more research to test the same pathways in different race/ethnicity and sex combinations (Wildeman et al., 2016).

The research findings describing incarceration as a protective factor for Black men generally agree that the effect is present, but the mechanisms by which imprisonment can actually have a protective element are debated in the literature (Wildeman & Wang, 2017). First, the controlled prison environment provides some safety from external causes of death which are only applicable to the population on the outside such as car accidents, street violence, and other violent encounters (Massoglia & Pridemore, 2015; Patterson, 2010; Rosen et al., 2011; Spaulding et al., 2011; Wildeman, 2016; Wildeman & Wang, 2017). Second, low income Black males may benefit from the semi-consistent health care availability in prison, as they may never have had standard or institutionalized health care before imprisonment (Massoglia & Pridemore, 2015; Patterson, 2010; Rosen et al., 2011; Spaulding et al., 2011; Wildeman, 2015). Third, there is reduced access to illicit alcohol and drugs inside the prison walls. That said, when ex-prisoners enter the free world, some overestimate their tolerance level after years of

sobriety and may overdose (Patterson, 2010; Rosen et al., 2011; Spaulding et al., 2011; Wildeman & Wang, 2017).

The protective aspects of prison on health is due to the imbalanced delivery of health services across prisons. Another potential reason for this contrasting finding could be because many states offer compassionate release. In that sense, inmates who are sick or near death may be released and then die shortly after being back in society which may increase the incarceration-mortality rate post-release (Massoglia & Pridemore, 2015), but this is likely a negligible difference. Spaulding and colleagues (2011) found that having *ever* been imprisoned was associated with an inflated mortality risk, even after adjusting for the minor protective effects in the short term. These short term mortality gains for Black ex-inmates combined with their unmet health needs might come at a long-term cost by neglecting current health issues while new ones are created (Wildeman & Muller, 2012).

Current and Previous Prison Terms

Although research is somewhat mixed regarding the causal effects of current incarceration on mortality risk, it is much more consistent on morbidity's enduring effects following incarceration (Massoglia & Pridemore, 2015; Pridemore, 2014; Wildeman & Wang, 2017). Especially in the weeks after release, there is an increased chance of mortality among former inmates though the magnitude of this relationship varies (Binswanger et al., 2007; Rosen et al., 2011; Spaulding et al., 2011). Indeed, Binswanger and colleagues (2007) found that in the two weeks post-release, the mortality rate of former inmates was nearly 13 times the general population. Additionally, a recent study indicated that every additional year in prison translated to an approximate two year decline in life expectancy, with the highest risk being right after

prison release (Patterson, 2013); leading the authors to conclude that incarceration length directly impacts life expectancy.

Though the research on mortality effects following imprisonment is variable from study to study, the effects on one's morbidity because of a current or past incarceration are far clearer: the negative health effect of incarceration on ex-inmates is long lasting. Causality claims in this relationship are difficult to tease out given that the pushes of selection into prison are very often directly or indirectly linked to poor health (Lichtenstein, 2009; Massoglia, 2008b; Schnittker et al., 2011; Turney, Wildeman, & Schnittker, 2012; Wildeman, 2015; Wildeman & Muller, 2012). Very few studies include both objective health measures and incarceration data but those that do cite valid physical health issues after controlling for all other relevant factors (Wildeman & Wang, 2017). For example, one study found a 2.7 odds increase for left ventricular hypertrophy, a consequence of uncontrolled hypertension, among those who had ever been incarcerated compared to those who had never been incarcerated (Wang et al., 2009). Another study using objective health measures found that reports of hepatitis, tuberculosis, and urinary tract infections are nearly four times more likely to occur in ex-inmates versus non-inmates (Massoglia, 2008b). Binswanger and colleagues (2009) showed that inmates suffer high rates of asthma, arthritis, hypertension, hepatitis, and cervical cancer compared to non-inmates, after adjusting for important sociodemographic factors such as age, sex, race, education, birthplace, employment, and level of alcohol consumption. This adds credence to the idea that even if prison is not a causal predictor of these deleterious health consequences, it very well may be a primary force in the etiology of disease for previously incarcerated persons.

Research has considered not only the *length* of current and past incarcerations but the *number* of previous incarcerations on health outcomes. Overall, the length of

incarceration appears to be far less critical on later health than the mere fact of incarceration itself (Massoglia, 2008b, 2008a; Massoglia & Pridemore, 2015; Schnittker & John, 2007; Spaulding et al., 2011; Wildeman, 2012a). However, "even a short sentence is sufficient to increase disability, although those who serve unusually long sentences may be at risk for poor health regardless of incarceration" [length] (Schnittker et al., 2011, p. 136). A recent study found that as the length of the total prison term increased, so did a variety of other behaviors such as alcohol use; leading the authors to conclude that, "exposure to the prison environment (measured by length of incarceration) fosters risk behaviors for chronic disease development, particularly low-quality diet and cocaine use" (Silverman-Retana et al., 2018, p. 4). Thus, the complete history of incarceration produces a stronger effect on future health outcomes including the chances of contracting infectious diseases and acquiring stress-related disorders (Massoglia, 2008a; Schnittker & John, 2007; Schnittker et al., 2011; Wildeman & Muller, 2012). If prisons are able to be briefly protective for some disadvantaged and exposed to violence groups, it is clear that these benefits vanish once the person is released.

Racial Disparities in Health

The incarceration-health link is exacerbated when we consider the substantially greater health burden felt by racial and ethnic minorities who are overrepresented in the criminal justice system and health care (Crow, 2008; London & Myers, 2006; Patterson & Wildeman, 2015; Schnittker & John, 2007; D. R. Williams & Collins, 1995). This population is medically disenfranchised and the disparities found in incarceration rates contribute to the diminished health status of communities most impacted by incarceration (Brinkley-Rubinstein, 2013; Iguchi, Bell, Ramchand, & Fain, 2005; Schnittker, Uggen, Shannon, & McElrath, 2015; Wildeman, 2011). In fact, "the weight of

the evidence reveals that mass incarceration has come with significant social costs and considerable implications for rising social inequality," of which physical health is only one piece (Kirk & Wakefield, 2018, p. 17). This is especially true for Black males (Iguchi et al., 2005; Schnittker & John, 2007; Wildeman & Wang, 2017; D. R. Williams & Collins, 1995), where the interaction between incarceration and race may both be more prevalent and more damaging (Patterson & Wildeman, 2015; Schnittker & John, 2007; D. R. Williams & Collins, 1995).

In a study on the disease profile of Texas inmates, Blacks and Hispanics had the highest prevalence of tuberculosis and HIV/AIDS with the HIV/AIDS prevalence estimate at 15 times higher than the general population (Baillargeon et al., 2004). Put a different way, incarcerated Blacks and Hispanics still have the same seroprevalence rate as was typical for the late 1990s, while the rest of the incarcerated population saw a 29.3% reduction by 2006 (Spaulding et al., 2009). Additionally, the Centers for Disease Control and Prevention (CDC) estimated that Black Americans account for 49% of new cases of HIV/AIDS (Lichtenstein, 2009) and in the southeast, this estimate soars to 75% (Hall, Li, & McKenna, 2005). In New York in 1997 48% of the Black inmates and 45% of the Hispanic inmates were diagnosed with AIDS while the rest of the state's population with AIDS hovered around 18% and 14%, respectively (Hammett et al., 2002). When looking at diabetes, research finds that the prevalence for African Americans is about 70% higher than it is for Whites and is nearly double for Hispanics than for Whites (Davis & Pacchiana, 2004). A closer look at the causes of these racial disparities in health, especially in how they relate to prisoners specifically is a logical next step.

Link and Phelan (1995) introduced the idea that disease may be linked to more broad, societal causes rather than individual risk factors. Prior to this, epidemiological studies focused on the more proximal causes of bad health and disease such as diet,

exercise, and even genetics. Because incarceration, race, and community factors are independently correlated with physical health, mental health, and mortality risk (London & Myers, 2006), it opened a new form of inquiry into the overarching "fundamental causes" that affect disease outcomes via multiple pathways stemming from sociological processes (Link & Phelan, 1995). Social and economic disadvantage became some of the first structural factors linking racial and ethnic disparities to incarceration (Bowman & Travis, 2012; Sampson & Loeffler, 2010; Walker, Spohn, & Delone, 2012).

Previous studies documented the role of education, neighborhood, and socioeconomic status as selection into prison (Wakefield & Uggen, 2010; Western, 2006), but very few tested how mass incarceration directly contributed to these inequalities (but, see Chamberlain and Wallace 2015). Racial disparity has quickly become "the only area we know to have come close to demonstrating incarceration's effects on inequality" (Wildeman & Muller, 2012, p. 12). Accordingly, these disparities for Latinos and Blacks persist as structural barriers throughout incarceration and adversely influence prisoner reentry as well (Bowman & Travis, 2012; Clear, 2007b). Thus, for people of color it is no surprise that there is a "striking degree of overlap between the risk factors for crime and those for disease" which includes unemployment, poverty, and marital instability (Awofeso, 2010; Massoglia & Schnittker, 2009; Schnittker & John, 2007, p. 118).

As evidenced above, the expansion of the justice system has disproportionately impacted minorities, of which incarceration rates are five to eight times higher compared to similarly situated Whites (Pettit, 2012; Pettit & Western, 2004). Indeed, for certain populations of color, namely Blacks, incarceration is just another phase in the life course (Patterson & Wildeman, 2015; Pettit & Western, 2004). Unfortunately, though, this uneven distribution of the penal system's negative effects "both reflects systematic and

institutionalized racism and exacerbates existing inequities" (Wildeman & Wang, 2017, p. 1470). What is less known, however, is the extent to which these minority communities have felt the collateral consequences of mass incarceration on health, especially considering that incarceration is an explanatory factor for racial disparities in health (Massoglia, 2008a; Pettit & Western, 2004). Two processes may propel this unbalanced impact. First, more minorities are incarcerated as a proportion of the United States population period. Consequently, even if any legitimate racial differences in health are nil, the aggregate impact will still affect minority groups more based solely on sheer numbers. Second, harmful consequences of incarceration such as reduced labor market prospects, minorities' social location relative to Whites, the stress and stigma of being an ex-felon, and that Blacks are likely to experience more chronic pain regardless, may all contribute to this racial inequality (London & Myers, 2006; Massoglia, 2008a; Massoglia & Pridemore, 2015).

These circumstances have generated a life course for racial and ethnic minorities wrought with accumulated disadvantage (London & Myers, 2006). These disadvantages not only affect the individual, but extend to the family and friends connected to this largely male and non-white criminal justice population (Green, Ensminger, Robertson, & Juon, 2006; Lee, McCormick, Hicken, & Wildeman, 2015; Wildeman, 2015). This disadvantage can work through education, socioeconomic status, and institutionalized racism, among other things (Crimmins & Saito, 2001; Ross & Wu, 1995). Race is strongly correlated with socioeconomic status (SES) and differences in SES among racial groups are robust explanatory variables for the observed patterns of racial disparities in health (M. Farmer & Ferraro, 2005; Navarro, 1990; Shavers, 2007; D. R. Williams et al., 2010). In fact, Williams and Collins (1995) argue it is unusual that the U.S. reports the health status of its citizens *based* on their race; compared to most other countries who report

based on social class. This reasoning in and of itself demonstrates how intimately connected race and socioeconomic status are in the United States (Navarro, 1990). Overall, there is "accumulating evidence that indicates that racial disparities in health persist at every level of SES" (D. R. Williams et al., 2010, p. 69). Moreover, this relationship is repeatedly observed and is persistent over time (Adler, Boyce, Chesney, Folkman, & Syme, 1993; Braveman et al., 2005; M. Farmer & Ferraro, 2005; D. R. Williams et al., 2010).

Aside from the previous findings on racial disparities in health based on aggregate-level circumstances and demographics, research on the link between poor health outcomes and racial/ethnic discrimination is growing (Frank, Wang, Nunez-Smith, Lee, & Comfort, 2014; Paradies, 2006; D. R. Williams & Mohammed, 2009). Irrespective of the source of discrimination (e.g., "legal" discrimination by the government via felon disenfranchisement as well as discrimination based on race); it is harmful, particularly for physical and psychological health (Paradies, 2006; Turney, Lee, & Comfort, 2013; D. R. Williams & Mohammed, 2009). But, discrimination stemming from incarceration and its stigmatizing effects, such as being labeled an "ex-con," may be especially detrimental for health post-release because it increases stress while also weakening the capacity to cope pro-socially (Hatzenbuehler, Phelan, & Link, 2013; Massoglia & Schnittker, 2009). The stress and stigma associated with immutable conditions such as the color of one's skin and discrimination related to a past conviction can be reduced through a strong sense of self-worth or social support (Birtel, Wood, & Kempa, 2017; Epperson et al., 2014; Galea & Vlahov, 2002; Turney et al., 2013).

Given this literature on health, incarceration, and racial disparities, it is evident that reentry research has largely failed to tie together the causal processes linking incarceration and health disparities with the stressors and health concerns found in the

reintegration process. The lack of communication between the two fields is cause for concern in that public health and safety are at risk. Moreover, the oversight in applying theoretically applicable and freely available factors (e.g., social support) to help reduce health inequities is remarkable. These gaps heighten the importance of the current research to answer essential questions that affect policy and practice.

Social Support

Social support is defined as the actual or perceived assistance from family, friends, and significant others in the form of emotional, instrumental, or informational aid (Cohen, 2004; LaRocco, House, & French, 1980; Thoits, 1995; Wallston, Alagna, DeVellis, & DeVellis, 1983). It is a cost-effective and influential tool that can be used to withstand the stressors of reentry (Berg & Huebner, 2011; Hairston, 1988) and is negatively related to risky sexual behaviors, criminal risk, and substance use (Spohr et al., 2016). Social support manifests in many forms, and may include, for example, demonstrations of love and encouragement, advice, or material assistance with practical tasks (Thoits, 2011). Considerable evidence has accrued over the last few decades showing that social support and social connections are both positively and causally related to improved mental and physical health, as well as longevity (Schaefer, Coyne, & Lazarus, 1981; Thoits, 1995; Uchino, 2004, 2009). Moreover, social support can buffer the harmful physical and mental health impacts of stress or stressors (Cohen, Gottlieb, & Underwood, 2000; Thoits, 1995; Uchino, 2004), with one such stressor being reentry (Western, Braga, Davis, & Sirois, 2015). Social support can also foster a sense of meaning and purpose in life (Thoits, 2006; Umberson & Montez, 2010), which may be linked to human agency and changes in identity, and thus desistance from crime (Cobb, 1976; Maruna, 2001; Paternoster, Bachman, Bushway, Kerrison, & O'Connell, 2015).

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Both the quantity and quality of social relationships affect mental health, health behavior, physical health, and mortality risk (Cohen, 1988; House, Landis, & Umberson, 1988; Thoits, 2010; Umberson & Montez, 2010). Social relationships, particularly social support, have both short and long term effects on health and these effects can emerge in childhood and cascade throughout life to foster cumulative advantage or disadvantage with regard to health outcomes (Piquero, Shepherd, Shepherd, & Farrington, 2011; Thoits, 2010; Umberson & Montez, 2010). Studies examining the interconnections between social support and physical health are interdisciplinary by nature. Thus, it is useful to engage public health approaches on these issues as an accompaniment to criminal justice research, particularly to facilitate a smooth reentry into society for returning prisoners. Indeed, newly released prisoners refer to personal conditions, such as problems with health and addiction, as primary reasons why they recidivate (Graffam et al., 2004).

Because of the abundance of research on the positive effects of social support, it has been widely studied in fields from psychology to health care science and is commonly recommended as an intervention to improve physical and psychological health and well-being (Cobb, 1976; Kaplan, Cassel, & Gore, 1977; Smith, Fernengel, Holcroft, Gerald, & Marien, 1994; Thoits, 1985; Uchino, 2004). This body of literature has since come to the conclusion that social support is an important predictor of health (Cohen, 2004; Hale, Hannum, & Espelage, 2005). So much so, that future research focusing on the etiology of disease and sickness, "may well be incomplete unless social support is taken into account" (Lin et al. 1979, p. 116).

Theoretical Models Linking Social Support and Health

In order to ascertain *how* social support has such a strong impact on health, a discussion of the theories involved in this pathway must be discussed. Two primary

theoretical models dominate the literature regarding the mechanisms involved in the social support-health link (D. Brown & Gary, 1987; Thoits, 1985). First, the main effect model suggests that if an individual is embedded in a supportive social network, than he/she is generally healthier than someone who is not (Cohen & Wills, 1985). The mechanism for this model is that being in a supportive network is health protective because people are given meaningful roles, self-esteem, and purpose in life (Thoits, 1983; Uchino, 2004). This kind of support is related to overall well-being and facilitates positive affect, stability in interpersonal relationships, and an acknowledgement of self-worth (Cohen et al., 2000). Thus, another term for the direct model is the stress prevention model since these provided social resources are beneficial regardless if the person is currently facing stressful circumstances (Cohen, 1988; Thoits, 1995; Uchino, 2004). Specifically for physical health outcomes, social support results in "suppressed neuroendocrine response and enhanced immune function" (Cohen et al. 2000, p. 11; Uchino et al. 1996). Additionally, under the main effect model, social support can predispose people to engage in health promoting or self-care behaviors such as post-release upkeep of treatment (Cohen, 1988; Cohen & Wills, 1985).

Conversely, the stress buffering model proposes that, in the context of a stressful life event, someone who can mobilize strong, supportive resources from their social ties has a better chance of combating or minimizing the negative effects of stressors on health (Cobb, 1976; Cohen, 2004; Cohen & Wills, 1985). Thus, social support is beneficial because it reduces the negative effects of stress on physical and mental health (Cohen & Herbert, 1996). Under the buffering model, social support can intervene at two different points in the causal chain between an individual's stressful experience and a harmful, pathological outcome (D. Brown & Gary, 1987; Cohen & Wills, 1985). At the appraisal stage, when the stressor first presents itself, social support works to influence

whether someone *initially* interprets an event as stressful (Thoits, 1986). Having confidence that your social network will provide the necessary resources, should you need them, strengthens one's ability to perceive a negative or stressful event as relatively benign. Individuals with this level of social support are more inclined to define a potentially stressful situation as less traumatic or difficult (Cohen et al., 2000; Thoits, 2010). At the stage that prompts a physiological response to stress, adequate social support may intervene in three ways: (1) by facilitating a re-appraisal of the event as non-stressful, (2) by inhibiting maladaptive coping strategies, or (3) by providing resources to cope with the existing stressful event (Cohen & Wills, 1985). Although the original conception of this model was widely researched by linking social support to mental health outcomes, there is now strong evidence for physical health outcomes as well (see, e.g., Uchino, 2004). This stress-buffering role of social support on health is crucial to reintegration success and will be demonstrated in Chapters 5 and 6 of this dissertation.

Social Support and Family

When thinking about the relationship between returning prisoners, social support, and health, the returning prisoner's familial context must be considered. During the process of reintegration, research has found that those with strong family support were more likely to succeed (e.g., not recidivate) than those with weak or fragmented familial support (Graffam et al., 2004; Martinez & Christian, 2009; Nelson, Deess, & Allen, 1999; Western et al., 2015). Moreover, if prisoners receive family support while incarcerated, their likelihood of future criminality is reduced (Hairston, 1988; Martinez & Christian, 2009). This support can emerge in the form of visitation during incarceration (Meyers, Wright, Young, & Tasca, 2017). Unfortunately, returning prisoners have likely strained individuals in their personal network in multiple ways

(Clear, Waring, & Scully, 2005). For families, the cost of having an incarcerated loved one is substantial, and spouses of family members are often trapped with their incarcerated partner's legal debt and credit problems (Wildeman, 2012b). Furthermore, families with incarcerated loved ones often withdraw from community life and participation in community organizations, such as attending church or other local social functions (Clear, Rose, & Ryder, 2001). Hence, having an incarcerated family member or close loved one impacts one's own ability to garner fiscal and social support. As such, families are often in a diminished position to provide various types of social support, such as instrumental social support, especially since they have learned to function without the former prisoner for some time (Martinez & Christian, 2009). As demonstrated in Chapter 5, different types of social support (e.g., material versus expressive support) have distinct effects on the ex-prisoner as they attempt to reintegrate.

In the reentry process, friends and family members are vitally important (Naser & La Vigne, 2006; Western et al., 2015). They are able to provide tangible (e.g., housing) and emotional support as well as a vital source of financial support (Mallik-Kane & Visher, 2008; Nelson et al., 1999). The studies that have compared the relative effects of familial social support versus other types of social support on health behaviors have found that family is the most important influence (Franks, Campbell, & Shields, 1992; Martinez & Christian, 2009). Ex-inmates who lack close family and friends, have a history of addiction, and are older have a much harder time transitioning back to the communities from which they came without a solid support network (Western et al., 2015).

After release, families are still the primary go-between for ex-prisoners. Their families continue to exert an influence on whether the returning prisoner maintains

communication with them while he/she was incarcerated (Harvey & Bray, 1991), similar to the control of contact and communication levels while prisoners are incarcerated. Extensive research demonstrates that returning prisoners who retained contact with their family members while in prison are more likely to have positive reentry outcomes (Berg & Huebner, 2011; D. Glaser, 1964; Hairston, 2002; Holt & Miller, 1972; Klein, Bartholomew, & Hibbert, 2002; Naser & La Vigne, 2006). However, if contact with loved ones is stressful or limited then positive outcomes stemming from social support are diminished (Meyers et al., 2017; Western et al., 2015). Here, loved ones may consider contact with a returning prisoner risky or even costly given the resource depletion they experienced prior to and during their loved one's incarceration. Should the family retain contact, it is likely that family-returning prisoner interactions are fraught with anxiety, tension, expectations, and relatedly, disappointment (Berg & Huebner, 2011; M. Brown & Bloom, 2009; Martinez & Christian, 2009). Naser and La Vigne (2006, p. 95) note that "the period of incarceration creates artificially high expectations of family and intimate partner relationships and that when these expectations are not met, relapse, antisocial behavior, and recidivism are soon to follow."

Social Support and Reentry

People, including returning prisoners, function at their best when they are in a supportive environment (Hale et al., 2005; Heller & Rook, 2001). Having individuals who can provide the reintegrating ex-prisoner with support post-release can reduce the intensity of the stress response and facilitate long-term coping (Uchino, 2004), with the hope of reducing individual recidivism in the process. In the pathway between stressful life circumstances and health outcomes, "the instrumental, informational, and social-emotional support supplied through social interaction serves to mediate the impact of stressful life events," such as reentry (Brown and Gary 1987, p. 165). Unfortunately,

returning prisoners are often not the subject in studies about social support (for exceptions, see Berg and Huebner 2011; Duwe and Clark 2011; Listwan et al. 2010; Spohr et al. 2016) or health, leaving much information and research about the link between social support and health for prisoners underdeveloped.

In the context of prisoner reentry, social support is of consequence for multiple outcomes including the ability to mediate and moderate other criminological risk factors (Hochstetler, DeLisi, & Pratt, 2008; Spohr et al., 2016). Importantly, the ability to cope pro-socially with the immense and stressful challenges of reintegration is key to success (Berg & Huebner, 2011). But, the research in this area generally fails to observe the linkages between health, stress during reentry, and social support to improve overall health (for an exception, see Wallace et al., 2016). In Chapter 5 of this dissertation, I discuss these interrelated variables and focus on the changes in social support, who it comes from (i.e., family or friends), and the type of support (i.e., emotional or instrumental) to add knowledge to this area of research.

However, the potential for stress to undermine all the benefits of positive social support in the process of reintegration is of utmost importance to focus on. Even though the stress of reentry is undeniably substantial, the stress inherent during imprisonment should not be overlooked either. Incarceration in and of itself can be classified as both a life event stress and a chronic stress (Massoglia, 2008a; Pearlin, 1989; Thoits, 1995; R. J. Turner, Wheaton, & Lloyd, 1995). Moreover, the effects of stress during incarceration can "carry over" to other sequential stages of life, such as reentry (Lin & Ensel, 1989; Lin et al., 1979; Thoits, 1995).

Stress and Reentry

Reentry is a complex and dynamic social process, one that is not uniformly experienced by all returning prisoners (Visher & Travis, 2003; Western et al., 2015).

Incarceration on its own constitutes a primary stressor, but once offenders are released from prison, a host of secondary stressors arise (Graffam et al., 2004; Pearlin, 1989; Pearlin, Aneshensel, & Leblanc, 1997). Returning prisoners have many tremendous challenges post-release, such as securing stable employment, finding a place to live, and rekindling familial, romantic, and friendly relationships (Martinez & Christian, 2009; S. Turner, 2017). These obstacles are compounded by the social stigma attached to a prison record (Graffam et al., 2004; Porter, 2014). Given that reintegration is a very stressful process, health issues during this time are highly likely to be related to other reentry outcomes, such as recidivism or obtaining employment (Mallik-Kane & Visher, 2008; Massoglia, 2008a). Stressors associated with reentry can be particularly challenging for those with substance use problems since they generally have fewer supports in their networks and have a harder time accessing resources (Western et al., 2015; Wimberly & Engstrom, 2018). In contrast, a study of reentering men found that those with substance abuse histories and physical health problems had relatively high levels of family social support; which may work to mitigate the stressors involved in the reentry process (Visher & Mallik-Kane, 2007). Chapter 6 of this dissertation focuses on this variability of stress and social support on offending and drug use during the arduous reentry process by testing the buffering model of social support.

Stress is a well-documented pathogen of physical health (Segrin, 2017; Thoits, 2010). Specifically, the prolonged exposure to stress in the form of incarceration, and later reentry, exhausts the immune and cardiovascular systems which increase the risk of deleterious physical and mental health effects (Wang et al., 2017). This relentless process has the potential to permanently alter the body's ability to regulate health functioning and respond to new stressors (Pearlin, 1989; Pridemore, 2014). At the very least, this creates a much greater risk for stress-related illnesses such as heart disease,

psychological problems, and hypertension (Massoglia, 2008b; Pridemore, 2014; Wang et al., 2017). As detailed above, a promising way to alleviate the detrimental impacts of these stressors is through social support (Lin et al., 1979; Martinez & Christian, 2009; Thoits, 1995, 2010; Wallace et al., 2016).

Reentry and Health

Not only is there evidence to support the fact that incarceration has a lasting, robust impact on one's physical health, mental health, social support networks, and general well-being (Brinkley-Rubinstein, 2013), but some of the strongest negative effects of incarceration materialize after release (Schnittker et al., 2011, 2012; Western et al., 2015). In order to establish the total effect of incarceration on health, consideration of both the time imprisoned and the time spent in the free world must be taken into account. The vast majority of inmates experience their first incarceration before their late 30s which means that most spend more time in the free world *after* an incarceration (Wildeman & Wang, 2017). In other words, the time spent after incarceration is crucial in establishing one's future with regard to reentry and health outcomes (Western et al., 2015).

Thus, the window of time from the weeks pre-release to the weeks post-release is pivotal in reentry planning and preparing for health care arrangements in the free world. At time of release, eight in ten men report having a chronic health condition that requires long-term management and treatment (Mallik-Kane & Visher, 2008). Among this group with chronic health conditions, less than half report continued treatment in the community while 64% reported receiving treatment during incarceration (Mallik-Kane & Visher, 2008). In other words, approximately one-third of men acknowledged health conditions while incarcerated that were not dealt with properly by correctional health care. This suggests that the route to healthy and accountable ex-inmates who can

contribute positively to society once released, starts with correctional health care at the beginning (or before) the prison term. Countless health problems found in this population can be directly or indirectly linked to infectious diseases stemming from incarceration—a primary stressor—and the stigma felt from a criminal record alongside the pressures of reintegration—a secondary stressor (Hammett et al., 2002; Massoglia, 2008b; Pearlin, 1989).

Release from prison creates a complicated transition during which inmates move from confinement to freedom quickly (Hawken & Kleiman, 2016). At this stage, many persons lack employment, housing, family support, and experience discrimination in finding legal work and a home based on their felon status (Pager, Western, & Bonikowski, 2009; Western, 2006). Their much higher burden of disease and illness as well as a lower educational achievement and low socioeconomic status, which are "overlapping and mutually reinforcing characteristics [that] are each stigmatizing conditions independent of criminal justice involvement," (Tyler & Brockmann, 2017, p. 546) creates a recipe for failure. Stigma, alongside all the other individual-level and structural-level barriers, has major implications for the social determinants of population health and individual successful reintegration (Hatzenbuehler et al., 2013).

For health and health care specifically, stigmatizing behaviors from health care providers, such as lack of empathy, judgmental attitudes, or superficial approaches to the complex medical and social problems exhibited by reentering people further exacerbates the barriers to well-being felt by this population (Marlow, White, & Chesla, 2010; Vail, Niyogi, Henderson, & Wennerstrom, 2017; Visher & Mallik-Kane, 2007). Upon release, other challenges include the mending of strained relationships and the uphill battle of learning new technologies after years of incarceration, become the primary focus for ex-prisoners. These issues are more distressing and time sensitive for ex-prisoners and

create yet another obstacle to improving their own health, as many other concerns take precedence (Binswanger et al., 2011; Vail et al., 2017). Add to this, the responsibility of managing their health issues and it is virtually expected that many "fail" soon after they have been discharged (Wakefield & Uggen, 2010; Wildeman & Wang, 2017). It is not surprising then that "reintegration remains *the* [emphasis added] key to understanding the incarceration-health link" (Massoglia & Schnittker, 2009, p. 40).

Many ex-inmates with chronic conditions are released without needed medications and without any plan or direct follow-up with medical staff in the community (Mallik-Kane & Visher, 2008; Shavit et al., 2017; Visher & Mallik-Kane, 2007; Wakeman, McKinney, & Rich, 2009). Even when given a prescription upon reentry, many ex-prisoners (i.e., up to 70%) do not fill the prescription by 60 days post-release (Baillargeon et al., 2009) or may not be able to fill the prescription at all since some outside pharmacies do not accept prescriptions written by prison doctors (Vail et al., 2017). This is problematic given that 66% of prisoners are currently taking prescription medicine for a chronic condition (Maruschak et al., 2015). Similarly, Mallik-Kane and Visher (2008) found that even though two-thirds of men who required treatment during incarceration received it, the treatment of these prior conditions fell to 50% just months after release. Moreover, although about 80% of recently released individuals have a chronic medical, substance abuse, or psychiatric problem, only 15-25% report visiting a doctor in their first year after release (Mallik-Kane & Visher, 2008; Wang et al., 2012). Ex-prisoners with under one year in the community are more likely to use emergency departments for medical care when their health need is inevitable, less likely to have a primary care physician, and are more likely to use hospital admissions when this route potentially could have been prevented (Conklin, Lincoln, & Tuthill,

2000; Frank et al., 2014; Wang et al., 2012; Weiss, Barrett, Heslin, & Stocks, 2016; Wildeman & Wang, 2017).

Inmates' mental health conditions paint an even bleaker picture of reentry outcomes related to health. At least 25% indicate they have one, if not more, previously diagnosed mental health conditions such as bipolar disorder or schizophrenia (Schnittker et al., 2011; Wilper et al., 2009) and upwards of 56% of state prison inmates indicate they have a mental health problem of some kind (D. J. James & Glaze, 2006). The formerly incarcerated also have an extremely high prevalence of psychiatric morbidity, especially for persistent depressive disorder (mild form of depression in the short term) and clinical depression, compared to a population that has never been incarcerated (Schnittker et al., 2012; Turney et al., 2012; Wildeman, 2015; Wildeman & Wang, 2017). Indeed, the incidence of serious mental illnesses among recently released ex-prisoners is at least two to four times higher than that of the general population (Golembeski & Fullilove, 2005; Hammett et al., 2001), making their reentry burden that much heavier. Thus, the circumstances surrounding reentry and proper self-care may be worsened since a disproportionate number of releasees have mental health problems that may create more impediments for attaining their proper physical health needs (Hamilton & Belenko, 2015; Schnittker et al., 2012).

Family Spillover Effects

Little is known about how incarceration directly affects the families and communities of those who are confined (Golembeski & Fullilove, 2005; Green et al., 2006). Recently, research has begun to document the "spillover effects" of mass incarceration on children, family, and community health (Hatzenbuehler, Keyes, Hamilton, Uddin, & Galea, 2015; Schnittker et al., 2015; Wakefield & Wildeman, 2013; Wildeman & Wang, 2017). Communicable diseases can have a direct impact not only on

those connected to prison through a loved one's previous incarceration, but also on correctional officers and staff who work in the overcrowded environment and are exposed to infection daily (Massoglia, 2008b; Visher & Mallik-Kane, 2007; Wildeman & Muller, 2012). Although incarceration is a significant family disruption, it may elicit mixed emotions in the family members left behind (Turanovic, Rodriguez, & Pratt, 2012): "the grief and anxiety associated with forced separation and the loss of emotional and monetary support is accompanied by hope for ending a destructive lifestyle" (Green et al., 2006, p. 430). A recent study found that family member incarceration—especially male sons and spouses—increased the likelihood of poor health across five conditions for women, but did not find the same effect for men. Specifically, Lee and colleagues (2014) found that women had 1.88 times the odds of being obese, 2.68 times the odds of having diabetes, 2.44 times the odds of having a heart attack or stroke, and 3.27 times the odds of reporting fair or poor health outcomes compared to women without a family member incarcerated. Thus, whether or not the family member incarcerated is male or female, everyone on the outside feels the repercussions.

Research has noted other collateral consequences stemming from mass incarceration's effects on health which have been linked to the women and children left behind (Wildeman, 2015). For example, having a family member incarcerated increases a woman's risk of cardiovascular disease (Lee & Wildeman, 2013; Lee et al., 2014) and having a romantic partner incarcerated increases the risk of major depressive disorder, heart attack, stroke, obesity, and generally reporting of poor health (Lee et al., 2014; Wildeman, 2015; Wildeman & Muller, 2012; Wildeman, Schnittker, & Turney, 2012). Moreover, having a son incarcerated significantly increases a mother's psychological distress, and this finding is greater when the incarceration is more recent (Green et al., 2006).

For children of incarcerated parents, a review of nearly 150 studies with control groups indicated that parental imprisonment is a strong risk factor for a host of deleterious outcomes for children such as antisocial behavior, later offending, drug abuse, failure in school, unemployment, and mental health problems (Murray & Farrington, 2008b). Specifically for health, two studies (Friedman & Esselstyn, 1965; Murray & Farrington, 2008a) both found that parental incarceration predicted mental health problems in their children throughout the life course with an odds ratio of 2.5; concluding that maternal or paternal imprisonment is "associated with at least double the risk for mental health problems of children" (Murray & Farrington, 2008b, p. 157). Another study found that youth who experience parental incarceration were more likely to develop attention-deficit/hyperactivity disorder (ADHD) and other conduct disorders (Phillips, Burns, Wagner, Kramer, & Robbins, 2002). Further, children of inmates or ex-inmates report symptoms consistent with PTSD and include hypervigilance, flashbacks to their parent's arrest, and anxiety (Massoglia & Schnittker, 2009). However, mothers' reports of child health assessments do not find any significant differences with regard to physical health and internalizing behaviors (Geller, Cooper, Garfinkel, Schwartz-Soicher, & Mincy, 2012). More research on the physical and mental effects of having a loved one incarcerated is important to ensure this pathway is minimized in the etiology of disease as much as possible.

Community and Population Health

Population health is an approach to health that studies the entire world population and attempts to reduce health inequities across groups usually measured using life expectancy and the infant mortality rates of a country (Wildeman, 2012a). But, the consequences of incarceration and the dramatic inequalities found are more pronounced in the United States than 21 other wealthy democracies (Wildeman, 2016).

Much of the research on population health focuses on the effects of being incarcerated, having a family member incarcerated, or living in a community where incarceration is disproportionately concentrated among community members (Sampson & Loeffler, 2010; S. Turner, 2017). Together, all of these effects point to the extensive impact of mass incarceration on health at the population level, which undoubtedly begins at the community level.

These communities are ill-suited to provide health care services or charity medical care to their residents (Davis & Pacchiana, 2004), as many are already unable to self-sustain (Clear, 2007a). At the community level, a study found that individuals living in neighborhoods with high incarceration rates were more likely to meet the criteria for major depressive disorder and generalized anxiety disorder after controlling for a host of neighborhood- and individual-level risk factors (Hatzenbuehler et al., 2015). Additionally, the HIV and crack cocaine epidemics in the 1980s and 1990s left a devastating blow to the physical and mental health of people living in urban communities; where the majority of ex-inmates will return. These impoverished neighborhoods have yet to fully stabilize to normalcy and lack of social cohesion amongst community members likely remains (Freudenberg, 2001). Thus, a more community-centered and supportive approach to rehabilitation such as improving health and social services for ex-inmates by emphasizing community reintegration would be beneficial for population health as well (Clear, 2007a; Freudenberg, 2001; Hatzenbuehler et al., 2015).

The research thus far implies that the effects of mass incarceration on population health and health inequalities are substantial (Wildeman, 2012a). By looking at population health, measured by the infant mortality rate and life expectancy, a couple noteworthy findings emerge: "(1) increases in the imprisonment rate are associated with higher infant mortality rates and greater absolute black–white inequalities in the infant

mortality rate and (2) parental incarceration increases the risk of infant mortality in a sample of at-risk infants" (Wildeman, 2009, 2012a, p. 76). Had the imprisonment rate stayed at its 1990 level, the infant mortality rate would have been nearly 4% lower and the black-white disparity in mortality rate would have been almost 9% lower (Wildeman, 2012b), illustrating the wide ranging effects of mass incarceration.

Although the primary mechanism by which mass imprisonment affects population health is through the contraction of infectious diseases, state-level research demonstrates that increases in the incarceration rate are associated with increases in the AIDS prevalence rates among the general population (Johnson & Raphael, 2009). This pathway to diminished population health works largely by the decrease in the socioeconomic status of prisoners and their families. A related consequence of cumulative socioeconomic disadvantage is that it contributes to excess disease and disability in infants, through the stress mothers with low SES endure; thereby increasing population health inequalities (Geronimus, 1992; Wildeman, 2012a). As Wildeman (2012a) argues, not only does good population health see a decline based on all the previously mentioned reasons, there is also an indirect link between correctional spending and public health spending. For example, an increase of $1 in correctional spending—whether directly on health care or otherwise—is associated with a decrease of about $1.40 on welfare or public expenditures spending (Ellwood & Guetzkow, 2009). This spending may compromise population health, but more so, it increases the inequalities in health among the general public and between the general public and the imprisoned.

Continuity of Care

Correctional health care systems are constitutionally responsible for the health care of those in their custody. Although the past few years have seen a bipartisan

emphasis on releasing prisoners for the correctional costs alone, the overcrowding in shared custodial settings has also created an impetus for prisoner release because the living situation may be considered cruel and unusual punishment under the Eighth Amendment (Dumont et al., 2012). The Constitutional standard for medical care behind bars was established in *Estelle v. Gamble* and argued before the Supreme Court in 1976 (Dumont et al., 2012; J. B. Glaser & Greifinger, 1993; Greifinger, 2007; Rold, 2008). The Court ruled that since inmates were deprived of their liberty while under custody, they are entitled to (1) access to care for diagnosis and treatment; (2) professional medical judgement regarding the course of treatment to be taken; and (3) the actual administration of said treatment ordered by a health care professional (Greifinger, 2007; Rold, 2008). Upon release, this obligation ceases.

Individuals experience the highest recidivism risk in the first weeks immediately following release from custody. Ensuring continuity of (health) care and support during this crucial time period later manifests as less recidivism and the hope for a safer, healthier community overall. In many cases, correctional health care has been the only health care incarcerated people have seen (Conklin et al., 2000; Massoglia & Schnittker, 2009). For example, Springer et al. (2011) found that HIV-infected prisoners showed excellent continuity of treatment while incarcerated. Once released however, they quickly relapsed under the immense pressures and lack of daily care, resulting in significant morbidity and mortality. Similarly, Altice et al. (2016) found that HIV viral suppression declined from approximately 50% to 30% in ex-inmates from the time between their release and reincarceration. Since the vast majority of inmates (95%) are released back to their communities (N. James, 2015), and many within a few years, the potential for infectious diseases to spread rapidly may occur at a higher rate (Brinkley-

Rubinstein, 2013; Schnittker et al., 2012). Thus, controlling these illnesses before prison release has far-reaching implications for public health (Baillargeon et al., 2004).

Providing continuity of treatment to recently released ex-inmates during this important time "is crucial to preventing individuals from reoffending" (U.S. Department of Justice, 2016, p. 5). Continuity of treatment and care post-release remains a significant problem for criminal-justice involved persons who find themselves cycling between correctional and community health care, inevitably leading to interrupted treatment plans and potential health status relapse (Hammett et al., 2001; Massoglia & Schnittker, 2009; Spillman, Clemans-Cope, Mallik-Kane, & Hayes, 2017). Not only would continuity of physical health care aid ex-inmates from reoffending, but would exert a considerable impact on other reentry outcomes such as employment (Carter, 2015; Hamilton & Belenko, 2015). This may be more poignant for men since physical health has a greater influence on reentry outcomes for men than women (Mallik-Kane & Visher, 2008).

Even when adequately prepared ex-inmates with a practical reintegration plan are released, the barriers they face including a clear and direct channel to health care in the community and lack of health insurance are problematic (Hamilton & Belenko, 2015; Hammett et al., 2001; Vail et al., 2017). Indeed, being uninsured may be "the single biggest barrier" to receiving satisfactory care upon release (Massoglia & Schnittker, 2009, p. 41). Nevertheless, returning prisoners are commonly uninsured upon release since their Medicaid benefits are terminated during incarceration—though no federal law mandates this—and it typically takes months to restore the eligibility upon release (Hammett et al., 2001; O'Grady & Swartz, 2016; Spillman et al., 2017). Suspending Medicaid rather than completely cancelling it might lead to more direct access to primary health care during the most critical time for ex-prisoner health and wellness

(Wakeman et al., 2009). Additionally, since many insurance policies do not cover existing conditions, this creates an additional obstacle for those attempting to seek treatment for an illness they received while incarcerated (Massoglia & Schnittker, 2009; Vail et al., 2017). For instance, in Mallik-Kane and Visher's (2008) study nearly 65% of men were still uninsured ten months after release from prison. Moreover, for those who did seek out health services, they seemed to target their acute problems, receiving sporadic care only when essential, rather than seeking treatment on their chronic health conditions (Mallik-Kane & Visher, 2008). The need for care management after release is underscored by this case manager working in a New York City health home: "much of the need for care management among justice-involved people stems from their high level of social and survival needs. They are so busy surviving they don't have time for the bureaucracies that are involved in accessing health care" (Spillman et al., 2017, p. 9). Corrections and the public health sector must cooperate and, together, play a more integral role in treatment throughout the release and reentry process (J. B. Glaser & Greifinger, 1993; Mallik-Kane & Visher, 2008).

Conclusion

The literature review herein demonstrated through past research the considerable effects that incarceration, race/ethnicity, stress, and social support have on physical health. Additionally, research was presented that showed how all these same variables, including physical health, affect reentry and recidivism for ex-prisoners returning to the community. Moreover, these associations are prominent for those who are doubly or triply marginalized via socioeconomic status, the stigma of a prison record, and/or lower educational attainment. Although some work has begun to more intricately describe and comprehend these relationships, there is still much work to be done to attend to this era of mass reentry. Chapters 4-6 of the dissertation seek to fill some of the

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gaps in this research area by testing the details of many of these pathways using a sample

of reentering prisoners in Texas.

CHAPTER 3

THE LONESTAR PROJECT

The LoneStar Project's central goal is to evaluate the interrelationship between prison gangs and street gangs and how gang membership affects recidivism, reentry, and programming upon release. The project survey instrument includes a battery of questions concerning demographic information, physical and mental health, criminological theoretical constructs, criminogenic attitudes and behaviors, gang membership and embeddedness, release planning and services received, procedural justice and legitimacy of police officers and parole officers, social support, family contact, peers, employment, housing, prisoner subculture, substance use, offending, victimization, and case management. The vast majority of these constructs use previously validated measures and scales to ensure reliability and validity in the concepts. This dissertation fits under the larger umbrella of the longitudinal investigation of incarcerated individuals preparing for reentry. Measures specific to this dissertation which were added to the LoneStar Project's survey instrument include a validated social support scale, a validated stress scale, physical health measures, and particular reentry-related questions. More on these scales and measures can be found in Chapters 4, 5, 6, and Appendices A and B.

Research Design

The data collection strategy consisted of three intensive, structured sets of interviews with the same cohort of subjects starting with an in-prison interview. First, baseline interviews (wave 1) were conducted in either the Huntsville Unit or the Estelle Unit of the Texas Department of Criminal Justice (TDCJ), within one week before release. The Huntsville Unit, Texas' largest release center and oldest state prison facility, releases approximately 65% of all prisoners statewide, with roughly 150 releases per day

(Lichenstein, 2001). Second, the former inmates were interviewed one month post-release (wave 2), which is a critical time period with respect to reentry outcomes (Freudenberg, 2001; Harding, Wyse, Dobson, & Morenoff, 2014; U.S. Department of Justice, 2016; Western et al., 2015), but particularly health and mortality risk (Binswanger et al., 2007; Frank et al., 2013). Third, study respondents were interviewed nine months (wave 3) after they had returned to their communities. Since more than a third of recidivists are arrested within the first six months of release (Durose et al., 2014), the nine month interview is a decisive window of time to gather information about barriers to reintegration. The one month and nine month interviews are conducted over the phone by trained students hired at Arizona State University (ASU), Sam Houston State University, and University of Colorado at Boulder. Following up with former inmates at least twice while they transition back to the community allows for comparisons across characteristics and behaviors that supplement a healthy and successful reintegration process.

The LoneStar Project began data collection in April 2016 and all baseline interviews were completed in December 2016. Wave 2 interviews began in May 2016 and were completed in April 2017. Wave 3 interviews began in January 2017 and were completed in February 2018. A longitudinal research design is imperative to understand the individual trajectories of released prisoners when they reenter society (Harding et al., 2014). Longitudinal multi-wave research designs are vulnerable to low retention rates. The LoneStar Project staff had a comprehensive strategy in place to follow up with and track respondents at waves 2 and 3 (see Fahmy, Clark, Mitchell, Pyrooz, & Decker, 2018). The entire reintegration period ending in recidivism or desistance may resemble a rollercoaster ride with extreme highs and depressed lows (Naser & La Vigne, 2006). Thus, the importance of valid, longitudinal data in the study of reentry cannot be

emphasized enough. Visher and Travis (2003) called for a longitudinal and interdisciplinary framework comprised of pre-prison circumstances, in-prison experiences, immediate post-prison experiences, and post-prison reintegration experiences; all of which this data addresses.

Sample and Data

Data for the study are part of a larger National Institute of Justice funded study (2014-MU-CX-0111) termed the LoneStar Project in collaboration with TDCJ and under principal investigators Scott Decker (Arizona State University) and David Pyrooz (University of Colorado, Boulder). Texas is well suited to conduct a large study of offender associations, reentry, and trajectories. It is the largest state correctional department (Carson, 2015), housing the most inmates per state, and is therefore in a position to serve as an example for other correctional departments.

The LoneStar Project's target sample size was 800 males with 400 gang members and 400 non-gang members using disproportionate stratified random sampling to analyze differences between groups regarding reentry outcomes (Daniel, 2011). The original sampling list consisted of 1,310 potential respondents. Project staff initially approached 850 inmates and 48 refused, leaving us with our final sample size of 802 respondents for the baseline interview. An 802 person sample size with three waves of data provides enough assurance that we will be able to detect a small effect size addressing gang and non-gang differences. We interviewed respondents who were housed in 75 of the total 112 units of the Texas Department of Criminal Justice. In that sense, the sample is representative of Texas state prisons.

As mentioned, the final sample size at the wave 1 (baseline) interviews was 802 respondents. At wave 2, 532 respondents, including those who were reincarcerated, completed the survey for a 66.3% retention rate and 515 completed interviews, including

incarcerated interviews, at wave 3 for a 64.2% retention rate. Thus, there were 632 completed interviews in either follow-up wave for a total retention rate of 77.7% of the entire sample. In other words, at least one follow-up wave was completed for more than 77% of the sample. For the purpose of this dissertation, only waves 1 and 2 were examined and all reincarcerated interviews were excluded from analyses.

In any multi-wave study, attrition of the original sample may become problematic for external and internal validity. Systematic bias may occur in longitudinal research if particular groups of respondents (e.g., gang members) drop out of the sample and leave the final sample with an underrepresentation of certain groups (Allison, 2002). Since this was not a problem in the LoneStar Project data, the remedy of using the Heckman two-step correction procedure—which can work against sample selection bias using a nonrandom subset of the population (Berk, 1983; Heckman, 1979)—was not necessary. Additionally, had it been necessary, Heckman two-step correction procedure would have been able to combat the potentially large consequences of undermining internal and external validity in the data (Berk, 1983). Relatedly, sampling weights are used in all multivariate analyses since we oversampled on gang membership. Doing so decreases the chances of inaccurate point estimates and/or flawed estimates of the standard errors in the data (R. Williams, 2015).

The sample demographic data collected is consistent with the breakdown of racial and ethnic minorities stateside. Texas is an ideal setting for a study that incorporates racial and ethnic disparities since many other correctional studies rely on a predominantly Black sample (Alexander, 2012; Steffensmeier, Ulmer, Feldmeyer, & Harris, 2010) or a sample with fewer Hispanics, while Texas's general population is about 39% Hispanic (U.S. Census Bureau, 2015). Nationally, those who identify as Latino/Hispanic are approximately 18% of the general population (U.S. Census Bureau,

2016). A limited number of studies "have looked beyond the black-white breakdowns to examine whether Latinos…have distinct health patterns associated with incarceration" (Dumont et al., 2012, p. 327). Furthermore, most studies examining incarceration and health focus on in-prison effects, without considering the pathway from the community to prison and back to the community. These data are unique in that they follow this group from prison to reentry while examining health-related outcomes and changes in health over time.

CHAPTER 4

PROFILE OF INMATE HEALTH

Current Focus

Health care and health care services are a hotly debated topic for American citizens, especially considering the present political discussions about health care (Sinclair, 2017). The nearly 10% of Americans comprised of current and former prisoners are a forgotten population in the dialogue surrounding United States health care in that their needs are not considered and rarely discussed (Wakefield & Uggen, 2010). The volume of research on the exact physical ailments incarcerated persons face during their confinement is comparatively low. Thus, a critical piece of this issue that must be addressed first is simply, "What personal and carceral factors affect the physical health of incarcerated individuals?" This study extends this line of research using the baseline, (in-prison interview) in two important ways. First, the study assesses what broad factors affect the physical health of incarcerated individuals, including an emphasis on race/ethnicity. The data also include information on particular illnesses and diseases by asking the respondents these questions directly. From an investigative standpoint, much of this research area has not been explored. Second, the study aims to open the discourse regarding the much needed linkage between correctional and public health care so that there can be one uniting conversation that incorporates prisoners and community citizens under one (health care-related) umbrella.

Measures

Dependent Variable

The dependent variable of interest is self-rated *physical health* and is asked using the question, "Would you say that in general your health is excellent, good, fair, or poor?" At the baseline interview, 37% of respondents indicated their health was excellent

(n = 293), 42% said it was good (n = 341), and 21% said their health was fair or poor (n = 168). Higher scores reflect better physical health. Fair and poor health were collapsed into one category because very few respondents reported having either: nearly 80% of respondents reported having good or excellent health. The Urban Institute's study of the health of returning prisoners found a similar account for men (81%) and women (75%) despite the high prevalence of their health conditions (Mallik-Kane & Visher, 2008). The dissonance between these positive self-assessments and the respondents' actual ailments may be due to the nature of these conditions in that many are chronic and "silent." In other words, these conditions may be asymptomatic for long periods of time, even though there might be daily care required. This one-item indicator of self-reported health has been deemed reliable (Lundberg & Manderbacka, 1996), including for cohort studies (Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997), has been validated in different ethnic groups (Chandola & Jenkinson, 2000), and has established excellent predictive validity that has only increased over time (Schnittker & Bacak, 2014).

Independent Variables

Since the study is exploratory in nature focusing on the overall profile of inmate physical health, it is necessary to parse out the variables by general category to recognize the groupings of predictors which are more central for prisoner health. These important independent variables can be categorized by personal factors and carceral factors. All variables are evaluated at the baseline interview or while the respondent is still in prison preparing for his release. Starting with the personal factors, education level was collapsed into four categories: *eighth grade* or less (14%, n = 117), *some high school* (45%, n = 359), *high school graduate* or GED credential (26%, n = 207), and *college* and above (15%, n = 118). The breakdown in these educational categories is typical of a prison sample (Harlow, 2003) with the bulk of respondents having at least some high school

education, which is the reference category. Higher scores on education represent more educational attainment. As far as race, the sample was consistent with the general population in the state of Texas (U.S. Census Bureau, 2015). For ease of comparison, the race/ethnicity of the sample was categorized into *Latino/Hispanic* (39%, *n* = 314, 1 = *yes*), *White* (29%, *n* = 231, 1 = *yes*), *Black/African American* (26%, *n* = 208, 1 = *yes*), and *other race* (6%, *n* = 47, 1 = *yes*) which includes American Indian, Alaskan native, Asian, East Indian, mixed race, and one respondent who did not know. White is the reference category for race. As respondents prepare for release, many feel afflicted and worried about how their time will go in the community. Since this level of *reentry stress* is a potential predictor of physical health, it is evaluated at the baseline interview. We ask respondents, "In the past month, how often have you felt worried or stressed about your upcoming reentry to the community?" with a response set of "none of the time" (36%, *n* = 290), "sometimes" (38%, *n* = 305), "most of the time" (12%, *n* = 101), or "all of the time" (14%, *n* = 105). Higher scores on this measure indicate more reentry stress.

Next, we discuss the independent variables that are considered carceral factors. *Length of incarceration* is a continuous variable used to assess how much the length of the current incarceration may have affected their physical health a week before their release. It is measured using the exact number of days the respondent was incarcerated with a range of 16 days to 12,776 days (35 years) and a mean of 1,792.59 days (4.91 years). Number of *prior prison terms* is used to assess how many times the respondent had been incarcerated in a TDCJ prison before the current term. The range was 1 (this includes the current term) to 9 previous incarcerations with a mean of 1.99 terms, or 2 terms. This means that the majority (74%) of our respondents were serving their first or second TDCJ stint. Both the length of time in the current prison term and the total

number of times in prison are important to understand the total effect of living in prison on one's health (Hammett et al., 2001).

Control Variables

Keeping in mind that the entire sample is composed of male prisoners, we now turn to the control variables. *Age* of the respondent at time of the baseline interview was calculated using their date of birth. The mean age in the sample was 39 with a range of 19 to 73 years old with 39 considered a typical mean age for prisoners (Carson & Anderson, 2016). Age is of particular importance with regards to health since as individuals become older, their health begins to deteriorate. TDCJ *gang status* represents those who were classified as gang members by the Texas Department of Criminal Justice (1 = *yes*, 0 = *no*). Since a primary goal of the LoneStar Project is to evaluate the interrelationship between prison and street gangs, we oversampled on gang membership so that nearly half the sample (46%, n = 368) were gang members. Marital status is dichotomized into *married* (25%, n = 200, 1 = *yes*) or not (75%, n = 602, 0 = no); which includes single, divorced, and widowed respondents). *Has children* is a dichotomized control variable indicating whether the respondent has any children (1 = *yes*, 0 = *no*). Most of the sample are fathers (70%, n = 562), which is consistent in the literature (Glaze & Maruschak, 2008). With regard to health care we ask respondents, "How much do you need medical treatment or physical health care?" with the response set for *needs health care* being "not at all" (38%, n = 304), "a little" (33%, n = 262), or "a lot" (29%, n = 235). The more the respondent needed health care (i.e., "a lot"), the higher the score they received on this measure. A dummy variable indicating if the respondent has a *chronic disease* is used as a control to ensure their self-rated physical health was not confounded with whether they have a long-lasting disease. They were coded as a one on this variable (18%, n = 146) if they reported having either HIV/AIDS, hepatitis B or hepatitis C, anemia, or a

seizure disorder. The respondent's self-rated *mental health* is a personal factor that is implicated for their physical health status. Research suggests that one's current mental health can affect their physical health—either deleteriously or beneficially— (Thoits, 2010; Umberson & Montez, 2010), and this might be especially true for ex-prisoners (Mallik-Kane & Visher, 2008; Wallace et al., 2016). We asked respondents, "Would you say that your overall mental and emotional health is excellent, good, fair, or poor?" The sample reported being in excellent mental health (42% *n* = 336), good mental health (37%, *n* = 300), fair mental health (18%, *n* = 144), and poor mental health (3%, *n* = 22). Similar to physical health, the vast majority of respondents rated their mental health as primarily good or excellent (79%). In both multivariate models, mental health is recoded as *poor mental health* so that higher scores represent worse mental health.

Analytic Strategy

The analysis proceeds in three stages. First, descriptive statistics were run on all study variables and included in Table 4.1. Additionally, descriptives of the particular health issues and diseases those in the sample have are included in Table 4.1. The descriptive information related to particular issues is solely to grasp the nature of these issues at the baseline level (i.e., in prison). Thus, most of these ailments were not included in the multivariate models (except for the control variables: chronic disease and poor mental health), but are shown to better understand the types of health ailments, primarily chronic, that respondents are dealing with prior to their release. Second, after conducting model diagnostics to rule out the presence of harmful levels of collinearity, bivariate relationships between physical health, personal and carceral factors related to health, and other related variables were estimated to ensure associations are in the theoretically expected direction. The bivariate correlation matrix for all study variables used in the multivariate analysis are presented in Table 4.2 with an associated numbered

variable list in Table 4.2a. All statistically significant relationships at the 0.05 level and

above are marked with an asterisk in the table. Third, since the dependent variable of

interest is an ordinal variable with a natural ordering of three possible outcomes

(poor/fair, good, or excellent health), an ordered logistic regression was conducted.

Ordered logistic regression is appropriate because the dependent variable can be ranked

from low to high but the distances between adjacent categories are unknown (Long,

1997). Additionally, ordered logistic regression can explicitly take into account the

ordering of the dependent variable's categories using the logistic distribution function

(Britt & Weisburd, 2010).

Model 1 will first regress all the independent variables and control variables on

self-rated physical health. Model 2 will do the same, but will also include reentry stress

and self-rated mental health as an interaction term. Assessing the moderating effects of

reentry stress and poor mental health on overall physical health is important since this

population is overburdened by stressors—of which incarceration is just one—that

inevitably lead to damaging effects on physical and mental health (Binswanger et al.,

2011; Thoits, 2010). Additionally, respondents are being surveyed just days before their

release and are likely anticipating the stressful nature of reintegration.

The Brant test was used to test the parallel slopes assumption by assessing the

slopes in the overall model as well as in each individual variable (Brant, 1990). The Wald

chi-square (χ^2) test, similar to the likelihood-ratio test, is used to ensure the explanatory

variables in the model are significant such that they add meaning to the model and

provide a better fit than a constant-only model (Britt & Weisburd, 2010). The statistical

significance of the logit coefficients was assessed using a pseudo R^2—McFadden's R^2—as

this is the default for an ordered logit in Stata. Additionally, Long and Freese (2014, p.

325) note, "for ordinal outcomes, McKelvey and Zavoina's R^2 most closely approximates

the R^2 obtained by estimating the linear regression model on the underlying latent variable." Thus, both statistical estimates are provided. The multivariate equation was estimated using Stata 14 (StataCorp LP, 2015).

<div align="center">

Results

</div>

Descriptive Statistics

Although the descriptive statistics for all variables included in the multivariate models have been described in the measures section above, there are a group of health issues laid out in the descriptive statistics in Table 4.1. These health issues are shown simply as documentation in the table and are not explicitly analyzed in the multivariate models. These will be described here. Eight individuals in the sample (1%) have been told they are HIV positive or have AIDS, which is actually slightly less than the national average in state and federal prisons (1.5%) as of 2010 (Centers for Disease Control and Prevention, 2015b). About 12% of the sample (99 men) has hepatitis B (HBV) or, more likely, hepatitis C (HCV). HCV is more likely the driver for those who answered "yes" to having hepatitis B or hepatitis C because HCV is more prevalent in incarcerated populations primarily because the most common route of transmission is through the sharing of contaminated needles (e.g., via drug use). Additionally, there has been a sharp increase in hepatitis C infections in the general population due to the worsening opioid epidemic in the United States. For instance, among 18-29 year olds between 2004 and 2014, there was a 400% increase in acute hepatitis C infection alongside an 817% increase in treatment facility admissions for injection of prescription opioids (Zibbell et al., 2018). As far as seizure disorders are concerned, there are 35 in this sample (4%) who have been diagnosed with one.

Approximately 6% of our sample (48 people) indicated that they suffer from post-traumatic stress disorder (PTSD) as identified by a health professional. Minimal research

has been conducted in the United States on PTSD in the incarcerated population. Most of the studies have used an international prison sample (Campbell et al., 2016; Goff, Rose, Rose, & Purves, 2007), have focused primarily on women (Grella, Lovinger, & Warda, 2013; Zlotnick, 1997), or are merely outdated (Gibson et al., 1999; Zlotnick, 1997). However, Mallik-Kane and Visher (2008) estimated that 16% of men in their reentry sample have symptoms consistent with PTSD. Almost 2% of the LoneStar Project sample (15 men) has anemia. Many members (36%) of the sample have had emergency surgery, which is unsurprising and likely mirrors that of the general population. Nearly 300 individuals in the sample (37%) have had a concussion or serious head injury in their lifetime. One-quarter complained about chronic back pain (200 persons). The majority of the sample (70%) has had a physical injury which required x-rays, an MRI, a CT scan, or injections. Nearly half (49%) have, at time of release, a bone, muscle, or joint injury that is chronic and bothers them regularly. About 135 men in our sample (17%) revealed that they have a cough, wheeze, or difficulty breathing during exercise. More than half of the respondents (52%) answered yes to ever having a drug or alcohol abuse problem. This is close to the national average of drug dependence and abuse for men in state prisons, which is 57%, but does not include alcohol abuse estimates (Bronson, Stroop, Zimmer, & Berzofsky, 2017). About 212 men in the sample (26%) stated that they have sustained a hit to the head which caused them confusion, a serious headache, or memory problems. Similarly, 37% of the sample (n = 298) indicated that they have had a concussion or serious head injury before. It is surprising that more of the sample had a concussion than a less severe hit to the head.

Table 4.1 Descriptive Statistics (*N* = 802)

Variables	Mean or %	Standard Deviation	Minimum	Maximum
Dependent variable				
Physical health	2.12	0.82	0	3
Independent variables				
Eighth grade	14%	--	0	1
Some high school	45%	--	0	1
High school graduate	26%	--	0	1
College	15%	--	0	1
Latino/Hispanic	39%	--	0	1
White	29%	--	0	1
Black/African American	26%	--	0	1
Other race	6%	--	0	1
Reentry stress	1.03	1.01	0	3
Length of incarceration (in days)	1,793	2,061	16	12,776
Prior prison terms	1.99	1.24	1	9
Control variables				
Age	39.06	11.22	19	73
Gang status	46%	--	0	1
Married	25%	--	0	1
Has children	70%	--	0	1
Needs health care	0.91	0.82	0	2
Chronic disease*	18%	--	0	1
Mental health**	2.18	0.82	0	3
Health issues				
HIV/AIDS	1%	--	0	1
Hepatitis B/Hepatitis C	12%	--	0	1
Seizure disorder	4%	--	0	1
Post-traumatic stress disorder (PTSD)	6%	--	0	1
Anemia	2%	--	0	1
Emergency surgery	36%	--	0	1
Concussion	37%	--	0	1
Chronic back pain	25%	--	0	1
Injury that required x-rays, MRI, CT scan, etc.	70%	--	0	1
Chronic bone, muscle, or joint injury	49%	--	0	1
Cough, wheeze, or difficulty breathing during exercise	17%	--	0	1
Alcohol or drug abuse problems	52%	--	0	1
Hit to the head that caused confusion, memory problems, etc.	26%	--	0	1
Problems with eyes or vision	52%	--	0	1
Mouth and teeth health**	1.59	0.90	0	3
Obesity	43%	--	0	1

Notes:

* = includes HIV/AIDS, hepatitis B, hepatitis C, anemia, and seizure disorders

** = response set of excellent (= 3), good (= 2), fair (= 1), or poor (= 0)

More than half of the sample (52%, n = 415) indicated they have problems with their eyes or vision generally. Optometric health is an untapped area of research in the prison population. Perhaps because it requires an established prison optometrist to assess, which are likely few and far between. And, vision health is unlike the more observable physical health conditions. However, evaluating eye health is imperative as vision plays an important role in employment and getting around for other appointments such as meeting with a parole officer. Excluding Pearce and colleagues (1972) who found a comparatively high proportion of inmates had never received adequate optometric care prior to their prison sentence and Verma (1989) and Hatch (1990) who found that vision and eye problems are more common among inmates and eye care should be mandated in prison, there are no other published studies related to optometry and prison health.

As far as dental health, 113 respondents indicated their oral health was excellent (14%), 360 said it was good (45%), 218 said it was fair (27%), and 111 said it was poor (14%). Thus, the mean oral health was 1.59 with a standard deviation of 0.90, with higher numbers indicating better oral health. Dental health of inmates is arguably the least researched area of correctional health (Gray, 2018; McGrath, 2002). Nonetheless, the high levels of oral disease among prisoners coupled with the enormous impact of oral health on quality of life should not be overlooked (McGrath, 2002). A report released by the World Health Organization notes that prisoner's dental health needs are significantly greater than the dental health needs of the general population (Clare, 2002; Moller et al., 2007). The use of alcohol, substances, and smoking contributes to poor oral health, of which use is rampant amongst correctional populations (Fazel, Bains, & Doll, 2006). Moreover, the Surgeon General affirmed the inextricable link between oral health and other conditions such as diabetes and cardiovascular disease (Department of Health and Human Services, 2000); highlighting that oral health care is important for overall health

and well-being. Specifically, excessive alcohol consumption and tobacco overuse is linked to periodontal disease—which is a substantial risk factor for oral cancer—and substance use is linked is tooth decay and gum disease (Moller et al., 2007). The report also made clear that the "burdens of oral disease weigh most heavily on disadvantaged populations and underrepresented minority groups" (Makrides & Shulman, 2017, p. S46). Expectedly, then, and much like primary health care, many inmates have never visited a dentist or received dental services (Gray, 2018; Moller et al., 2007).

Obesity was the final descriptive health issue assessed at baseline. Using the respondents' height and weight—provided by TDCJ—their body mass index (BMI) was calculated. According to the World Health Organization, those whose BMI is under 18.5 are considered underweight, 18.5-24.9 is normal weight, 25.0-29.9 is overweight, 30.0-34.9 is obese, 35.0-39.9 is severely obese, and over 40.0 is considered morbidly obese (World Health Organization, 2000). See Figure 4.1 for the breakdown of the sample with regard to their BMI measures. The red lines on the figure separate those who fall in each of the obesity categories (i.e., those who fall between the first and second red line are considered obese, those who fall between the second and third line are considered severely obese, and those who fall after the third line are considered morbidly obese). This means that 43% of the sample (341 individuals) are considered obese to some degree;[8] though, typically, 8.1% to 55.6% is the obesity prevalence range with 21.54% as the average prevalence rate for an all-male prison sample (Choudhry, Armstrong, & Dregan, 2018). Nevertheless, this is a large percentage of the sample to be classified as obese, but research has indicated that obesity is a socially-patterned and contextual

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[8]Although BMI is still the preferred (and simplest) method to evaluate obesity (Sifferlin, 2013), some research has expressed concern on the ability of the crude index to accurately measure body fat versus muscle, which tends to weigh more (Shah & Braverman, 2012).

epidemic in that those with lower socioeconomic status and racial minorities are

disproportionately impacted (Choudhry et al., 2018; Houle, 2014).

Figure 4.1 Sample Distribution of Obesity using BMI
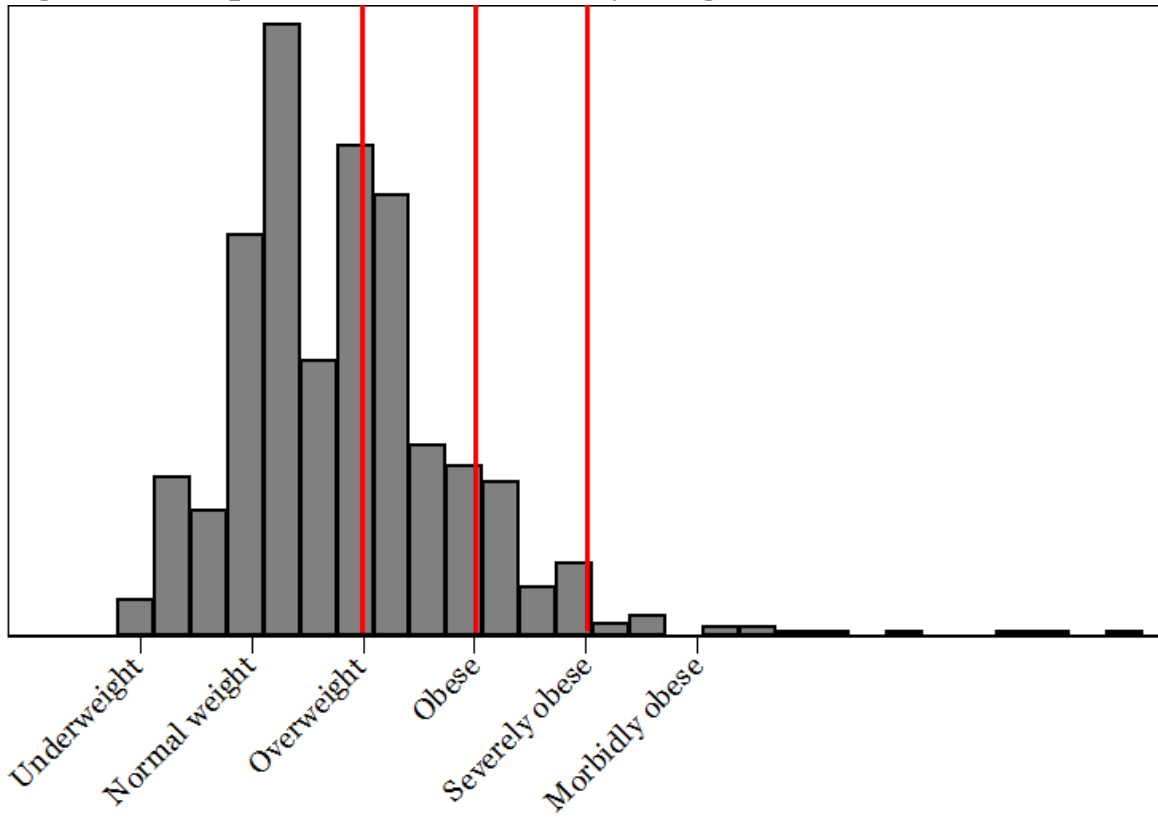
Table 4.2 Bivariate Correlation Matrix for all Study Variables (*N* = 798)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	--																		
2	-0.03	--																	
3	-0.01	-0.37*	--																
4	0.03	-0.24*	-0.53*	--															
5	0.01	-0.17*	-0.37*	-0.24*	--														
6	-0.06	0.14*	0.09*	-0.11*	-0.13*	--													
7	-0.01	-0.05	-0.11*	0.08*	0.10*	-0.51*	--												
8	0.10*	-0.10'	0.02	0.05	0.01	-0.48*	-0.38*	--											
9	-0.03	-0.01	-0.01	-0.03	0.06	-0.20*	-0.16*	-0.15*	--										
10	-0.12*	0.00	0.01	0.01	-0.03	-0.03	0.02	0.01	-0.01	--									
11	-0.08*	0.11*	-0.01	-0.05	-0.03	-0.05	0.02	0.04	-0.01	0.09*	--								
12	-0.05	-0.02	0.10*	-0.04	-0.07*	-0.01	-0.03	0.03	0.01	-0.02	-0.20*	--							
13	-0.30*	-0.07	-0.09*	0.04	0.15*	-0.10*	0.15*	-0.05	0.01	-0.06	0.32*	0.28*	--						
14	0.11*	0.12*	0.10*	-0.06	-0.17*	0.23*	-0.20*	-0.03	-0.05	0.08*	0.12*	0.17*	-0.15*	--					
15	-0.07*	0.00	-0.04	0.02	0.03	0.02	0.02	-0.03	-0.01	0.03	0.05	0.08*	0.18*	0.08*	--				
16	-0.01	-0.04	-0.01	0.04	0.00	0.06	-0.10*	0.02	0.02	-0.03	-0.06	0.10*	0.15*	0.05	0.20*	--			
17	-0.30*	-0.06	0.01	-0.01	0.06	-0.04	0.02	0.03	-0.01	0.12*	0.07*	0.11*	0.25*	-0.14*	0.04	-0.01	--		
18	-0.23*	0.02	0.06	-0.09*	0.00	-0.06	0.16*	-0.08*	-0.02	0.06	0.07*	0.22*	0.33*	0.00	0.04	0.03	0.20*	--	
19	-0.39*	-0.02	0.08*	-0.04	-0.05	-0.01	0.05	-0.03	-0.02	0.21*	0.03	0.12*	0.16*	0.00	0.00	-0.03	0.25*	0.19*	--

Table 4.2a Numbered Variable List

1. Physical health
2. Eighth grade
3. Some high school
4. High school graduate
5. College
6. Latino/Hispanic
7. White
8. Black/African American
9. Other race
10. Reentry stress
11. Length of incarceration
12. Prior prison terms
13. Age
14. Gang status
15. Married
16. Has children
17. Needs health care
18. Chronic disease
19. Mental health

Multivariate Results

Table 4.3 showcases the results from the multivariate analyses predicting

physical health with a final sample size of 798. Both Model 1 and Model 2 met the

parallel test assumptions (Brant) and had significant Wald χ^2 test statistics (Model 1 =

208.63, p < 0.01 and Model 2 = 215.65, p < 0.01), indicating good model fit. In terms of

collinearity for both models, all variance inflation factors (VIFs) and condition indices

were under the standard thresholds; all VIFs were < 1.88 with a mean VIF of 1.32 and a

condition index of 17.82, well below the traditional limit of 30 (Mason & Perreault, 1991).

Model 1's McFadden's R^2 was 0.1477 and Model 2's was 0.1505. Model 1's McKelvey and

Zavoina's R^2 was 0.3050 and Model 2's was 0.3080. Together this indicates that Model

2, with the inclusion of the interaction term between reentry stress and mental health, is

a better overall fit of the data with regard to self-rated physical health. All variables that

were significant in Model 1 stayed significant in Model 2 with the inclusion of the

interaction term.

Table 4.3 Ordered Logistic Regression Models Predicting Physical Health ($N = 798$)

Variables	Model 1				Model 2			
	b	(SE)	*z*-test	OR	*b*	(SE)	*z*-test	OR
Eighth grade	-0.27	(0.24)	-1.14	0.76	-0.27	(0.24)	-1.12	0.76
High school graduate	0.05	(0.18)	0.28	1.05	0.07	(0.18)	0.37	1.07
College	0.31	(0.22)	1.41	1.36	0.31	(0.22)	1.41	1.37
Latino/Hispanic	-0.53***	(0.18)	-2.85	0.59	-0.51***	(0.18)	-2.78	0.60
Black/African American	0.04	(0.21)	0.20	1.04	0.05	(0.21)	0.26	1.06
Other race	-0.57*	(0.32)	-1.78	0.56	-0.56*	(0.32)	-1.76	0.57
Reentry stress	-0.14*	(0.08)	-1.84	0.87	-0.30***	(0.11)	-2.85	0.74
Length of incarceration	0.00	(0.00)	0.88	1.00	0.00	(0.00)	0.82	1.00
Prior prison terms	0.18***	(0.06)	2.86	1.20	0.17***	(0.06)	2.68	1.18
Age	-0.05***	(0.01)	-5.66	0.96	-0.05***	(0.01)	-5.61	0.96
Gang status	0.40**	(0.16)	2.48	1.49	0.39**	(0.16)	2.44	1.48
Married	-0.23	(0.17)	1.31	0.80	-0.22	(0.17)	-1.30	0.80
Has children	0.17	(0.17)	0.98	1.18	0.17	(0.17)	1.02	1.19
Needs health care	-0.40***	(0.09)	-4.05	0.67	-0.41***	(0.10)	-4.12	0.66
Chronic disease	-0.52***	(0.20)	-2.65	0.59	-0.51***	(0.20)	-2.58	0.60
Poor mental health	-0.87***	(0.11)	7.81	0.42	-1.09***	(0.16)	-6.98	0.34
Reentry stress X Poor mental health*	---	---	---	---	0.19**	(0.09)	2.03	1.21
Wald χ2	208.63***				215.65***			
McFadden's *R²*	0.1477				0.1505			
McKelvey and Zavoina's *R²*	0.3050				0.3080			

Notes:

Entries are unstandardized regression coefficients (*b*).

Robust standard errors in parentheses (SE).

OR = odds ratios.

Threshold values indicating cut points in latent variables are not shown.

* Reentry stress and poor mental health are reverse coded in the interaction term.

*** p<0.01, ** p<0.05, * p<0.10

First, we see that none of the educational dummy variables are significant in either Model 1 or Model 2, which is surprising given the past literature on education and health (Braveman et al., 2005; Krieger, Williams, & Moss, 1997; Marmot, 2017; Ross & Wu, 1995). Particularly in its use as a proxy for socioeconomic status in public health literature (Grzywacz, Almeida, Neupert, & Ettner, 2004; Winkleby, Jatulis, Frank, & Fortmann, 1992), it is certainly unexpected that none of the education variables are significant on health. In both models, being Latino/Hispanic is negatively associated with excellent health, as predicted. For Latinos/Hispanics, the odds of having excellent versus the combined poor/fair and good health categories are 41% (Model 1) and 40% (Model 2) lower than for Whites, the reference category, given the other variables are held constant. Although the literature purports that Blacks/African Americans have worse health outcomes than Latinos, Whites, and other races, especially in the prison population, this finding may not hold true in Texas (Dumont et al., 2012; Fazel & Baillargeon, 2011). Specifically, a study of the prevalence of chronic medical conditions among inmates in the Texas prison system found that Hispanics' prevalence rates were equivalent to African Americans on nearly all conditions (Harzke et al., 2010). There was no association with those who are Black/African American and physical health in either model. However, the other race category, which includes American Indians, Alaskan natives, Asians, East Indians, and those of mixed race, is approaching significance at the 0.10 level (b = -0.57 in Model 1 and b = -0.56 in Model 2). Thus, for those in the other race category, the odds of having excellent versus the combination of poor/fair and good health are 44% (Model 1) and 43% (Model 2) lower than for White males, while all other variables are held constant.

Moving forward, reentry stress predicting physical health as a direct effect approaches significance in Model 1 (b = -0.14, $p < 0.10$), but is highly significant in

Model 2; which may be because it is a component of the interaction term in that model. With regard to the other carceral-related independent variables, we see that length of the current incarceration has no effect on baseline physical health. However, the number of prior prison terms served in TDCJ is highly significant in both models. For a one unit increase in previous incarcerations (i.e., an additional prison term), the odds of excellent physical health versus the combined good and poor/fair health categories are 1.20 times and 1.18 times greater for Models 1 and 2, respectively. This is consistent with past research that those who have *ever* been incarcerated are more likely to experience negative breakdowns in health than those who have never been incarcerated, regardless of the length of the prior prison terms (Binswanger et al., 2009; Massoglia & Pridemore, 2015; Schnittker & John, 2007; Wang et al., 2009).

Age (b = -0.05), if the respondent needs health care (b = -0.40), if they have a chronic disease (b = -0.52), and if they have poor mental health (b = -0.87) are all control variables which are significant at the 0.01 level, are in the theoretically expected direction, and are all negatively associated with physical health. TDCJ gang status was the only significant control variable that positively predicted physical health. Although on the surface, this may seem like a contrary finding, there is not, to date, an analysis on the physical health of prison and gang-involved individuals. This may be because the gang members in our sample are slightly younger than the non-gang members. Respondents classified in the gang member group have 8% fewer individuals under the age of 40 compared to the non-gang member group. Additionally, the age range of non-gang members has a maximum of 73 whereas the gang members' oldest respondent was 68 at the time of the baseline interview. All nonsignificant control variables are displayed in Table 4.3.

Last, we see that the interaction effect between reentry stress and poor mental health predicts in-prison physical health at the 0.05 level (b = 0.19). For ease of interpretation of the interaction term in Model 2, both poor mental health and reentry stress were reverse coded.[9] Thus, higher scores for mental health indicate better mental health and higher scores on reentry stress denote lower levels of stress or minimal stress related to reentry. This interaction is graphed in Figure 4.2. As reentry stress gets lower and mental health gets better, we see a higher probability of reporting excellent physical health. However, mental health has differential effects on physical health depending on the amount of reentry stress a respondent reports. For instance, as seen in Figure 4.2, for someone who has negligible reentry stress (i.e., stressed "none of the time"), the likelihood of excellent physical health starts quite low. With the inclusion of better mental health in the term, though, they become the best suited, probabilistically, for excellent physical health. For someone who is stressed about reentry "most of the time," the probability of them having excellent physical health is highest when mental health is poor. Interestingly though, as mental health improves, the probability of them having excellent health increases, but at a lower rate than the other three groups. Perhaps for someone who is stressed "most of the time," adding extra stressors on them will have a less damaging impact (i.e., flatter slope) than someone who does not regularly experience stress. Thus, only at certain levels of reentry stress do we see that mental health has a strong conditioning effect for the probability of having excellent physical health.

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[9]Although both reentry stress and mental health should be mean centered for the interaction term, Stata 14 was reading both variables as categorical and does not allow non-integer values (which occurred after mean centering) to be included in an interaction term.

Figure 4.2 Predicted Probabilities of Excellent Physical Health by Mental Health Status and Level of Reentry Stress
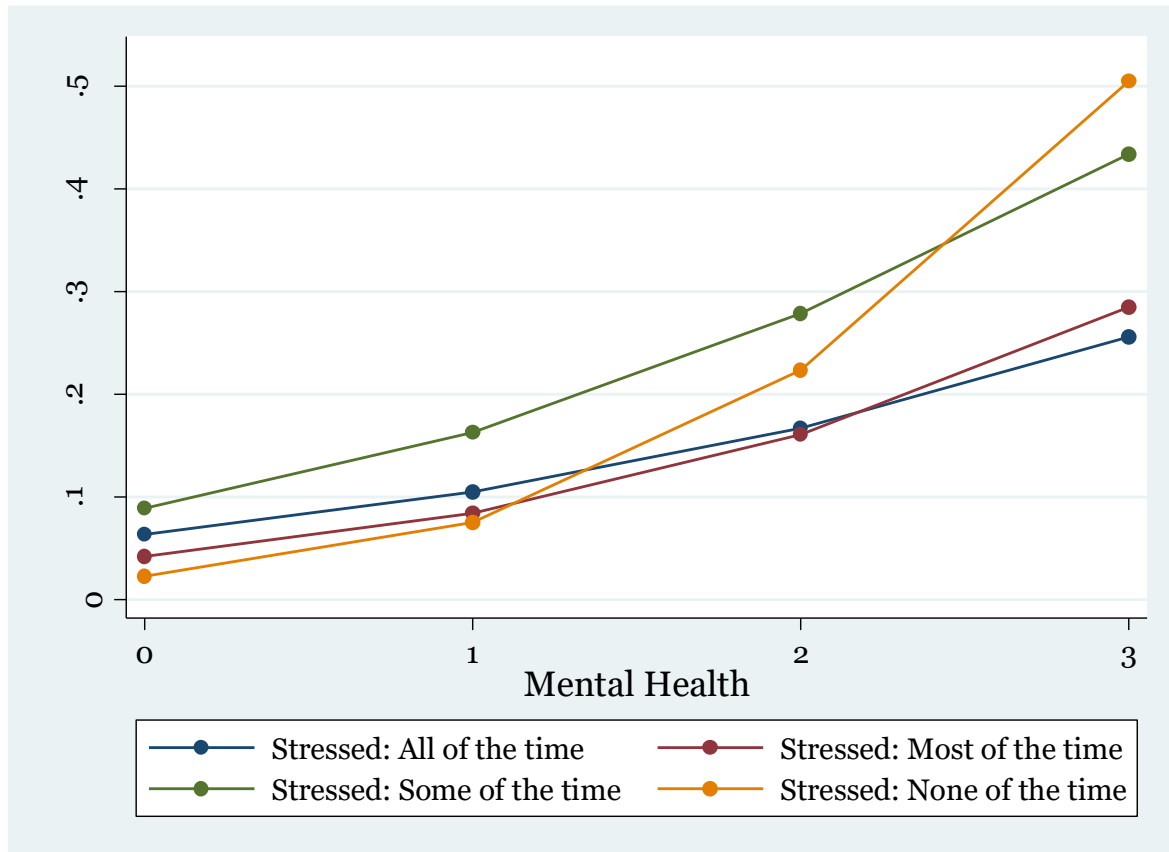
Conclusion

      This study is an important step toward building a more comprehensive view of the profile of inmate health in the United States. Since quite little is known about the health status of inmates—partially because there are very few nationally representative data sets that include them—each and every attempt to ascertain an exhaustive description of their health and well-being is a step in the right (research) direction. Additionally, since correctional health care is mandated in all fifty states and is thus of importance to the entire nation, it is the responsibility of those who have access to these data to help garner an all-encompassing knowledge base. This task is necessary to ensure that health care is not just reaching the Constitutionally-mandated minimum. Indeed, ensuring that those living behind the walls are actually *cared* for in a manner that they

will, in turn, be able to resist criminal temptation and avoid recidivism upon release should be of utmost concern to criminologists and health scholars alike. This study demonstrates that there are particular areas of interest regarding inmate health (e.g., communicable diseases, obesity, and oral health) that need to be focused on in future research endeavors in order to make evidence-based modifications to prisoner health. More discussion on the findings and limitations from this chapter can be found in Chapter 7 of this dissertation.

CHAPTER 5

SOCIAL SUPPORT AND PHYSICAL HEALTH

Current Focus

This study builds on past research investigating the social support and physical health links in prisoner reentry. Specifically, the propositions laid out by social support theory contend that social support and social interpersonal relationships can have a great impact on health, wellness, and longevity (Thoits, 2011). However, alongside the precarious stressors of reentry and volatile first weeks out of prison, social support stability's impact on health may have a stronger effect than social support's impact on health at the same time point (Mowen & Visher, 2015). To that end, this research asks, "Do changes in social support post-release influence the physical health of previously incarcerated individuals?" Additional sub-questions in this research examine the main effects of social support on physical health. These include: "Does the effect differ by the type of social support (i.e., emotional or instrumental) received?" and "Does this effect differ if the support comes from family members or friends?" Using both baseline (in-prison) and wave 2 (one month post-release) measures, this chapter focuses on how the constancy in social support between prison and weeks after release is arguably more important for reentry outcomes—such as health—compared to social support measured at just one month since release. This volatile time period after release from prison is of utmost importance for positive reintegration outcomes (Binswanger et al., 2011; Harding et al., 2014; Western et al., 2015). Thus, the following study is centered on the rapid change—or stability—felt by returning individuals of their perceived social support on their physical health.

Dependent Variable

The dependent variable is self-reported *physical health* at wave 2. We ask respondents, "Would you say that in general your health is excellent, good, fair, or poor?" Approximately 6% (5.86%) of the sample reported poor health (n = 30), 16.02% reported fair health (n = 82), 37.50% reported good health (n = 192), and 40.63% reported excellent health (n = 208). Higher scores on this measure represent better physical health. Since only 30 people reported being in poor physical health, poor health and fair health were collapsed into one category comprised of 112 individuals. Self-rated physical health has been shown to be reliable (Lundberg & Manderbacka, 1996), valid in different ethnic groups (Chandola & Jenkinson, 2000), and has good predictive validity over time (Schnittker & Bacak, 2014).

Independent Variables

The primary independent variable is informal social support. Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS), originally developed and validated using three subscales: family, friends, and significant others (Zimet, Dahlem, Zimet, & Farley, 1988). The social support measures include subscales related to instrumental support (e.g., someone to offer help or advice on finding a job; 10 items) and emotional support (e.g., someone you can share joys and sorrows with; 6 items) to better assess what type of support wields the greatest effect on health (Lin, 1986; Thoits, 2011). Additionally, within the instrumental support and emotional support measures are questions related specifically to family members and specifically to friends.[10] Breaking out the four scales of social support (family emotional

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[10] Social support from significant others was not included in the current analysis.

support, friend emotional support, family instrumental support, and friend instrumental support) at wave 2 allows for more nuanced results regarding how support operates post-prison. Moreover, past research indicates that the independent effects of family support and peer support (or criminality) are significant and should be evaluated separately (Boman & Mowen, 2017). All of the social support scale items have a response set of strongly agree (3), agree (2), disagree (1), and strongly disagree (0).[11] Higher scores on all four scales represent higher levels of informal social support in that domain.

Model fit indices such as the root mean square error of approximation (RMSEA), the Tucker-Lewis index (TLI), and the comparative fit index (CFI)[12] are typically presented in unweighted models, but the current analysis uses weighted estimates since nearly half of the respondents are gang members. For weighted models, Stata only provides SRMR and CD, which are relevant and dependable for this analysis. SRMR is the standardized root square mean and CD is the coefficient of determination. All three family emotional support items loaded onto one factor (loadings = 0.82 and above)[13] with good reliability (α = 0.89, IIC = 0.37, SRMR = 0.00, CD = 0.91).[14] All three friend

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[11] Please refer to Appendix A for a list of all the social support scale items from waves 1 and 2 along with their means and standard deviations.

[12] RMSEA can be thought of us a parsimony-adjusted index that works well with larger sample sizes. TLI is another name for the (non) normed-fit index which gives fit information relative to the null model and is preferable in smaller sample sizes. CFI is a revised form of the TLI and compares the fit of a target model to the null model (Browne & Cudeck, 1993; Rigdon, 1996).

[13] All factor analyses use principal factor analysis (the standard in Stata) with promax rotation.

[14] Cronbach's alpha (Cronbach, 1951) is a measure of internal consistency that assesses reliability by indicating how closely related items are in a group. A modest reliability estimate is 0.70 and above (Nunnally & Bernstein, 1994). An interitem covariance (IIC) is an additional way to measure reliability and the extent to which the items vary together. IIC estimates are more flexible in that they vary by individual responses. An appropriate IIC ranges from 0.15 to 0.50 (Clark & Watson, 1995). Guidelines suggest that a value between 0.40 and 0.59 is fair, between 0.60 and 0.74 is good, and above 0.75 is excellent (Cicchetti, 1994). Standardized root mean square residual (SRMR) is an absolute fit index that can be defined as the standardized difference between the predicted correlations and the observed correlations. A value of less than 0.08 is considered a good fit (T. A. Brown, 2015; Hu & Bentler, 1999). The coefficient of determination (CD) is defined as the proportion of variance in the construct that is predicted by the items and can be interpreted like an R^2 (Acock, 2008).

emotional support items loaded onto one factor (loadings = 0.87 and above) with an appropriate degree of reliability (α = 0.94, IIC = 0.62, SRMR = 0.00, CD = 0.95). The five family instrumental support measures loaded onto one factor with loadings 0.86 and above and suitable reliability (α = 0.93, IIC = 0.38, SRMR = 0.03, CD = 0.92). The five friend instrumental support items loaded onto one factor (loadings = 0.84 and above) and had good reliability (α = 0.95, IIC = 0.59, SRMR = 0.02, CD = 0.95). Overall, then, this means that all four social support scales are suitably tapping into the construct of support using the questionnaire items put forth.

Missing data was assessed for all scale items before analyses were conducted. If an individual had missing data on less than 50% of the items within that scale, than their scale's mean score replaced all the missing data points on that measure. For family emotional support (3 total items), there were zero missing items; for friend emotional support (3 total items), two people were missing one item each; for family instrumental support (5 total items), one person was missing one item; and for friend instrumental support (5 total items), three people were missing one item each. Thus, none of the social support scales' missing items surpassed the 50% cutoff point to require further investigation on the missing data in the scales.

Next, wave 1 (in-prison) support was subtracted from wave 2 (one month post-release) to achieve a raw change (or stability) score. Each of these four stability scores (*family emotional support stability*, *friend emotional support stability*, *family instrumental support stability*, and *friend instrumental support stability*) then became the key independent variables in the analysis. Research suggests that a rapid change in support—and thus, lack of stability—might matter more for health outcomes in the weeks following release (Pettus-Davis, Doherty, Veeh, & Drymon, 2017; Thoits, 1982; Wallace et al., 2016).

Although many of the social support measures at wave 2 (see Appendix A) had overall means that were higher than at wave 1, this may because of the nature of the questions and prison context. For instance, asking if the respondent has "a friend who would provide help or advice on finding a place to live" might not be in the forefront of the respondent's mind at the time. They likely have distorted ideas of expectations from their families and friends based on their relationships pre-prison and during the time the respondent was incarcerated. Indeed, the instrumental support means for family and friends showed more decreases in support over the one month period compared to any of the emotional support means. At wave 1, respondents are still incarcerated and are focusing on other, more pressing, matters as they prepare for release. Additionally, during the first month out of prison, family and friends may be a lot more receptive to providing emotional and instrumental support, but this steadfast support wanes as time progresses (Pettus-Davis, Doherty, et al., 2017; Thoits, 1995).[15]

Control Variables

Control variables are used in the analysis to ensure the relationships among the variables of interest are not caused by spuriousness.[16] *Age* is the respondent's age at the baseline interview. The sample ranged from 19 to 73 and had a mean age of 39. Thirty-nine is *now* an average age for a returning prisoner (Carson, 2018), but even as of a few years ago, the average age was lower (Carson, 2014). *Gang status* is a control variable indicating if the respondent was classified as a current gang member (44%, n = 223, 1 = *yes*) by the Texas Department of Criminal Justice (TDCJ). *White* represented those who reported being primarily of Caucasian descent (29%, n = 150) and is the reference

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[15] The wave 3 (9 months post-release) data may exhibit this issue, but it is beyond the scope of the current analysis.
[16] Descriptives of control variables are restricted to those who participated in wave two and are not considered missing on the dependent variable: physical health.

category in all models. *Latino/Hispanic* captures those who reported being of primarily Hispanic descent (38%, *n* = 196) and *Black/African American* captures those who reported being Black (27%, *n* = 135). *Other race* includes respondents who reported being American Indian, Alaskan native, Asian, East Indian, and/or of mixed race (6%, *n* = 29). Education in the sample was captured using four dummy variables: *eighth grade* or less (13%, *n* = 69), *some high school* (45%, *n* = 229), *high school graduate* (24%, *n* = 122), and some *college* (or college graduate; 18%, *n* = 91) with *some high school* as the reference group as it is the most common education level for prisoners (Harlow, 2003).

Next, the control variables that may have an impact on physical health are discussed. Relationship status is important to include because research purports that marriage is "...a key source of practical, emotional, and social support, and spouses may be well placed to recognise the warning signs of deteriorating health..." (Spittal, Forsyth, Borschmann, Young, & Kinner, 2017, p. 7; Visher, Knight, Chalfin, & Roman, 2009). Relationship status was coded into three categorical dummy variables: *single* (57%, *n* = 292), *married*, which includes having a partner or being in a common law marriage (25%, *n* = 128), and *divorced* or widowed (18%, *n* = 92). *Single* is the reference category. *Has children* is a dichotomous variable used to indicate if the respondent has any minor children (70%, *n* = 356, 1 = *yes*).

The rest of the control variables are correctional-related or health-related and necessary in the models to ensure the findings are not artificially inflated. *Prior prison terms* indicates how many prior TDCJ incarcerations the respondent has served, not including the current prison term. The range is from 1 to 7 previous prison sentences with a mean of 1.92 terms. *Length of incarceration* is a variable describing how many days were served in the current incarceration. The sample had a range of 16 days to 12,776 days with 2,074 days as the mean (i.e., 5.68 years) length of time served.

Needs medical treatment is a dichotomous variable asking if since the baseline interview—approximately one month—the respondent has felt like they needed any medical treatment (30%, $n = 155$, 1 = *yes*). This variable is included in the models since we would expect needing medical treatment represents how serious the physical health status of respondents are once released. Respondents received a 1 on the *chronic disease* measure (22%, $n = 113$) if they responded "yes" to being diagnosed with either HIV/AIDS, hepatitis B or hepatitis C, anemia, or a seizure disorder since the baseline interview. Importantly, the wording of the question at wave 2 was, "Now thinking about your physical health, *since our last interview* has a doctor, nurse, or other health professional told you that you…" Thus, after a careful examination of the chronic disease measure (e.g., people misunderstanding the question by answering "yes" when they already said "yes" at wave 1) revealed that there were ten new cases of someone diagnosed with any of those diseases. Although the updated number (including wave 1 participants) of those with a chronic disease in the entire sample was 156, 113 of those who participated in wave 2 have one (or more) of these illnesses. *Poor mental health* is an ordinal variable used to assess the respondent's self-rated mental health at wave 2. Mental health is an important predictor of physical health (Umberson & Montez, 2010), especially for ex-prisoners (Mallik-Kane & Visher, 2008). We ask respondents, "Would you say that your overall mental and emotional health is excellent, good, fair, or poor?" Respondents stated that 41% are in excellent health ($n = 212$), 36% are in good health ($n = 185$), 18% are in fair health ($n = 92$), and 5% are in poor health ($n = 23$). Higher scores on this variable represent worse mental health.

Table 5.1 Descriptive Statistics (*N* = 507)

Study Variables	Mean or %	Standard Deviation	Minimum	Maximum
Dependent variable				
Physical health	1.19	0.77	0	2
Independent variables				
Family emotional support change score	-0.01	0.65	-2	2.67
Friend emotional support change score	0.05	0.96	-3	3
Family instrumental support change score	-0.03	0.63	-1.8	2.2
Friend instrumental support change score	0.02	0.91	-3	3
Family emotional support stability	0.40	--	0	1
Friend emotional support stability	0.32	--	0	1
Family instrumental support stability	0.30	--	0	1
Friend instrumental support stability	0.21	--	0	1
Control variables				
Age	39.91	10.96	20	73
Gang status	44%	--	0	1
White	29%	--	0	1
Black/African American	27%	--	0	1
Latino/Hispanic	38%	--	0	1
Other race	6%	--	0	1
Eighth grade	13%	--	0	1
Some high school	45%	--	0	1
High school graduate	24%	--	0	1
College	18%	--	0	1
Single	57%	--	0	1
Married	25%	--	0	1
Divorced	18%	--	0	1
Has children	70%	--	0	1
Prior prison terms	1.92	--	1	7
Length of incarceration (in days)	2,074	2,280	16	12,776
Needs medical treatment	30%	--	0	1
Chronic disease*	22%		0	1
Poor mental health	0.86	0.87	0	3

Notes:

All variables are taken from wave two except the four change scores

* = includes HIV/AIDS, hepatitis B, hepatitis C, anemia, and seizure disorders

Analytic Strategy

The analytic strategy proceeds in three steps. After running model diagnostics to rule out the presence of harmful levels of collinearity and heteroscedasticity, descriptive statistics on all variables at wave 2 are presented in Table 5.1. Next, bivariate relationships between physical health, four measures of social support stability, and known correlates of health, incarceration, and social support are run to confirm associations among the variables of interest. See Table 5.2 for all bivariate correlations among study variables and Table 5.2a for an associated numbered variable list. After noting that the variables of interest are correlated in the expected directions, multivariate inquiry began. All statistically significant relationships at the 0.05 level and above are marked with an asterisk. Significance tests (alpha levels) of 0.05 with two-tailed tests will be used in all analyses. Since the dependent variable of interest is an ordinal variable with a natural ordering of three possible outcomes (excellent, good, or fair/poor), ordered logistic regression is appropriate to use. However, the Brant test of parallel regression assumption was violated so multinomial logistic regression will be used instead (Long & Freese, 2014). Multinomial logistic regression simultaneously estimates binary logits for all possible comparisons amount the outcome variables (Long, 1997). The third step in the analyses involves regressing four models of social support stability on physical health. All of the multivariate models are estimated using Stata 14 (StataCorp LP, 2015).

Running a multinomial logistic regression requires adherence to the independence of irrelevant alternatives (IIA) assumption. The IIA presumes that the chances of alternative outcomes do not affect the odds among the remaining outcomes. In other words, the inclusion or exclusion of categories should not affect the relative risks associated with the outcomes in the rest of the categories (Long & Freese, 2014).

The Wald chi-square (χ^2) test is reported to ensure the explanatory variables are adding

significance to the model versus a constant-only model (Britt & Weisburd, 2010) and is

the default chi-square test statistic in Stata. Since determining which pseudo R^2 to report

in a multinomial logit model is largely preferential (Allison, 2013), both the Cox-Snell R^2

and the Nagelkerke R^2 will be reported for all multivariate models.

Table 5.2 Bivariate Correlation Matrix for all Study Variables (N = 507)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	--																							
2	0.13*	--																						
3	0.05	0.05	--																					
4	0.17*	0.42*	0.16*	--																				
5	0.09*	0.07	0.53*	0.17*	--																			
6	-0.31*	-0.03	-0.02	-0.09*	0.03	--																		
7	0.12*	0.00	0.00	0.05	-0.03	-0.15*	--																	
8	-0.08	-0.01	0.03	0.01	0.09*	0.15*	-0.20*	--																
9	0.09*	0.00	-0.04	0.01	-0.02	-0.05	-0.03	-0.38*	--															
10	0.00	0.05	0.00	-0.01	-0.06	-0.10*	0.23*	-0.51*	-0.48*	--														
11	-0.03	-0.08	0.01	-0.01	-0.03	0.01	-0.05	-0.16*	-0.15*	-0.20*	--													
12	0.05	0.00	0.01	-0.02	-0.01	-0.07	0.12*	-0.05	-0.10*	0.14*	-0.01	--												
13	-0.03	0.03	0.01	0.01	-0.01	-0.09*	0.10*	-0.11*	0.02	0.09*	-0.01	-0.37*	--											
14	0.00	-0.04	-0.01	0.03	0.03	0.04	-0.06	0.08*	0.05	-0.11*	-0.03	-0.24*	-0.53*	--										
15	-0.01	0.01	-0.01	-0.02	-0.01	0.15*	-0.17*	0.10*	0.01	-0.13*	0.06	-0.17*	-0.37*	-0.24*	--									
16	-0.15*	-0.01	-0.05	-0.05	-0.03	0.28*	0.17*	-0.03	0.03	-0.01	0.01	-0.02	0.10*	-0.04	-0.07*	--								
17	0.00	0.00	0.03	-0.03	0.14*	0.32*	0.12*	0.02	0.04	-0.05	-0.01	0.11*	-0.01	-0.05	-0.03	-0.20*	--							
18	-0.40*	-0.08	-0.06	-0.19*	-0.10*	0.31*	-0.14*	0.10*	-0.03	-0.08	0.04	0.01	-0.06	-0.08	0.16*	0.07	0.07	--						
19	-0.24*	-0.05	-0.07	-0.10*	0.01	0.34*	0.01	0.15*	-0.08*	-0.07	0.00	0.01	0.06	-0.10*	0.03	0.25*	0.07	0.24*	--					
20	-0.48*	-0.12*	-0.04	-0.19*	-0.07	0.20*	-0.04	0.03	0.01	-0.05	0.01	0.03	0.05	-0.07	-0.01	0.14*	0.01	0.27*	0.25*	--				
21	0.11*	-0.05	-0.05	0.02	0.01	-0.42*	0.04	-0.14*	0.12*	0.03	-0.01	0.04	0.11*	-0.06	-0.12*	-0.10*	-0.03	-0.13*	-0.14*	0.02	--			
22	-0.04	0.06	0.01	0.01	0.02	0.18*	0.08*	0.02	-0.03	0.02	-0.01	0.00	-0.04	0.02	0.03	0.08*	0.05	0.07	0.04	-0.07	-0.69*	--		
23	-0.10*	-0.01	0.05	-0.03	-0.04	0.35*	-0.15*	0.16*	-0.12*	-0.05	0.02	-0.05	-0.10*	0.06	0.12*	0.04	-0.02	0.09*	0.13*	0.05	-0.53*	-0.26*	--	
24	-0.06	0.00	-0.01	0.01	-0.01	0.15*	0.05	-0.10*	0.02	0.06	0.02	-0.04	-0.01	0.04	0.00	0.10*	-0.06	-0.04	0.01	0.04	-0.28*	0.20*	0.14*	--

Table 5.2a Numbered Variable List

1. Physical health
2. Family emotional support stability
3. Friend emotional support stability
4. Family instrumental support stability
5. Friend instrumental support stability
6. Age
7. Gang status
8. White
9. Black/African American
10. Latino/Hispanic
11. Other race
12. Eighth grade
13. Some high school
14. High school graduate
15. College
16. Prior prison terms
17. Length of incarceration
18. Needs medical treatment
19. Chronic disease
20. Poor mental health
21. Single
22. Married
23. Divorced
24. Has children

Results

Descriptive Statistics

Beginning with the descriptive statistics for the primary dependent and
independent variables, we see that physical health at wave 2 has a mean of 1.19 and a
standard deviation of 0.77; indicating that most respondents reported their health being
good or excellent. Although the final models for the four primary independent variables
are run as dichotomous variables (change versus stability), Table 5.1 gives the
descriptives for the raw change scores (wave 2 support minus wave 1 support) as well as
the dichotomous indicators of stability (= 1) or change (= 0).[17] Of note, both family

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[17] See Appendix A for descriptive statistics of all four social support scales from each wave.

support scale means decreased in perceived support between prison and one month

post-release while both friend support scale means increased in perceived support.

Perhaps while imprisoned respondents feel as if they do not have many friends who

would be willing to lend emotional or instrumental support, and once released feel like

they can now rely on those peers as face-to-face interaction commences.

Multivariate Results

Table 5.3 presents the results from the multivariate analyses predicting physical

health at wave 2 with a final sample size of 507. All four models met the IIA assumption

and had significant Wald χ^2 test statistics (Model 1 = 115.26, p < 0.01; Model 2 = 115.55, p

< 0.01; Model 3 = 118.67, p < 0.01; Model 4 = 112.23, p < 0.01),[18] indicating good model

fit. In terms of collinearity, all variables used in the models had variance inflation factors

(VIFs) and condition indices under the standard thresholds. All VIFs were under 2.12

with a mean VIF of 1.41 and a condition index of 22.88, below the standard cutoff of 30

(Mason & Perreault, 1991). For all models, the probability of reporting good health

relative to fair/poor health will be discussed first followed by the probability of reporting

excellent health relative to fair/poor health. Stata sets the base category for multinomial

logit as the outcome with the most observations, but for ease of interpretation, fair/poor

health will be the base model in the following analyses.

Beginning with a discussion of the primary independent variables, for family

emotional support stability we see that a one-unit increase in support stability (i.e., less

rapid change) is associated with a 0.71 increase (p < 0.05) in the relative log odds of

being in good health versus fair/poor health. For excellent health relative to fair/poor

health, the coefficient is approaching significance with a 0.67 increase (p < 0.10) in the

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[18] References to model numbers coincide with reading from left to right in Table 5.3. Thus, Model 1 is family emotional support stability, Model 2 is friend emotional support stability, Model 3 is family instrumental support stability, and Model 4 is friend instrumental support stability.

relative log odds of being in excellent health. Family instrumental support is significant for both good health relative to fair/poor health (b = 0.95, p < 0.05) and for excellent health relative to fair/poor health (b = 1.17, p < 0.05). That is to say, a one-unit increase in family instrumental support stability is associated with a 1.17 increase in the probability of excellent health relative to fair/poor health. This same relationship exists for the probability of good health with a 0.95 increase. Neither the friend emotional support stability variable nor the friend instrumental support stability variable were statistically significant in either Model 2 or Model 4 in Table 5.3.

In all four models, age is negatively associated with having excellent health compared to fair/poor health. Thus, a one-unit increase in age (i.e., being one year older) is associated with a decreased log odds of reporting excellent health compared to fair/poor health (Model 1 = -0.05, p < 0.05; Model 2 = -0.05, p < 0.05; Model 3 = -0.05, p < 0.05; Model 4 = -0.05, p < 0.05). As respondents age, the probability of reporting worse health overall increases, when all other variables in the model are held constant. The only race variable that emerged as significant—and in all four models—were those who reported being Latino/Hispanic. The multinomial logit estimate comparing Latinos/Hispanics to Whites is 1.11 units lower (Model 1 = -1.11, p < 0.01; Model 2 = -0.98, p < 0.05; Model 3 = -1.04, p < 0.05; Model 4 = -0.99, p < 0.05) for good health compared to fair/poor health. Thus, Whites are more likely than Latinos/Hispanics to report being in good health compared to fair/poor health. This is unsurprising given the literature on racial health disparities, especially for Latinos/Hispanics (Mulvaney-Day, Alegría, & Sribney, 2007; Priest & Woods, 2015).

Needs medical treatment was significantly associated with both good health and excellent health across all four models. In Model 1, the multinomial logit estimate comparing needing medical treatment to those who did not need medical treatment is

1.05 units lower ($p < 0.01$) for good health and 1.94 units lower for excellent health ($p < 0.01$) compared to fair/poor health. This same relationship occurs in the remaining three models for good health compared to fair/poor health (Model 2: $b = -1.03$, $p < 0.01$; Model 3: $b = -0.92$, $p < 0.05$; Model 4: $b = -1.03$, $p < 0.01$) as well as excellent health compared to fair/poor health (Model 2: $b = -1.92$, $p < 0.01$; Model 3: $b = -1.78$, $p < 0.01$; Model 4: $b = -1.91$, $p < 0.01$). This finding makes intuitive sense since those who claim they require current medical treatment are likely the same pool of respondents who have the worst health outcomes overall.

Poor mental health also emerged as a negatively correlated variable across all eight sets of analyses. In Model 1, we see that a one-unit increase in poor mental health (i.e., worse mental health) is associated with a 0.55 decrease in the relative log odds of being in good mental health compared to fair/poor health. Similarly, poorer mental health is correlated with a 1.43 decrease in the relative log odds of reporting excellent health compared to fair/poor health. This same relationship carries across the other three models for good relative to fair/poor health (Model 2: $b = -0.58$, $p < 0.01$; Model 3: $b = -0.57$, $p < 0.01$; Model 4: $b = -0.57$, $p < 0.01$) and for excellent relative to fair/poor health (Model 2: $b = -1.47$, $p < 0.01$; Model 3: $b = -1.42$, $p < 0.01$; Model 4: $b = -1.48$, $p < 0.01$). This finding is consistent with the literature that poor mental health is highly correlated with poor physical health (Thoits, 2010; Umberson & Montez, 2010).

Table 5.3 Multinomial Logistic Regression Models Predicting Physical Health (*N* = 507)

Variables	Family Emotional Support		Friend Emotional Support		Family Instrumental Support		Friend Instrumental Support	
	Good Health	Excellent Health	Good Health	Excellent Health	Good Health	Excellent Health	Good Health	Excellent Health
Support stability	0.71**	0.67*	0.36	0.02	0.95**	1.17**	0.37	0.23
	(0.35)	(0.38)	(0.34)	(0.38)	(0.45)	(0.47)	(0.41)	(0.44)
Age	-0.00	-0.05**	-0.00	-0.05**	-0.00	-0.05**	-0.00	-0.05**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Gang status	0.33	0.50	0.32	0.49	0.28	0.45	0.34	0.50
	(0.33)	(0.36)	(0.32)	(0.35)	(0.33)	(0.36)	(0.33)	(0.35)
Black/African American	-0.41	0.13	-0.28	0.20	-0.30	0.29	-0.26	0.20
	(0.42)	(0.49)	(0.42)	(0.50)	(0.43)	(0.51)	(0.43)	(0.50)
Latino/Hispanic	-1.11***	-0.71	-0.98**	-0.67	-1.04**	-0.61	-0.99**	-0.67
	(0.41)	(0.49)	(0.41)	(0.48)	(0.41)	(0.49)	(0.41)	(0.48)
Other race	-1.03	-0.44	-1.09	-0.54	-1.02	-0.41	-1.04	-0.52
	(0.67)	(0.86)	(0.69)	(0.88)	(0.68)	(0.89)	(0.70)	(0.89)
Eighth grade	-0.19	0.80	-0.08	0.93	-0.17	0.78	-0.09	0.91
	(0.58)	(0.63)	(0.56)	(0.62)	(0.57)	(0.63)	(0.56)	(0.62)
High school graduate	-0.15	-0.29	-0.15	-0.31	-0.19	-0.31	-0.20	-0.33
	(0.40)	(0.46)	(0.39)	(0.45)	(0.39)	(0.46)	(0.39)	(0.45)
College	0.53	0.62	0.55	0.64	0.50	0.62	0.52	0.63
	(0.46)	(0.52)	(0.47)	(0.52)	(0.45)	(0.51)	(0.47)	(0.52)
Prior prison terms	-0.16	-0.01	-0.15	-0.00	-0.14	0.01	-0.16	-0.01
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
Length of incarceration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Married	0.08	-0.12	0.18	-0.06	0.14	-0.08	0.22	-0.06
	(0.44)	(0.47)	(0.43)	(0.46)	(0.45)	(0.48)	(0.43)	(0.46)
Divorced	0.17	0.33	0.23	0.39	0.25	0.41	0.29	0.39

	(0.46)	(0.50)	(0.45)	(0.51)	(0.45)	(0.50)	(0.45)	(0.50)
Has children	-0.46	-0.50	-0.51	-0.55	-0.53	-0.56	-0.51	-0.53
	(0.40)	(0.43)	(0.39)	(0.43)	(0.39)	(0.43)	(0.39)	(0.43)
Needs medical treatment	-1.05***	-1.94***	-1.03***	-1.92***	-0.92**	-1.78***	-1.03***	-1.91***
	(0.36)	(0.45)	(0.36)	(0.44)	(0.37)	(0.45)	(0.35)	(0.44)
Chronic disease	-0.59	-0.57	-0.63	-0.59	-0.59	-0.59	-0.67	-0.62
	(0.42)	(0.53)	(0.42)	(0.53)	(0.44)	(0.56)	(0.42)	(0.53)
Poor mental health	-0.55***	-1.43***	-0.58***	-1.47***	-0.57***	-1.42***	-0.57***	-1.48***
	(0.19)	(0.27)	(0.20)	(0.27)	(0.20)	(0.27)	(0.20)	(0.27)
Constant	2.72***	4.37***	2.78***	4.63***	2.66***	4.20***	2.84***	4.59***
	(0.90)	(1.01)	(0.88)	(0.10)	(0.89)	(1.00)	(0.88)	(1.01)
Wald χ2	115.26***		115.55***		118.67***		112.23***	
Cox-Snell R^2	0.38		0.38		0.39		0.38	
Nagelkerke R^2	0.43		0.43		0.43		0.42	

Notes:

Referential category for all models is fair/poor health.

Entries are unstandardized regression coefficients (*b*).

Robust standard errors in parentheses (SE).

*** $p<0.01$, ** $p<0.05$, * $p<0.10$

Conclusion

The first month after release from prison is fraught with unrealistic expectations and excessive amounts of stress placed on the ex-prisoner to quickly get their lives back in order as their family members, friends, and local authorities are keeping a close eye; thereby adding more stress (Western et al., 2015). Because this time is already volatile and in constant flux, it is important to ensure there are stable support systems and social networks within reach who can help—whether emotionally or practically—in times of need. This paper opens a new line of research into social support from family and friends post-release for reintegrating ex-prisoners. By focusing on the *stability* of social support in the first month after release, the current research highlights the importance of steadiness in this demanding time period. Indeed, though social support interventions that focus on garnering support once released are certainly useful, "Declines in social support do not start to surface until much later in the reentry process" (Pettus-Davis et al., 2017, p. 19). Thus, a focus on stability of support for longer time periods is imperative.

Putting the findings together, it becomes clear that the reentering prisoner's family is of utmost importance during the first weeks away from prison. The ex-prisoner's family is likely who they live with, who is caring for them, and who is helping them find a job; peers are much more inconsequential for physical health outcomes (Naser & La Vigne, 2006). Importantly, family members are likely in a better position to understand the personal needs of their loved ones. Friends may not understand what *type* of social support a person needs and this potential mismatching of needs may end up being more damaging than helpful for the receiver (Floyd & Ray, 2016); in this case: male ex-prisoners. A larger discussion on the findings in this chapter are discussed in Chapter 7 of this dissertation.

CHAPTER 6

HEALTH, SOCIAL SUPPORT, AND OFFENDING

Current Focus

This study builds on past research examining the relationships between physical health, social support, and offending on an individual level. Criminological research primarily uses macro-level social support to explain crime (see, e.g., Pratt & Godsey, 2003). Social support is a cost-effective way to directly combat the stressors of reentry which inevitably has implications for recidivism (Berg & Huebner, 2011; Spohr et al., 2016). Previous research has found that, "the quality of social support in an offender's immediate social network was significantly negatively associated with sexual risk behaviors, criminal risk, and substance use" (Spohr et al., 2016, p. 6). Other research has found that health-related strains are positively associated with delinquency and marijuana use; lending support to the idea that the proliferation of stress—alongside an unhealthy lifestyle—increases the likelihood of offending and drug use (Kort-Butler, 2017). Moreover, when models predicting reincarceration take health-related variables into account (in addition to well-established risk factors), the models improved prediction of recidivism over and above when just the criminological variables were included (E. G. Thomas et al., 2015). Thus, this study takes this research one step forward by also examining stress in the post-release time period when pressure and strain might be highest for the returning prisoner. By testing the buffering model of social support and stress on individual-level offending and drug use post-release, this study moves this area of research forward by explicating how different *types* of social support may affect post-release antisocial behaviors.

Measures

Dependent Variables

This study uses two dependent variables. The first, self-reported *offending,* captures property offending, violent offending, and illicit sales (Huizinga, Esbensen, & Weiher, 1991; Reisig & Mesko, 2009) in the month since release. Though some researchers debate the use of self-reports to measure offending, others have found that this way of assessing individual crime generally has predictive, concurrent, prospective, and retrospective validity, especially for males (Jolliffe et al., 2003; Kazemian & Farrington, 2005; Piquero, Schubert, & Brame, 2014). A variety score is used to measure self-reported offending as it is the best measure of individual criminality and possesses high reliability and validity (Sweeten, 2012). Property offending consists of 7 items and asks questions such as, "How many times (in the last month) have you purposefully damaged or destroyed property that did not belong to you?" Violent offending consists of 7 items and has questions such as, "How many times (in the last month) have you physically attacked another person?" The illicit sales measure consists of 4 items and asks questions such as, "How many times (in the last month) have you sold prescription pills?" The majority of respondents—of those who admitted to any offending—had only committed one offense since release (5%, n = 28).[19] Overall, offending ranges from 0 to 8 with a mean of 0.16 and a standard deviation of 0.70. Thus, offending is quite low in this sample at wave 2, but this makes sense given the short amount of time out of prison.

The other dependent variable of interest is self-reported *drug use* during the month after release. Assessing predictors of drug use is important in the study of health, stress, and social support, because abusing substances post-release may not only be a

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[19] See Appendix B for all self-reported offending questions and wave 2 frequencies.

violation of parole conditions—which is a form of recidivism—but also a strong indicator of stress and unhealthiness. In that sense, focusing on drug-using behaviors and offending separately will help target areas where modifications to the evidence base of reentry research are necessary. Similar to self-reported offending, it is captured using multiple questions and then a variety score is created. Simply, we ask respondents, "how many times in the last month have you used…" Respondents were asked about marijuana, cocaine, heroin, hallucinogens, painkillers, tranquilizers, and stimulants. The range was from 0 to 3 with a mean of 0.09 and a standard deviation of 0.36. Thus, the majority of respondents who had used any substances since release had only used one (7%, $n = 36$).

Independent Variables

The first independent variable is self-rated *physical health* at wave 2. Self-rated physical health has been deemed a reliable and valid indicator of physical health in different populations (Lundberg & Manderbacka, 1996; Schnittker & Bacak, 2014). Respondents were asked, "Would you say that in general your health is excellent, good, fair, or poor?" Responses ranged from poor (6%, $n = 30$) to fair (16%, $n = 82$), good (37%, $n = 192$), and excellent (41%, $n = 208$). Since hardly any respondents indicated their health was fair or poor, these two categories were collapsed into fair/poor health. One would expect that poor physical health could create a more stressful situation for the ex-prisoner as they attempt to get healthy post-release and therefore, health should be negatively associated with drug use and offending. Higher values of physical health indicate better health.

Next, social support was measured using one global measure of emotional support and one global measure of instrumental support. In other words, unlike in Chapter 5, both the emotional support measure and the instrumental support measure

included questions related to family and friends. This was done to be able to parse out the importance of emotional *or* instrumental support as it relates to health and offending—regardless of if the respondent's support primarily stems from family members or friends. The *global emotional support* scale ranges from 0 to 3 with a mean of 2.19 and a standard deviation of 0.57.[20] All items loaded onto one factor with loadings from 0.56 to 0.82 and a good degree of reliability (α = 0.81, IIC= 0.25, SRMR = 0.30, CD = 0.90).[21] The *global instrumental support* scale ranges from 0 to 3 with a mean of 2.10 and a standard deviation of 0.57. All items loaded onto one factor (loadings = 0.67 and above) with an appropriate degree of reliability (α = 0.88, IIC= 0.28, SRMR = 0.27, CD = 0.95). Both social support scales have a response set of strongly agree (3), agree (2), disagree (1), and strongly disagree (0) with higher numbers representing more perceived social support.

The final independent variable in the analysis is *stress*. The benefits of social support can be counteracted by the stress surrounding the reintegration process for ex-prisoners (Lin & Ensel, 1989). Stress is a known correlate of offending and drug use (Agnew, 1992; Pearlin, 1989; Sinha, 2008) and research has found that, "any agent that is associated with increased stress (e.g., poor social skills) could pose a potential threat to physical health" (Segrin, 2017, p. 2). The transition from the prison to the community is replete with uncertain situations, difficult decision making, and unpredictability which further creates hardship (Hoffmann & Su, 1997; Western et al., 2015). Thus, the

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[20] All factor analyses for the scales used principal factor analysis and promax rotation, as this is the default in Stata.

[21] Cronbach's alpha (Cronbach, 1951) measures internal consistency to assess reliability of the relation of the items in the group. An interitem covariance (IIC) measures reliability a different way, varies by individual responses, and measures the extent to which the items vary together (Clark & Watson, 1995). A standardized root mean square residual (SRMR) is the standardized difference between the predicted and observed correlations (Hu & Bentler, 1999). Last, the coefficient of determination (CD) is the proportion of variance in the construct that is predicted by the items and is generally interpreted similarly to an R^2 (Acock, 2008).

Perceived Stress Scale (PSS), a global measure of perceived stress (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988), is used as an independent variable in both the models.[22] Respondents were asked: (1) "In the past month, how often have you felt that you were unable to control the important things in your life?" (2) "In the past month, how often have you felt confident about your ability to handle your personal problems?" (3) "In the past month, how often have you felt that things were going your way?" (4) In the past month, how often have you felt that difficulties were piling up so high you could not overcome them?" The stress scale has a response set of: all of the time (= 3), most of the time (= 2), sometimes (= 1), and none of the time (= 0). Questions two and three were reverse coded for all analyses. Thus, a higher value on the stress scale indicates more stress post-reentry. The stress scale ranges from 0 to 3 with a mean of 0.75 and a standard deviation of 0.58. All four items loaded onto one factor (loadings = 0.52 and above) with a suitable degree of reliability (α = 0.65, IIC= 0.23, SRMR = 0.40, CD = 0.68).

Missing data was taken into consideration for all items belonging to the three scales before multivariate analyses were conducted. If a respondent had less than 50% of missing data within a scale, than their scale's mean score replaced the missing data points. For the global emotional support scale, two respondents were missing one item each (6 total items). For the global instrumental support scale, four people were missing one item each (10 total items). For the stress scale, one person was missing one item (4 total items). Thus, none of the social support or stress scales required mean replacement of missing data as all were under the 50% threshold.

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[22] Although the entire scale is not available because many questionnaire items were cut to save time for the over-the-phone interviews, factor analysis shows that the items used in this analysis are strongly correlated with each other and are, as a whole, indicative of latent stress.

Control Variables

Control variables related to offending, physical health, social support, and stress were used in the models to ensure the relationships present are not spurious. Keep in mind that the sample is comprised entirely of males. First, *age* was used to assess how old the respondent was at baseline since age is positively correlated with health problems and negatively correlated with offending over the life course (Loeber & Farrington, 2012; Nagin, Farrington, & Moffitt, 1995). The mean age was 39.91 with a range of 19 to 73. *Gang status* is a binary variable (1 = *yes*, 0 = *no*) indicating whether the respondent was classified as a gang member by the Texas Department of Criminal Justice (TDCJ). This is important to control for because (1) nearly half of the respondents are considered gang members (44%, *n* = 223) and (2) gang members are more likely to violently offend (Mitchell, Fahmy, Pyrooz, & Decker, 2016; Worrall & Morris, 2012). *Employment* is a categorical variable (1 = *yes*, 0 = *no*) indicating if the respondent had gotten a job since release. Remarkably, 232 respondents (45%) said that they had gotten a job in the approximate one month since leaving prison. Employment is a control variable since having steady work can be a turning point in behavioral changes over the life course, especially for ex-prisoners over age 27 (Uggen, 2000).

Race was broken down into four categories: *White*, *Black/African American*, *Latino/Hispanic*, and *other race*. Those who reported being White make up 29% of the sample (*n* = 150), Black/African Americans make up 26% (*n* = 135), Latino/Hispanics make up 38% (*n* = 196), and other race—which consists of those who reported being American Indian, Alaskan native, Asian, East Indian, and/or of mixed race—make up the remaining 6% (*n* = 29) of the sample. The racial makeup of the sample is standard for the state of Texas (U.S. Census Bureau, 2015). White is the reference category for all multivariate models and all race dummy variables are coded as 1 for "yes" and 0 for "no."

Education is parsed out into four categories (1 = *yes*, 0 = *no*) as well: *Eighth grade* or less (13%, *n* = 69), *some high school* (45%, *n* = 229), *high school graduate* (24%, *n* = 122), and *college* and above (18%, *n* = 91). Attending some high school is typical of a prison sample (Harlow, 2003) and is the reference category for all multivariate models. Education can be used as a proxy for socioeconomic status and is often used in the public health literature for this reason (see, e.g., Grzywacz, Almeida, Neupert, & Ettner, 2004; Winkleby, Jatulis, Frank, & Fortmann, 1992).

As far as the institutional-related control variables, first is the number of *prior prison terms*. This variable ranges from 1 to 7 prior TDCJ incarcerations with a mean of 1.92 (or 2 previous terms), which includes the most recent term. The *length of incarceration* is the length of the respondent's current incarceration with TDCJ, measured in days. The mean is 2,074 days (or 4.91 years) with a range of 16 to 12,776 days. The respondent's current offense (i.e., the offense they were serving time for when they were interviewed at baseline) is broken down into four dichotomized categories (1 = *yes*, 0 = *no*): *property offense*, *violent offense*, *drug offense,* and *other offense*—the latter of which is the reference category. The sample at wave 2 consists of 17% who committed a property offense (*n* = 89), 18% who committed a violent offense (*n* = 90), 45% who committed a drug offense (*n* = 228), and 20% who committed another type of offense (*n* = 105).

A few more control variables related to social support and health behaviors are also included to ensure the results are not confounded by other variables in the models. First, the respondent's marital status is of particular importance to social support and offending because, "offenders eventually find pro-social romantic partners who provide them with both a role model and social support for their initial steps toward breaking from crime" (Paternoster, Bachman, Bushway, Kerrison, & O'Connell, 2015, pp. 213-

214). Relationship status was coded into three categories (1 = *yes*, 0 = *no*): *single* (57%, *n* = 292), *married*, cohabitating, common law marriage, or has a partner (25%, *n* = 128), and *divorced* or widowed (18%, *n* = 92). Single is the reference category. Fatherhood is considered an important turning point toward desistance and a good motivator for changes in antisocial behaviors, including for gang members (Moloney, MacKenzie, Hunt, & Joe-Laidler, 2009). Thus, *has children* (70%, *n* = 356) is used as a control variable in the models and is coded as a 1 for "yes" and a 0 for "no" children.

Needs medical treatment and *poor mental health* are both control variables included to ensure that other effects of known covariates of physical health are restrained in the models. If a respondent said "yes" to needing medical treatment at the wave 2 interview, this might mean they have serious medical conditions that need to be attended to and are in need of seeing a doctor. Approximately 30% (*n* = 150) of respondents said that they need medical treatment since release from prison (1 = *yes*, 0 = *no*). Having poor mental health is an important predictor of poor physical health (Umberson & Montez, 2010). We ask respondents, "Would you say that in general your overall mental and emotional health is excellent, good, fair, or poor?" Respondents reported having excellent (41%, *n* = 212, "yes" = 0), good (36%, *n* = 185, "yes" = 1), fair (18%, *n* = 92, "yes" = 2), and poor (5%, *n* = 23, "yes" = 3) mental health with a mean of 0.86. Higher scores represent worse mental health.

Analytic Strategy

The analyses proceed in multiple steps. First, diagnostic tests are conducted to rule out the presence of high levels of collinearity and heteroscedasticity. Next, descriptive statistics for all study variables are presented in Table 6.1. Third, bivariate correlations between self-reported offending, drug use, physical health, social support, stress, and all control variables are run to confirm relationships among the theoretically-

driven variables before proceeding with multivariate analysis. The correlation matrix is presented in Table 6.2 with a numbered variable list in Table 6.2a. All statistically significant correlations are indicated with an asterisk. Last, multivariate analyses are estimated to test the research hypotheses. Since the dependent variable of interest is a discrete count variable with overdispersion (mean = 0.14, variance = 1.94),[23] negative binomial regression is used in the current analyses (Long, 1997).[24] All of the multivariate models are estimated with a two-tailed significance test using Stata 14 (StataCorp LP, 2015).

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[23] Overdispersion can be defined as when the variance is at least double the mean (Long, 1997).
[24] A Poisson model was first chosen as an appropriate model because of the nature of the dependent variable and the distribution, but goodness-of-fit test statistics determined the overdispersion in self-reported offending was too high to justify using a Poisson analysis (Berk & MacDonald, 2008). Thus, a negative binomial regression model was used.

Table 6.1 Descriptive Statistics (*N* = 512)

Study Variables	Mean or %	Standard Deviation	Minimum	Maximum
Dependent variables				
Offending	0.16	0.70	0	8
Drug use	0.10	0.36	0	3
Independent variables				
Physical health	1.19	0.77	0	2
Global emotional support	2.19	0.57	0	3
Global instrumental support	2.10	0.57	0	3
Stress	0.75	0.58	0	3
Control variables				
Age	39.91	10.96	19	73
Gang status	44%	--	0	1
Employment	45%	--	0	1
White	29%	--	0	1
Black/African American	26%	--	0	1
Latino/Hispanic	38%	--	0	1
Other race	6%	--	0	1
Eighth grade	13%	--	0	1
Some high school	45%	--	0	1
High school graduate	24%	--	0	1
College	18%	--	0	1
Prior prison terms	1.92	1.19	1	7
Length of incarceration (in days)	2,074	2,279	16	12,776
Property offense	17%	--	0	1
Violent offense	18%	--	0	1
Drug offense	45%	--	0	1
Other offense	20%	--	0	1
Single	57%	--	0	1
Married	25%	--	0	1
Divorced	18%	--	0	1
Has children	70%	--	0	1
Needs medical treatment	30%	--	0	1
Poor mental health	0.86	0.87	0	3

Table 6.2 Bivariate Correlation Matrix for all Study Variables ($N = 510$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	--																												
2	0.21*	--																											
3	-0.05	0.00	--																										
4	-0.08	0.04	0.16*	--																									
5	-0.09*	-0.03	0.15*	0.88*	--																								
6	0.15*	0.08	-0.3*	-0.22*	-0.23*	--																							
7	-0.03	-0.09*	-0.31*	-0.16*	-0.17*	0.05	--																						
8	0.04	0.07	0.12*	0.01	0.04	-0.05	-0.15*	--																					
9	0.02	0.07	0.21*	0.09*	0.09*	-0.22*	-0.26*	0.00	--																				
10	0.02	0.04	-0.08	-0.08*	-0.10	-0.01	0.15*	-0.2*	0.04	--																			
11	-0.07	-0.04	0.09*	0.11*	0.09*	-0.01	-0.05	-0.03	-0.06	-0.38*	--																		
12	0.06	0.01	0.00	-0.02	0.01	0.03	-0.10*	0.23*	0.04	-0.51*	-0.48*	--																	
13	-0.03	-0.02	-0.03	-0.02	0.00	-0.01	0.01	-0.05	-0.05	-0.16*	-0.15*	-0.20*	--																
14	0.12*	0.00	0.05	-0.04	-0.04	0.01	-0.07	0.12*	-0.01	-0.05	-0.10*	0.14*	-0.01	--															
15	-0.01	0.03	-0.03	-0.03	0.04	0.08	-0.09*	0.10*	0.03	-0.11*	0.02	0.09*	-0.01	-0.37*	--														
16	0.00	0.01	0.00	0.02	0.01	-0.13*	0.04	-0.06	0.05	0.08*	0.05	-0.11*	-0.03	-0.24*	-0.53*	--													
17	-0.09*	-0.06	-0.01	0.05	-0.02	0.03	0.15*	-0.17*	-0.08	0.10*	0.01	-0.13*	0.06	-0.17*	-0.37*	-0.24*	--												
18	0.06	0.05	-0.15*	-0.12*	-0.10*	0.05	0.28*	0.17*	0.00	-0.03	0.03	-0.01	0.01	-0.02	0.10*	-0.04	-0.07*	--											
19	-0.06	-0.08	0.00	0.04	0.05	-0.02	0.32*	0.12*	-0.19*	0.02	0.04	-0.05	-0.01	0.11*	-0.01	-0.05	-0.03	-0.20*	--										
20	-0.08	0.05	-0.10*	-0.06	-0.05	0.03	-0.03	0.03	0.05	0.04	0.01	-0.04	-0.02	-0.01	0.06	-0.03	-0.04	0.11*	-0.12*	--									
21	0.10*	-0.01	-0.06	-0.07	-0.07	0.04	-0.05	0.07*	0.02	-0.01	-0.06	0.07	0.00	0.04	-0.02	0.00	-0.02	0.16*	-0.13*	-0.22*	--								
22	0.01	-0.05	0.08	0.04	0.04	0.02	0.00	0.00	-0.10*	-0.04	0.09*	-0.05	-0.01	0.05	0.00	-0.04	0.01	-0.29*	0.39*	-0.40*	-0.36*	--							
23	-0.04	0.02	0.05	0.07	0.07	-0.09*	0.07*	-0.09*	0.05	0.02	-0.06	0.03	0.02	-0.08*	-0.03	0.07*	0.04	0.08*	-0.22*	-0.28*	-0.25*	-0.45*	--						
24	0.01	0.09*	0.11*	0.02	0.04	0.12*	-0.42*	0.04	0.06	-0.14*	0.12*	0.03	-0.01	0.04	0.11*	-0.06	-0.12*	-0.10*	-0.03	0.08*	0.00	0.03	-0.11*	--					
25	0.03	-0.07	-0.04	0.02	0.01	-0.10*	0.18*	0.08*	0.01	0.02	-0.03	0.02	-0.01	0.00	-0.04	0.02	0.03	0.08*	0.05	-0.03	0.04	-0.01	0.00	-0.69*	--				
26	-0.04	-0.04	-0.10*	-0.06	-0.06	-0.04	0.35*	-0.15*	-0.09*	0.16*	-0.12*	-0.05	0.02	-0.05	-0.10*	0.06	0.12*	0.04	-0.02	-0.07	-0.05	-0.04	0.14*	-0.53*	-0.26*	--			
27	0.01	-0.08	-0.06	-0.01	0.00	-0.07	0.15*	0.05	-0.10*	-0.10*	0.02	0.06	0.02	-0.04	-0.01	0.04	0.00	0.10*	-0.06	-0.05	0.06	-0.06	0.07	-0.28*	0.20*	0.14*	--		
28	0.06	0.07	-0.40*	-0.12*	-0.19*	0.22*	0.31*	-0.14*	-0.22*	0.10*	-0.03	-0.08	0.04	0.01	-0.06	-0.08	0.16*	0.07	0.07	0.00	0.03	-0.04	0.02	-0.13*	0.07	0.09*	-0.04	--	
29	0.11*	0.07	-0.48*	-0.24*	-0.23*	0.56*	0.20*	-0.04	-0.2*	0.03	0.01	-0.05	0.01	0.03	0.05	-0.07	-0.01	0.14	0.01	0.05	0.02	-0.02	-0.03	0.02	-0.07	0.05	0.04	0.27*	--

Table 6.2a Numbered Variable List

1. Offending
2. Drug use
3. Physical health
4. Global emotional support
5. Global instrumental support
6. Stress
7. Age
8. Gang status
9. Employment
10. White
11. Black/African American
12. Latino/Hispanic
13. Other race
14. Eighth grade
15. Some high school
16. High school graduate
17. College
18. Prior prison terms
19. Length of incarceration
20. Property offense
21. Violent offense
22. Drug offense
23. Other offense
24. Single
25. Married
26. Divorced
27. Has children
28. Needs medical treatment
29. Poor mental health

Results

Table 6.3 presents the results from the multivariate analyses predicting self-reported offending (Model 1) and drug use (Model 2) at wave 2 with a final sample size of 510. Both models had highly significant Wald χ^2 test statistics (Model 1 $\chi^2 = 75.33$, $p <$ 0.01 and Model 2 $\chi^2 = 147.94$, $p < 0.01$) indicating good model fit. Model 1's (offending) pseudo R^2 was 0.14 and Model 2's (drug use) pseudo R^2 was 0.18. Technically, this demonstrates that Model 2's independent and control variables are slightly better at explaining drug-using behaviors in the month post-release than they are at explaining self-reported offending. Additionally, the overdispersion parameter in both negative binomial regression models was positive, indicating the data are consistent with the model.[25] In terms of collinearity, all variables in both models had variance inflation factors (VIFs) and condition indices under the standard thresholds. All VIFs were below 2.28 with a mean VIF of 1.76 and a condition index of 23.07, which is below the standard cutoff of 30 (Mason & Perreault, 1991).

Starting with a discussion of the primary independent variables that are significant from Model 1 in Table 6.3, we see that instrumental support is negatively associated with offending ($b = -1.28$, $p < 0.05$). Thus, having instrumental support decreases the likelihood of self-reported offending by a factor of 0.28, holding other variables constant.[26] In other words, having family and friends who are directly supporting the respondent via financial or material sustenance makes a difference on the respondent's choice to engage in criminal behaviors. Next, Model 1 in Table 6.3 shows that stress is positively correlated with offending ($b = 0.74$, $p < 0.05$). Being stressed at

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[25] Had the overdispersion parameter been negative, the data would not be considered consistent with the model (Greene, 1994).
[26] The discussion of results will use incidence rate ratios (IRR) to compare as these are estimated coefficients that are transformed for ease of interpretation.

wave 2 increases the likelihood of offending by a factor of 2.09, with all other variables held constant. As hypothesized, the extremely stressful situation surrounding reintegration may actually drive ex-prisoners to commit *more* crime; with release having the opposite of the intended effect on desistance.

Gang status approaches significance at the 0.10 level in the positive direction (b = 0.66). Thus, those who are considered being in a gang or security threat group by TDCJ have a higher likelihood of reporting offending in the month post-release. This is consistent with data on gang members who tend to offend consistently. Additionally, research shows that even if their level of embeddedness in the gang is modest at best, they are still offending at a higher rate (Sweeten, Pyrooz, & Piquero, 2013) compared to their non-gang involved counterparts. Employment also approaches significance at the 0.10 level (b = 0.63). However, it is in an unexpected direction because research suggests that having a job would actually *decrease* future offending (Laub & Sampson, 1993; Uggen, 2000). Attending some college prior to the current incarceration was negatively related to offending at the 0.10 level (b = -1.26). In other words, those who enrolled in and at least attended some courses at the college level are less likely to report offending after prison release. This is a promising result to better understand post-release offending in that education is an important predictor of post-release recidivism (Lockwood, Nally, Ho, & Knutson, 2012). Lastly, having been previously incarcerated was positively related to offending (b = 0.33, p < 0.05). Thus, having more than one prior prison term at TDCJ on the respondent's record increases the likelihood of self-reported offending by a factor of 1.39, holding all other variables constant. Consistent with some recent literature implicating prisons as "schools of crime", it is not surprising that more time behind bars likely deepens illegal involvement by having a criminogenic

effect on prisoners (Cullen, Jonson, & Nagin, 2011). Other research suggests that longer

incarceration stays away from loved ones will see a greater deterioration of support after

community reentry (Pettus-Davis, Doherty, et al., 2017), which may inexorably affect

offending behaviors as well.

Turning to Model 2 in Table 6.3, there are a few independent variables

significantly related to self-reported drug use one month post-release. First, global

emotional support is positively associated with drug use (b = 1.68, p < 0.05). Although at

first glance, this seems like a counterintuitive finding, closer inspection reveals it makes

some sense. Those who use drugs regularly and/or are addicts are also more likely to

need emotional support from their family and friends. For example, a middle-aged man

recently released from prison after serving ten years is probably going to depend on his

loved ones for some level of expressive support before getting fully back on his feet. At

the same time, he is likely to revert back to old drug-using habits irrespective of how

much emotional support he receives. In other words, both the positive support and the

drug use—perhaps minor drug use—may be occurring simultaneously since many non-

addicted family members and friends may be enabling drug-using behaviors without

awareness (Mowen & Visher, 2015; Visher & Travis, 2003). Conversely, global

instrumental support is negatively associated with drug use (b = -1.46, p < 0.05). In

other words, for every one unit increase in global instrumental support, the likelihood of

the respondent using drugs decreases by a factor of 0.23 while holding all other variables

constant. Similar to the finding of instrumental support on offending, it makes sense that

respondents receiving direct financial and material care from their loved ones are less

likely to engage in drug use. Perhaps not using substances is a requirement for living in a

family member's house, for example. Recall that wave 2 was conducted barely one month

post-release; which leaves very little time for the ex-prisoner to lose instrumental support from family and friends by making critical mistakes.

Turning to the control variables from Model 2 in Table 6.3, we see that gang status is again positively associated (b = 0.81, p < 0.10) with the dependent variable which in this case is drug use. In other words, being in a gang increases the likelihood of drug use by a factor of 2.25, holding all other variables constant. Again, this finding is consistent with the literature that dictates those who are involved with gangs are more likely to engage in all types of antisocial and deviant behaviors—especially if their gang is involved in drug using and selling (Esbensen & Huizinga, 1993). Having a job at wave 2 is also positively associated with using drugs (b = 0.90, p < 0.05). Again, though on the surface, this seems like a contradictory finding, it makes sense that employment might be positively related to drug use. For one, the quality of the employment was not taken into account in these analyses. Much of the desistance literature discusses the quality of the job, not just the fact that the ex-prisoner *has* a job to be able to lead to reductions in deviant behavior. Additionally, the amount of hours worked per week was not taken into consideration. Those who reported having a job at wave 2 may just have a part time (i.e., less than 20 hours per week) or even an odd job (e.g., moving furniture) that is not consistent work on a regular basis. Moreover, those with a job at wave 2 might be spending their earnings on substances as a way to unwind and decompress from the stresses of reintegration and employment. Reporting being Black/African American has a negative association with drug use at wave 2 (b = -1.11, p < 0.05). Thus, being Black/African American decreases the likelihood of using drugs (or at least admitting to drug use) by a factor of 0.33, holding other variables in the model constant.

Table 6.3 Negative Binomial Regression Models Predicting Offending and Drug Use (*N* = 510)

Variables	Model 1: Offending		Model 2: Drug Use	
	b	(SE)	*b*	(SE)
Physical health	0.08	(0.28)	0.14	(0.32)
Global emotional support	0.61	(0.55)	1.68**	(0.66)
Global instrumental support	-1.28**	(0.58)	-1.46**	(0.72)
Stress	0.74**	(0.34)	0.47	(0.31)
Age	-0.05**	(0.02)	-0.05	(0.03)
Gang status	0.66*	(0.39)	0.81*	(0.46)
Employment	0.63*	(0.36)	0.90**	(0.36)
Black/African American	-0.74	(0.55)	-1.11**	(0.51)
Latino/Hispanic	-0.04	(0.52)	-0.74	(0.46)
Other race	-0.08	(0.85)	0.05	(0.90)
Eighth grade	0.65	(0.43)	0.12	(0.50)
High school graduate	0.14	(0.45)	-0.63	(0.47)
College	-1.26*	(0.71)	-0.85	(0.62)
Prior prison terms	0.33**	(0.15)	0.30	(0.26)
Length of incarceration (in days)	0.00	(0.00)	-0.00	(0.00)
Property offense	-1.03	(0.74)	-0.33	(0.59)
Violent offense	0.54	(0.50)	-0.09	(0.56)
Drug offense	-0.12	(0.54)	-0.34	(0.52)
Married	0.36	(0.47)	-0.60	(0.53)
Divorced	0.77	(0.57)	0.13	(0.54)
Has children	0.20	(0.41)	-0.24	(0.37)
Needs medical treatment	0.60	(0.44)	0.74	(0.55)
Poor mental health	0.13	(0.29)	0.21	(0.29)
Constant	-1.39	(1.45)	-2.40*	(1.34)
Wald χ2	75.33***		147.94***	
Pseudo R^2	0.1433		0.1803	

Notes:

Entries are unstandardized regression coefficients (*b*).

Robust standard errors in parentheses (SE).

*** p<0.01, ** p<0.05, * p<0.1

Conclusion

The first month out of prison is extremely stressful for reintegrating ex-prisoners

(Western et al., 2015; Wimberly & Engstrom, 2018). They are expected to not only

adhere to their parole terms, but also quickly find a job, pay their child support and/or

alimony and/or restitution, find a safe place to live, and stop engaging with their felonious friends and family members, all while living in the same, likely disadvantaged, neighborhood with the same peers who were incarcerated alongside them (Boman & Mowen, 2017). This common situation does not create a space where offending and drug use are discouraged. In fact, just the opposite occurs with antisocial behavior and easier access to substances (compared to in-prison access) practically ubiquitous. The majority of the findings here illustrate the need to focus on both emotional and instrumental social support from loved ones in the weeks post-release as a way to decrease recidivism.

Of particular importance for family members is the balancing act necessary to help their family members achieve low rates of offending and drug use vis-à-vis reducing the individual's stress level while also extending support in the ways that are needed for the ex-prisoner. In other words, family members who give emotional support when instrumental support is needed or vice versa are missing vital opportunities to help steer their family members away from criminogenic peers, places, and situations. Moreover, aside from a potential missed opportunity to help the ex-prisoner, the mismatched support could actually be causing more stress; ultimately leading to more offending and drug use. However, instrumental support—at least in the first month out—is extremely important to reduce offending and drug use and might have other positive unintended consequences as well. The issue, however, is that many of the families these ex-prisoners return to may not have the instrumental capability or material means (e.g., limited financial resources) to help ex-prisoners. Thus, the determination on the part of the ex-prisoner must be quite high to disengage from the only world most of them have ever known.

CHAPTER 7

DISCUSSION

For decades, the uncertainty about the mass exodus of prisoners—after many years of millions of prisoners behind bars—dominated research (Mears & Cochran, 2015; Petersilia, 2004; Seiter & Kadela, 2003; Travis, 2000). Now that "mass reentry" is in full force—even being referred to as a "social movement,"—research has begun to dig deeper into the complex interactions and minutiae involved in prisoner reintegration (Turner, 2017, p. 342). This dissertation answered the call to research by expanding on the interrelationships among physical health, social support, stress, offending, and drug use in a sample of reentering prisoners using data from the LoneStar Project. Specifically focusing on physical health as an outcome in the reentry process is a fairly new endeavor in this area. Nevertheless, the primary overall goal of this type of research should be linking criminal justice and public health by creating a field of epidemiological criminology (Vaughn et al., 2012): "to draw a significant number of the theories into a coherent framework that accommodates examining criminal and health behaviors in a consistent manner grounded in the same paradigms regardless of the discipline" (Akers & Lanier, 2009, p. 400).

Profile of Inmate Health

The profile of inmate health chapter (Chapter 4) laid out a summary of the current and chronic health issues experienced by participants in the LoneStar Project. The goal of this chapter was to begin to create a body of literature detailing the physical health ailments reintegrating prisoners must overcome. Although the Bureau of Justice Statistics (BJS) gathers data on correctional populations,[27] understanding the intricacies

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[27] BJS collects data on in-custody deaths since 2000 which can give some indication of the health and wellness of inmates, but only collects aggregate counts of mortality. Moreover, although the

of this national concern on a more individualized level is a defensible approach; rather than reading these numbers from an aggregate standpoint. For instance, by closely examining individual-level accounts, one can discover the full depiction of the happenings in that ex-prisoner's life. Otherwise, they are merely data points en masse without any real empathy or understanding of the personal circumstances that caused them to be included in a prisoner data set in the first place. Though it is difficult to extrapolate to the entire U.S. prison population based on these data, it is nevertheless a step in the right direction to better acknowledge the ways in which ex-prisoners needs are (un)met.

Of note with regard to the descriptive statistics of diseases is that 12% of the sample (99 men) said that a doctor or health professional told them they have hepatitis B or hepatitis C (Paintsil, He, Peters, Lindenbach, & Heimer, 2010). Compared to the general population, this number is staggering and the opioid epidemic may be to blame (Paintsil et al., 2010; Zibbell et al., 2018). Injection of prescription opioids has skyrocket recently and needle sharing is the most common route of transmission for hepatitis C; leaving the positive correlation between the two partially responsible for the recent epidemic (Zibbell et al., 2018).

Although saying that 6% of the sample has a diagnosis of post-traumatic stress disorder (PTSD) is lower than other prison samples,[28] PTSD is a particularly incendiary illness. This is because PTSD affects *both* physical and mental health simultaneously, has substantially higher rates among male prisoners, and is understudied in the correctional

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Survey of Inmates in State Correctional Facilities (SISCF) is currently active, it has only been conducted in 1974, 1979, 1986, 1991, 1997, 2004, and 2016 with the latest data available being from 2004.

[28] Other prison samples have PTSD rates ranging from 4% to 21% (Goff et al., 2007; Mallik-Kane & Visher, 2008).

population (Gibson et al., 1999; Goff et al., 2007). The lack of knowledge on how the disease manifests in prisoners specifically is problematic since it is common for prisoners to have a history of serious and chronic trauma. Moreover, successful in-prison treatment of multiple incident PTSD indicates that state prisons can engage in these therapeutic opportunities, especially since many prisoners with PTSD are veterans (Campbell et al., 2016; Gros et al., 2016).

As detailed in the profile of inmate health chapter (Chapter 4), gang members in this sample have better physical health across the board compared to their non-gang counterparts. The potential reason for this surprising finding—since gang members are more violent than non-gang members—may be because gang members generally comprise a younger age group (Pyrooz, 2014; Pyrooz, Turanovic, Decker, & Wu, 2016) and younger people have better health overall. Additionally, since a sample weight was used in all multivariate models to balance gang membership in the sample, this statistical correction might be driving the positive self-ratings of physical health for gang members.

The most palpable finding from the profile of inmate health chapter is that of the moderating effects that stress and mental health have on one's physical health (see e.g., Western, Braga, Davis, & Sirois, 2015; Wimberly & Engstrom, 2017) in addition to the direct effects of reentry stress on physical health. Essentially, what is important to take from this finding is that one's stress level (particularly reentry stress in this instance) interacted with mental health has a more significant impact on physical health than just stress or mental health alone. For example, a reentering prisoner who is not very stressed about their upcoming reentry (these measures were taken at baseline) and reports their mental health as moderately decent (i.e., "good" or "excellent") is much

more likely to report being in good or excellent physical health as well. The repercussions for this are more striking when the example is reversed. Thus, when a reentering prisoner is stressed about their upcoming reentry *and* reports their mental health as less than ideal, they are much more likely to also report their physical health as poor or fair. Moving forward in prisoner reentry research, observing how different types of stress affect the respondents at later—when reentry stress is no longer an issue—will be of interest to better understand physical health outcomes in the reintegration process.

Social Support and Physical Health

The social support and physical health chapter focused on how social support changes between the time an individual is locked up through their first few weeks out of prison. The stability of social support during this volatile time was an important question to answer in the prisoner reentry literature (Binswanger et al., 2011; Nelson et al., 1999). This time period (approximately one month) should be of utmost concern to criminologists, correctional leaders, and health professionals since it is the time most wrought with instability and vulnerability, disorientation of the person's (likely new) role in society and within their family, and stress because of the unknown. Not to mention, ex-prisoners also face the logistical challenges and pressures associated with finding a safe and hospitable place to sleep, figuring out finances as a whole—but particularly getting a job as soon as possible, health care system barriers, parole conditions as an additional challenge, and the lack of knowledge on how to approach attaining basic human needs, makes successful reintegration that much more difficult.

That said, it is clear that perceptions of social support matter for physical health during this difficult time. Specifically, family emotional social support stability *and* family instrumental social support stability are positively correlated with good and

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excellent health in all four models whereas neither friend emotional support stability nor friend instrumental support stability were significant. The fact that family instrumental support had slightly stronger effects on physical health than family emotional support did was an expected finding (Taylor, 2015). In the sense that some ex-prisoners likely amass their emotional support from romantic or even friendly relationships, the lion's share of the burden with regard to essentials, such as sleeping and eating, are more likely to come from family members. Family members may feel more of an obligation—and for longer periods of time—to care for their loved ones post-release (Pettus-Davis, Doherty, et al., 2017). Additionally, instrumental support is easier to measure and recall (e.g., "my mother let me borrow the car" rather than "my mother gave me advice"), which may explain the differences in the magnitude of these support stability variables.

It is not surprising that peers do not give the same level of support needed for reentering prisoners as family members do. Friends likely have their own families and issues to deal with and parole conditions might prevent ex-prisoners from spending time with any deviant peers; let alone garnering support from them. The importance of the stability of familial support, especially in the first weeks out of prison, cannot be emphasized enough (Boman & Mowen, 2017; Brunton-Smith & McCarthy, 2016; Mowen & Visher, 2016; Naser & La Vigne, 2006). This area of research is missed or understated in much of the literature on general reentry processes. These individuals probably do not have anyone to turn for help and support, aside from their family members. Once that bond is weakened or broken—likely because of mistakes and problems created by the ex-prisoner—it is much harder to repair, especially after years of incarceration (Brunton-Smith & McCarthy, 2016).

Health, Social Support, and Offending

The health, social support, and offending chapter focused on how health, two types of social support (emotional and instrumental), and stress were associated with self-reported offending and drug use at one month post-release. The findings in Chapter 6 were thought-provoking in that many of the results supported past research and the dissertation's hypotheses while other results seemed counterintuitive at the outset. Changing the outcome from physical health in Chapters 4 and 5 to offending and drug use in Chapter 6 was compelling because it showed a natural progression from the baseline (in prison) interview through reentry for this sample of men. Specifically, by first examining the predictors of physical health in prison and then again during reentry, a more accurate assessment of what matters for this group in the later models predicting antisocial behavior transpired. It is easy to discuss the physical health of reentering individuals as a problematic concern and one that certainly requires attention and care. However, using health and health-analogous variables—such as stress and social support—as ways to measure recidivism are the next step in conceiving a well-rounded and comprehensive model of successful prisoner reintegration.

The most powerful finding from the health, social support, and offending chapter is that instrumental support from family and friends was negatively associated with both offending and drug use. What this essentially means is that the material or tangible elements of social support have a direct effect on the reentering prisoner's recidivism. This finding is not only revealing about the workings of the relationships ex-prisoners have with their family and friends, but it demonstrates that the ways in which loved ones are supportive has important consequences for the ex-prisoner's offending trajectory. The fact that instrumental support also predicted self-reported drug use is evidence of an

additional way that the family can help or hinder their loved one's progress post-release (Boman & Mowen, 2017; Visher & Travis, 2003).

The other major finding in Chapter 6 is that stress predicts offending positively and robustly. Stress has wide-ranging and significant consequences for many realms of post-release life (R. Glaser & Kiecolt-Glaser, 2005; Sigfusdottir, Kristjansson, Thorlindsson, & Allegrante, 2016; Sinha, 2008; Thoits, 1984). Given the literature on stress and its effects on one's well-being, this may be an unsurprising finding (Giarratano, Ford, & Nochajski, 2017; McEwen & Stellar, 2017; Thoits, 2010). However, the fact that stress had such a strong effect on offending directly, irrespective of the control variables and social support in the model is important to take note of. Though research clearly states that employment is the biggest deterrent from offending after prison release (Berg & Huebner, 2011; Uggen, 2000), perhaps stress is an overall moderating factor involved in the relationship between offending and various other positive reentry outcomes such as employment and finding stable living. Future research will need to test this pathway. The promising aspect of this stress and offending finding is twofold. First, previous research states that social support and social ties can actually work to decrease the negative effects of stressors via the buffering hypothesis (Cohen, 2004; Cohen & Wills, 1985; Thoits, 1995). Thus, if family members do their best to upkeep the relationship while the ex-prisoner is incarcerated through visitation and other forms of contact, it stands to reason that encouraging and supportive behavior will have an impact on their stress level and ultimately offending as well. Second, since we know that stress has such a strong impact on the likelihood of offending; it is feasible that the institution provide targeted resources to combat the stressors associated with

reentry that can aid the ex-prisoner in navigating the taxing journey to full societal reintegration.

Summary of Key Findings

A summary of the overall results of the dissertation are presented in Table 7.1 and warrant three broader points of discussion. As a reminder, the guiding research question of the dissertation was, "What personal and carceral factors affect the physical health of incarcerated individuals?" In addition, I asked how social support and the stability of social support influence the physical health of reentering individuals and how that differs by who is the contributor (i.e., family or friends) and the type of support (i.e., emotional or instrumental). Moreover, using all the previous findings on physical health, social support, and stress, the final research question asked how these elements altered self-reported offending and drug use after the ex-prisoner has been released. This research confirms the findings from previous studies of the relationships among the key independent variables and their influence on physical health and subsequently, offending and drug use. The only major independent variable that was hypothesized to have an effect on offending and drug use, but did not, was physical health. More information on the potential reason for this is discussed below but suffice it to say that measures of objective physical health—assessed by health professionals—may be a more promising way to operationalize physical health for ex-prisoners.

Table 7.1 Summary of Key Findings

Independent variable	Dependent variable	Positive or negative relationship?
Chapter 4: Profile of Inmate Health		
Latino/Hispanic	Physical health	Negative
Reentry stress	Physical health	Negative
Prior prison terms	Physical health	Positive
Age	Physical health	Negative
Gang status	Physical health	Positive
Needs health care	Physical health	Negative
Chronic disease	Physical health	Negative
Poor mental health	Physical health	Negative
Reentry stress X poor mental health	Physical health	Positive
Chapter 5: Social Support and Physical Health		
Family emotional support stability	Physical health	Positive
Family instrumental support stability	Physical health	Positive
Latino/Hispanic	Physical health	Negative
Needs medical treatment	Physical health	Negative
Chapter 6: Health, Social Support, and Offending		
Global instrumental support	Offending	Negative
Stress (scale)	Offending	Positive
Age	Offending	Negative
Gang status	Offending	Positive
Current employment	Offending	Positive
College education	Offending	Negative
Prior prison terms	Offending	Positive
Global emotional support	Drug use	Positive
Global instrumental support	Drug use	Negative
Gang status	Drug use	Positive
Current employment	Drug use	Positive
Black/African American	Drug use	Negative

Notes:
Findings that were statistically significant in both Chapters 4 and 5 are not repeated in the table (e.g., age) since physical health was the dependent variable of interest in both chapters.

Social Support

In short, social support matters. It matters not only for physical health evaluated in the same wave of data collection, but also for its effect on a later point in time (wave 2). Its stability over time matters for physical health of reintegrating prisoners. And, social support matters for the level of offending and drug use participation in the first few weeks after prison release. Specifically, family support seemed to emerge as much

more important than support from peers. This may be because many former prisoners often live with family members upon release, rely on family for a larger network of support during their transition, and regularly utilize family and familial contacts as a way to secure employment (Braman, 2007; Harding et al., 2014; Nelson et al., 1999; Uggen, Wakefield, & Western, 2005). Moreover, the ubiquitous role of family in the reintegration process is even noticed by the ex-prisoners themselves. Nelson et al. (1999) found that individuals, "overwhelmingly and consistently cited family support as being an important factor in the process of release and integration" (as cited in Mowen & Visher, 2015, p. 340). And, as more and more individuals face the challenges associated with reentry, the role of family and family relationships for successful reintegration becomes even more extensive.

A new area of social support research focuses on stability over time. Much research has laid out the argument that economic insecurities, parole restraints, and other related reentry challenges require enough adjustment on their own that social support should be ever-present. However, there exists a deterioration of post-incarceration social support as it diminishes over time, especially as the length of the incarceration increases (Pettus-Davis, Doherty, et al., 2017). Harding and colleagues (2014) tracked a group of former prisoners for a multi-year period and found that those who more easily leveraged familial social support *and* when it was stable over time, had a much greater chance of attaining independent economic security. Other, older research in social psychology operationalized social support as a stable trait conditioned by one's personality characteristics, particularly in parent-child relationships (Sarason, Sarason, & Shearin, 1986) and on health outcomes (Uchino et al., 1996). More research in this

area is necessary to tease out the stability versus fluidity of social support and the mechanisms by which that matters for health and offending.

Stress

Both Chapters 4 and 6 conclude that stress—specifically reentry stress—and overall stress post-release were significantly associated with physical health in prison and with offending after prison release. In both instances, the higher the level of stress felt by the respondent, the higher the likelihood of poor physical health and the higher the likelihood of offending, respectively. Additionally, as Figure 4.2 illustrates, the impact of the level of reentry stress on having excellent physical health is conditioned by the respondent's mental health. In other words, mental health and reentry stress work in tandem to benefit or hinder one's perception of their physical health. Thus, this finding could be working through those who already have poor mental health; thereby adding yet another piece to the personality disposition and reentry outcome puzzle.

In Chapter 6, results showed that stress was highly associated with self-reported offending. This relationship was quite strong with an incidence rate ratio of 2.09. In other words, those who felt stress at wave 2 had about double the likelihood of engaging in property offending, violent offending, and/or illicit sales, in *just* the one month since being released from prison. This is no trivial conclusion. It is remarkable that in just the few weeks of being "free" from the constraints of prison, the relentless stress surrounding the reintegration process actually *pushes* the respondent back to committing crime, much like Agnew's general strain theory would predict (Agnew, 1992). Thus, creating the opposite of the intended effect of a prison sentence; that is, desistance from crime. Rearrest and recidivism data would not have been able to measure this nuanced finding of stress on offending. More than likely all the respondents in our

sample who admitted to offending at wave 2 did so under the radar of parole officers and police officers.

Although previous research has found a moderate effect of stress on delinquency (Hoffmann & Su, 1997), most of the research in this area focuses on stress's effects on engaging in substance use (Hoffmann & Su, 1997; Sinha, 2008; Wimberly & Engstrom, 2018), and might be working through neighborhood disadvantage (Boardman, Finch, Ellison, Williams, & Jackson, 2001). But, the current study did not find a significant association between stress and drug use at wave 2. Future research should explore why different kinds of substance-using behaviors may be more strongly influenced by stress.

Latino/Hispanic Health

Finally, the results illustrating worse health outcomes for Latinos/Hispanics in the sample are worthy of attention. In both the profile of inmate health chapter (Chapter 4) and the health and social support chapter (Chapter 5) those who identified as Latino/Hispanic were more likely to report having worse health (Chapter 4; b = -0.53, p < 0.01; b = -0.51; p < 0.01) or being in fair/poor health compared to good health across all models (Chapter 5; b = -1.11, p < 0.01; b = -0.98; p < 0.05; b = -1.04, p < 0.05; b = -0.99; p < 0.05). These findings are consistent with the research asserting that non-White prisoners have worse health outcomes than White prisoners, primarily stemming from social stratification which leads to racial and ethnic disparities in health (Brinkley-Rubinstein, 2013; Kirk & Wakefield, 2018; Link & Phelan, 1995). However, research investigating the "Latino paradox" demonstrates otherwise.

The Latino paradox is shown in a number of different fields and demonstrates that Hispanic populations experience better health and lower levels of violence even after their high level of disadvantage is taken into account (Acevedo-Garcia & Bates, 2008;

Lara, Gamboa, Kahramanian, Morales, & Hayes Bautista, 2005). The contradicted

expectations are well documented in the social gradient and health literature: individuals

with higher levels of socioeconomic status (SES) have better health than those with lower

levels of SES (Lara et al., 2005). Many of the same circumstances plague African

American communities, but the paradoxical finding is that, despite these practically

equivalent social and economic problems, Hispanics seem to emerge as healthier, less

violent, and less criminally involved than African Americans and in some cases, Whites

(Sampson & Bean, 2006; Steffensmeier, Feldmeyer, Harris, & Ulmer, 2011). Thus, the

findings that Latinos/Hispanics in this sample have worse health outcomes across the

board compared to both the Whites and Blacks/African Americans warrant some further

discussion.

There are several plausible reasons for these results. For one, since the entire

sample is made up of Texas residents—whose largest ethnic minority is

Latinos/Hispanics by far (U.S. Census Bureau, 2015)—the sheer number of

Latinos/Hispanics (39%) compared to the other racial groups in the sample (Whites =

29%, Blacks/African Americans = 26%, and other races = 6%) may be driving the

strength of this finding of worse health. Second, perhaps when large numbers of

Hispanics are assimilated into a general population; they may lose some of their strong

culture, which is usually cited as a protective benefit of their health (Acevedo-Garcia &

Bates, 2008). Third, research has suggested that there are specific health conditions in

which Latinos do not exhibit this health advantage—diabetes, obesity, HIV/AIDS to

name a few—all of which were assessed in this research and could be prompting these

results (Bates, Acevedo-Garcia, Alegría, & Krieger, 2007). Lastly, since Texas shares a

border with Mexico, there might be issues of prejudicial behavior. Essentially,

Latino/Hispanic immigrants may feel a sense of discrimination and/or racism by the institutions meant to serve them and because of this feel less inclined to engage in any governmental organization that may not look at them as legitimate Americans deserving of welfare or health services. Research has suggested that there is an inverse relationship between discrimination and health (Paradies, 2006; D. R. Williams & Mohammed, 2009) that may prevent Latinos/Hispanics from engaging with state institutions; thereby prohibiting their desire to seek out healthy habits such as seeing a doctor regularly.

Limitations

All research has limitations and this dissertation is no different. First, with an entirely male sample, the findings are missing much of how health, stress, and social support operate differently with female ex-prisoners (Pettus-Davis, Veeh, Davis, & Tripodi, 2017; Shumaker & Hill, 1991; Wohlgemuth & Betz, 1991). Their pathways to prison, including trauma, abuse, and drug addiction, and their responsibilities—such as child rearing—after release from prison create a completely different set of needs (Holtfreter, Reisig, & Morash, 2004; Kruttschnitt & Gartner, 2003). Since the female imprisonment rate of growth has outpaced men by more than 50% since 1980 and is over nine times the size of the 1978 numbers, it is imperative research start focusing on women's special circumstances and conditions (Sawyer, 2018; The Sentencing Project, 2015). Their particular health needs while incarcerated, such as gynecological and reproductive health issues are commonly unmet and even ignored (Braithwaite, Treadwell, & Arriola, 2005). Future research interested in social support and physical health of reentering prisoners must take females into account.

Next, all the analyses in the dissertation were conducted using baseline (in prison) and wave 2 (one month post-release) measures. The LoneStar Project administered interviews with respondents at wave 3 (nine months post-release) as well, but the data were still being collected at time of writing. Had wave 3 been included in the dissertation than within individual health, social support, stress, and offending would have been analyzed over time using hierarchical linear modeling. This analytic method would have better explored changes in social support over time as well as how reentry stress (measured in prison) and other forms of stress (measured after prison) affected physical health and offending nearly a year later (Woltman, Feldstain, MacKay, & Rocchi, 2012). Wave 3 measures will certainly be included in future analyses using the LoneStar Project.

The third limitation of this dissertation deals with perceptions, not objective reality. For social support, it is nearly impossible to scientifically measure one's actual level of social support and how it may change over time (Martinez & Christian, 2009; Uchino, 2004). This is especially the case because social support is two sided: it has a giver and a receiver. A person who is giving what they deem as sufficient and pertinent support may not be what the receiver needs or even wants; which may cause conflict between the two people (Cohen et al., 2000; Smith et al., 1994). What is of consequence, however, is how the receiver interprets the support. The fact of the matter is that perceptions are what actually count because the ex-prisoner needs to *feel* supported, whatever that may mean for each individual relationship and situation (Cullen, 1994). Thus, social support is only "seen" when the requirements of the recipient are being met.

According to the matching hypothesis, the effectiveness of any form of support is conditioned on the context and demands of the particular stressful circumstance (Cohen

& Wills, 1985; Cutrona & Russell, 1990). For example, for more manageable events such as finding a job, "action-facilitating social support such as informational or tangible support is predicted to be more important because it helps one deal directly with the stressor. That is, others can give advice on interviewing…" (Uchino, 2004, p. 25). If the event or stressor is less controllable, such as spousal infidelity, than emotional support would serve to assist in the adjustment process by consoling and assuring one's sense of self-worth and/or providing distractions while the individual takes the time to cope (Cutrona & Russell, 1990; Uchino, 2004). Thus, social support and the coping options available depend heavily on the individual and the context in which the support is needed (Uchino, 2009). Future research should improve this line of inquiry by using qualitative methods to examine the intricacies of these family relationships and how returning prisoners accept (or deny) the type of support offered (Martinez & Christian, 2009; Rozanova, Brown, Bhushan, Marcus, & Altice, 2015). This could be done by interviewing both the ex-prisoner and the family members over the course of the first year out of prison to capture how each person involved anticipated support to be given and received. The solution, in this case, might be as simple as having a direct conversation among family members upon release to indicate what is needed by the returning prisoner.

The other limitation of the dissertation, also under the perceptions versus reality umbrella, is that of physical health. It was quite surprising to see how many respondents at baseline indicated their health was good (42%) or excellent (37%). After digging into the data a bit deeper, it became clear that there is a big difference in how respondents perceived their health as opposed to if it were measured objectively by a health professional. A "chronic health issue" variety score was created using the four disease-

like health problems used previously in the chronic disease control variable: HIV/AIDS, hepatitis B or hepatitis C, seizure disorder, and anemia, but with the inclusion of chronic back pain, obesity, eye or vision problems, and oral health—all health issues that the Centers for Disease Control and/or the World Health Organization listed as chronic health problems. Comparing the prevalence of those with multiple chronic issues against their self-rated physical health was compelling. Despite the high prevalence of their health conditions, so many respondents rated their health as satisfactory. Recall that 80% of the sample rated their health as good or excellent. Please refer to the cross tabulations in Table 7.2.

Focusing on the respondents who rated their health as excellent, nearly 60% have at least two or more chronic health issues. The dissonance between the respondents' prevalence of health conditions and their positive self-assessments of their physical health is definitely a finding worth paying attention to. This may cause them to be less concerned about their physical conditions when they might actually be in need of medical treatment (Visher & Mallik-Kane, 2007). Perhaps this discrepancy is because they are about to reenter society (less than a week) and are generally thinking positively about themselves and their futures. It might also be due to the nature of their chronic ailments. Some of these conditions might be asymptomatic for long periods of time and these respondents might forget or simply be used to these conditions in a way that they do not see them as affecting their daily lives. Other similar research has come across this finding as well (Mallik-Kane & Visher, 2008). It is conceivable that self-rated health may simply not be a reliable measure of health in incarcerated samples, even though it has high validity and reliability in general population samples (Lundberg & Manderbacka, 1996; Miilunpalo et al., 1997; Schnittker & Bacak, 2014). Future research should

investigate how objective measures of physical health may have more concurrent validity for prison populations than the single item measure of self-rated health.

Table 7.2 Perceptions versus Reality of Physical Health (*N* = 800)

Self-rated physical health	0 chronic issues	1 chronic issue	2 chronic issues	3 chronic issues	4 or more chronic issues	Total:
Poor/fair health	12 7.14%	35 20.83%	43 25.60%	54 32.14%	24 14.29%	168 100%
Good health	20 5.88%	98 28.82%	115 33.82%	77 22.65%	30 8.83%	340 100%
Excellent health	24 8.22%	95 32.53%	107 36.64%	56 19.18%	10 3.42%	292 100%
Total:	56 7.00%	228 28.50%	265 33.13%	187 23.38%	64 7.99%	800 100%

Directions for Future Research

The first suggestion for future research is to continue to gather data on physical health, social support, stress, and self-reported offending for recently released individuals. More specifically, in general there is a lack of data and still much work to be done in the area of incarceration, reentry, and health. Current large scale data sets such as the Fragile Families and Child Wellbeing Study (FFCW), the National Longitudinal Survey of Youth (NLSY79 and NLSY97), and the National Longitudinal Study of Adolescent to Adult Health (Add Health) are all valuable data sets with rich information, but all share a common thread: none were built to look at the issues with incarceration and health specifically (Kirk & Wakefield, 2018; Massoglia & Pridemore, 2015). Ahalt and colleagues (2012) affirm this lack of data:

Our study highlights the extent to which relevant data are absent from most of the widely used and easily accessible national health data sets. Increasing the amount of available incarceration-related data could inform further studies and policies aimed at controlling health care costs, mitigating risk for chronic conditions among vulnerable populations, and narrowing demographic health disparities in outcomes and delivery. (p. 165)

Indeed, Visher and Travis (2003) suggest that data needed to build the evidence base of prisoner reentry must include an overarching outlook that takes into consideration a variety of personal and situational characteristics best understood in a longitudinal, life-course framework. This all-encompassing perspective should include pre-prison circumstances, in-prison experiences, immediate post-prison experiences, and post-release integration experiences.

An emphasis on qualitative research would surely move this area of research forward (see, e.g., Adams et al., 2011; Binswanger et al., 2012; Breese, Ra'el, & Grant, 2000; Condon et al., 2007; Harding, Wyse, Dobson, & Morenoff, 2014; Martinez & Christian, 2009). In particular, qualitative data would be able to parse out the complexities of these family relationships and how that affects the ex-prisoner. Moreover, future research should attempt to measure the health status of prisoners *prior* to entering prison and follow their trajectories. Identifying the full particulars of prisoners' journeys will not only add to the life-course framework, but will allow for more causal interpretations of incarceration's effects on health. Though quantitative analyses are fine at deciphering answers to the "what," "who," and "when" questions, being able to answer the "how," "how much," and "why" questions is the next frontier in this area of research.

The results shown here and by other interdisciplinary research endeavors should shed light on conceiving a new paradigm of health for ex-prisoners. Policymakers and practitioners would be well served to adopt a fresh model that recognizes health as a universal concern among returning prisoners instead of a special needs concern. In line with this push to examine health as a common burden, perhaps we should begin to study integration, not *re*integration. For the most part, ex-prisoners are having to start from scratch and learn themselves and their communities all over again in what Western et al. (2015) call a process of deprisonization. This is especially the case for those who have been incarcerated for long periods of time and are likely ignorant of newer technologies and resources. Having to integrate into a society that feels foreign to them or what Irwin (1970) characterized as, "reentering the world as a stranger" (p. 115) is indeed quite a stressful process. Future research should work to redefine what the health concerns are of this population as a whole with a focus on what feels like an initial integration.

Policy Recommendations

The first major policy implication and recommendation from the dissertation is to leverage family and friends in the reentry process more acutely. This can be as simple as having them attend a reentry preparation seminar or sending the ex-prisoner home with an information packet so that family members can be aware of how important the first few months out are to successful reintegration. Facilitating enhanced contact while in prison such as through video visitation while involving family members in reentry plans early on can go a long way as well. If there exists any conflict from past familial disputes, working through these problems before release would produce greater odds of successful reintegration since contention and negative interactions with family might be more poignant than pleasant exchanges (Mowen & Visher, 2015; Wallace et al., 2016).

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But, research has found that strong family relationships prior to prison do not automatically translate into positive reintegration outcomes; rather, the continual strengthening of these relationships throughout the entirety of the prison sentence can have a much stronger and sustained impact on reoffending risks and behaviors (Brunton-Smith & McCarthy, 2016). Recent research has posited that prosocial peer-to-peer programs would be beneficial for those who lack support from a stable family upon release (Boman & Mowen, 2017). Inherent in this idea is that ex-prisoners' associations with family and friends are naturally intertwined and both should be focused on prosocial outcomes for their loved one.

A second policy recommendation is to establish a more practical regimen of continuity of care and treatment between prisons and the community. For one, creating electronic health systems—similar to those the non-incarcerated population utilize—would create a much smoother transition back to society (Ahalt & Williams, 2017; Freudenberg & Heller, 2016; Makrides & Shulman, 2017; Plotkin & Blandford, 2017; Schlanger, 2017). Building a local system of records (e.g., county wide) would not add much additional burden to either the correctional or public health side, but once that infrastructure is in place, would be extremely useful for exiting prisoners. This is especially true for prisoners with substance abuse problems or serious health conditions that require constant attention because there exists a temporal and a functional gap between treatment need and treatment receipt once released (Hamilton & Belenko, 2015; Polonsky et al., 1994).

If not an integrated system of health care between institutions and the community—because staff might be reluctant to adopt new ways of working or because of financial restraints—than a focus on telemedicine would be a good next step.

Telemedicine has proven effective in the Texas Department of Criminal Justice, in part owed to the expansive size of the state and the often remote locations of prisons (Raimer & Stobo, 2004). It has also reduced the cost of transporting prisoners far distances for consultations and procedures (Brecht, Gray, Peterson, & Youngblood, 1996). However, effectively addressing these issues requires utmost coordination and a shared accountability approach of public and correctional health officials at both the local and state levels. With the eventual goal of bringing together prison health and public health in closer collaboration, we have to move away from merely talking about these policy recommendations and into actual implementation and evaluating returns in order to see improvements.

A significant barrier to attaining an effortless connection between community health services and prison health care is that as many as 70% of prisoners lack any type of health insurance (Mallik-Kane & Visher, 2008; Plotkin & Blandford, 2017). Prior to the enactment of the Affordable Care Act (ACA), lack of health insurance was an even larger problem for this population because many did not qualify for coverage (Cardwell, 2016; Plotkin & Blandford, 2017). Therefore whether their Medicaid was terminated during their incarceration was not a huge issue (Schlanger, 2017). But, under the provisions of the ACA, most of this population (i.e., 80%-90%) are now eligible for Medicaid based on their income status (Plotkin & Blandford, 2017). The ACA allowed states to expand their Medicaid coverage for those who are under 65 (Medicare is for those aged 65 and older) and earn under the federal poverty line—which changes annually (Plotkin & Blandford, 2017; Schlanger, 2017).[29] The resulting benefit of this is that people can enroll in Medicaid anytime—even during their incarceration—which can

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[29] As of January 2017, more than 30 states and the District of Columbia signed up for the Medicaid expansion funding (Schlanger, 2017).

aid those thinking ahead about release preparation while also helping to broaden the scope of the public health-correctional health link. [30] Thus, correctional staff should make sure not to terminate incoming prisoners' Medicaid status, but rather suspend it while they are incarcerated for easy reactivation upon release (Cardwell, 2016; Jannetta et al., 2018; Plotkin & Blandford, 2017; Schlanger, 2017).

What would be helpful alongside this need for health care to continue uninterrupted is a health needs assessment prior to prison release. That way, even if there is intermittent health insurance coverage or lack of shared health data systems, the ex-prisoner can physically take this information to their primary care doctor in the community. An assessment of health needs before the individual is released would undoubtedly help ensure continuity of care and screening for problems potentially requiring follow-up management. This assessment can also include evaluating each person's eligibility for Medicaid, disability, and other forms of public assistance and then linking them with the appropriate service care providers in the community (Mallik-Kane & Visher, 2008). This type of pre-release service would help facilitate treatment access in the first, critical, three months out and would help identify the individual needs of the ex-prisoners (Hamilton & Belenko, 2015).

The final policy implication and recommendation from this dissertation involves curtailing stress and stressful circumstances as much as possible. As is clear from the above results, stress can have a major impact on not only physical and mental health, but offending as well. This is a crucial finding insofar as the policies derived from it are cost effective and easily adoptable. In light of these known links among stress and the key

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[30] They can enroll in Medicaid anytime as long as they do not seek reimbursement for services provided while they were incarcerated (Jannetta et al., 2018).

variables of interest, policies targeting stress reduction during reintegration would be valuable for all parties. Ex-prisoners would have improved health and well-being, their family members and peers would likely take more of a role in their lives (assuming they desist), and public safety would be enhanced too. But, how can stress be reduced in a population of ex-prisoners who, arguably, have been continually stressed since the day they were incarcerated? One promising solution is the practice of yoga and/or mindfulness meditation (Shonin, Van Gordon, Slade, & Griffiths, 2013; Wimberly & Engstrom, 2018; Zgierska et al., 2009).

Recently, a study conducted in a Philadelphia reentry center found encouraging responses to attending a yoga class; producing a pro-social coping mechanism. Through an enrollment questionnaire, participants claimed they were primarily attending the classes for stress reduction and relaxation. Feedback from the weekly yoga classes highlighted positive health and wellness as a result. Specifically, "participants described yoga as alleviating stress and tension that arose from various challenges, including managing strained family relationships, securing stable living, and pursuing economic opportunities" (Wimberly & Engstrom, 2018, p. 5). A systematic review of the rehabilitative utility of Buddhist-derived interventions also found promising results. Participants in the mindfulness interventions revealed substantial improvements on five criminogenic features: (1) negative affect, (2) substance use and attitudes related to using substances, (3) anger and hostility, (4) the capacity to fully relax and unwind, and (5) positivity and overall self-esteem (Shonin et al., 2013).

Though not statistically significant in Chapter 6, there is a well-established association of the effects of stress on substance use (Sinha, 2008; Wimberly & Engstrom, 2018). Those who are under pressure or stress—such as the majority of ex-prisoners—are

less likely to exert self-control when faced with difficulties. Neuroscientific research has demonstrated that stress, especially acute stress, can compromise decisions that require self-control by intensifying the impact of immediate rewards and reducing the capacity of brain regions that are normally attuned with long-term goals (Maier, Makwana, & Hare, 2015). Thus, those in stressful situations are more likely to yield to pressures of substance-using behaviors. Furthermore, a review of prison meditation movements and mass incarceration revealed that the current evidence suggests that meditation training can be an effective, long-lasting intervention for people with addiction (Shonin et al., 2013). Although some of these movements (e.g., The Prison Yoga Project) simultaneously reduce drug use and recidivism after prison release, their primary objective is to improve the lives of prisoners while incarcerated (Lyons & Cantrell, 2016); with the hopes of continuing the practice for more positive reentry outcomes as well.

Conclusion

Even though the LoneStar Project and the data presented here may have their own set of limitations, the key findings in this dissertation should not be dismissed. The individual respondents in the sample are real men with legitimate physical health, social support, stress, offending, and drug-abusing needs. Their families and the communities they stem from are, at the time of writing, dealing with distress and instability following their father's/husband's/brother's/dad's/friend's return into their lives. Lest we forget that the purpose of research focusing on successful reintegration is solely for the important objective of keeping these men (and women) at home with their families and friends. Reducing the prison population while simultaneously making the streets safer, our neighbors healthier, and our families closer should be the preeminent focus of

reentry research. The best routes to succeed in this endeavor are not only costless or inexpensive, but directly benefit the family members and friends of ex-prisoners as well.

Moreover, correctional costs have soared to the point that both liberals and conservatives are hopeful about the focus on reentry research because mass imprisonment is no longer fiscally sustainable (S. Turner, 2017). It is no longer justifiable for the aging population as well; who constitute a much more expensive population (Bedard et al., 2017; Millemann et al., 2017). As such:

> A stronger research connection between the fields of public health and criminal justice is becoming increasingly necessary [with the overall goal being]...to provide a comprehensive epidemiologic statement aimed toward building an evidence-base on offenders under community supervision at the intersection of public health and criminal justice. (Vaughn et al., 2012, p. 166)

Collectively, with a greater focus on the continuity of care for justice-involved individuals, and recognizing that prison health is just another component of public health, this is the next best step to ensure that "successful" reintegration is defined as one's attainment of a basic level of material and social well-being as an upstanding community member (Conklin, Lincoln, & Flanigan, 1998; Gatherer et al., 2005; Western et al., 2015).

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APPENDIX A

SOCIAL SUPPORT SCALE ITEMS AND DESCRIPTIVE STATISTICS

Item	Wave 1 Mean	Wave 1 *SD*	Wave 2 Mean	Wave 2 *SD*
Family emotional support				
You have someone in your family who...				
1. Is willing to help you make decisions.	2.36	0.83	2.38	0.74
2. Really tries to help you.	2.49	0.77	2.53	0.68
3. Can give you the emotional help and support you need.	2.40	0.80	2.47	0.69
Friend emotional support				
You have a friend who you can...				
1. Share your joys and sorrows with.	1.81	1.02	1.87	0.89
2. Count on when things go wrong.	1.79	0.99	1.91	0.87
3. Talk to about your problems.	1.85	0.99	1.97	0.85
Family instrumental support				
You have someone in your family who would provide...				
1. Help or advice on finding a place to live.	2.44	0.76	2.40	0.71
2. Help or advice on finding a job.	2.38	0.79	2.35	0.73
3. Support for dealing with a substance abuse problem if you had one.	2.32	0.86	2.36	0.74
4. Transportation to work or other appointments if needed.	2.34	0.83	2.33	0.77
5. Financial support.	2.21	0.89	2.31	0.75
Friend instrumental support				
You have a friend who would provide...				
1. Help or advice on finding a place to live.	1.06	1.05	1.88	0.85
2. Help or advice on finding a job.	0.97	1.02	1.93	0.82
3. Support for dealing with a substance abuse problem if you had one.	0.93	1.01	1.93	0.89
4. Transportation to work or other appointments if needed.	0.86	0.97	1.81	0.93
5. Financial support.	0.32	0.47	1.66	0.90

APPENDIX B

SELF-REPORTED OFFENDING MEASURES AND FREQUENCIES

Measures	Frequency*
In the last month...	
Property offending	
1. How many times have you used a weapon or force to try to get money or things from people?	3
2. How many times have you entered or attempted to enter a building to steal something?	0
3. How many times have you stolen or tried to steal something?	2
4. How many times have you purposefully damaged or destroyed property that did not belong to you?	7
5. How many times have you used counterfeit money, stolen checks, credit cards, or other illegal means to pay for something?	0
6. How many times have you tried to trick someone by selling them something that was worthless or not what you said it was?	3
7. How many times have you lied about your identity or used a fake identity?	4
Violent offending	
1. How many times have you carried a weapon for protection?	14
2. How many times have you used a gun to shoot at someone?	3
3. How many times have you physically attacked a police officer?	0
4. How many times have you physically attacked another person?	5
5. How many times have you threatened to hurt someone?	27
6. How many times have you had or attempted to have sexual relations with someone against their will?	1
Illicit sales	
1. How many times have you sold something that was illegal?	4
2. How many times have you sold prescription pills?	4
3. How many times have you sold other illegal drugs?	5
4. How many times have you transported drugs for someone?	3

* Frequency here is a dichotomous indicator of the number of respondents who said "yes" to any of these questions. The total number of times *per respondent* is not shown.