ABSTRACT

Title of Dissertation:	EXPLORING THE ROLE OF MENTAL HEALTH IN PATHWAYS FROM INCARCERATION TO OFFENDING
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Research on the link between incarceration and offending largely finds a null or positive relationship – that is, incarceration either has no impact on future offending or it increases the likelihood of future offending. However, there is a dearth of research examining the pathways to post-incarceration offending, particularly with respect to the role of mental health as a potential mediator or moderator. This dissertation explored these pathways using the Stress Process Paradigm and the concept of stress proliferation as a framework. Using 12 years of data from the National Longitudinal Survey of Youth 1997, the current research examined mental health issues as a moderator and a mediator between incarceration and three measures of offending (delinquency variety score, binary delinquency, and arrest). Further, this dissertation examined how mental health issues as a mediator between incarceration and offending may vary by race and sex using moderated mediation. Finally, the influence of multiple post-incarceration stressors (specifically, being unemployed, being unmarried, and having physical health issues) on offending were examined, although mental health itself was examined as the primary interest and driver of differential offending outcomes. Results indicated that incarceration played a smaller role in the pathway to offending than expected, and mental health played a much larger role than expected – highlighting the importance of considering mental health when investigating the pathways to offending and other outcomes. The findings and their implications for theory and future research are discussed.

EXPLORING THE ROLE OF MENTAL HEALTH IN PATHWAYS FROM INCARCERATION TO OFFENDING

by

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DEDICATION

This work is dedicated to MR. I am endlessly grateful for your partnership.

W, S, and R, too!

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CFA – Confirmatory Factor Analysis

CFI – Comparative Fit Index

FE – Fixed Effects

GOF – Goodness of Fit

GSEM – Generalized Structural Equation Modeling

HFE – Hybrid Fixed Effects

IRR – Incidence-Rate Ratio

MAR – Missing At Random

MCAR – Missing Completely At Random

MHI-5 – Mental Health Inventory-5

MI – Modification Indices

MLMV – Maximum Likelihood with Missing Values

MNAR – Missing Not At Random

NLSY79 – National Longitudinal Survey of Youth 1979

NLSY97 – National Longitudinal Survey of Youth 1997

OR – Odds Ratio

RE – Random Effects

RMSEA – Root Mean Squared Error of Approximation

SEM – Structural Equation Modeling

SRMR – Standardized Root Mean square Residual

Chapter 1: Introduction

The striking growth in the U.S. incarceration rate over the past 50 years has spurred a multitude of studies on both its causes and its consequences. In particular, a wide array of research has examined the negative consequences of incarceration across a variety of life domains. Due to the large number of individuals impacted by the criminal justice system, examining such outcomes is important for understanding the broad extent to which incarceration impacts individuals' lives. Further, identifying variation in and mediators of those outcomes is integral for gaining a fuller understanding of the differences in and the processes by which justice-involved individuals are impacted.

In the mid-1970s, the U.S. incarceration rate began a massive incline – starting at around 105 individuals incarcerated per 100,000 in 1976 and peaking at 767 per 100,000 in 2007 (Travis et al., 2014). Despite declining since 2007, the most recently reported rate of incarceration (at yearend 2020) was 510 per 100,000 U.S. residents – this is nearly 5 times the rate in 1976 and equates to the incarceration of around 1.8 million individuals in prisons and jails (Kluckow & Zeng, 2022). On top of that, the number of individuals in the population who were previously incarcerated is estimated to be around 4.9 million individuals, bringing the number of individuals affected by incarceration (either current or former) to nearly 7 million (Shannon et al., 2017).

For these 7 million individuals, the deleterious outcomes of incarceration often extend beyond the direct impact of court-ordered incarceration (e.g., removal from society and family) and occur across a multitude of life domains, including social, economic, familial, and health (Pettit & Lyons, 2009; Travis et al., 2014; Western, 2006). In particular, throughout the span of criminal justice research, studies have commonly examined post-incarceration offending because it serves as an indication of the success (or failure) of incarceration. Such studies largely find a null to positive impact (Loeffler & Nagin, 2022). That is, incarceration has little impact or increases the likelihood of future criminal activity. However, the majority of extant research has not considered the pathways that lead to offending (Loeffler & Nagin, 2022).

More recently, research on post-incarceration outcomes has focused on mental health and consistently finds poor mental health for both currently and formerly incarcerated individuals (Bronson & Berzofsky, 2017; Maruschak et al., 2021b; Schnittker & John, 2007). For those in prison, mental health issues are more prevalent than in the general population. A recent Bureau of Justice Statistics (BJS) report found that over half of prisoners and nearly three-quarters of jail inmates reported having serious psychological distress or having been previously diagnosed with a mental disorder (Bronson & Berzofsky, 2017). This varies by gender and race, with women and White individuals more likely than men and Black individuals to report mental health symptoms or a history of mental illness during incarceration (Bronson & Berzofsky, 2017; Fazel & Baillargeon, 2011).

For those released from prison, mental health outcomes are poor. Previous incarceration (compared to no previous incarceration) is associated with higher levels of anxiety, mood, and impulse disorders; and these mental health issues are worse for those with longer durations and multiple periods of incarceration (Porter & DeMarco, 2019; Schnittker et al., 2012).

Despite a wide range of research indicating the negative relationship between incarceration and mental health issues, few studies have considered the role of mental health in the pathway to outcomes of incarceration. Specifically, there is less known about whether offending may vary by mental health (i.e., moderation) or whether mental health may explain some of the relationship between incarceration and offending (i.e., mediation). There is also a lack of research on racial and gender variation in the role of mental health in predicting post-incarceration offending (i.e., moderated mediation).

Further, there are a number of other outcomes of incarceration that have strong relationships with incarceration and mental health. In particular, research on employment, family ties, and physical health tends to find significant impacts of incarceration on each of these outcomes. Incarceration is associated with lower wages and probability of employment, higher likelihood of divorce, and higher incidence of physical health issues (Maruschak et al., 2021b; Siennick et al., 2014; Western, 2002). Research also suggests that mental health is associated with employment, family ties, and physical health – those with poor mental health have worse outcomes of all three factors (Banerjee et al., 2017; Mojtabai et al., 2017; Ohrnberger et al., 2017b). Despite these relationships, few studies have considered these variables within the pathway of post-incarceration offending. In fact, in a recent review of literature on post-incarceration offending, Loeffler and Nagin (2022) concluded that more research is needed to explicate the pathways that may lead to offending.

One notable study examining mental health as a mediator post-incarceration is Link et al. (2019). Using 15-month follow-up data from violent, male offenders, they found that mental health mediated the relationship between physical health and family conflict, and only through family conflict did mental health impact financial problems, crime, and reincarceration (Link et al., 2019). Further, physical health mediated the relationship between crime and reincarceration only through its impact on mental health (specifically depression) and on employment. However, this research was limited to only men who were convicted of serious violent offenses, the follow-up period was 15-months, and it did not include incarceration as part of the pathway. Additionally, the mediators used were only measured at certain time intervals, limiting the pathways that could be examined.

This dissertation addresses this gap by examining the role of mental health in the incarceration-offending link. Using the framework of the Stress Process Paradigm, incarceration is examined as a stressor, and mental health is examined as a secondary stressor which may moderate or mediate the relationship between incarceration and offending. Also, additional stressors after mental health (employment, family ties, and physical health) are used to explore additional pathways through which incarceration, in tandem with mental health, could impact offending – which is framed through the process of stress proliferation. Thus, using panel data from the National Longitudinal Survey of Youth 1997 (NLSY97), this research explores five questions:

(1) Is there a relationship between incarceration and offending, incarceration and mental health, and mental health and offending?

(2) Does mental health moderate the association between incarceration and offending?

(3) Does mental health mediate the association between incarceration and offending?

(4) Is there moderated mediation of the incarceration-offending link by race or sex?

(5) How do stressors after incarceration and mental health (being unemployed, being unmarried, and physical health issues) proliferate to generate future offending?

In doing so, this research seeks to advance the understanding of the role of health and other mediators in the pathway from incarceration to offending and, thus, highlight the more complex processes that may lead to offending.

The following chapters provide the background for this dissertation. *Chapter 2* discusses the literature on post-incarceration offending, other outcomes of incarceration, the link between incarceration and mental health, and various pathways to offending through mental health. The chapter ends with a discussion of the gaps in the literature and how this dissertation addresses them. *Chapter 3* outlines the theoretical rationale behind this research and how that rationale supports the research hypotheses. *Chapter 4* provides an overview of the data and methods used in this research. *Chapter 5* presents the results. *Chapter 6* provides a discussion of the results within the context of extant literature and theory, overall limitations of this research, and future directions. This dissertation concludes with a discussion of main takeaways in *Chapter 7*.

Chapter 2: Literature Review

Given the large number of individuals impacted by the criminal justice system, the outcomes of incarceration have long been of research interest for researchers, policy makers, and public health professionals. The focus of such research has varied throughout its lifespan – including bodies of research on educational attainment, housing instability, community outcomes, offending, employment, marriage, and health.

The current research focuses on post-incarceration offending because it is an indication of the efficacy of incarceration. That is, if the experience of incarceration dissuades individuals from committing crime again, then incarceration successfully deterred future crime. Additionally, offending can be thought of as a measure to determine whether an individual was successful in re-entering society post-incarceration – where individuals who refrain from criminal activity are considered to have reintegrated more successfully than those who engage in illegal activity after being incarcerated.

However, since incarceration impacts multiple areas of life beyond offending, the path from incarceration to offending is likely complex. In particular, this dissertation examines the role of mental health in post-incarceration offending. Mental health impacts how individuals think, feel, and act, in addition to how they handle stressful situations and interact with other individuals (*Mental Health: Strengthening Our Response*, 2022). Thus, health impacts how individuals think and act not only during everyday life, but – importantly – during incarceration and during the reentry process. This impact of health may then influence later outcomes, such as ability to avoid offending (Mallik-Kane et al., 2018). Further, given the high prevalence of health issues among those incarcerated and formerly incarcerated, health likely plays an even larger role in determining outcomes of incarceration, and explicating this role is important for furthering understanding the reentry process.

Finally, this research explores the pathway between incarceration and offending further by examining the roles of additional life factors (e.g., employment, family ties, and physical health).

2.1 Incarceration and Offending

There are a number of explanations for why incarceration may impact offending. The main mechanisms proposed for incarceration having a negative impact (i.e., decreasing) offending are incapacitation and deterrence. Incapacitation refers to removing individuals from society and physically keeping them in prison or jail, thus eliminating their ability to commit crimes. Deterrence occurs when an individual refrains from committing crime in order to avoid the threat of future incarceration (or re-incarceration). However, there are also reasons to expect that incarceration may have a criminogenic effect instead (i.e., increasing offending). Because incarceration separates individuals from prosocial bonds, it may be difficult to reconnect with prosocial individuals after release, which could lead to additional criminal behavior. Further, while incarcerated, individuals are exposed to antisocial experiences and persons, which – again – may increase criminal behavior upon release. And once released, formerly incarcerated individuals carry with them a criminal record which impacts many areas of life – hindering efforts to reintegrate and avoid criminal behavior.[1] Thus, it can be theorized that incarceration could have either a positive or negative impact on future crime.

The body of research on the impact of incarceration on offending is large and varied (both in terms of measures used and findings). To begin with, extant studies use a variety of different measures for the independent "incarceration" variable (e.g., pretrial detention, jail, prison, length of sentence) and for the dependent "recidivism" variable (e.g., self-reported criminal behavior, rearrest, reconviction, reincarceration).[2] In addition, and to some extent as a result, research findings on incarceration and recidivism are inconsistent: some studies find a negative impact (i.e., incarceration reduces offending), some find no impact, and still others find a positive impact (i.e., incarceration increases offending) (Loeffler & Nagin, 2022; Mears et al., 2015).

Using incarceration as a sanction is partially premised on the idea that imprisonment will have a deterrent effect – that is, the risk of being incarcerated will prevent individuals from engaging in future criminal behavior (Latessa et al., 2020). There is some evidence – though limited – to support this hypothesis (Hjalmarsson, 2009). For example, using felony cases in North Carolina and discontinuity in sentencing produced by changes to state sentencing guidelines, Rose and Shem-Tov (2021) found that incarceration (compared to probation) reduced the likelihood of committing crimes within 3 years of conviction. Specifically, 1 year of incarceration

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[1] For more on theories of punishment see *Classics of Criminology* by Jacoby, Severance, & Bruce (2012).

[2] Because post-incarceration offending can be measured in different ways, this research will also use the more general term "recidivism" – which encompasses all types of post-incarceration criminal activity whether it was self-reported, led to an arrest, led to a conviction, or led to an incarceration. The type of recidivism (e.g., reconviction) is specified where needed.

reduced the likelihood of a new assault by 38%, property offense by 24%, and drug offense by 20%.

Most studies on recidivism focus on the impact of a *previous* sentence on recidivism; but a unique study by Drago et al. (2009) examined the deterrent effect of the threat of a longer sentence in the *future* on whether released individuals committed crime again. The researchers used the enactment of the Italian Collective Clemency Bill, which called for the release of all Italian inmates with fewer than 3 years of their sentence remaining, to examine how exogenous variation in future sentence length impacted re-offending. The Collective Clemency Bill specified that any released individuals who recidivated would have to serve the remainder of their sentence along with the sentence for the new crime (i.e., lengthening their future sentence). The study found a significant deterrent effect of a longer future sentence on recidivism. Specifically, 1 more month of expected sentence for a future crime led to a 1.3% decrease in the probability of recidivism. This finding was largely consistent across sub-groups (e.g., sex, age, original crime type), with a few exceptions. Those with an original sentence length longer than 69 months (presumably the most serious offenders) did experience a deterrent effect. Also, Italian inmates experienced a smaller deterrent effect than foreign inmates (which constituted 40% of released inmates). This could indicate that other nationalities, such as Americans, may experience the deterrent effect more. However, the exact nationalities of the non-Italian inmates were not reported and this has not been examined in the US context.

Despite some evidence to indicate a deterrent effect of incarceration, findings supporting deterrence are in the minority and the majority of recidivism research fails to find such support. Several studies of incarceration and offending report null impacts on both rearrest and reconviction within 5 years of release (Franco et al., 2022; Green & Winik, 2010; Harding et al., 2017; Loeffler, 2013; Nagin & Snodgrass, 2013). Mitchell et al. (2017) examined recidivism of felony offenders in Florida and found that prison (compared to non-incarcerative sentences) had no impact on likelihood of reconviction. There is also evidence to support that pretrial detention has no significant impact on rearrest compared to those who were released pretrial, indicating that other types of incarcerative sentences also lack effects on recidivism (Dobbie et al., 2018).

On the other hand, some research finds a criminogenic effect of incarceration, across numerous sentence types. For example, Mueller-Smith (2015) found that, for both prison compared to probation and jail compared to release, the incarcerative sentence was associated with higher rates of rearrest and reconviction after release. When looking at juveniles in particular, those given a sentence of detention were more likely to be reincarcerated as adults than those given a sentence of probation (Aizer & Doyle, 2015). And other research finds that pretrial detention (compared to pretrial release) is associated with greater likelihood of rearrest, new charges, or reincarceration (Gupta et al., 2016; Heaton et al., 2017; Leslie & Pope, 2017). Because most research tends to focus on one sentence type, it is difficult to compare results across different measures. To address this, Cochran et al. (2014) compared recidivism across prison, jail, intensive probation, and probation. Their results indicated that, in each comparison, the more severe sanction was associated with a greater likelihood of recidivism (measured as felony reconviction within 3 years).

Other research finds mixed effects. For example, Mears et al. (2015) examined the impact of length of incarceration on reconviction and found a curvilinear relationship: time served up to 1 year increased recidivism, time served between 1 and 2 years decreased recidivism, and time served more than 2 years had no impact. Additionally, Mears and Cochran (2018) found mixed results in their examination of recidivism (measured as a new felony conviction) among first- and second-time felons. Their findings indicated that sometimes the more severe sanction reduced recidivism and sometimes the more severe sanction increased recidivism (with no consistency across first- and second-time felons). For example, for first-time felons, a prison sentence was associated with *less* recidivism than a (less severe) jail sentence; but a jail sentence was associated with *more* recidivism than a (less severe) probation sentence.

Though findings on the incarceration-offending link seem to be varied, there is some consistency in which studies find significant findings. Most studies that account for selection bias (e.g., instrumental variable, regression discontinuity) find little impact of incarceration on later offending (Loeffler & Nagin, 2022). Studies finding a negative impact of incarceration on offending (i.e., decreasing the likelihood of offending) are in settings that emphasize rehabilitative programming, whereas positive impacts are in settings without rehabilitative programming (Loeffler & Nagin, 2022). The most consistent findings come from studies examining pretrial incarceration – with results pointing to a positive, criminogenic impact (Loeffler & Nagin, 2022). Given the variability in findings across incarceration types and methodologies, the role of other processes may be masked or overlooked. As such, examining the potential for mediators and moderators is integral in further delineating the relationship between incarceration and later offending.

2.2 Other Outcomes of Incarceration

Importantly, incarceration impacts any areas of life in ways that are mostly negative and which have implications for future involvement in offending (Berg & Huebner, 2011; Link et al., 2019; Uggen et al., 2005). Yet, there is still limited research examining post-incarceration pathways and what factors lead to re-offending. Focusing on employment, family ties, and physical health, the following sections will discuss the body of research on the relationship between incarceration and each factor, as well as the importance of each factor in the reentry pathway.

2.2.1 Employment

Employment is an important part of reentry because an individual's ability to obtain and hold a job and make a living wage is integral for many life aspects (including housing, food, health insurance, criminal activity, etc.). The majority of research in this area finds that incarceration has deleterious impacts on employment and earnings over the life course (Apel & Sweeten, 2010; Pager, 2003; Pettit & Lyons, 2007; Uggen et al., 2005; Western, 2002). For example, Western (2002) used survey data from the NLSY79 and found that imprisonment significantly reduced wages, leading to a wage gap of 16% for those who have been incarcerated compared to those who have not. Similarly, using administrative data, Pettit and Lyons (2007) found that post-release wages were lower compared to wages directly prior to incarceration. Beyond the impact on current wage, Western (2002) also found long-term impacts of incarceration on wages in the form of flattened wage trajectories, which reduced both wage growth and earnings for those who had been incarcerated, compared to similarly high-risk men who were never incarcerated.

On the other hand, Apel and Sweeten (2010) found no significant impact of incarceration on wages. However, they also reported that recently incarcerated men had slightly lower wages, but they worked more hours than those who were not recently incarcerated, effectively cancelling out the impact. The authors found that, in the short-term, the probability of employment after incarceration was significantly reduced, and, in the long-term, those who had been incarcerated had lower quality jobs – overall, indicating a net negative impact of incarceration on employment. Conversely, Kling (2006) found that the probability of employment increased in the first several quarters following incarceration, but ultimately decreased in the long-term. Further, using random judge assignment as an instrumental variable for sentence length, the duration of the incarceration sentence had no significant impact on employment and earnings (Kling, 2006).

Despite such results, research using reentry studies (e.g., Boston Reentry Survey and Returning Home Project) reports consistent findings that likelihood of employment is reduced post-incarceration (even for those who were employed prior to incarceration) (Visher et al., 2011; Western et al., 2015). In the Returning Home Project, 31% reported employment 2 months post-release and this number only rose to 45% at 8 months after incarceration (Visher et al., 2011). Further, at 8 months post-incarceration, the largest percentage of individuals were receiving income from informal work (47%) rather than legal work (41%) (Visher et al., 2011). Similarly, results from the Boston Reentry Survey indicated that just over half (53%) of individuals were employed 6 months post-incarceration, but even more individuals (70%) received public assistance (which could be due to unemployment and/or low wages) (Western et al., 2015).

2.2.2 Family Ties

Establishing social ties and family stability is also integral in reentry – individuals with few or weak ties are more likely to recidivate after incarceration (Uggen et al., 2005). Yet, research suggests that incarceration is particularly harmful for social ties – particularly marriage – thus making the reentry process even more difficult. For marriage, incarceration can be harmful both by decreasing the likelihood of getting married and by increasing the likelihood of divorce.

For example, Lopoo and Western (2005) found that men who were currently incarcerated had 78% lower odds of transitioning to marriage than similar non-incarcerated counterparts. The authors also found that men who were married during incarceration had greater odds of divorce compared to those who were not incarcerated (11% vs. 4%). However, they did not find evidence that the impact of incarceration on marriage or divorce extended beyond incarceration. Once released from prison, there were no significant differences in marriage or divorce for previously incarcerated men compared to those who had never been incarcerated (Lopoo & Western, 2005). Similarly, Siennick et al. (2014) found that incarceration during marriage was associated with an increased risk of divorce, but this did not hold for incarceration prior to marriage.

On the other hand, some research has found incarceration to have an effect on later marriage and divorce outcomes. For example, Western (2004) found that formerly incarcerated men were both less likely to get married and more likely to be divorced six years post-incarceration compared to their never-incarcerated counterparts. Using the NLSY97, Baćak and Kennedy (2015) found that incarceration was associated with reduced chances of entering marriage. Apel (2016) also examined incarceration and marriage using the NLSY97 and found that incarceration increased the risk of divorce and decreased the likelihood of marriage (for follow-ups 1 month and 5 years post-release).

Apel et al. (2009) also reported a greater risk of divorce amongst formerly incarcerated individuals who were married during first incarceration, and the increased risk remained both 5- and 10-years post-release. However, for those who were unmarried during incarceration, the impact of incarceration on marriage did not extend beyond the first year post-release – indicating that the impact of incarceration on marriage may be due to the removal of the individual from the dating pool. Examining incarceration and divorce, Massoglia et al. (2011) similarly found no effect – but this was only after accounting for the length of time incarcerated. The authors posited that separation from a spouse (as caused by time spent incarcerated) was the reason for the relationship between incarceration and divorce rather than the experience of incarceration itself.

2.2.3 Physical Health

Finally, research suggests that physical health matters in the reentry process due to the stressful nature of having health issues and the limitations on what an individual can and cannot do in everyday life. During incarceration, having a physical health issue could – expectedly – lead to more interactions with health professionals (which has been identified as one of the most stressful experiences of incarceration) due to the need to receive care (Porter, 2019; Yang et al., 2009). Further, having physical limitations (e.g., using a wheelchair) or frequent health needs (e.g., a diabetic individual needing medication) may make the experience of incarceration more stressful, and, as previously discussed, stressful incarceration experiences are more likely to lead to negative reentry outcomes (Listwan et al., 2013). Research suggests a high prevalence of physical health issues (including infectious diseases, chronic illnesses, and mortality) among those incarcerated. Using data from the most recent Survey of Prison Inmates, Maruschak et al. (2021b) found that 17% of state and 10% of federal prisoners reported ever having an infectious disease. Specifically, 8% of state prisoners reported *currently* having Hepatitis C and 1% reported current HIV/AIDS.[3] Additionally, Maruschak et al. (2021b) reported that 51% of state and 43% of federal prisoners reported ever having a chronic illness, with 40% and 33% (respectively) *currently* having a chronic illness.[4] The most common current conditions reported among state prisoners were high blood pressure (22%), arthritis (15%), and asthma (12%) (Maruschak et al., 2021b).

After incarceration, physical health issues continue to be more prevalent and can impact reentry by necessitating healthcare (which those released from incarceration often have difficulties accessing), limiting employment options (e.g.,

[3] To measure infectious disease, inmates were asked whether they were ever told by a doctor, nurse, or other healthcare provider that they had any of the following: tuberculosis, Hepatitis B, Hepatisis C, HIV, or other sexually transmitted disease (Maruschak et al., 2021b).
[4] To measure chronic illness, inmates were asked whether they were ever told by a doctor, nurse, or other healthcare provider that they had any of the following: cancer; high blood pressure or hypertension; a stroke; diabetes, high blood sugar, or sugar diabetes; heart disease, including heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems; problems with kidneys; some form of arthritis, rheumatoid arthritis, gout, lupus or fibromyalgia; asthma; or cirrhosis of the liver (Maruschak et al., 2021b).

health conditions limiting work abilities), and impacting what activities an individual can engage in – thus influencing reentry outcomes (Mallik-Kane & Visher, 2008). Individuals who have prior incarceration are at higher risk of infectious and stress-related diseases (Fahmy & Wallace, 2018; Massoglia, 2008; Massoglia & Remster, 2019; Schnittker & John, 2007; Wildeman & Muller, 2012; Wildeman & Wang, 2017). For example, using the National Longitudinal Survey of Youth 1979 (NLSY79), Schnittker and John (2007) examined long-term health impacts and found that individuals with history of incarceration reported more chronic health problems after incarceration than before. Examining prevalence of specific health problems, Massoglia (2008) found that individuals with prior incarceration were almost 2 times more likely to be diagnosed with heart problems; over 3 times more likely to report UTI, hepatitis, and tuberculosis; and more than 4 times more likely to report hypertension and chronic lung illness.

More recently, Udo (2019) reported similar findings. Using data from the National Survey of Alcohol and Related Conditions, they found that the total number of medical conditions was significantly greater for those with a history of incarceration; and this finding held for the total sample, as well as across sex and racial groups. Specifically, having a history of incarceration predicted significantly greater odds of diagnosis for the majority of chronic health conditions – including hypertension, high cholesterol, myocardial infarction, epilepsy or seizure, arthritis, sleep problems, liver disease, AIDS, and STDs (Udo, 2019).

2.2.4 Summary

Research on the impact of incarceration on outcomes other than offending finds largely negative consequences. In particular for this study, employment, family ties, and physical health are all significantly associated with incarceration. The majority of research on incarceration and employment finds that incarceration reduces employment probability and wages (Pettit & Lyons, 2007; Visher et al., 2011; Western, 2002; Western et al., 2015), though a small subset finds no effect of length of incarceration on employment (Kling, 2006).

For incarceration and family ties, research overall indicates that incarceration decreases likelihood of marriage and increases likelihood of divorce. Those who are single and currently incarcerated are less likely to get married and those who are married and currently incarcerated are more likely to get divorced (compared to similar non-incarcerated persons) (Lopoo & Western, 2005; Siennick et al., 2014). Some research suggests this impact does not extend beyond current incarceration (Lopoo & Western, 2005), but the majority finds that prior incarceration also decreases marriage and increases divorce likelihood (Apel, 2016; Apel et al., 2009; Baćak & Kennedy, 2015; Western, 2004).

Finally, research finds significant associations between incarceration and poor physical health both during and after incarceration. Those who are incarcerated have a higher prevalence of infectious disease, chronic illness, and mortality compared to the general population (Maruschak et al., 2021b). Further, individuals with a history of incarceration are more likely to have medical conditions (such as heart problems, UTI, hepatitis, tuberculosis, hypertension, and chronic lung illness) than those who have never been incarcerated (Massoglia, 2008; Schnittker & John, 2007; Udo, 2019).

Taken together, research suggests that incarceration significantly impacts multiple aspects of reentry (including employment, family ties, and physical health), but the role of such factors within the reentry pathway is still relatively unknown.[5]

2.3 Incarceration and Mental Health

In recent years, research has begun to look more closely at health-related outcomes of incarceration.[6] As noted, there has been a wealth of research on physical health, but perhaps more research has been focused on mental health, which can impact how individuals think and act across all aspects of life – including during a period of incarceration and post-incarceration during the reentry process. Despite being a relatively[7] new area of research, studies on the relationship between incarceration and health indicate evidence of a strong, negative relationship – that is, incarceration tends to be associated with worse mental health (or more mental health issues) (Nowotny et al., 2017; Wildeman & Wang, 2017). Research focusing on the mental health-incarceration nexus tends to examine the relationship in two ways: (1) health during incarceration, and (2) health after incarceration.

2.3.1 Mental Health During Incarceration

In examining mental health during incarceration, it is important to first understand the prevalence of the issue. It is difficult to obtain an accurate estimate of mental illness among those incarcerated for a number of reasons. First, mental illness

[5] This is discussed further in *2.2.4 Other Pathways to Offending Through Mental Health.*
[6] Wildeman and Muller (2012) provide a useful table summarizing the (at that time) extant research on the incarceration and health relationship, including the time period, outcomes, data used, and strongest quantitative test (p. 16-17). Although it is now 11 years old, it still serves as a useful guide and summary of incarceration and health research prior to 2012.
[7] Relative to other consequences of incarceration (e.g., offending) that have been of research interest much longer.

is measured differently in different institutions and therefore estimates may vary due to simple definitional differences. Second, and compounding the first issue, collection of mental illness data differs across institutions, which can lead to differing estimates. For example, some institutions may use self-reported mental illness or symptoms, which leaves it up to the discretion of the inmate, while other institutions may rely on official diagnosis from a psychiatrist prior to incarceration. Additionally, some institutions may use a psychological screening tool upon entry to prison or jail, which can provide different estimates based on who is administering the survey (e.g., a layperson or someone who is clinically trained) (Fazel et al., 2016). Notably, there is a lack of continual data collection on mental illness in incarceration settings. The only national level data collection that gathers mental illness data in prisons – the Survey of Prison Inmates (SPI) – is not collected regularly and the most recent data is from 2016, making the most recent estimates 8 years old.

Despite these measurement issues, extant research is largely consistent in reporting a high prevalence of mental illness among those incarcerated. One of the most commonly cited studies – a BJS report by James and Glaze (2006) – reports that around half of prisoners and 60% of jail inmates reported mental illness (measured as a recent history of or symptoms of a mental health problem as defined by the DSM-IV). Using the most recent prison data, Maruschak et al. (2021a) reported that 43% of state prisoners reported a history of a mental health problem (i.e., having previously been told by a mental health professional that they had a mental or emotional condition); and 17% met the threshold for past 30-day serious psychological disorder (using the self-report Kessler 6 psychological distress scale). According to the

Centers for Disease Control (CDC), more than 40% of inmates self-reported having a mental illness (Reeves et al., 2011).

The prevalence of mental illness among those incarcerated is consistently found to be higher than among those in the general population. Early studies estimated only 5% of the U.S. population to have a mental illness, with more recent research suggesting that mental illness in the general population is as high as 25% (Kessler et al., 1996; Kessler et al., 2011; Reeves et al., 2011; Schnittker, 2014). Still, mental illness among those incarcerated is at least twice as common (and potentially up to five times as common) as in the general population (Bronson & Berzofsky, 2017).

When considering demographic factors, additional patterns emerge for mental health prevalence during incarceration. First, incarcerated women are more likely to report mental health issues than incarcerated men (Fazel & Baillargeon, 2011; Fries et al., 2013; Harner & Riley, 2013; James & Glaze, 2006). For example, Fries et al. (2013) found that in Michigan prisons 1 in 4 women (compared to 1 in 5 men) reported mental health symptoms. Bronson and Berzofsky (2017) reported that women are 6.5% more likely to report serious psychological distress than males and are twice as likely to report a history of mental health problems.

Second, White individuals in prison are more likely than Black individuals to report either serious psychological distress (17% vs. 13%) or a history of a mental health problem (50% vs. 30%) (Bronson & Berzofsky, 2017). Hispanic prisoners have similar rates of mental illness as Black individuals, with 12% reporting serious psychological distress and 26% reporting history of a mental health problem

(Bronson & Berzofsky, 2017). However, it is important to note that racial differences may be due to other factors rather than reflecting actual differences in mental illness across race. Foremost, Black individuals are less likely to seek help for mental illness due to stigma and are more likely to distrust mental health services, making them less likely to have a formal mental health diagnosis. Additionally, Black individuals are more likely to reside in marginalized communities with fewer resources and are less likely to have jobs with comprehensive health insurance, which impacts both their ability to seek help and their treatment options (Clement et al., 2015; Gary, 2005). These barriers to seeking help, being treated, and receiving an official diagnosis directly impact estimates of mental illness. Thus, lower rates of mental illness among minorities in prison may be due to lack of treatment and diagnosis, rather than a substantial difference in rates (Nowotny et al., 2017).

Beyond the prevalence of mental health while incarcerated, other research examines the relationship between mental health and other factors, such as in-prison behaviors and attitudes as well as facility characteristics. Yang et al. (2009) examined how mental health status may frame prison experiences and found that prisoners with serious mental illness (SMI) spoke about their prison experience in more hostile terms and attributed their suffering to their circumstances of incarceration and the criminal justice actors in the institution. Contrastingly, inmates with no SMI also spoke negatively about their prison experience, but they were more likely to have an introspective attitude and call their own behavior into question than to blame others and the criminal justice system (Yang et al., 2009). Additionally, in a literature review of how prisoners experience prison, Goomany and Dickinson (2015) reported that the majority of prisoners perceived the prison environment to have a negative influence on their mental health (although a small fraction of prisoners viewed prison as a place of respite, with needed structure and health care). Thus, not only do those with worse mental health view prison more negatively, but most individuals feel prison negatively influences their mental health.

Further research has examined which aspects of incarceration inmates find to be so impactful. In a qualitative study of 25 ex-inmates, Porter (2019) found that inmates identified three main stressful experiences during incarceration – interactions with correctional officers, interactions with medical staff, and fear of other inmates. These experiences were seen as the most stressful due to being looked down upon or potentially messed with by correctional staff, feeling a lack of trust from and unimportant to medical staff, and feeling uncertainty about who to trust and who may be a threat amongst other inmates (Porter, 2019). The constant anticipation of potential stressful experiences negatively impacted inmates' psychological well-being. Apart from interactions, research also finds a number of institutional characteristics to be salient to inmate mental health – including prison overcrowding, punitiveness, low availability of work assignments, lack of television time, and a recent prison suicide, all of which are associated with increases in depression and hostility amongst those incarcerated (Edgemon & Clay-Warner, 2019).

Overall, extant research finds that incarcerated individuals are more likely to have mental illnesses than those in the general population; and, among those incarcerated, women and White individuals report more mental health issues than men and Black individuals (although racial differences may be due to differences in diagnosis as well). Mental health also frames the experience of prison – with those who have worse mental health describing their incarceration experience in more hostile terms. Additionally, constant anticipation of stressful interactions while incarcerated (as well as other institutional characteristics such as prison overcrowding and punitiveness) negatively impacts mental health. Taken together, these findings indicate a cycle of worsening mental health – individuals with poor mental health are incarcerated at a higher rate, the experience of incarceration is stressful and thus negatively impacts mental health, which then feeds back into higher numbers of mental health issues among those incarcerated.

2.3.2 Mental Health After Incarceration

The second main facet of incarceration and health research focuses on health outcomes *post*-incarceration. Given the stressful nature of incarceration and high prevalence of mental health issues, it is not a far reach to expect that incarceration may make mental health worse. Prior research overwhelmingly supports this hypothesis and finds that incarceration is associated with higher levels of stress-related mental health issues (including depression and anxiety) (Haney, 2012; Porter & Novisky, 2016; Schnittker et al., 2012; Turney et al., 2012). For example, Schnittker et al. (2012) examined the relationship between incarceration and psychiatric disorders and found that former inmates were more likely than non-inmates to experience anxiety, mood, and impulse control disorders (including major depressive disorder, bipolar disorder, and dysthymia). Specifically, incarceration was found to be associated with a 45% increase in the odds of lifetime major depression (compared to those who were never incarcerated). Additionally, in an examination of current and recent (within the past 3 years) incarceration, Turney et al. (2012) reported both types of incarceration were associated with a greater risk of major depression (although this study focused on men only). Using in-depth interviews, Binswanger et al. (2011) examined recently released prisoners' experiences with health, mental health, and health care. Their research found that individuals with self-reported mental illness described worse symptoms immediately upon release and many experienced challenges obtaining medication (leading to discontinuity in treatment) which also worsened symptoms (Binswanger et al., 2011).

Extant research has also examined variation in the incarceration-mental health relationship using factors such as the measurement of incarceration and individual factors like race and sex. Research examining different measurements of incarceration has explored timing (i.e., age of first incarceration), duration (length of time spent incarcerated), and dosage (number of times an individual is incarcerated). In terms of timing, those who are incarcerated at earlier ages (adolescence and early adulthood) are more likely to experience mental health problems (including self-reported mental health issues, receiving psychiatric treatment, and receiving therapy) compared to those who do not experience incarceration and compared to those who experience incarceration at later ages (older than 25) (Baćak et al., 2019; Dhami et al., 2007; Kim, 2015; Powell, 2021).

Additionally, longer durations and greater dosages of incarceration (i.e., multiple periods of incarceration) are largely associated with worse mental health. Porter and DeMarco (2019) examined the relationship between time served and number of incarceration spells and mental health and found both to be associated with more mental health symptoms and a higher likelihood of depression. However, this relationship only held for individuals who were already released from incarceration. For those who were currently incarcerated, length of time served decreased mental health symptoms and odds of depression, while number of incarcerations had no impact on either outcome (Porter & DeMarco, 2019). Similarly, another study on time served and mental health also found a positive association between length of time served and a number of mental health symptoms (including depression, bipolar disorder, anger, psychotic disorders, anxiety disorders, and personality disorders), but only for certain race-sex combinations (Porter et al., 2021). Specifically, longer durations of incarceration increased mental health symptoms for Black females and Black males but decreased mental health symptoms for White males (Porter et al., 2021).

An additional line of research examines how mental health affects reentry outcomes post-incarceration. Wallace and Wang (2020) examined the impact of in-prison mental health, and change in mental health after release, on recidivism and found that better in-prison mental health and increases in mental health post-release were associated with lower odds of recidivating. One notable study – the Returning Home study of released prisoners in Ohio and Texas – examined how reentry trajectories for employment criminal involvement (among other outcomes) differed for those with mental health disorders compared to those without (Mallik-Kane & Visher, 2008). Across nearly all reentry measures, those with mental illness experienced worse outcomes compared to those who did not report mental illness. Those who self-reported having a mental illness were less likely to be employed and more likely to report engaging in criminal behavior post-release than their counterparts without mental illness (Mallik-Kane & Visher, 2008).

Mallik-Kane and Visher (2008) also examined the impact of mental health on outcomes by sex. Men with mental health issues were more likely to report criminal activity but were no more likely to be arrested or reincarcerated, compared to men without mental health issues. Women with mental health issues reported more criminal activity than those without, but they were also more likely to be arrested (although reincarceration rates were similar across both groups).

Other research on mental health impacting post-incarceration outcomes also finds support for variation based on gender. For example, Bakken and Visher (2018) examined the role of mental health in shaping reentry outcomes by gender. They reported that mental health problems were important in determining employment and criminal behavior for women post-release, while mental health problems only impacted employment for men.

Considering both race and gender, Porter and Novisky (2016) investigated predictors of post-incarceration mental health (in addition to examining mediators). Findings indicated that the impact of incarceration on depressive symptoms did not vary across race and gender, however mediating factors of the relationship showed some racial and gender differences. For males, marital status and employment status were stronger predictors of post-incarceration mental health (compared to females); and marital status was a stronger predictor of mental health for Whites than it was for Blacks or Hispanics. As discussed previously, Porter et al. (2021) also examined time served and mental health symptoms across sex and race – finding that White males exhibit fewer mental health symptoms at longer prison lengths, while Black males and Black females exhibit more symptoms.

Taken together, having been incarcerated is associated with worse mental health (compared to those who have never been incarcerated). Additionally, incarceration earlier in life (compared to later in life) and longer durations and higher dosages of incarceration are all associated with worse mental health. Those reentering society with mental health issues are more likely to experience poor outcomes (such as unemployment and criminal activity), and some research indicates these relationships may vary by race and sex, but results are inconsistent.

2.3.3 Summary

Overall, research on incarceration and mental health shows largely consistent findings: those who are in prison have worse mental health than those not incarcerated and individuals who have experienced incarceration have worse mental health outcomes post-incarceration, compared to those who have not been incarcerated. In addition, a smaller fraction of research indicates that other post-release outcomes (such as employment and recidivism) vary for those with health issues compared to those without. However, there is still a dearth of research examining the role of mental health in the pathway between incarceration and post-release outcomes, particularly with regards to how these relationships operate based on mental health status.

2.4 Mental Health as a Focal Point in the Pathway from Incarceration to Offending

Despite the breadth of research on the incarceration-offending relationship, there is markedly less research on the mechanisms linking incarceration experiences with offending outcomes. In fact, in their review on incarceration and recidivism, Loeffler and Nagin (2022) concluded that there is insufficient evidence on the underlying mechanisms of post-incarceration offending and called for further research to explicate these pathways. Given the prevalence of mental health issues among those incarcerated and formerly incarcerated, examining the role of mental health in this pathway is of importance. Additionally, there are a number of other life domains (employment, family ties, and physical health) that are also associated with incarceration and offending, which suggests that the pathway from incarceration to offending may be even more complex. The following sections will explore various mechanisms through which mental health may impact post-incarceration offending and the research (or lack thereof) in each area.

2.4.1 Mental Health as a Moderator

There is good reason to expect variation in (or moderators of) outcomes of incarceration: not every individual will experience the event of incarceration in the exact same way and not every individual will have the exact same incarceration event. Different individual or situational characteristics may impact how events are experienced, thus impacting the outcomes of those events. In the case of incarceration, differences between individuals (e.g., race, sex, background) may impact the experience of incarceration and, subsequently, impact outcomes such as offending.

Although not as often considered as demographic factors, incarceration's impact on outcomes may also vary by mental health. This is because health impacts both how incarceration is experienced and how individuals reintegrate post-incarceration.[8] Mental health may impact outcomes of incarceration because it impacts how people relate to others, make decisions, and handle stress (Council of State Governments, 2002). While incarcerated, mental health impacts how individuals interact with staff and other incarcerated persons and how they view the experience of incarceration. For example, past research has shown that interactions with staff and other inmates are some of the most stressful parts of the incarceration experience and those who have mental illness are more likely to view their incarceration experience negatively (Porter, 2019). Further, individuals who experience incarceration as stressful and negative are more likely to have negative outcomes after release (e.g., recidivism) (Ashkar & Kenny, 2008; Listwan et al., 2013). Thus, those with worse mental health are more likely to experience incarceration as stressful and that experience leads to worse outcomes. After incarceration, mental health issues can cause distress and interfere with social and emotional adjustment, which complicates and disrupts reentry (Council of State Governments, 2002; US Department of Health and Human Services, 1999). This impacts how individuals make and maintain relationships (i.e., obtain social and family support), gain and keep employment, and engage in other activities (e.g., criminal activities) – hence impacting post-incarceration outcomes (Lurigio, 2011; Mallik-Kane & Visher, 2008).

[8] Theoretical explanations for how mental health impacts offending will be discussed in *Chapter 3: Theoretical Rationale*.

The majority of research on health and reentry considers the impact of mental health on post-release outcomes (e.g., Wallace & Wang, 2020), with some studies separating those with health conditions and those without and comparing outcomes between the two groups (e.g., Mallik-Kane and Visher, 2008). Such research supports the idea that mental health impacts outcomes of incarceration (such as offending) (Abracen et al., 2014; Link et al., 2019; Wallace & Wang, 2020). For example, Wallace and Wang (2020) examined the impact of in-prison mental health, and change in mental health after incarceration, on recidivism outcomes. The authors found that better mental health in prison and increases in mental health post-incarceration decreased recidivism among parolees (for technical violations and new offenses). Additionally, Mallik-Kane and Visher (2008) examined outcomes for those with health issues (compared to those without) and found that poor mental health led to an increased risk of recidivism.

Yet, extant research often fails to consider health as a moderator in the relationship between incarceration and offending (i.e., whether the impact of incarceration on offending varies by an individual's health status). Given that research indicates that the experience of incarceration and reentry is likely to vary by health status and that health issues are common amongst the incarcerated population, this is a notable gap in the literature.

2.4.2 Mental Health as a Mediator

On the other hand, in addition to expecting variation in offending based on a different factor aside from incarceration (i.e., moderation), it is possible that the additional factor itself explains some of the relationship between incarceration and the outcome (i.e., mediation). That is, if there is a relationship between incarceration and the mediator and a relationship between the mediator and the outcome, then perhaps the relationship between incarceration and the outcome is due in part to the presence of the mediator. Because research indicates that incarceration impacts mental health and that mental health impacts offending, mental health serve as a mediator the relationship between incarceration and later offending – partially explaining some of the relationship.

As previously discussed, incarceration is largely associated with worse mental health (both in and out of prison).[9] Individuals who are currently incarcerated or have previously been incarcerated are more likely to have poor mental health (Bronson & Berzofsky, 2017; Mallik-Kane & Visher, 2008; Maruschak et al., 2021a, 2021b; Massoglia & Remster, 2019). Further, poor mental health is associated with offending. Those with poor mental health are more likely to commit crimes after experiencing incarceration compared to those with better mental health (Mallik-Kane & Visher, 2008; Wallace & Wang, 2020). Aside from the post-incarceration literature, other research also suggests that mental health impacts criminal activity. Semenza and Silver (2022) examined how symptoms of depression and anxiety predicted incarceration exposure both between- and within-individuals over a 25-year period. They found that within-individual increases in depressive and anxiety symptoms were associated with increases in the subsequent number of months incarcerated. For between-individuals, higher levels of depressive and anxious

[9] For a more in-depth discussion of the research, see *2.3.2 Mental Health After Incarceration*.

symptoms were associated with more time incarcerated in the following year (Semenza & Silver, 2022).

Despite the evidence indicating a relationship between (1) incarceration and mental health and (2) mental health and criminal activity, few studies have examined mental health as a mediator between incarceration and recidivism. To date, only one study has examined mental health as a mediator, but it was between post-incarceration physical health and later outcomes. Using longitudinal data on men returning from prison in the Serious and Violent Offender Reentry Initiative (SVORI) dataset and structural equation modeling (SEM), Link et al. (2019) examined different pathways of relationships between post-incarceration physical health and crime and reincarceration using depression, family conflict, employment, and financial problems as potential mediators. Results indicated that depression served as a mediator between physical health limitations and family conflict (directly increasing it). Depression only impacted financial problems, crime, and reincarceration indirectly through family conflict. Thus, both depression and family conflict, in that specific pathway, served as mediators between post-incarceration physical health and the other outcomes (Link et al., 2019). However, this study was limited in that it began its pathway with physical health (rather than incarceration), only measured recidivism as reincarceration, used a 15-month follow-up period, and focused only on men convicted of violent offenses. In general, few studies explore the relationship of mental health as a mediator between incarceration and other measures of recidivism, longer follow-up periods, and more broad populations.

2.4.3 Mental Health and Demographics in Moderated Mediation

It is possible for both moderation (i.e., variation in the outcome based on a factor) and mediation (i.e., the relationship between two variables being partially or completely explained by another factor) to occur at the same time – called moderated mediation. Moderation mediation occurs when the mediation of a relationship varies by some other factor. As previously mentioned, there is reason to expect variation in outcomes of incarceration because not all individuals experience things in the same way. Along the same lines, the degree to which mental health mediates the relationship between incarceration and re-offending may vary because not all individuals will experience incarceration or respond to mental health issues in the same way.

This idea is supported in prior literature: research has found that the impact of incarceration on mental health varies by demographics, as does the impact of mental health on other outcomes. Increases in the length of incarceration are associated with increases in mental health symptoms for Black females and Black males, compared to decreases in symptoms for White males (Porter et al., 2021). Other research has examined variation in how mental health shapes reentry outcomes. Bakken and Visher (2018) found that post-incarceration mental health was a significant predictor of employment and criminal behavior for women, but only predicted employment for men. This indicates that the impact of mental health on other post-release outcomes also varies by demographic factors.

Overall, research suggests there are gender and racial differences in mental health both during and after incarceration. Yet – just as there is a lack of research on mediators between incarceration and offending – there is dearth of research examining moderated mediation in the relationship between incarceration and offending. Studies have examined moderated mediation between incarceration and mental health (e.g., Porter & Novisky, 2017) and mental health in the post-incarceration pathway to crime and re-incarceration (e.g., Link et al., 2019), but – at the time of this research – no extant studies have examined race and gender variation in how mental health mediates the relationship between incarceration and offending.

2.4.4 Other Pathways to Offending Through Mental Health

As previously discussed, there are a multitude of negative outcomes of incarceration – for this research, the focus is on employment, family ties, and physical health.[10] Each of these outcomes, as important pieces in the reentry pathway, may also impact offending. However, because mental health influences how individuals function and make decisions,[11] each outcome may itself be impacted by mental health. In fact, extant research indicates there are ties between employment, family ties, and physical health and mental health as well as between each factor and future offending – indicating that mental health could be an important link in understanding the role of these factors in the pathway from incarceration to offending. The following paragraphs briefly describe the association between mental health and each factor of interest (employment, family ties, and physical health) and each factor and offending.

For employment, research has found that poor mental health has a negative association with employment (Banerjee et al., 2017; Chatterji et al., 2011; Frijters et

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[10] See *2.2 Other Outcomes of Incarceration*.
[11] The impact of mental health on life is further explicated in *Chapter 3: Theoretical Rationale*.

al., 2014). Using the National Comorbidity Survey-Replication, Banerjee et al. (2017) found that those with psychiatric disorders were less likely to be employed, more likely to be absent from work, and worked fewer weeks. Frijters et al. (2014) examined mental health and employment in the Household, Income and Labour Dynamics in Australia survey and found that a one standard deviation reduction in mental health was associated with a 30-percentage reduction in employment likelihood. Additional research on post-incarceration mental health has similar findings – men and women with poor mental health were less likely to be employed and worked for fewer months post-incarceration (Mallik-Kane & Visher, 2008).

Further, research supports the notion that employment impacts criminal activity. In a review of literature, Uggen et al. (2005) reported that the absence of job opportunities, presence of barriers to employment, and low quality jobs all increased the likelihood of criminal activity. Other studies have also found employment to have a significant impact when examining offending post-incarceration. For example, in an analysis of parolees in Texas, Tripodi et al. (2010) found that being employed was associated with greater time to re-incarceration compared to those who were not employed, although being employed itself did not significantly decrease the likelihood of re-incarceration. On the other hand, Nally et al. (2014) examined released offenders in Indiana and found that employment itself was significantly associated with re-incarceration.

For family ties, the evidence suggests that mental health impacts both marriage and divorce likelihood (Breslau et al., 2011; Butterworth & Rodgers, 2008; Mojtabai et al., 2017). Using the National Comorbidity Survey, Mojtabai et al. (2017)

found that mental disorders were associated with lower odds of marriage and higher odds of divorce. The authors concluded that addressing common mood, anxiety, and substance use disorders would be associated with 6.7 million fewer divorces and 3.5 million additional marriages (Mojtabai et al., 2017). Breslau et al. (2011) found similar results in a multi-national analysis with data from 19 countries. The authors reported that mental disorder was associated with lower likelihood of ever marrying and higher likelihood of divorce. Further, major depression was one of the most salient mental disorders predicting never marrying and divorce (Breslau et al., 2011).

The impact of marriage on offending has been of research interest for many years, with early research suggesting that marriage was associated with a reduction in offending (Laub & Sampson, 1993). More recent studies find similar effects. Theobald and Farrington (2009) reported that men who got married had a significant reduction in number of convictions (compared to men who were not married), though this effect was only significant for marriages at ages 24 and younger. Bersani and DiPietro (2016) similarly found a reduction in offending (measured as arrest) for men who were married. The authors also examined divorce (i.e., marital dissolution) and offending, and found a significant increase in offending for men who experienced marital dissolution. Theobald and Farrington (2013) examined the effect of separation on crime (specifically convictions). After matching based on age at marriage, prior convictions, and likelihood of separation, they found that men who got separated experienced an increase in convictions (Theobald & Farrington, 2013).

For physical health, extant research has found that mental health is closely associated with physical health. Some research suggests that the relationship between mental health and physical health is bi-directional – that is, mental health predicts future physical health and physical health predicts future mental health (Ohrnberger et al., 2017a, 2017b). But, even after accounting for prior physical health, there was still a significant, positive relationship between mental health and later physical health – those with worse mental health are more likely to have worse physical health (Ohrnberger et al., 2017b). In a study focusing specifically on risk of stroke, Surtees et al. (2008) found that one standard deviation decrease in mental health (measured by the Mental Health Inventory-5) was associated with an 11% increase in the risk of stroke (although major depressive disorder alone was not associated with stroke risk). In an examination of 12 cardiac diseases, Daskalopoulou et al. (2016) found that having a history of depression was associated with all of the cardiac diseases examined.[12]

Further, research on the impact of physical health on post-incarceration offending reports varying results. For example, Mallik-Kane and Visher (2008) found that those with physical health conditions (compared to those without) were more likely to have criminal involvement. However, this relationship differed by gender. Criminal involvement by gender differed by type of involvement – men with physical health conditions reported the same amount of criminal behavior as those without, but were more likely to be reincarcerated, while women with physical health conditions reported higher levels of criminal behavior but were no more likely to be reincarcerated than those without physical health conditions. On the other hand,

[12] The cardiac diseases examined were stable angina, unstable angina, myocardial infarction, unheralded coronary death, heart failure, cardiac arrest, transient ischemic attack, ischemic stroke, subarachnoid hemorrhage, intracerebral hemorrhage, peripheral arterial disease, and abdominal aortic aneurysm (Daskalopoulou et al., 2016).

Wallace and Wang (2020) found that better physical health was associated with a higher likelihood of recidivism, as did an increase in physical health post-incarceration. This may speak to an individual's ability to engage in criminal activity – where those with physical health issues may be less able to engage in such activity, and those with better physical health may be more able.

2.4.5 Summary

The body of research on incarceration and mental health indicates there may be a number of roles that mental health could play within the reentry process. First, mental health impacts how both incarceration and reentry is experienced – those with worse mental health are more likely to view incarceration as a stressful experience which can lead to negative outcomes (Ashkar & Kenny, 2008; Listwan et al., 2013). Mental health also impacts daily life (e.g., interpersonal interactions and mental functioning) and can be a barrier in the reentry process (Council of State Governments, 2002). Thus, it could be that the relationship between incarceration and offending varies by mental health status (i.e., moderation).

Second, there is a significant relationship between incarceration and mental health and mental health and offending. Those who have experienced incarceration are more likely to have poor mental health than those who have not (Bronson & Berzofsky, 2017; Massoglia & Remster, 2019). Further, individuals with poor mental health are more likely to engage in criminal activity compared to those with better mental health (Mallik-Kane & Visher, 2008; Semenza & Silver, 2022; Wallace & Wang, 2020). Taken together, incarceration may impact offending *through* mental health (i.e., mediation).

Third, the impact of incarceration on mental health and mental health on reentry is not unilateral but, instead, varies by demographic factors. Increasing lengths of incarceration are associated with worse mental health for Blacks females and Black males but associated with better mental health for White males (Porter et al., 2021); and, after incarceration, mental health is a salient predictor of criminal behavior for women but not for men (Bakken & Visher, 2018). This indicates that there may be racial and gender differences in how mental health mediates the incarceration-offending relationship (i.e., moderated mediation).

Finally, mental health is associated with other reentry factors – such as employment, family ties, and physical health (Banerjee et al., 2017; Mojtabai et al., 2017; Ohrnberger et al., 2017b). Each of these factors, in turn, are also associated with offending (Mallik-Kane & Visher, 2008; Theobald & Farrington, 2009; Uggen et al., 2005). Therefore, mental health could be an important link (i.e., mediator) in understanding the relationship between incarceration and later offending through other post-incarceration outcomes.

2.5 The Gaps

Research suggests that there is a link between incarceration and recidivism (i.e., post-incarceration offending, arrest, conviction, or imprisonment) – with the majority of studies finding that incarceration increases the risk of criminal activity (Loeffler & Nagin, 2022). Yet, there is still little known about the mechanisms of and variation in offending outcomes (as discussed in Loeffler & Nagin, 2022). In particular, there is a lack of research examining the role of mental health (and other factors in the reentry pathway), despite evidence that such factors are associated with incarceration and offending.

First, there is strong empirical support that incarceration impacts mental health – rates of mental illness are higher among those incarcerated than the general population and those who have been incarcerated are more likely to have worse mental health outcomes (compared to those who have never been incarcerated). Additionally, outcomes of incarceration are worse for those with mental health issues compared to those without (e.g., Mallik-Kane & Visher, 2008). Despite this, few studies have examined the role of mental health in post-incarceration offending – such as how offending may vary by mental health status (i.e., moderation) and how mental health status may explain the relationship between incarceration and offending (i.e., mediation). Extant research tends to compare outcomes of incarceration for those with mental health issues compared to those without (i.e., not actual moderation) or focus on a subset of the population (e.g., only violent offenders and males) for mental health as a mediator (Link et al., 2019; Mallik-Kane & Visher, 2008). This fails to consider mental health as a true moderator (i.e., how variation in mental health may lead to variation in the outcome) or expand examining mental health as a mediator into men and women and those convicted of any offense. Further, little research has focused on variation in mental health mediating offending based on demographic factors (i.e., moderated mediation). Research suggests that there is demographic variation in many aspects of incarceration and post-incarceration, yet this area of research is largely understudied.

Second, extant literature also supports the idea that incarceration impacts many facets of life (including employment, family ties, and physical health) and that these facets of life are also associated both with mental health and with criminal activity. Given the complexity of reentering society from incarceration and the research that many factors are associated with both incarceration and offending, it could be expected that many factors are at play in the process of reentry. Yet, few studies have considered this process as a whole, as well as the role of mental health, employment, family ties, and physical health within it.

Studies that have considered reentry as a process have been limited. For example, Porter and Novisky (2016) examined demographic differences in employment and marital status as mediators, however their outcome was post-incarceration mental health rather than recidivism. They found that, for males, marital status and employment status were stronger predictors of post-incarceration mental health (compared to females); and marital status was a stronger predictor of mental health for Whites than it was for Blacks or Hispanics. Looking at post-incarceration criminal activity and reincarceration, Link et al. (2019) examined different pathways through depression, physical health limitations, family conflict, employment, and financial problems. They found that the link between post-incarceration depression and recidivism only worked via family conflict and financial problems. Similarly, the link between post-incarceration physical health issues and recidivism only worked through depression, then family conflict, then financial problems.

Based on such research, it is clear that reentry is a complex process that is not as simple as a direct relationship between incarceration and offending. But these studies are limited in how they consider the reentry process and in the populations of interest, leaving room for further explications of these relationships. The current research addresses these gaps in the literature and expands research on how mental health impacts reentry. Using ten years of longitudinal data from the National Longitudinal Survey of Youth 1997, this research examines the role of mental health as a moderator and mediator between incarceration and offending (measured as reoffending and rearrest). Then, this research examines whether there is demographic variation (using race and sex) in mental health as a mediator (i.e., moderated mediation). Finally, this research explores additional processes by which incarceration leads to offending. Using mental health as the primary stressor and the driver of post-incarceration offending differences, the role of other stressors (specifically employment, family ties, and physical health) and how they may operate alone or in tandem with each other are examined.[13]

[13] See *Appendix A* for a theoretical diagram of how these pathways relate and *Chapter 3* for further theoretical explication.

CHAPTER 3: THEORETICAL RATIONALE

In examining the impact of incarceration on various parts of life, it is difficult to ignore the stressful nature of incarceration itself, as well as how outcomes of incarceration may be stressful in and of themselves. As such, this research uses an overarching theoretical framework grounded in the impact of stress on life – the Stress Process Paradigm.

3.1 Stress Process Paradigm

The Stress Process Paradigm posits that the experience of stressful events in life – called stressors – leads to a stressor response, which can be physiological, psychological, or behavioral in nature (McEwen, 2000; Pearlin, 1989). The stressor response can have both immediate and long-term impacts across multiple life domains (including, but not limited to, economic status and earnings, and health-related conditions) (Pearlin, 1989). Stressors themselves can come in different forms (e.g., a single event versus a chronic strain) and can be differentiated by the order in which they occur: primary stressors, which occur first, and secondary stressors, which occur as a consequence of primary stressors (Pearlin, 1989).

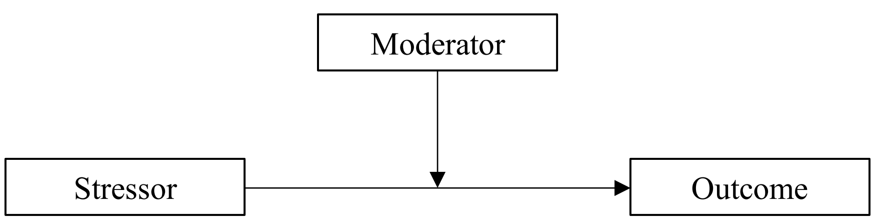
A stressor is considered an event when it has "an identifiable point in time at which it occurred" (p. 400); whereas, a chronic strain may come on more gradually and persist for a longer period of time (Pearlin, 1999). That is not to say, however, that events and chronic strains are mutually exclusive. In fact, events can occur along the course of a chronic stressor, making it difficult to disentangle their individual impacts (Pearlin, 1999).

Primary stressors occur prior to, and often lead to, secondary stressors (Pearlin, 1999). However, they do not always occur distinctly. Specifically, if a primary stressor and a secondary stressor occur in quick succession, or if a secondary stress event emerges from a primary chronic strain, their impacts will be intertwined. Additionally, secondary stressors may lead to further stressors down the line – stressors beget stressors (Pearlin, 1989; Pearlin et al., 1997). This cyclical nature of stressors – called stress proliferation – is the central component of the Stress Process Paradigm (Pearlin, 1999; Thoits, 2010; Turney et al., 2012).

Stress proliferation refers to “the expansion or emergence of stressors within and beyond a situation whose stressfulness was initially more circumscribed” (Pearlin et al., 1997, p. 223). Rarely will a person experience one singular stressor in their life, but instead the experience of stress places individuals at heightened risk for later exposure to stress in other areas of their life beyond the domain of the initial stressor (Pearlin et al., 2005). Research has found that chronic strains can permanently weaken the body’s ability to respond to additional stressors and manage health, in a process called the allostatic load (McEwen, 2006). The allostatic load is “the cumulative toll on the body from elevated use of physiologic systems” (Smith, 1999, p. 162). Thus, the more stress a person experiences, the higher their allostatic load will be (which reduces their ability to cope or deal with future stressors). A higher allostatic load means that not only is that individual at a higher risk of experiencing further stress, but their ability to deal with that stress is lowered and the impacts of stress will be greater (Lazarus & Folkman, 1984). The larger the impact of stress, the more accumulation of the toll on the allostatic load, which leads back to a higher risk of experiencing stress – and the cycle continues.

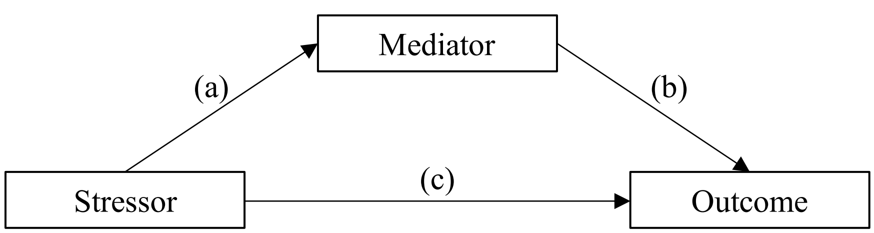
Not all individuals will be exposed to the same stressors, same number of stressors, or react to stressors in the same way (Sugie & Turney, 2017). Instead, the Stress Process Paradigm posits that factors such as background, social status, and relationships may "hinder, prevent, or cushion the development of the stress process and its outcomes" (Pearlin, 1999, p. 405). In other words, the exposure to and reaction to stress may vary by individual characteristics – called moderating resources – which then impact the experience and emergence of further stressors (potentially exacerbating or blocking stress proliferation) (see *Figure 1*). For example, an individual dropping ice cream on their lap (stressor) will lead to a sticky lap (outcome). This relationship is likely to vary by individual factors such as the amount of ice cream that the person had (moderator) – a smaller amount of ice cream will make the person's lap less sticky than a larger amount of ice cream.

Figure 1. Moderation Model



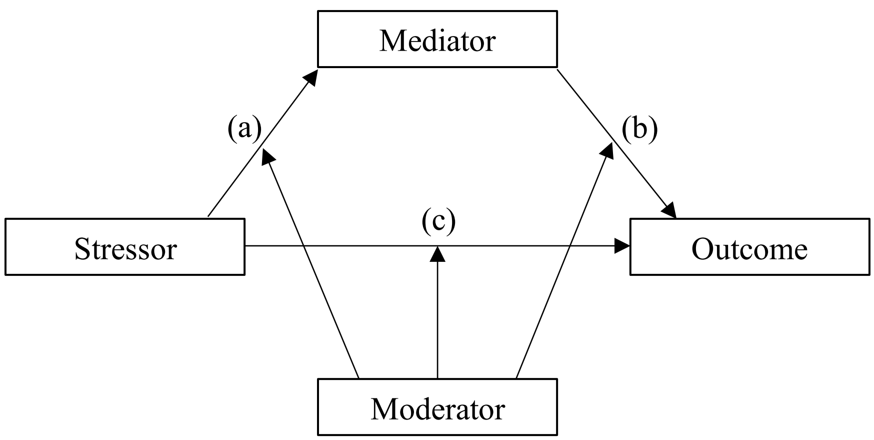
The effects of the stress process on outcomes may also be channeled through an additional factor – called mediation (Pearlin, 1999). Instead of an outcome varying by individual factors (i.e., moderation), mediation involves the process of a variable impacting an outcome *through* another variable (see *Figure 2*). In the case of stress, a stressor may impact a certain variable (i.e., the mediator) (relationship *a* in *Figure 2*), and the impact of the stressor on that variable then impacts the outcome (relationship *b* in *Figure 2*). This is not to say that the stressor does not still directly impact the outcome (relationship *c* in *Figure 2*) – it may – but the indirect impact of the stressor on the outcome through the mediator will either partially or fully explain the relationship between stressor and outcome (Karazsia et al., 2014). Within the Stress Process Paradigm, this is another form of stress proliferation – where the mediating variable is a secondary stressor brought on by the initial stressor, which then impacts the outcome. Using the ice cream example from earlier (where dropped ice cream is the stressor and a sticky lap is the outcome), standing up quickly may act as a mediator in this relationship. If a person drops their ice cream, they may have the quick reaction to stand up (relationship *a*). Standing up quickly would then impact whether the ice cream hits their lap to leave a sticky mess – if they are quick enough to stand up the ice cream might miss completely and hit the floor (relationship *b*). Thus, while dropping the ice cream may still lead to a sticky lap, whether the person stood up may explain part of that relationship.

Figure 2. Mediation Model



Moderators and mediators may also work in concert with one another. Specifically, “the strength of mediating pathways [may] vary as a function of some other individual difference” – referred to as moderated mediation (Karazsia et al., 2014, p. 165) (see *Figure 3*). In moderated mediation, the impact of stress on the outcome is still channeled through the mediator, but, in addition, the moderating variable(s) impact the strength of the relationship between the stressor and the mediator (relationship *a* in *Figure 3*) and between the mediator and the outcome (relationship *b* in *Figure 3*). Moderators may also continue to impact the strength of the direct relationship between stressor and outcome (relationship *c* in *Figure 3*). In the ice cream example, the amount of ice cream a person has (moderator) may impact whether the choose to stand up (mediator) – those with less ice cream may deem it not necessary to try and stand up because the mess from the ice cream will be smaller anyways (moderated mediation).

Figure 3. Moderated Mediation Model



Overall, the Stress Process Paradigm (and the concept of stress proliferation within the paradigm) posits how earlier circumstances and life events (i.e., stressors) can impact later experiences and health. The theory also posits how these impacts may vary by individual characteristics (i.e., moderators) and how they may be channeled through other factors (i.e., mediators) (Pearlin et al., 2005).

3.2 Pathways from Incarceration to Offending Within a Stress Proliferation Framework

3.2.1 Incarceration as a Stressor

The experience of incarceration is widely recognized as a stressful one (Massoglia & Pridemore, 2015). Imprisonment is "a major life event that requires dramatic changes in a short period of time across a number of life circumstances" (Massoglia & Pridemore, 2015, p. 299). Within the framework of the Stress Process Paradigm, imprisonment itself is not only a stressor, but it also exposes individuals to additional stressful events and chronic strains (i.e., a source of stress proliferation) (Nowotny et al., 2017; Turney et al., 2012).

Incarceration can be considered both an event and a chronic strain within the Stress Process Paradigm. Incarceration is an acute stressful event in that it removes an individual from their normal life and routine, removes their connection with family and friends, and removes personal autonomy – in general, providing a jarring change from pre-incarceration life. However, imprisonment is not limited to the event of *being* imprisoned. Instead, incarceration becomes the state of being for the term of an individual's imprisonment, and, thus, becomes a chronic stressor. Every day an individual is incarcerated exposes them to further stress and strain, including the threat of violence and social isolation (Baćak et al., 2019).

As the Stress Process Paradigm outlines, prolonged stress can lead to an increase in allostatic load (Lazarus & Folkman, 1984; Smith, 1999). Taken within the context of incarceration, this indicates that the continual stress experienced during incarceration would be expected to increase the allostatic load of inmates. In other words, the prolonged elevated use of the physiological system due to jarring life change and the threat of violence (amongst other incarceration stressors) strains the body and makes the individual more susceptible to future strains. Over time, the "the body is unable to return to its prior state of functioning" – leading to permanent physiological change (Massoglia, 2008, p. 58). With a lowered ability to cope and adjust to stressors, adjusting to life after incarceration becomes more difficult (Massoglia, 2008). In particular, abstaining from crime becomes harder to accomplish for persons with lowered coping abilities. Previous research finds support for the stress of incarceration impacting this. Studies find incarceration is associated with an increased likelihood of offending across measures such as rearrest, reconviction, and reincarceration (Leslie & Pope, 2017; Mueller-Smith, 2015; Nagin et al., 2009). In order to establish the base relationship, this research first examines the relationship between incarceration and offending (*Hypothesis 1a*).

Hypothesis 1a*: Incarceration will have a positive association with offending.*

3.2.2 Stress Exposure and Mental Health

Additionally, incarceration is likely to impact mental health status due to similar processes as previously described. The continual stress experienced during incarceration is expected to increase allostatic load and lead permanent physiological change (Massoglia, 2008). Research suggests that this increase in allostatic load has a direct (and negative) impact mental health. In fact, in a review of literature on allostatic load and health, Guidi et al. (2021) found agreement across studies that allostatic load was associated with mental health. Specifically, higher allostatic load was associated with higher levels of self-rated stress, PTSD, and psychotic disorders. Accordingly, this research hypothesizes that (*Hypothesis 1b*):

Hypothesis 1b*: Incarceration will have a positive association with mental health issues.*

Not only is the stress of incarceration likely to lead to poor mental health, but poor mental health itself is a stressful experience. Although the majority of research on health and stress examines health as an outcome of stress (e.g., Giudi et al., 2021), there is some evidence suggesting that the relationship is bidirectional, with health also acting as a source of stress.

Mental health issues are often long-endured (i.e., it is unlikely that a mental health issue would be an acute event), fitting in the category of chronic stressors. Mental illness can impact the way people think, distort their perception and memory, reduce their ability to concentrate, and increase fatigue (Ridley et al., 2020). All of these alter how individuals view and interact with the world and are sources of stress (Ridley et al., 2020). Further, mental health issues are highly stigmatized (internally, publicly, and institutionally), also contributing to the level of stress experienced when living with a mental illness (Ridley et al., 2020; Vigo, 2016).

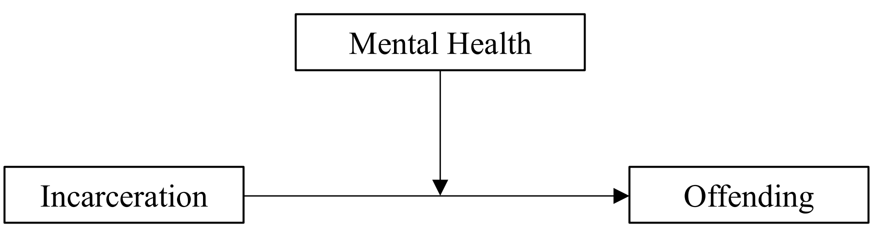
Within the Stress Process Paradigm, the stress of poor mental health – similar to the stress of incarceration – increases the allostatic load of individuals. For example, in a study examining the directionality of depression and allostatic load, McClain et al. (2022) found that depressive symptoms were significantly associated with higher 5-year allostatic load scores (as well as allostatic load being associated with 5-year depressive symptoms). In this research, the relationship between mental health and allostatic load was stronger than the reciprocal relationship. Thus, the stress of poor health increases allostatic load and makes individuals more susceptible to and less able to cope with future strains, which may make abstaining from crime a more difficult endeavor. As such, it is also hypothesized that (*Hypothesis 1c*):

> ***Hypothesis 1c****: Mental health issues will have a positive association with offending.*

Furthermore, having poor mental health and high allostatic load impacts what individuals can do and the decisions they make when faced with future choices or adversities both during and after incarceration. In particular, having poor mental health (and high allostatic load) after incarceration impacts the choices made during reintegration, contributing to future outcomes like offending (see *Figure 4*). Thus, it is hypothesized that the impact of incarceration on offending may vary by mental health (*Hypothesis 2*):

> ***Hypothesis 2****: The impact of incarceration on offending will vary by mental health – those with worse mental health will have worse offending outcomes.*

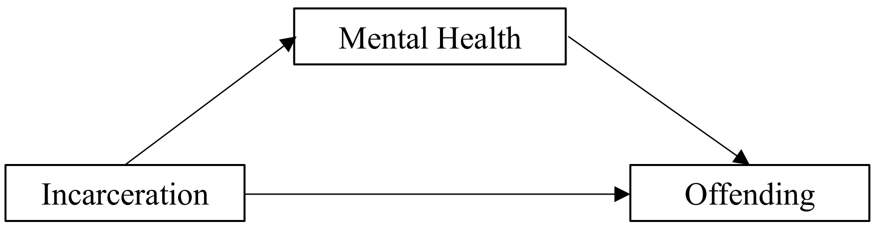
Figure 4. Mental Health as a Moderator



The relationship between incarceration and offending may also be mediated by mental health (see *Figure 5*). As discussed previously, there is strong evidence that incarceration negatively impacts mental health (Maruschak et al., 2021a). There is also a body of research indicating that mental health impacts criminal activity (Mallik-Kane & Visher, 2008; Semenza & Silver, 2022). Since incarceration is associated with worse mental health and worse mental health is associated with crime, it could be that incarceration impacts offending through its impact on mental health. Thus, this research hypothesizes that mental health will mediate the relationship between incarceration and offending (*Hypothesis 3*).

Hypothesis 3*: The impact of incarceration on offending will be partially mediated by mental health.*

Figure 5. Mental Health as a Mediator

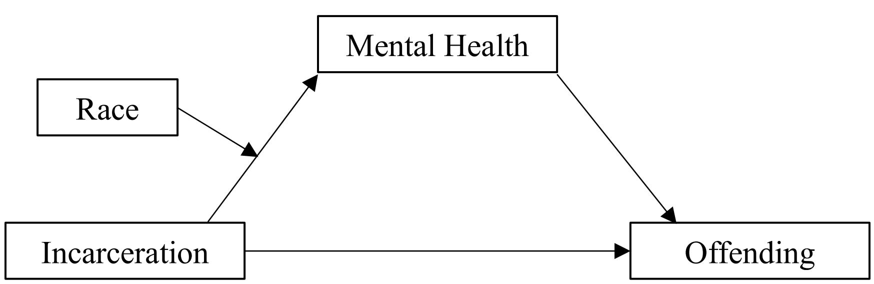


Further, it is likely that the impact of the stress of incarceration on later outcomes is not uniform across all individuals. As the Stress Process Paradigm indicates, individual factors may "hinder, prevent, or cushion the development of the stress process and its outcomes" (Pearlin, 1999, p. 405). In particular, race and sex are stratified orders of social and economic class, and, within the Stress Process Paradigm, they are posited to "impact daily existence and the experiences that flow from it" (Pearlin, 1999, p. 398) (see *Figures 6* and *7*). Because race and sex are pervasive in daily life and can signal linkages between individuals and their placement in society, these status characteristics may heighten the risk of exposure to stressors; and, when there are no connections between status characteristics and exposure to stress, they may impact how individuals experience and manage stress (Pearlin, 1999). In the context of this research, this would mean that whether or not an individual experiences incarceration (which is a stressor) is likely to be impacted by status characteristics like race and sex (e.g., Black individuals and men are more likely to be incarcerated than White individuals and women), as well as how an individual experiences and responds to being incarcerated (e.g., women may be more likely to view incarceration as stressful than men). Thus, the stress of incarceration and how that stress is dealt with (which then impacts future stressors and how those are dealt with) are likely to vary by the individual characteristics of race and sex.

Research supports the idea that individuals differ in their reaction to stressors by race. Black individuals report a greater number of stressful events in life and a stronger response to those stressors, compared to White individuals (Brown et al., 2020; Bulatao & Anderson, 2004). Studies focused on incarceration and mental health also find racial differences – Black individuals are more likely to have poor mental health after incarceration compared to White individuals (Porter et al., 2021; Ropes Berry et al., 2020). Thus, if Black persons are more likely to respond strongly to stressors, like incarceration and mental health, and more likely to have mental health issues post-incarceration, it is hypothesized that:

> ***Hypothesis 4a****: Mental health will more strongly mediate the relationship between incarceration and offending for Black individuals compared to White individuals.*

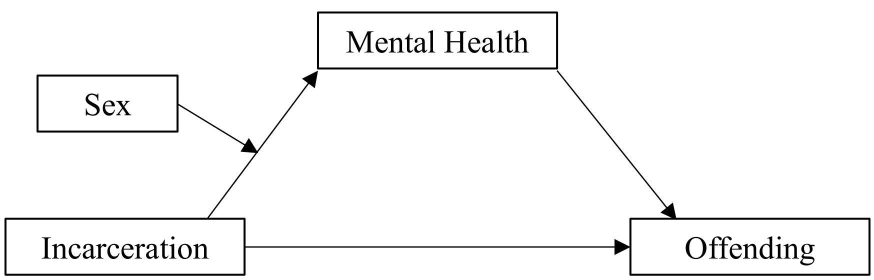
Figure 6. Race and Mental Health in Moderated Mediation



Additionally, prior studies suggest that women and men respond differently to stressors, with women being more likely to report having a high stress level and experiencing physical and emotional outcomes of stress (Costa et al., 2021). Women are also more likely than men to report mental health issues post-incarceration (Mallik-Kane & Visher, 2008). And other research suggests that mental health issues are significant predictors of criminal behavior post-release for women, but not for men (Bakken & Visher, 2018). Taken together, women are more likely to have negative reactions to stressors (such as incarceration and mental health issues), more likely to have mental health issues after incarceration, and it is hypothesized that:

Hypothesis 4b*: Mental health will more strongly mediate the relationship between incarceration and offending for women compared to men.*

Figure 7. Sex and Mental Health in Moderated Mediation



3.2.3 Other Pathways of Stress Proliferation

The idea of stress proliferation within the Stress Process Paradigm can be considered with just two stressors (like incarceration and mental health issues above); however, the overarching concept of stress proliferation highlights the cyclical and expanding nature of multiple (i.e., more than two) stressors. The increase in allostatic load from an initial stressor (e.g., incarceration) reduces an individual's ability to deal with later stressors and makes them more likely to experience stress – thus leading to the continued experience of more and more stressors (Pearlin et al., 2005). Incarceration and mental health issues, as stressors, increase an individual's allostatic load, making them more susceptible to additional stressors in other areas of life – such as employment, family ties, and physical health; and these subsequent stressors further increase their allostatic load and make the individuals even more likely to experience additional stress and poor stress-related outcomes.

Research supports that outcomes of incarceration – such as employment, family ties, and physical health – can be stressful experiences in and of themselves and that they are associated with both incarceration and mental health. First, extant studies have found that incarceration has negative impacts on wages and employment probability and that individuals with mental health issues are more likely to be unemployed after incarceration (compared to those without mental health issues) (Mallik-Kane & Visher, 2008; Western, 2002). Unstable employment and the resulting economic hardship are then stressful experiences in and of themselves because they hinder an individual's ability to achieve financial goals, which adds on to extant stressors and can lead to future stressors (Uggen et al., 2005).

Second, incarceration has a negative impact on marriage – with those who are married during incarceration being more likely to get divorced post-incarceration, and those who are unmarried during incarceration being less likely to get married post-incarceration (Huebner, 2007; Lopoo & Western, 2005). Further, individuals with mental health issues have higher rates of divorce (Breslau et al., 2011). Not having the family ties of marriage or experiencing a divorce can both be a source of stress by impacting an individual’s prosocial contacts and support; and this can contribute to the stress already experienced and predisposes individuals to future stressors (Strizzi et al., 2021; Uggen et al., 2005).

Finally, incarceration and mental health issues are also associated with physical health issues. Studies have found that physical health issues are more prevalent among those who have been incarcerated than those who have not; and poor mental health predicts poor physical health later (Ohrnberger et al., 2017b). Expectedly, physical health issues are also sources of stress, both chronic and acute. Physical health can be a source of chronic stress for permanent or long-term conditions, such as HIV, cancer, or physical disabilities, and it can be a source of acute stress in the form of shorter-term illnesses or injuries (e.g., having the flu or breaking a bone). Regardless of chronic or acute, dealing with a physical health issue impacts what a person is physically capable of doing and is likely accompanied by symptoms that are uncomfortable or painful, all of which contribute to stress (Semenza & Grosholz, 2019).

Each of these areas of research indicates that employment, family ties, and physical health can be sources of stress, but are also associated with incarceration and mental health. Within the framework of stress proliferation, it follows that each of these factors can further the stress an individual is already experiencing and lead to additional stressors and poor outcomes in the reentry process. However, the pathways through which stress proliferates is less clear. Few studies have examined different pathways between incarceration, mental health, and offending and those that do are limited in their population of interest and follow-up period (e.g., Link et al., 2019). To further explicate these relationships, this research explores the potential pathways between incarceration and mental health to offending through employment, family ties, and physical health. The current research takes an exploratory approach and models multiple pathways to determine which factors determine offending. Pathways are examined via individual variables and via combinations of variables and, therefore, it is hypothesized that:

> ***Hypothesis 5****: The impact of incarceration on offending will be partially mediated by mental health and additional factors.*

3.3 Present Study

The current study utilizes the Stress Process Paradigm to examine stress proliferation in the pathway from incarceration to offending. Specifically, this research examines whether mental health functions as a moderator or mediator between incarceration and offending and whether there is moderated mediation by race and gender. Finally, this research explores potential pathways from incarceration to offending through other stressors (employment, family ties, and physical health) (see *Table 1* for hypotheses by research question).

Table 1. Hypotheses

#	Hypothesis
Is there a relationship between incarceration and offending, incarceration and mental health, and mental health and offending?	
1a	Incarceration will have a positive association with offending.
1b	Incarceration will have a positive association with mental health issues.
1c	Mental health issues will have a positive association with offending.
Does mental health moderate the association between incarceration and offending?	
2	The impact of incarceration on offending will vary by mental health – those with worse mental health will have worse offending outcomes.
Does mental health mediate the association between incarceration and offending?	
3	The impact of incarceration on offending will be partially mediated by mental health.

Is there moderated mediation of the incarceration-offending link by race or sex?	
4a	Mental health will more strongly mediate the relationship between incarceration and offending for Black individuals compared to White individuals.
4b	Mental health will more strongly mediate the relationship between incarceration and offending for women compared to men.
How do stressors after incarceration proliferate to generate future offending?	
5	The impact of incarceration on offending will be partially mediated by mental health and additional factors.

Chapter 4: Data and Methods

This research uses the National Longitudinal Survey of Youth 1997 (hereafter, NLSY97) to examine the role of health and other stressors in the pathway from incarceration to offending.

4.1 Data

The NLSY97 is a longitudinal dataset collected by the Bureau of Labor Statistics (BLS) that follows a sample (n=8,984) of U.S. individuals who were born between 1980 and 1984 (*National Longitudinal Survey of Youth 1997*; *National Longitudinal Survey of Youth 1997 Data Overview*). The sample consisted of two subsamples: (1) a cross-sectional sample representative of the civilian, noninstitutional population (n=6,748), and (2) a supplemental sample oversampling Hispanics and non-Hispanic Blacks (n=2,236) (*National Longitudinal Survey of Youth 1997*). Youth (and their parents) were first interviewed in 1997 when they were between 12 and 17 years old, and they were interviewed yearly until 2011, when interviews began occurring every other year (i.e., 2013, 2015, 2017, etc.) (*National Longitudinal Survey of Youth 1997*).

Interviews are conducted using a computer-assisted personal interview (CAPI) instrument, which is administered by an interviewer with a laptop. For sensitive portions of the interview, respondents enter their answers to questions directly into the laptop instead of verbally telling the interviewer their answer. Additionally, there is an audio option for respondents to listen to sensitive questions and answers being read via headphones. In some cases, depending on the respondent's location and willingness to be interviewed in person, interviews are conducted via phone. The percent conducted via phone has varied per survey round, with the lowest occurring in the first round in 1997 (3.2%) and the highest occurring in round 19 in 2019 (95.6%) (*National Longitudinal Survey of Youth 1997*).[14]

NLSY97 also surveys participants in correctional facilities (*National Longitudinal Survey of Youth 1997*). Participants who are incarcerated are first sent a letter reminding them about previous participation in the survey and encouraging them to participate in the upcoming round of surveys. Individuals are then required to return a pre-addressed and pre-paid envelope to request a consent form. Once the consent form is signed and returned, NLSY97 staff contacts the prison to request permission to interview the individual, and, if granted, an interview is scheduled (*National Longitudinal Survey of Youth 1997*).

The NLSY97 survey includes questions on a range of topics – including incarceration, mental and physical health, crime and criminal justice involvement. The NLSY97 is an ideal dataset for examining incarceration and the current relationships of interest for a number of reasons. First, this survey follows individuals born between 1980 and 1984, making participants between the ages of 13 and 17 at first interview in 1997. Literature on age and crime suggests that offending peaks during the teen years (dropping off in the early- to mid-20s), so the individuals in this sample are at the prime ages to engage in crime and experience incarceration during the early survey waves (Le Blanc, 2020; Shulman et al., 2013). And, because the NLSY97 surveys those incarcerated, individuals do not have to drop out of the

[14] Expectedly, the percentage of phone interviews in 2019 was influenced by the COVID pandemic. However, phone interviews had previously been increasing and were already at 89.5% in 2017 (pre-pandemic).

sample due to periods of incarceration. Further, because the survey uses self-reporting and asks for incarceration status in each month of the year, the NLSY97 is more likely to capture incarceration in general and incarceration at smaller intervals. The survey is also useful for examining health because it includes a number of questions gathering information on mental health – specifically it includes questions from the Mental Health Index-5 (MHI-5), which is a validated mental health tool. Finally, because the survey follows the same individuals over many years, the data allow for analyzing pathways and outcomes over longer periods of time. This is particularly helpful because much of the research on post-incarceration pathways has a follow-up period of 2 or fewer years (e.g., Link et al. (2019)).

Importantly, not all questions are asked in every survey year or with the same reference period (e.g., in the past month, in the past year).[15] Specifically of interest for this research, mental health was asked every other year (2000, 2002, 2004, 2006, 2008, and 2010), rather than annually. Because mental health is one of the main foci of this research, the analyses here use data collected between 2000 and 2011 because it contains the most data on mental health and because the ages of the individuals during those years (in their 20s) works well for examining incarceration and offending.

4.2 Measures and Descriptive Statistics

4.2.1 Incarceration

This research uses incarceration as the main independent variable. The NLSY97 asked for each respondent's incarceration status in each month of the

[15] See *Appendix B* for the survey questions and waves for each variable of interest.

previous year. Using these questions, incarceration is be recoded in two ways – binary and proportion. For binary, incarceration is be measured as whether or not the individual was incarcerated in the past year (0 = *no*, 1 = *yes*) – across all years, 2.36% of respondents were incarcerated in the prior year. For proportion, incarceration is coded as the proportion of months in the year that the individual was incarcerated (not including non-reporting months). For example, if an individual reported being incarcerated 5 months of the year 2000 panel, but only responded to the incarceration question for 8 months of the year, then their incarceration proportion would be 5/8 = 0.625 (62.5%).[16] On average, respondents who were incarcerated were incarcerated for 59.10% of the year (or just over 6 months).

4.2.2 Offending

The outcome variable of interest for this research is offending. Previous research on offending has examined it using a number of different measures – including rearrest, reconviction, and reincarceration – and reports inconsistent findings (Green & Winik, 2010; Rose & Shem-Tov, 2021). To examine this relationship further, this dissertation utilizes two measures of offending: self-reported delinquency and arrest, which are more sensitive to capturing criminal activity. These measures are more sensitive because they require fewer steps within the criminal justice system. For example, reconviction requires an individual be arrested, charged, and convicted of a crime – requiring 3 steps after commission of a crime to measure offending. Conversely, delinquency relies on self-reported delinquent activity and does not require that the individual be caught for the crime. Arrest is also used

[16] See *Table 2* for descriptive statistics of the key variables in this research.

because it is only one step into the system and is likely to occur for more serious crimes.

NLSY97 respondents were asked a number of questions about engaging in delinquent acts – including destroying property, stealing something worth more than $50, stealing something worth less than $50, committing some other property crime, attacking someone, and selling drugs. For this analysis, these questions are used to measure delinquency in two ways. First, the measures are combined into one variety score, indicating the number of different delinquent acts committed in a year (respondents reported an average of 0.233 delinquent acts across all years). Second, the measures will be combined into a dichotomous variable where 0 = *no delinquency* and 1 = *committed any delinquent act* (an average of 14.65% of the sample committed delinquent acts).

Arrest information was gathered from respondents by asking how many times they were arrested in each month of the previous year. For this research, arrest is measured as a binary of whether or not the individual was arrested during the year (4.53% of the sample were arrested over the years of data used in this research).

4.2.3 Mental Health

Mental health is examined as a moderator and mediator in this research. In the NLSY97, mental health is measured with a series of five questions asking how often in the past month the respondent has felt (1) nervous, (2) blue, (3) depressed, (4) calm, and (5) happy. These questions are measured on a likert scale with 1 = *all of the time*, 2 = *most of the time*, 3 = *some of the time*, and 4 = *none of the time*. This five-question scale is referred to as the Mental Health Inventory-5 (MHI-5) and is a validated tool for screening for anxiety and mood disorders (Cuijpers et al., 2009). For this dissertation, nervous, blue, and depressed are reverse coded so that they are measuring mental health in the same direction as the calm and happy measures – larger numbers indicating more frequent mental health issues (e.g., a 4 would indicate feeling nervous/blue/depressed/not calm/not happy all of the time). For respondents who answered all five questions, the measures are combined into one sum from 5 to 20, where higher numbers indicate *worse* mental health and lower numbers indicate *better* mental health. The average mental health sum is 9.547, indicating that, on average, respondents felt nervous, blue, depressed, not calm, and not happy *some of the time*.

4.2.4 Other Pathways to Offending

This research also examines potential differences in the impact of mental health on offending (i.e., moderated mediation) via demographic variables – race and sex. In the NLSY97, race/ethnicity is captured in one variable that includes Black, Hispanic, Mixed Race, and White. For this research, this was recoded into 0 = *White*, 1 = *Black*, 2 = *Other race*. Sex is measured as a binary with 0 = *female* and 1 = *male*.[17]

Further, the potential for incarceration and mental health to impact offending through additional stressors (i.e., stress proliferation) – namely, employment, family ties, and physical health – is examined.

[17] For initial models race and sex are included as control variables, but for later models (specifically moderated mediation) they are examined as potential moderators. For moderated mediation analyses, race only uses White and Black because those are the categories of interest in this research.

In each survey, NLSY97 respondents are asked for their employment status for each week of the previous year. Employment options for each week included *no information reported*, *no association with an employer*, *not working*, *association with an employer*, *unemployed*, *out of the labor force*, and *active military service*. For this research, employment is measured as a binary of whether or not an individual was employed during the year. Because this research focuses on the stress of not having employment, this measure is coded as 0 = *employed* and 1 = *unemployed*, where an individual was considered employed in a year if they reported being employed for at least half of the weeks in the year. Conversely, an individual was considered unemployed in a year if they reported being employed for fewer than half of the weeks in the year. For the years used in this research, an average of 15.7% of respondents report being unemployed.

Next, family ties are examined – with a specific focus on being married compared to unmarried. NLSY97 participants are asked yearly what their marriage status is as of the date of the interview, with answer options of: 0 = *never married* (i.e., single; 76.82%), 1 = *married* (19.64%), 2 = *separated* (0.78%), 3 = *divorced* (2.69%), and 4 = *widowed* (0.07%). Again, this research investigates whether not being married functions as a stressor, and, therefore, this variable is recoded to be 0 = *married* and 1 = *unmarried* (be that through being single, separated, divorced, or widowed). Overall, 80.4% of the sample report being unmarried.

Finally, the role of physical health is also examined. There are a number of questions that ask about physical health in the NLSY97, but many are not consistently included in the survey. For example, the survey inquired about specific physical health conditions (e.g., asthma, anemia, diabetes) each person had, but only in the 2002, 2007, 2008, and 2009 surveys. The most consistently (i.e., in each survey wave) asked physical health question was “In general, how is your health?”, with answers on a scale from 1 = *excellen*t to 5 = *poor*. On the surface, this may seem like a poor way to estimate physical health; but research has shown that this self-rated health (SRH) question is a valid and reliable measure of an individual’s health (Bombak, 2013). Therefore, this research uses the physical health SRH question, where higher values indicate to worse physical health (or more physical health issues), which coincides with the direction mental health is measured. Respondents’ average physical health is 2.165 (between good and very good).

Table 2 (below) shows the descriptive statistics for the key variables of interest across all years.[18] The table shows the minimum and maximum values for each variable, as well as the overall average or percentage. All binary variables show the percentage of respondents who responded “yes.” For incarceration proportion and employment proportion, the table shows the average response for those who responded yes to the incarceration and employment binary questions (respectively). Finally, *Table 2* also shows the descriptive statistics for the control variables (discussed below).

Table 2. Descriptive Statistics of Key Variables

	n	Min	Max	M or %
IVs				
Incarceration binary	102,367	0	1	2.36%
Incarceration proportion[1]	2,411	0.08	1	59.10%
DVs				
Delinquency variety score	50,114	0	6	0.233

[18] See *Appendix B* for descriptive statistics by year.

Attack someone	49,997	0	1	5.89%
Destroy property	49,990	0	1	3.75%
Other property crime	49,987	0	1	1.72%
Steal something worth <$50	50,008	0	1	4.57%
Steal something worth >$50	50,004	0	1	1.92%
Help sell illegal drugs	49,959	0	1	5.50%
Delinquency binary	50,114	0	1	14.65%
Arrests binary	102,367	0	1	4.53%
Mediators				
Mental health issues	44,478	5	20	9.547
Blue	45,174	1	4	3.203
Depressed	45,177	1	4	3.617
Nervous	45,374	1	4	3.226
Not calm	45,509	1	4	2.615
Not happy	45,578	1	4	2.791
Unemployed	101,793	0	1	15.67%
Unmarried	89,582	0	1	80.36%
Physical health issues	91,335	1	5	2.165
Moderators				
Male	107,808	0	1	51.19%
Race				
White	107,808	0	1	51.93%
Black	107,808	0	1	25.99%
Other race	107,808	0	1	22.08%
Controls				
Education				
High school drop out	90,785	0	1	20.68%
High school/GED	90,785	0	1	62.33%
Associate's degree	90,785	0	1	4.09%
Bachelor's degree	90,785	0	1	11.28%
Master's degree or higher	90,785	0	1	1.63%
Drug use	43,310	0	1	30.24%
Income	71,174	0	$421,368	$56,867
Age	91,380	15	32	23.287

[1] indicates the percentage of respondents who answered “yes” to the binary
Note: Race and education are shown as multiple binary variables in order to show the percent in each category. Descriptives shown are across all years, so *n* counts each individual in each year.

4.2.5 Controls

Consistent with prior research, a number of controls that may impact incarceration, health, and offending are also included in this analysis: drug use, education, age, and income. Drug use is measured as 0 = *has not used drugs* and 1 = *used marijuana, cocaine, or other substances not prescribed by a doctor* (mean = 30.24%). Highest education level is categorical and measures the highest degree as of each survey. This variable was originally coded for seven different types of education (e.g., GED, high school diploma, bachelor's). This is collapsed and recoded into five education levels: no education, high school or GED, Associate's degree, Bachelor's degree, and post-graduate (including Master's, PhD, JD, and MD) (the majority – 62.33% – of the individuals in this study had a high school diploma or equivalent). Age is measured as the age of the individual at the time of the survey (mean = 23); and income is the yearly household income that respondents report (mean = $56,867).[19]

4.3 Limitations of NLSY

4.3.1 Missingness

Because the NLSY97 is a large panel dataset that followed individuals over many years, there are (expectedly) missing data. First, there is some missingness due to attrition that naturally occurs in longitudinal studies (i.e., the longer a study goes on, the more difficult it is to maintain 100% participation in every survey wave). In the NLSY97, particular care has been taken to maintain participation over the years –

[19] Prior incarceration is not controlled for in this research for two reasons. First, because fewer than 1% of respondents (67 persons) had been incarcerated before 2000, which is not a large enough sample to detect statistical differences between those that experienced prior incarceration and those that did not. Second, because those individuals who had been incarcerated prior to 2000 were between the ages of 10 and 20 – making them mostly teenagers. Incarceration during the teen years is qualitatively different than incarceration as an adult (Silver et al., 2023). Juvenile incarceration facilities often offer (and emphasize) education, treatment, and counseling, whereas adult facilities do not (Kupchik, 2007; Silver et al., 2023). Thus, the experience of incarceration as a teenager is less likely to elicit stress responses than the experience of incarceration as an adult, and, because this research is focused on the stress-related outcomes of incarceration, prior incarceration is therefore not controlled for.

including continuing to contact participants who have not responded to prior interviews (allowing participants to come in and out of the study, rather than remaining out) (Moore et al., 2000). From the first interview to the second interview, participation only dropped to 93.3% (*Retention & Reasons for Non-Interview*). During the time frame used for this research, participation ranged from 89.9% (in 2000) to 82.6% (in 2011), which is quite high for longitudinal surveys (Moore et al., 2000; *Retention & Reasons for Non-Interview*). Comparatively, other panel surveys have suffered from participation rates as low as 65% in later waves (Hillygus & Snell, 2018). In the technical sampling report for the NLSY97, Moore et al. (2000) examined differences based on the number of persons in the household, type of area, and region for NLSY97 responders compared to the nationally representative Current Population Survey (CPS). The authors found the composition of the NLSY97 responders and CPS to be very similar (for the variables examined) and concluded that nonresponse did not have a major impact on the sample composition. Further, due to the high response rate, the authors concluded that the impact of non-response is likely small because the number of respondents far outweighs the number of non-respondents, thus diluting any differences between the two groups (Moore et al., 2000).

Second, apart from non-response to an entire survey wave, longitudinal studies can suffer from missingness due to item non-responses. Item non-response occurs when an individual who is participating in the survey does not answer particular questions or parts of the survey. In the NLSY97, this can occur for a number of reasons: refusal to answer the question, not knowing the answer, and a valid skip. Refusal to answer the question and answering with “I don’t know” are obviously not answer options and, thus, are types of item non-response. A valid skip occurs when a respondent answers “no” to a lead-in question, thus identifying that topic as inapplicable and resulting in all follow-up questions of that topic being skipped.[20]

It is important to examine patterns in missing data because it has the potential to be related to the research questions at hand. Depending on the structure of the missingness, missing data can be missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR) – each of which has a different impact on estimation.[21] MCAR means the data that are missing are independent of the observed variables and independent of the unknown values of the missing observations; if the missing data are MCAR, then listwise deletion of observations with missing values will have no impact on the estimates. Missing data that are MAR may be dependent on other observed variables, but they are independent of the unknown values of the missing observations. MAR is much more common than MCAR, and – similar to MCAR – if missing data are MAR, then listwise deletion will not impact estimates. Finally, MNAR means that the missings are dependent on the unknown values of the missing data. Because the values of the data impacts whether or not they are missing, MNAR will bias the estimates if listwise deletion is used.

[20] For all analyses in this research, all options for non-response were coded into a single missing category.
[21] For more on missing values, see Allison (2009).

In general, it is difficult to determine whether missingness is random or not because the information needed to determine it is the missing data itself, but it is still important to understand how missingness functions in the data. Missing data in this research were explored in two ways: (1) by examining missings on the outcome variables (delinquency and arrest) by type of missing (item non-response vs. survey non-response) and (2) by examining patterns in missing outcome data based on the main variables of interest (incarceration and mental health issues).

First, missing data were examined by type of missing and year for each outcome variable (*Table 3* below). From 2000 to 2003, both delinquency and arrest had high response rates (around 88% and 97%, respectively). For delinquency, missing values during this time period were more likely to be due to not responding to the survey (around 11%) than not responding to the delinquency questions in particular (fewer than 1%). For arrest, missing values were only due to not responding to the arrest questions (around 3%). This is a reflection of to whom the questions were asked and when the questions were asked. In earlier survey years, all respondents were asked the delinquency questions, so item non-response was only due to individuals refusing to answer questions or answering “I don’t know” and, consequently, there were few respondents with missing delinquency data due to item non-response. Arrest, on the other hand, was asked in an event history format and only after the age of 12. Each time an individual was interviewed, they were asked about any arrests (and the month of arrest) since the prior interview. Meaning that, for example, if a respondent was surveyed in 2001 but not again until 2004, they were asked about arrests during the missing years (2002 and 2003) and the current year at the 2004 interview. As such, none of the arrest data are categorized as survey non-response. Instead, any missing responses were categorized under “valid skip” (or item non-response) in the codebook, but the NLSY97 data guide clarifies that for arrest this indicates “the respondent is younger than 12 years old or has not been interviewed about this month” (*Crime & Substance Use*).

For later years of data (2004 and after), missing data for arrest continues following a similar pattern – the majority of respondents had arrest data, but as time went on there were slight increases in the number of non-responses (which mirrors the slight increase in non-response of the survey as a whole over time). For delinquency, on the other hand, there was a stark change in the percent of item non-response starting in 2004. The percent of item non-response jumped from 0.26% in 2003 to 63.18% in 2004. This is due to a change in which respondents were asked the delinquency questions. As previously mentioned, prior to 2004, all respondents were asked the delinquency questions; but, for 2004 and later, the delinquency questions “were only asked of respondents who had ever reported being arrested and a control group of approximately 10% of the respondents for comparison” (*Crime & Substance Use*).[22] This change reduced the number of delinquency responses from around 8,000 each year prior to 2004 to around 2,000 in 2004 and later.

[22] The NLSY97 data guide does not specify why this change occurred, but it may have been in an effort to reduce the length (and, relatedly, the time-commitment) of the survey.

Table 3. Type of Missing, by Dependent Variable and Year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Delinquency (n = 8,984)												
Response	89.45%	87.40%	87.56%	86.06%	20.32%	22.91%	25.10%	25.85%	27.19%	28.62%	29.14%	29.47%
Non-response												
Item	0.49%	0.33%	0.32%	0.26%	63.18%	58.77%	58.93%	56.62%	56.06%	55.43%	53.94%	52.99%
Survey	10.06%	12.27%	12.11%	13.69%	16.50%	18.32%	15.96%	17.54%	16.76%	15.95%	16.91%	17.54%
Arrest (n = 8,984)												
Response	98.46%	98.09%	97.64%	96.90%	96.11%	95.41%	94.57%	93.99%	93.20%	92.62%	91.59%	90.86%
Non-response												
Item	1.55%	1.90%	2.36%	3.09%	3.88%	4.60%	5.43%	6.01%	6.80%	7.38%	8.41%	9.14%
Survey	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note: n/a indicates not applicable.

This change in the population of who was asked about delinquency may have impacted the percent of individuals responding *yes* or *no* to the delinquency questions. It could be that those who had been previously arrested are more likely to have committed prior delinquency (or other acts not included in the delinquent measure that would result in arrest). Thus, by asking the delinquency questions almost solely to those who reported prior arrest, those responding to delinquency may have already been more likely to have committed delinquent acts. In order to examine this possibility, the percent who responded *yes* to delinquent acts was examined over the years used in this research (see *Appendix B.2*). From 2000 to 2011, the percent of respondents reporting delinquent acts dropped by more than 50%, from 21.04% to 7.93%. Although there was an increase in reported delinquency between 2003 and 2004 (from 12.53% to 16.05%), the larger trend over the timespan shows a gradual decrease in delinquent activity – which is in support of delinquency decreasing as age increases. In fact, the percent of respondents reporting delinquent activity decreased every year except from 2003 to 2004 and 2005 to 2006. Because of this long-term decreasing trend, the concern that delinquency may have been artificially inflated by selecting on arrest does not appear to be supported. Further, because this research uses all of the years of data, the potential for the few increases in delinquency to largely sway the results is reduced.

Another potential consequence of the reduction in the number of respondents for the delinquency questions is a loss of data and, accordingly, power. As previously mentioned, the change in who is asked delinquency questions reduced the sample size from around 8,000 (nearly the full sample size) to just over 2,000 respondents.

Though this may seem like a large reduction in numbers alone, 2,000 respondents is still a fairly large sample size for statistical analysis (with more than 200 of those responding *yes* to delinquency). Further, the reduced sample size is only of impact for some of the analyses in this research. Specifically, later analyses are able to use a maximum likelihood with missing values approach and an equationwise deletion approach in order to utilize all available data and reduce (though not completely negate) the impact of missing values on analytical power (see *4.4 Analyses* for more on analytic techniques). Finally, as an additional check, initial models in this research that examined delinquency as an outcome (both using hybrid fixed effects (HFE) and structural equation modeling (SEM)) were run separately for 2000-2003 and 2004-2011 to ascertain whether the change in sample size impacted the results of the analysis. For both HFE and SEM, the direction and significance of the impacts of incarceration and mental health on delinquency remained the same (with only slight changes in the magnitudes) before and after the NLSY97 change. Thus, the increase in missing values for delinquency are not expected to have largely impacted the results of this analysis, but it is still possible they did and that is important to take into consideration when interpreting results (see *Chapter 6* for a discussion of the results).

Second, the missing data in the outcome variables were examined based on the independent variables of interest. If missingness in the dependent variables *is not* related to the independent variables, then the data *may* be MCAR. If the missingness in the dependent variables *is* related to the independent variables, then the data *may* be MAR or NMAR. Again, it is not possible to know which it is because the missing values will never be known; however, patterns in the missing data can inform research conclusions. For this research, the main independent variables were incarceration and mental health issues.[23] *Table 4* (below) shows a comparison of the missing values in outcome variables based on whether the respondent was incarcerated and in good mental health or incarcerated and in poor mental health, with 1-, 2-, and 3-year lags.[24]

Table 4. Missingness in Delinquency and Arrest, by Incarceration and Mental Health

	1 Year Lag		2 Year Lag		3 Year Lag	
	Inc & +MH	Inc & -MH	Inc & +MH	Inc & -MH	Inc & +MH	Inc & -MH
Delinquency						
n	44,250	63,156	37,147	70,259	37,156	70,250
Response	53.09%	42.16%	41.95%	49.14%	42.51%	48.85%
Non-response						
Item	41.38%	35.71%	51.13%	31.13%	49.08%	32.21%
Survey	5.53%	22.13%	6.91%	19.73%	8.41%	18.94%
Arrest						
n	44,392	63,416	37,285	70,523	37,285	70,523
Response	99.71%	91.62%	98.92%	92.86%	98.37%	93.15%
Non-response						
Item	0.28%	8.38%	1.08%	7.14%	1.63%	6.85%
Survey	n/a	n/a	n/a	n/a	n/a	n/a

Note: Inc & +MH indicates incarcerated and in good mental health; Inc & -MH indicates incarcerated and in poor mental health. Missingness shown is across all years, so *n* counts each individual in each year.

For delinquency, those who had been incarcerated and were in poor mental health were more likely to be missing due to survey non-response (22.13%) than those incarcerated and in good mental health (5.53%), and this held across 1-, 2-, and 3-year lags (though the impacts diminished). This indicates that those in poor mental

[23] For this analysis on missingness, mental health issues was split into a binary measure, where 0 = good mental health (comprised of those who experienced mental health issues none or some of the time) and 1 = poor mental health (comprised of those who experienced mental health issues most or all of the time).
[24] Different lags were examined because lag time varies in the analyses used in this research (1 year for HFE analysis and 2 and 3 years for SEM analysis).

health were more difficult to maintain contact with to continue survey participation, but the impact of poor mental health on survey participation lessens with time. Item non-response is more difficult to detangle because of the change in who was asked delinquency questions in 2004. It appears that those who had been incarcerated and were in poor mental health were less likely to have item non-response (35.71%) than those incarcerated and in good mental health (41.38%). This could indicate that those in good mental health were more aware of the illegality of delinquent activities and therefore did not want to disclose them, or it could be that those in poor mental health were more likely to have been arrested and were, therefore, more likely to be included in the delinquency respondents post-2004. Examining the percentage of responses to the delinquency question sheds some light on this. Those incarcerated and in poor mental health had more responses with a 3-year lag then a 1-year lag – suggesting that they were more likely to be arrested and, with longer time periods to report a potential arrest (3 vs. 1 year), this would shift them into the category of those asked the delinquency questions and out of the item non-response category.

For arrest, those who had been incarcerated and were in poor mental health were more likely to be missing due to item non-response (8.38%) than those incarcerated and in good mental health (0.28%). As previously mentioned, item non-response for arrest indicates that the individual was not yet asked the question (they can then be asked to fill in arrest history the next time they are interviewed) or they were under the age of 12 (which decreases to zero individuals as the years go on and respondents age). Thus, those who were incarcerated and in poor mental health were more likely to miss the survey in the year following, but that likelihood decreased in the second and third years (indicating a reduction in the impact of incarceration and poor mental health on response over time). On the other hand, for those incarcerated and in good mental health, there was an increase in missing the survey in each subsequent year (up to 3 years). However, both those in good and in poor mental health had very high response rates (over 90%), lending more support and statistical power to the results despite the slight differences in arrest response-rates based on mental health.

Overall, because missingness in both delinquency and arrest is related to the independent variables of interest, the missing data cannot be MCAR. However, it is unknown whether the data are MAR or NMAR, because the missing values of delinquency and arrest are not known. What *is* known is that, for both delinquency and arrest, those with poor mental health were more likely to have missing responses – indicating that the results of these analyses are likely to be conservative estimates of the impact of incarceration and mental health issues on offending outcomes because those with the worst mental health issues are more likely to be excluded from analysis. This is particularly true for initial analyses in this research that use Hybrid Fixed Effects, which treats the data as MAR and uses listwise deletion.[25] To adjust for this as much as possible, later analyses in this research[26] utilize the entire dataset in order to avoid listwise deletion and reduce the potential for biased estimates.

[25] Considering the data MAR and using listwise deletion is consistent with prior research using large panel datasets, as well as research using NLSY97 specifically (Halpern-Manners, 2016; Porter & DeMarco, 2019; Weisshaar & Cabello-Hutt, 2020).
[26] Analytic techniques used in this research are discussed in *4.4 Analyses*.

4.3.2 Other Limitations

Other limitations of the NLSY97 are related to the frequency and type of questions asked in the survey. Particularly important for this research, the mental health set of questions (MHI-5) is not asked yearly in the NLSY97; and the most consistent timing when it was asked was only every other year for a 12-year period. Further, the mental health questions do not capture the full range of time in the two years between questions being asked. That is – the MHI-5 questions reference the individual's mental health for only the prior month. This means that the mental health of an individual is only captured for a one-month period every 24 months. On the other hand, other variables are captured with shorter reference times, such as every month (e.g., incarceration) and every week (e.g., employment). Because of the infrequency with which mental health is measured, other variable measurements have to be changed to accommodate a larger timeframe, which loses the ability to examine more granular changes in both mental health and outcomes. Similarly, even though incarceration is captured on a monthly basis, it is not possible to examine shorter terms of incarceration (such as short jail stays).

There are also limitations in the NLSY97 data due to the change of who was asked the delinquency questions starting in 2004. In addition to leading to a larger number of missing values for delinquency (as discussed in the prior section), this change introduced a discontinuity in asking the same individuals the same questions in every survey wave. The additional 10% of the sample that was asked the delinquency questions in the first year of this change (2004) was not maintained for the subsequent years (2005 and on); instead, a new 10% of the sample was asked the delinquency questions in 2005 and those individuals were then asked the delinquency questions in subsequent years. This means that the 10% of the sample that received the delinquency questions in 2004 may or may not have been included in the "new" 10% of the sample that was used in 2005 and later – which led to a discontinuity in who received the delinquency questions and thus a discontinuity in the longitudinal delinquency data. This makes the 2004 delinquency answers potentially not suitable for examination in longitudinal analysis, which, for this research, only impacts the Hybrid Fixed Effects (HFE) analyses[27] (see *4.4.1 Hybrid Fixed Effects Regression* for more on HFE analysis and how the data discontinuity was dealt with).

Finally, the NLSY97 has not remained immutable over the years, and some changes in the measurement of variables has occurred, which makes it difficult for comparing change over time. For this study, none of the variables of interest had their measurement changed in the time period used, and the focus on pathways to offending over longer periods of time makes the lack of granular data less of an issue.

4.4 Analyses

The goal of this research is threefold: (1) examine the heterogeneity in offending outcomes based on mental health, (2) explore the role of mental health as a mediator between incarceration and offending (overall and by race and sex), and (3) explore the role of mental health in pathways to offending *through* additional stressors. Two methods of analysis are used to explore this: hybrid fixed effects

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[27] This impacts the Hybrid Fixed Effects (HFE) analyses because HFE examines the impact of lagged predictors on the outcome of delinquency, so delinquency from each panel (including 2004) is used. Structural Equation Modeling (SEM) analyses examine the impact of predictors in earlier years (2005 and earlier) on delinquency in later years (2006 and later), so the analyses are not impacted by the 2004 data inconsistency.

(HFE) regression (for research questions 1 and 2) and structural equation modeling (SEM) (for research questions 3 through 5). Each method requires the data to be structured in a specific (and different) way, which is discussed in the subsequent sections.

4.4.1 Hybrid Fixed Effects Regression

Hybrid fixed effects (HFE) models (also referred to as Mixed Effects) are a particular kind of Fixed Effects model (FE). FE is useful for analyses with panel data because they control for time-stable individual characteristics, whether measured or unmeasured. Such characteristics may be related to an individual's likelihood of committing delinquent acts or being arrested (e.g., criminal propensity), but if they cannot be measured then they cannot be controlled for, which would lead to a poorly specified model. FE avoids this and controls for these characteristics by subtracting from each observation the average of all observations for each individual (Kennedy, 2008). Thus, a factor that does not change over time (i.e., time-stable) is subtracted from itself, yielding a zero and removing it from the analysis (Kennedy, 2008). The general FE model is as follows:

$$y_{it} = \alpha_i + x_{it}\beta_i + \delta_t + c_i + \epsilon_{it}$$

Equation 1. General FE Model

where y_{it} is outcome *y* for individual *i* at time *t*; α_i is the individual-specific intercept, which does not vary over time; x_{it} is the row vector of independent variables *x* for individual *i* at time *t*; β_i is the column vector of coefficients (one for each independent variable) for individual *i*; δ_t is the coefficient for each unit of time; c_i is the within-individual error term, which does not vary over time; and ϵ_{it} is the error term for individual *i* at time *t*.

Because FE subtracts each observation from the average of all observations, it is considered a "within" estimator (i.e., variation within an individual). This means that each coefficient β can be interpreted as the change in the outcome y, for a given individual i, when the independent variable x changes one unit over time *t*. This is useful for panel data research because it takes advantage of the repeated measures from the same individuals, allowing for estimation of the impact of within-individual change over time.

Despite what is gained by using FE, it is not the panacea of models. Two major drawbacks of FE are (1) fewer degrees of freedom and (2) inability to estimate coefficients for time-stable characteristics (Kennedy, 2008). First, because FE has individual-specific intercepts, each individual effectively is included in the model as a dummy variable and each included variable decreases the degrees of freedom – thus leading to fewer degrees of freedom and lower statistical power. A similar model – the random effects (RE) model – avoids this drawback by not allowing for individual-specific intercepts; however, RE requires that all factors that may influence the outcome be specified in the model or else risk a model with omitted variable bias. For this research, it is not possible to measure all variables (such as internal criminogenic tendencies) that may impact the outcomes (delinquency and arrest), making FE the more useful model. Further, RE requires that individual characteristics (like individual error terms) not be correlated with the independent variables. This correlation can be tested using a Hausman test; and a Hausman test[28] of the initial models in this research confirmed that there was correlation, making the RE coefficients biased and indicating than an FE model is more appropriate.

The second flaw of the FE model is that it is unable to produce coefficients for time-stable characteristics because of how the model subtracts each observation from the average of all observations (for each individual). This means that the impact of immutable characteristics cannot be estimated with this model. While this is useful for characteristics that are difficult to measure, it is less ideal for those that are measurable (like race and sex). This can be overcome, however, by using a variation of FE called Hybrid Fixed Effects (HFE). HFE allows for the normal FE model to include random intercepts or coefficients (like a RE model would) (StataCorp, 2023). In doing so, HFE can estimate both time-invariant and time-varying predictors. The model of HFE is similar to the FE model, except with regards to the intercept. Where the FE model predicts an individual-level intercept (α_i), the HFE model views the intercepts as drawn from a pool of possible intercepts (i.e., random, u_i) and the intercept is therefore lumped in with the error term:

$$y_{it} = x_{it}\beta_i + \delta_t + c_i + (u_i + \epsilon_{it})$$

Equation 2. General HFE Model

For the initial models in this research aimed at determining base relationships, there are three outcomes: mental health issues, delinquency, and arrest. For delinquency and arrest as the outcomes, the main independent variable is, first,

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[28] See *Appendix C* for Hausman test results.

incarceration (to determine if incarceration has a relationship with offending) and, then, mental health issues (to determine if mental health has a relationship with offending). For mental health issues as the outcome, the main independent variable is incarceration. For all of the base models, the controls are drug use, education, income, age, sex, and race, and the controls and independent variables are lagged 1 panel prior to the outcome variable.

After identifying the base relationships, two main outcomes are examined in this research – delinquency and arrest – and the main independent variables are incarceration and mental health (with drug use, education, income, age, sex, and race as controls). Using these variables, the HFE models are:

$$
\begin{aligned}
delinquency_{it} \\
&= L.incarceration_{it}\beta_i + L.mentalhealth_{it}\beta_i \\
&+ L2.mentalhealth_{it}\beta_i + L.drug\ use_{it}\beta_i + L.education_{it}\beta_i \\
&+ L.income_{it}\beta_i + age_{it}\beta_i + male_i\beta_i + white_i\beta_i + black_i\beta_i + \delta_t \\
&+ c_i + (u_i + \epsilon_{it})
\end{aligned}
$$

Equation 3. HFE Model Predicting Delinquency

$$
\begin{aligned}
arrest_{it} = \alpha_i &+ L.incarceration_{it}\beta_i + L.mentalhealth_{it}\beta_i \\
&+ L2.mentalhealth_{it}\beta_i + L.drug\ use_{it}\beta_i + L.education_{it}\beta_i \\
&+ L.income_{it}\beta_i + age_{it}\beta_i + male_i\beta_i + white_i\beta_i + black_i\beta_i + \delta_t \\
&+ c_i + (u_i + \epsilon_{it})
\end{aligned}
$$

Equation 4. HFE Model Predicting Arrest

where *L.* indicates the variable is lagged 1 panel prior to the outcome variable, which assures that the predictor occurred before the outcome, and *L2.* indicates the variable is lagged 2 panels prior to the outcome variable, which is done in order to control for the mediator (mental health) pre-incarceration.

The outcomes in this research are measured in two ways: count (delinquency variety score and mental health issues) and binary (delinquency and arrest). Count outcomes are commonly estimated using either a Poisson or a negative binomial distribution. The difference between the two is in the dispersion of the data – the Poisson model assumes that the variance is equal to the mean, while the negative binomial model relaxes this assumption and allows for the variance to be greater than the mean (i.e., overdispersion). In this research, delinquency variety score has a large incidence of zeros, which often leads to overdispersion. An examination of the mean and variance shows the variance to be larger than the mean (see *Table 5*). Additionally, the variable has high skew and Kurtosis values. Skewness and Kurtosis are both measures of the normality of data, where data are considered normally distributed if the skew is between -2 and +2 and the Kurtosis is between -7 and +7 (Byrne, 2013). Delinquency variety score exceeds those values, indicating the negative binomial model to be the better choice. For mental health issues, the variance did not exceed the mean, and the skew and Kurtosis values were within the values that can be considered normally distributed; so, the Poisson distribution was used for analysis.[29]

Table 5. Distribution of Delinquency Variety Score and Mental Health Issues

	n	Mean	Variance	Skewness	Kurtosis

[29] As an additional check, the distribution of delinquency variety score and mental health issues was compared with the Poisson and negative binomial probability distributions in a graph (using the *nbvargr* command in Stata). The distribution of delinquency variety score more closely resembled the negative binomial distribution, and the distribution of mental health issues more closely resembled the Poisson distribution (see *Appendix C*).

Delinquency variety score	23,536	0.423	0.876	2.974	13.284
Mental health issues	44,478	9.547	6.184	0.701	3.637

Note: Distributions shown are across all years, so *n* counts each individual in each year.

The negative binomial model and Poisson models are useful because they can produce incident-rate ratios (IRR) which indicates the change in the rate of the dependent variable for every unit change in the dependent variable (where coefficients less than one indicate a decrease in the rate and coefficients greater than one indicate an increase in the rate). This is particularly useful for the research questions at hand because it allows for a calculation of the percent increase or decrease in delinquency variety score (or mental health issues) that is attributable to incarceration.

The binary outcomes in this research (delinquency and arrest) are estimated using a logistic (i.e., logit) model. Logit models are used for discrete (i.e., binary) outcomes because they estimate the probability of an event happening. Using logit, the odds-ratio of each independent variable can be estimated, which produces the change in odds of the event happening. This is useful for this research because it seeks to examine the probability of delinquency and arrest after incarceration, which can be reported as a change in odds of delinquency and arrest.

Importantly, the HFE analysis addresses missing observation via listwise deletion. This means that any individual that has a missing observation for any of the variables used will be deleted from the analysis altogether. As previously discussed, listwise deletion is most impactful when observations are not missing at random (NMAR) – meaning the probability of an observation being missing depends on the value of that missing observation – and may result in biased estimates. But when observations are missing at random (MAR), or when the probability of missingness is independent of the missing values, listwise deletion will not impact the estimates. For the HFE analyses, MAR is assumed (see *4.3.1 Missingness* for more discussion on missing data).

Another drawback of listwise deletion is that it reduces the number of observations, thus reducing statistical power. This concern is more relevant for datasets with few observations to begin with; and, because this research uses a large panel dataset with more than 8,000 observations, listwise deletion is not of concern.

Importantly, the data for the first two research questions are organized into 2-year panels for analysis. One of the main variables of interest – mental health – is not measured in every year of the NLSY97 and is, instead, measured every other year (2000, 2002, …, 2010). Therefore, in order to create a panel dataset where every variable of interest is measured in each panel, the data are combined into 2-year panels. All of the variables are measured the same way previously described, except instead of referring to 1 year of time they refer to 2 years.

Lastly, as mentioned in *4.3.2 Other Limitations*, the delinquency measure in 2004 was discontinuous with later years because it was not asked of the same individuals. In order to examine whether the discontinuity impacted the findings in this research, the HFE models for research questions 1 and 2 were run first using the 2004 delinquency data as reported and then using the 2005 delinquency data imputed in for the 2004 data. Results of these analyses (shown in *Appendix C.4*) indicated that the discontinuous delinquency data did not impact the direction or significance of the relationships of interest. Thus, the reported 2004 data is used for this research and shown in the results in *Chapter 5*.

4.4.2 Structural Equation Modeling

The second method used for this research is structural equation modeling (SEM). SEM is a method that can encompass a number of techniques – including multivariate regression, confirmatory factor analysis, path analysis, and structural models – into one model, which simultaneously estimates relationships between multiple independent and dependent variables (Kline, 2016; Tomarken & Waller, 2005; Ullman, 2006). The variables in SEM can be defined by four terms: observed, latent, exogenous, and endogenous. Observed variables are those that are measured in the data; latent are those that are not directly measured in the data but can be estimated using observed variables; exogenous variables are those that are only used as independent variables in the model and never as dependent variables; and endogenous are those that are used as dependent variables (and may also be used as independent variables). These terms are used in concert with one another to describe the parts of the SEM model – i.e., observed exogenous, observed endogenous, latent exogenous, latent endogenous. All of these parts are represented in an SEM equation like so:

$$Y = B\Upsilon + \Gamma X + \alpha + \varsigma$$

Equation 5. General Structural Equation Model

where Υ is a vector of endogenous variables (both latent and observed); X is a vector of exogenous variables (both latent and observed); B and Γ are matrices of coefficients; α is a vector of intercepts; and ς is a vector of error terms. In this research, Y represents the outcomes (delinquency variety score, delinquency binary, and arrest binary); Υ includes Mental Health and Delinquency; and X includes incarceration, unemployed, unmarried, physical health issues, pre-incarceration mediators, and the control variables (drug use, education, age, income, sex, and race).

In order to measure latent concepts, SEM uses confirmatory factor analysis (CFA). CFA is the process of taking a set of measured variables that are assumed to be correlated because they share a common cause with the latent variable and using them to estimate the latent construct based on their shared variance (Kline, 2016; Link et al., 2019). Another common way of measuring a latent variable is by using a summative[30] or average score of the measured variables. CFA provides a more accurate representation of the latent construct because it develops a scale that weighs each measured item by how salient it is to the latent concept, rather than all variables having an equal impact on the latent construct as a sum or an average would produce (Kline, 2016). Additionally, SEM's ability to estimate latent variables within the model (i.e., simultaneously estimating the variables while also estimating the regression) is useful because it removes the measurement error from the latent variable itself (which would be present if the variable was separately estimated) and increases the predictive power of the model (Kline, 2016). SEM is also beneficial because it can produce goodness of fit (GOF) statistics. GOF statistics are a number of hypothesis tests that indicate how closely the estimated data (i.e., the coefficients produced by a regression analysis) represent the observed data (i.e., the actual data in

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[30] This research uses a summative score for the measures of mental health and delinquency in the hybrid fixed effects analysis.

the dataset). GOF statistics are important in model identification, which is an iterative process that ensures that significant pathways are accounted for in the model.[31]

As useful as SEM may seem, it is important to note two potential drawbacks with using SEM: (1) it utilizes linear regression and, therefore, is most useful for continuous, normal outcome variables, and (2) SEM automatically uses listwise deletion to deal with missing observations. In research such as this – which has non-continuous outcome variables and missing observations – these could pose a threat to the validity of the results.

However, there are ways to modify SEM to overcome these issues. First, the binary outcomes of delinquency and arrest can be examined using a form of SEM called generalized structural equation modeling (GSEM), which relaxes some of the assumptions of SEM. Where SEM fits models using linear regression (requiring normal distributions), GSEM can fit models to other distributions including Poisson, negative binomial, Bernoulli, and Gamma. SEM can be used to estimate the models looking at delinquency variety score because it is a latent construct, and the coefficients can be interpreted similarly to regular linear regression: "every 1 unit increase in x is associated with a β unit increase in y." For the binary outcomes used in this research, GSEM can be estimated with logit (the Bernoulli distribution) which produces estimates that can be exponentiated to provide the odds ratio (similar to HFE). As such, the results for delinquency and arrest as binary outcomes can be interpreted as "every 1 unit increase in x is associated with a (1-β)% change in the

[31] GOF statistics of interest in this research and the process for model identification are discussed further in *5.3 Confirmatory Factor Analysis for Latent Variables*.

odds of *y*". This is useful for this research because it is interested in how incarceration, mental health, and the other mediators will impact the likelihood of offending.

Second, this research includes a number of missing observations across the years of data. If examined with the default options, SEM would use listwise deletion and simply delete all respondents who had missing data in any of the years. Instead, SEM can be modified by using maximum likelihood with missing values (MLMV), which will include all respondents who had responses for any of the variables (even if some responses were missing). This avoids the loss of respondents that occurs with listwise deletion (i.e., maximizing the use of available data) and provides results that are more robust and representative of the sample than those computed with listwise deletion. GSEM, on the other hand, does not allow for the use of MLMV. However, GSEM models can be estimated using equationwise deletion. Equationwise deletion addresses missings at the equation level, rather than the list level as listwise deletion does. Where listwise deletion ignores all observations where there are missing observations for any of the variables of interest across any of the equations in the estimated model, equationwise deletion will only ignore missing observations for variables used in that particular equation and will allow non-missing observations to still be used in other equations in the model, as applicable. This means that each equation in a GSEM model may have slightly different sample size, but it also means that the method is utilizing more of the available data and producing more robust and representative results (compared to listwise deletion). Thus, analyses examining delinquency variety score will utilize the full sample via SEM and MLMV, and analyses examining the binary outcomes will utilize as much of the sample as possible via equationwise deletion.[32]

Therefore, because SEM can be modified to adjust for non-continuous outcomes and to utilize data with missing values, this research uses SEM (and GSEM modifications) for the path analyses. Further, because this research is interested in the pathways from incarceration and mental health to offending, SEM is useful for the research questions at hand because it can provide estimates for the change in the outcome variables due to each predictor individually as well as the total impacts on the outcomes through pathways of numerous predictors. Additionally, SEM postestimation tests can statistically compare estimates using the Wald test for equality of coefficients, which indicates whether the null hypothesis that two coefficients are equal (i.e., not statistically different) can be rejected. This is particularly useful for the moderated mediation in this research that examines race and sex differences in mediation of the incarceration-offending relationship.

For the SEM analyses presented here, the data are used in single year, wide format – rather than the 2-year panel, long format used by HFE. The data are in single year because SEM does not require all variables to be measured in all years, so the fact that mental health is only measured every other year does not impact the analysis; and they are in wide format (meaning there is a different variable for each year and measure combination) in order to specify the time-order of variables in the pathways examined (e.g., the impact of incarceration in 2001 on mental health in 2002).

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[32] This is particularly important for examinations of delinquency because, as discussed in *4.3.1 Missingness*, delinquency has a large number of missing observations after 2004. Using MLMV and equationwise deletion allows all other equations in the SEM and GSEM models to utilize more of the available data despite the lack of available data for delinquency.

4.4.3 Summary

This research uses two main methods to explore the role of mental health in pathways to offending. Hybrid fixed effects is used to identify the base relationships needed for this research and to examine within-individual change in mental health as a potential moderator in the incarceration-offending relationship. Using HFE to examine within-individual change is beneficial for this research because it produces coefficients that indicate the average impact on the dependent variable that would be expected of an individual experiencing the independent variable. In other words, this allows for examination of how an individual responds to the independent variables (in this case incarceration and mental health issues). Using within-individual for the moderation analyses provides insight into how an individual's mental health directly impacts the incarceration-offending relationship (rather than the average impact of mental health across a group of individuals).

However, HFE cannot estimate latent variables, estimate direct and indirect pathways, or utilize the full sample. SEM, on the other hand, can address these shortcomings by estimating latent variables and main relationships within the same model, providing coefficients for direct and indirect pathways, and utilizing either all (SEM) or the majority (GSEM) of the sample. Thus, to investigate the role of mental health further, SEM is used to explore mental health in mediation, moderated mediation, and multiple mediation. Unlike HFE, SEM produces between-individual coefficients, which indicate the average impact on the dependent variable for the group of individuals who experience the independent variable compared to the group who do not experience the independent variable (i.e., a group-level analysis). Between-individual analysis is useful for mediation pathways because it can identify the various pathways (and relationships within those pathways) that groups of individuals may take. Because this research uses both within- and between-individual analyses, this provides a broader picture of the relationships of interest. Results from both methods can complement each other and provide further insight into the mechanisms of the incarceration-offending relationship on both an individual- and group-level.

CHAPTER 5: RESULTS

5.1 Is there a relationship between incarceration and offending, incarceration and mental health, and mental health and offending?

The initial research aim in this dissertation was simply to identify the relationships between the three main variables of interest: incarceration (binary and proportion of the panel), mental health issues, and offending (delinquency variety score, binary delinquency, and binary arrest). These base relationships are described in the following sections.

5.1.1 Incarceration and Offending

The relationship between incarceration and multiple measures of offending was examined using hybrid fixed effects regression (as discussed in *Section 4.4*). *Table 6* (below) shows the results of this analysis for both measures of incarceration and delinquency variety score as the outcome variable. For both measures of incarceration, the model was first run with no controls (models labeled (1)) before the controls were included (models labeled (2)). As discussed in *4.4.1 Hybrid Fixed Effects Regression*, results are presented as incidence-rate ratios (IRR) in order to examine the percent change in delinquency variety score due to incarceration.

Results indicated that incarceration measured as a binary indicator had a significant, positive impact on delinquency variety score. This finding held with and without controls. Experiencing incarceration led to a 30.4% ((1.304-1)*100) within-individual increase in delinquency variety score ($p<0.01$) before accounting for controls and a 20.5% ((1.205-2)*100)) within-individual increase after accounting for controls ($p<0.05$). Results showed that incarceration measured as a proportion also had a positive impact on delinquency variety score (increasing it by 50.7%), but this was only when controls were included, and it only reached marginal significance at $p<0.10$. This indicates that both the experience of incarceration and the amount of time incarcerated (though only marginally significant) were important in determining delinquency variety score.[33]

Table 6. Negative Binomial HFE Regression: Incarceration Predicting Delinquency Variety Score

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 15,814	*n = 11,718*	*n = 15,814*	*n = 11,718*
	IRR (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)
Incarceration	1.304*** (0.101)	1.205** (0.105)	1.157 (0.193)	1.507* (0.368)
Drug use		3.015*** (0.169)		3.028*** (0.169)
Education[1]				
High school/GED		0.705*** (0.042)		0.703*** (0.042)
Associate's		0.898 (0.159)		0.897 (0.159)
Bachelor's		0.298*** (0.047)		0.296*** (0.046)
Master's or higher		0.122** (0.118)		0.121** (0.116)
Income		0.999* (4.54E-07)		0.999* (4.54E-07)
Age		0.910*** (0.008)		0.911*** (0.008)
Male		1.761*** (0.103)		1.767*** (0.103)
Race[2]				
Black		1.121* (0.076)		1.121* (0.073)
Other race		1.038 (0.076)		1.038 (0.076)
Constant	0.155*** (0.006)	0.752 (0.150)	0.154*** (0.006)	0.740 (0.147)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls

[33] Results and implications will be discussed further in *Chapter 6*.

[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.[34]

Table 7 (below) shows the results for both measures of incarceration and delinquency as a binary measure. Results are presented as odds ratios to represent the change in the odds of delinquency occurring. For incarceration as a binary measure, results indicated a significant, positive impact of incarceration on delinquency occurring. Accounting for controls, incarceration is associated with a 1.389 factor increase (i.e., a 38.9% within-individual increase) in the odds of delinquency occurring ($p<0.05$). Results were similar for incarceration as a proportion. Without controls, incarceration had a significant, positive impact on odds of delinquency (more than doubling the odds) ($p<0.01$); and, after including controls, incarceration more than doubled the odds of delinquency, but this was only marginally significant at $p<0.10$. Similar to the results for delinquency variety score, this indicates that whether or not an individual was incarcerated as well as the amount of time spent incarcerated were both significant in determining whether that individual engaged in delinquency.

Table 7. Logit HFE Regression: Incarceration Predicting Binary Delinquency

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 15,814	*n = 11,718*	*n = 15,814*	*n = 11,718*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)
Incarceration	1.756*** (0.197)	1.389** (0.188)	2.011*** (0.501)	2.097* (0.822)

[34] A note on standard errors: Initial HFE regressions were run with both regular (i.e., OIM) and robust standard errors for comparison purposes. The results indicated that robust standard errors did not impact any significance levels of the coefficients (e.g., if a coefficient was significant at the $p<0.05$ level using OIM, it was still significant at the $p<0.05$ level using robust). Therefore, robust standard errors were used for all HFE analyses to provide the most conservative estimates, but such estimates were not significantly different from non-robust estimates.

Drug use		4.926*** (0.363)		4.975*** (0.366)
Education[1]				
High school/GED		0.652*** (0.057)		0.648*** (0.056)
Associate's		0.857 (0.211)		0.855 (0.211)
Bachelor's		0.224*** (0.047)		0.221*** (0.046)
Master's or higher		0.077** (0.096)		0.075** (0.094)
Income		0.999 (6.60E-07)		0.999 (6.62E-07)
Age		0.893*** (0.011)		0.894*** (0.011)
Male		2.134*** (0.173)		2.146*** (0.174)
Race[2]				
Black		1.141 (0.104)		1.139 (0.104)
Other race		0.915 (0.090)		0.916 (0.090)
Constant	0.131*** (0.006)	0.682 (0.187)	0.131*** (0.007)	0.674 (0.185)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

Finally, *Table 8* (below) shows the results for both measures of incarceration and binary arrest as the outcome. Once again, incarceration as a binary had a significant, positive impact on the outcome (odds of arrest). Accounting for control variables, experiencing incarceration was associated with a 2.262 factor increase (i.e., 126.2% within-individual increase) in the odds of being arrested (p<0.01). Proportion of the panel incarcerated also had a significant, positive impact on the odds of arrest (only with controls included). For every unit increase in proportion of the panel spent incarcerated, the within-person odds of arrest increased by 206.0% (p<0.01).

Table 8. Logit HFE Regression: Incarceration Predicting Binary Arrest

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 42,504	*n = 30,413*	*n = 42,504*	*n = 30,413*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)
Incarceration	1.516*** (0.176)	2.262*** (0.282)	0.877 (0.187)	3.060*** (0.959)
Drug use		3.452*** (0.207)		3.532*** (0.215)
Education[1]				
High school/GED		0.401*** (0.029)		0.387*** (0.028)
Associate's		0.281*** (0.057)		0.270*** (0.055)
Bachelor's		0.111*** (0.022)		0.104*** (0.020)
Master's or higher		0.149*** (0.070)		0.141*** (0.067)
Income		0.999*** (7.04E-07)		0.999*** (7.15E-07)
Age		0.957*** (0.010)		0.959*** (0.010)
Male		3.087*** (0.216)		3.220*** (0.228)
Race[2]				
Black		1.274*** (0.098)		1.288*** (0.101)
Other race		1.005 (0.081)		1.008 (0.084)
Constant	0.026*** (0.001)	0.082*** (0.020)	0.025*** (0.001)	0.075*** (0.019)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

5.1.2 Incarceration and Mental Health

Next, the relationship between incarceration and mental health issues was examined. The models were first run with no controls and then with controls added –

see *Table 9* (below) for the results for both measures of incarceration. With controls included, incarceration had a significant, positive impact on mental health issues. Experiencing incarceration led to a 3.7% ((1.037-1)*100) within-individual increase in mental health issues ($p<0.01$). Further, every unit increase in proportion of the panel incarcerated was associated with a 13.5% ((1.135-1)*100) within-individual increase in mental health issues ($p<0.01$) – indicating that the time spent incarcerated had a larger effect on mental health than whether or not an individual was incarcerated.

Table 9. Poisson HFE Regression: Incarceration Predicting Mental Health

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 36,459	*n = 29,379*	*n = 36,459*	*n = 29,379*
	IRR (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)
Incarceration	1.027*** (0.010)	1.037*** (0.013)	1.019** (0.020)	1.135*** (0.040)
Drug use		1.066*** (0.004)		1.066*** (0.004)
Education[1]				
High school/GED		0.952*** (0.006)		0.952*** (0.006)
Associate's		0.941*** (0.010)		0.941*** (0.010)
Bachelor's		0.929*** (0.007)		0.929*** (0.007)
Master's or higher		0.937*** (0.013)		0.937*** (0.013)
Income		0.999*** (3.13E-08)		0.999*** (3.13E-08)
Age		0.997*** (0.001)		0.997*** (0.001)
Male		0.923*** (0.004)		0.923*** (0.004)
Race[2]				
Black		0.989** (0.006)		0.988** (0.006)
Other race		0.984***		0.984***

		(0.006)		(0.006)
Constant	9.439*** (0.020)	10.706*** (0.154)	9.444*** (0.020)	10.705*** (0.153)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

5.1.3 Mental Health and Offending

The final base relationships examined were between mental health issues and multiple measures of offending (delinquency variety score, binary delinquency, and binary arrest). *Table 10* (below) shows the findings for mental health predicting delinquency variety score. The results indicated that mental health issues had a significant, positive relationship with delinquency variety score, both before and after controls were included in the model. Accounting for controls, every unit increase in mental health issues was associated with a 6.1% within-individual increase in delinquency variety score (p<0.01).

Table 10. Negative Binomial HFE Regression: Mental Health Predicting Delinquency Variety Score

	(1)	(2)
	n = 14,648	*n = 11,319*
	IRR (S.E.)	*IRR* (S.E.)
Mental Health Issues	1.071*** (0.008)	1.061*** (0.009)
Drug use		2.895*** (0.165)
Education[1]		
High school/GED		0.728*** (0.044)
Associate's		0.923 (0.165)
Bachelor's		0.310*** (0.049)

Master's or higher		3.15E-09*** (8.50E-10)
Income		0.999 (4.64E-07)
Age		0.911*** (0.008)
Male		1.912*** (0.112)
Race[2]		
Black		1.158** (0.076)
Other race		1.065 (0.078)
Constant	0.077*** (0.007)	0.390*** (0.083)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

The binary measures of offending had similar results to delinquency variety score. Both had significant, positive relationships between mental health and the measure of offending (see *Tables 11* and *12* below). For delinquency, a unit increase in mental health issues was associated with a 9.4% within-individual increase in the odds of delinquency. For arrest, a unit increase in mental health issues was associated with a 7.3% within-individual increase in the odds of arrest.

Table 11. Logit HFE Regression: Mental Health Predicting Binary Delinquency

	(1)	(2)
	n = 14,648	*n = 11,319*
	OR (S.E.)	*OR* (S.E.)
Mental Health Issues	1.111*** (0.013)	1.094*** (0.015)
Drug use		4.738*** (0.362)
Education[1]		
High school/GED		0.675*** (0.060)

Associate’s		0.899 (0.221)
Bachelor’s		0.227*** (0.048)
Master’s or higher		3.03E-09 (7.88E-10)
Income		0.999 (6.80E-07)
Age		0.895*** (0.011)
Male		2.419*** (0.203)
Race[2]		
Black		1.193* (0.111)
Other race		0.941 (0.095)
Constant	0.045*** (0.006)	0.249*** (0.077)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

Table 12. Logit HFE Regression: Mental Health Predicting Binary Arrest

	(1)	(2)
	n = 36,951	*n = 29,444*
	OR (S.E.)	*OR* (S.E.)
Mental Health Issues	1.079*** (0.011)	1.073*** (0.013)
Drug use		3.391*** (0.214)
Education[1]		
High school/GED		0.384*** (0.029)
Associate’s		0.280*** (0.058)
Bachelor’s		0.103*** (0.021)
Master’s or higher		0.148*** (0.070)
Income		0.999*** (7.31E-07)

Age		0.960*** (0.010)
Male		3.619*** (0.266)
Race[2]		
Black		1.363*** (0.110)
Other race		1.035 (0.088)
Constant	0.012*** (0.001)	0.033*** (0.010)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

In sum, these findings indicate that incarceration was significantly associated with increases in within-individual offending risk for all outcome measures, which is in support of *Hypothesis 1a*. For delinquency variety score and binary delinquency, the duration of time spent incarcerated was only marginally significant, indicating that whether or not the individual experienced incarceration was a more salient predictor of delinquency outcomes. For arrest, both the experience of and duration of incarceration were highly significant ($p<0.01$) and had large impacts on the odds of an individual being arrested (more than doubling them). For the relationship between incarceration and mental health, both measures of incarceration had a significant, positive impact on within-individual mental health issues, which is in support of *Hypothesis 1b*. Further, proportion of the panel incarcerated had a larger impact on mental health than whether or not the individual was incarcerated, and both relationships were highly significant at $p<0.01$. Finally, results also indicated a significant, positive relationship between mental health and all three measures of offending, which is in support of *Hypothesis 1c*. Taken together, these findings indicate that there are significant (and positive) within-individual relationships among incarceration and offending, incarceration and mental health, and mental health and offending, which leads to the question of whether the impact of incarceration on offending is moderated by mental health.

5.2 Does mental health moderate the association between incarceration and offending?

In order to explore the relationship further, the role of mental health as a moderator was examined, again using hybrid fixed effects regression. IRR results for delinquency variety score are shown in *Table 13* (below), first with mental health included but not the interaction between mental health and incarceration (models labeled (1)) and then with the interaction term included (models labeled (2)). For both incarceration as a binary measure and proportion measure, mental health had a significant, positive impact on delinquency – every unit increase in mental health (which indicates *worse* mental health) led to a 5.6% within-individual increase ((1.056-1)*100)) in delinquency variety score ($p<0.01$). However, unlike the results in *Table 6*, after including mental health (models labeled (1)), incarceration no longer had a significant relationship with delinquency variety score (for both measures of incarceration).

After including the interaction term between mental health and incarceration (models labeled (2)), mental health maintained a significant, positive relationship with delinquency variety score (i.e., worse mental health was associated with increases in within-individual delinquency variety score) and incarceration had no significant impact. Further, the interaction term itself was not significant for either measure of incarceration, indicating a lack of a moderation effect of mental health on the impact of incarceration on delinquency variety score.

Table 13. Negative Binomial HFE Regression: Incarceration Predicting Delinquency Variety Score with Mental Health Moderator

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 6,153	*n = 6,153*	*n = 6,153*	*n = 6,153*
	IRR (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)
Incarceration	1.138 (0.118)	1.768 (0.740)	1.338 (0.361)	1.086 (1.072)
Mental health issues	1.056*** (0.012)	1.062*** (0.013)	1.056*** (0.012)	1.056*** (0.012)
Mental health issues X incarceration		0.960 (0.036)		1.019 (0.080)
Drug use	2.537*** (0.210)	2.540*** (0.210)	2.545*** (0.211)	2.545*** (0.211)
Education[1]				
High school/GED	0.823** (0.075)	0.825** (0.075)	0.821** (0.075)	0.821** (0.075)
Associate's	0.914 (0.174)	0.915 (0.174)	0.913 (0.174)	0.913 (0.174)
Bachelor's	0.327*** (0.057)	0.328*** (0.057)	0.325*** (0.057)	0.325*** (0.057)
Master's or higher	9.34E-10*** (2.60E-10)	1.36E-09*** (3.80E-10)	8.39E-10*** (2.35E-10)	8.38E-10*** (2.35E-10)
Income	0.999 (5.73E-07)	0.999 (5.75E-07)	0.999 (5.71E-07)	0.999 (5.71E-07)
Age	0.892*** (0.011)	0.892*** (0.011)	0.892*** (0.011)	0.892*** (0.011)
Male	1.317*** (0.113)	1.319*** (0.113)	1.318*** (0.113)	1.318*** (0.113)
Race[2]				
Black	1.143 (0.106)	1.144 (0.106)	1.142 (0.106)	1.142 (0.106)
Other race	1.030 (0.106)	1.028 (0.106)	1.030 (0.106)	1.030 (0.106)
Pre-incarceration mental health issues	1.028** (0.012)	1.027** (0.012)	1.028** (0.012)	1.028** (0.012)
Constant	5.421*** (2.104)	5.781*** (2.252)	5.378*** (2.087)	5.325*** (2.073)

*** p<.01, **p<.05, *p<.10
(1) without moderation

(2) with moderation
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

Results for binary delinquency are presented in *Table 14* (below). With mental health included in the analysis (models labeled (1)), incarceration as a binary measure and as a proportion did not have a significant impact on odds of delinquency (unlike the results in *Table 7* which were significant). Mental health, however, had a significant, positive impact on odds of delinquency for both measures of incarceration. Every unit increase in mental health issues (i.e., having worse mental health) was associated with a 9.1% within-individual increase in the odds of delinquency ($p<0.01$). In the second models, which included the interaction term, again, neither measure of incarceration had a significant impact on odds of delinquency, and mental health still had a significant, positive impact on odds of delinquency. The interaction term, however, was not significant – indicating a lack of a moderation effect of mental health on the impact of incarceration on odds of delinquency.

Table 14. Logit HFE Regression: Incarceration Predicting Binary Delinquency with Mental Health Moderator

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 6,111	*n = 6,111*	*n = 6,111*	*n = 6,111*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)
Incarceration	1.303 (0.251)	2.867 (1.951)	1.831 (1.092)	1.629 (3.383)
Mental health issues	1.091*** (0.022)	1.099*** (0.023)	1.091*** (0.022)	1.091*** (0.022)
Mental health issues X incarceration		0.927 (0.067)		1.011 (0.178)
Drug use	3.959*** (0.457)	3.961*** (0.457)	3.994*** (0.461)	3.995*** (0.461)

Education[1]				
High school/GED	0.754* (0.113)	0.755* (0.113)	0.748* (0.112)	0.749* (0.112)
Associate's	0.829 (0.240)	0.832 (0.240)	0.826 (0.240)	0.826 (0.240)
Bachelor's	0.219*** (0.056)	0.220*** (0.057)	0.216*** (0.056)	0.216*** (0.056)
Master's or higher	3.64E-09 (1.55E-10)	3.89E-09 (2.48E-10)	4.62E-09 (1.24E-10)	4.43E-09 (5.86E-10)
Income	1.000 (9.43E-07)	1.000 (9.44E-07)	1.000 (9.45E-07)	1.000 (9.46E-07)
Age	0.832*** (0.018)	0.832*** (0.018)	0.832*** (0.018)	0.832*** (0.018)
Male	1.605*** (0.212)	1.611*** (0.213)	1.609*** (0.213)	1.609*** (0.213)
Race[2]				
Black	1.191 (0.173)	1.191 (0.173)	1.188 (0.174)	1.188 (0.174)
Other race	0.960 (0.150)	0.958 (0.150)	0.961 (0.151)	0.961 (0.151)
Pre-incarceration mental health issues	1.044** (0.021)	1.043** (0.021)	1.043** (0.021)	1.043** (0.021)
Constant	1.412 (0.891)	1.320 (0.835)	1.425 (0.902)	1.429 (0.906)

*** p<.01, **p<.05, *p<.10
(1) without moderation
(2) with moderation
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

Table 15 (below) shows the results for the final moderation models predicting binary arrest. First, after including mental health (models labeled (1)), incarceration still had a significant, positive impact on odds of arrest (similar to *Table 8*), and mental health had a significant, positive impact on odds of arrest (this held across both measures of incarceration). Every unit increase in mental health (indicating better mental health) was associated with a 7.4% (or 7.5% for proportion incarceration) within-individual increase in the odds of arrest. Second, after including the interaction term between mental health and incarceration (models labeled (2)), incarceration was no longer significant while mental health remained significant and negative. Importantly, the interaction term was not significant which indicated no moderation effect of mental health on the impact of incarceration on the odds of arrest.

Table 15. Logit HFE Regression: Incarceration Predicting Binary Arrest with Mental Health Moderator

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 23,154	*n = 23,154*	*n = 23,154*	*n = 23,154*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)
Incarceration	2.381*** (0.393)	5.920*** (3.514)	4.368*** (2.013)	4.063* (21.257)
Mental health issues	1.079*** (0.017)	1.087*** (0.017)	1.081*** (0.017)	1.084*** (0.017)
Mental health issues X incarceration		0.916 (0.051)		0.896 (0.124)
Drug use	3.672*** (0.283)	3.670*** (0.283)	3.770*** (0.296)	3.765*** (0.295)
Education[1]				
High school/GED	0.382*** (0.037)	0.383*** (0.037)	0.369*** (0.036)	0.369*** (0.036)
Associate's	0.267*** (0.059)	0.269*** (0.059)	0.258*** (0.058)	0.259*** (0.058)
Bachelor's	0.100*** (0.021)	0.101*** (0.021)	0.094*** (0.020)	0.094*** (0.020)
Master's or higher	0.149*** (0.073)	0.150*** (0.073)	0.140*** (0.069)	0.141*** (0.069)
Income	0.999** (8.27E-07)	0.999** (8.26E-07)	0.999** (8.37E-07)	0.999** (8.37E-07)
Age	0.953*** (0.013)	0.952*** (0.013)	0.955*** (0.013)	0.955*** (0.013)
Male	3.221*** (0.284)	3.232*** (0.285)	3.337*** (0.297)	3.342*** (0.298)
Race[2]				
Black	1.287*** (0.123)	1.287*** (0.123)	1.290** (0.127)	1.290*** (0.127)
Other race	1.066 (0.106)	1.065 (0.106)	1.070 (0.109)	1.071 (0.109)
Pre-incarceration mental health issues	1.013 (0.015)	1.012 (0.015)	1.014 (0.016)	1.014 (0.016)
Constant	0.031***	0.030***	0.028***	0.027***

	(0.012)	(0.012)	(0.011)	(0.011)

*** p<.01, **p<.05, *p<.10
(1) without moderation
(2) with moderation
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

Overall, the results indicated that mental health had a significant, negative impact on within-individual delinquency variety score, odds of delinquency, and odds of arrest. After including mental health issues, incarceration was no longer significant in predicting delinquency variety score or odds of delinquency, but still had a significant, positive association with odds of arrest. When including the interaction between mental health and incarceration, the interaction term itself was not significant for any measures of incarceration or offending. This is not in support of *Hypothesis 2*, which proposed that mental health would moderate the relationship between incarceration and offending. Further, because mental health alone (i.e., not as an interaction) had a significant impact on offending, this could indicate that, instead of the impact of incarceration on offending varying by mental health, mental health may explain some of the relationship between the two (i.e., mediation), which is explored in the next research question.

5.3 Does mental health mediate the association between incarceration and offending?

5.3.1 Confirmatory Factor Analysis for Latent Variables

The prior research questions, which were explored using FE, provided *within-individual* effects of incarceration and mental health on offending. In order to explore the facets of these relationships more, the remaining research questions use SEM. Unlike FE, SEM provides *between-individual* effects and, importantly, allows for utilization of the majority of data available and estimation of latent constructs within the models. There are two constructs of interest in this research – mental health and delinquency – and, although they can be estimated simultaneously with the rest of the model, they must first be analyzed alone via Confirmatory Factor Analysis (CFA). CFA is a process by which the constructs are estimated and examined for how well the observed variables map onto the construct, and then the constructs are edited based on what additional relationships may help map the construct. The process is iterative: estimating the model, examining what additional pathways may need to be added, adding those pathways, and repeating.

During this process, the constructs are tested for goodness of fit using three parameters: the root mean squared error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean square residual (SRMR). RMSEA is an index of the difference between the observed covariance matrix per degree of freedom and the hypothesized covariance matrix (Cangur & Ercan, 2015). The smaller the RMSEA the better the model fits the data, and, in general, a value of no more than 0.08 is needed for a good fit, but less than 0.05 is more ideal. CFI is a comparison between the estimated model and the alternative model with manifest covariance matrix (i.e., what if the observed variables do *not* represent a single construct) (Cangur & Ercan, 2015). CFI indicates how much better the estimated model is than the alternative and it ranges from 0 to 1, with values greater than 0.95 indicating a good fit. Finally, SRMR is an index of the average of standardized residuals between the observed and the hypothesized covariance matrices (Cangur & Ercan, 2015). SRMR values of less than 0.10 can be considered an acceptable fit, but values of less than 0.05 are more indicative of a good model fit. If the model is not well fit according to these test statistics, then modification indices (MI) are examined. MI show the approximate change in the model's chi-square[35] if additional paths are added – a high MI indicates that including that pathway will improve the model fit. The pathway with the highest MI is then included in the next SEM model, and the process begins again.[36] When the goodness of fit parameters indicate the model is well fitting, that is considered the final model for the latent construct (to be included in the full SEM analyses). The following sections describe this process for each latent construct.

Mental Health CFA

The latent construct mental health is based on the MHI-5 scale, which includes questions regarding how often an individual felt nervous, blue, depressed, calm, and happy in the past month. For this research, nervous, blue, and depressed were reverse coded so that higher numbers for all of the measures were indicative of worse mental health. *Figure 8* shows the initial SEM model[37] of these 5 variables loaded onto one construct – mental health. All coefficients and the error terms were significant at the $p<0.01$ level, indicating that all of observed variables appeared to be describing a single underlying concept.

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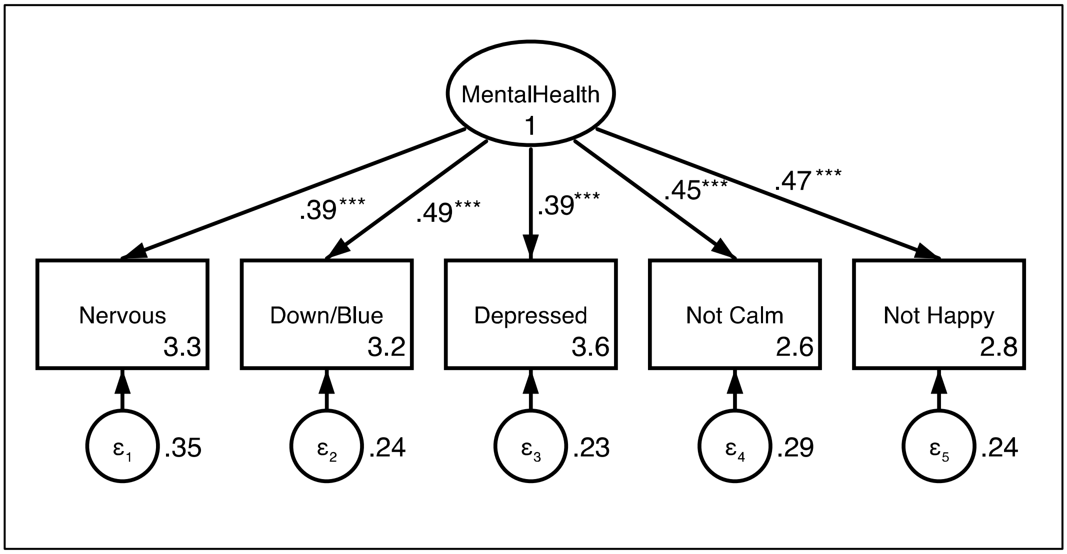
[35] The chi-square is another model fit statistic for SEM models. A chi-square of 2 or smaller indicates a good fit, however chi-square is particularly vulnerable to non-normality (which is present in this data) and sample size (Cangur & Ercan, 2015). Thus, for this research, it is not used to determine goodness of fit of the models. However, it is still used for identifying the modification indices that will have the largest impact on model fit, as those with the largest chi-square are likely to be important pathways.
[36] It may seem like an obvious solution to simply include all of the listed modification indices in order to maximize the model fit; however, each included parameter of the model will decrease the statistical power. Thus, the inclusion of additional modifications must be weighed against the loss of power (Kline, 2016). This research used the fewest modifications needed in order to have good model fit.
[37] As is common practice when depicting SEM models, round outlines indicate latent variables and rectangular outlines indicate observed variables for all SEM and GSEM models in this research.

Figure 8. CFA for Mental Health – Model 1

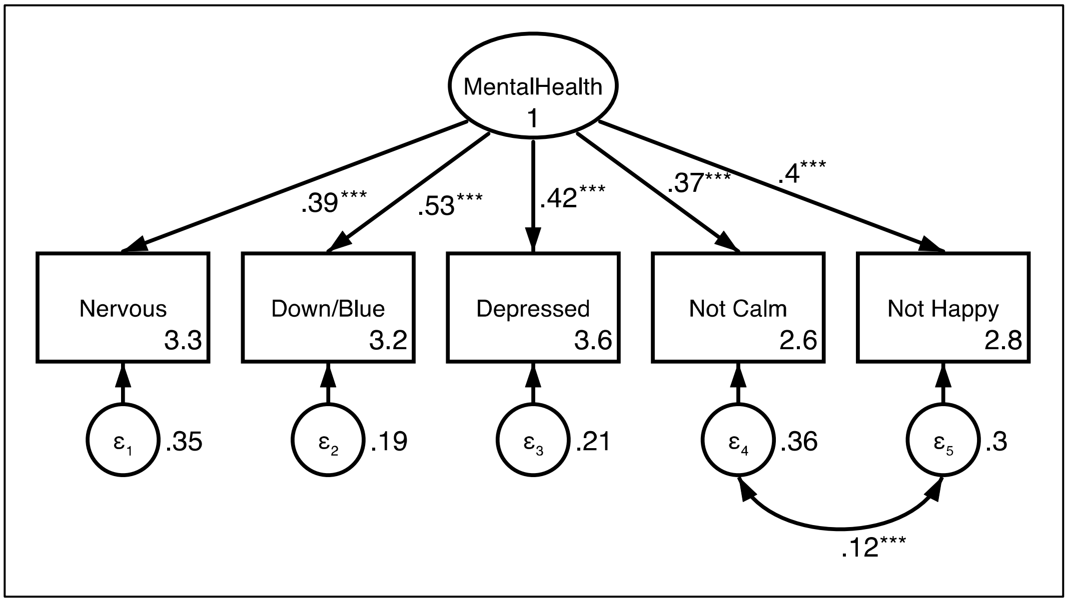


*** p<0.01

The goodness of fit for this model (and all mental health models) is shown in *Table 16* (below). The RMSEA of the initial mental health construct was 0.154, which does not meet the threshold of 0.08 (or the more ideal threshold of 0.05). The CFI of the initial model was 0.911. This means the estimated model was 91.1% better than the alternative model where the variables do not fit one single construct, but this does not meet the 95% threshold. Finally, the initial SRMR for mental health was 0.051, which indicates an acceptable (but not necessarily good) fit.

After examining the model fit, the initial SEM model for the mental health latent construct was not an ideal fit. To identify where the model could be improved, the modification indices were examined (see *Table 17* below). The pathway with the largest modification index (by far) was between the errors of not calm and not happy (MI = 711.023). Therefore, the SEM model for mental health was estimated again, this time allowing for covariance between those errors (see *Figure 9)*. The results indicated that all of the observed variables were still significant for the latent variable, along with the new pathway between the errors.

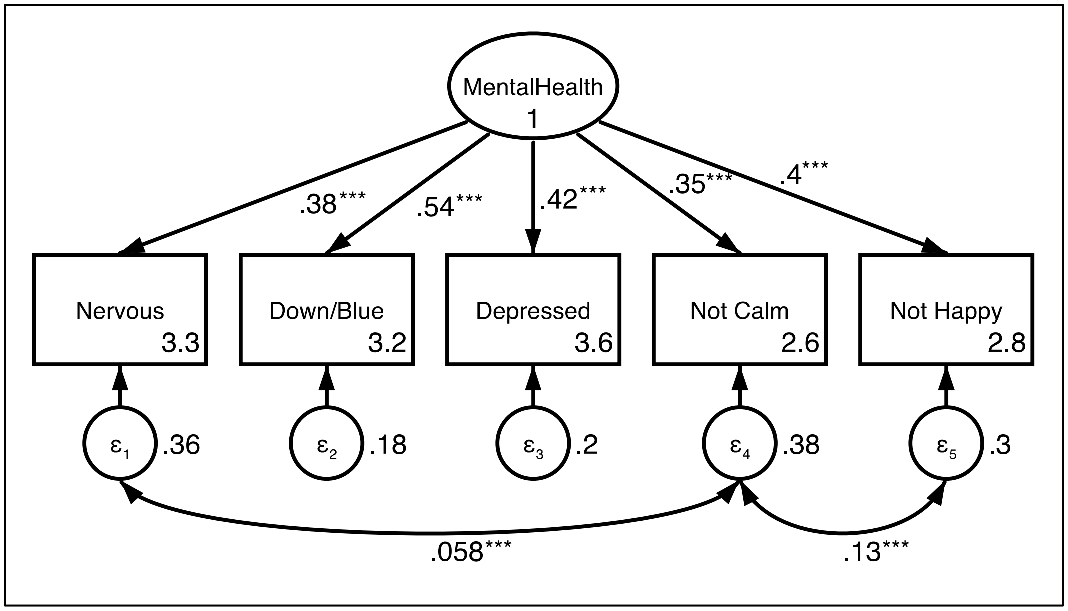
Figure 9. CFA for Mental Health – Model 2



*** p<0.01

Again, the goodness of fit measures for Model 2 are shown in *Table 16*. For this model, the RMSEA was smaller (0.081), but still not within the 0.08 threshold. The CFI was higher – at 0.980 – meaning the estimated model was 98.0% better than the alternative model. This fit the 95% threshold. The SRMR was 0.027 indicating a good model fit. The modification indices for Model 2 (see Model 2 in *Table 17*) indicate one pathway in particular had a much larger modification index than the others: the pathway between the errors of not calm and nervous (MI = 186.625). Based on these findings (the high RMSEA and the large modification index), another model was estimated adding in the pathway between not calm error and nervous error (see *Figure 10*).

Figure 10. CFA for Mental Health – Model 3



*** p<0.01

With Model 3, all of the goodness of fit statistics fell within their thresholds indicating a good model fit (RMSEA = 0.018, CFI = 0.999, SRMR = 0.006) (see *Table 16*). Further, the modification indices showed only 3 remaining significant pathways, but the MI for these pathways was much smaller (see *Table 17*). Thus, Model 3 is the final mental health model used for this research.

Table 16. Goodness of Fit Statistics for Mental Health

	Model 1	Model 2	Model 3^
RMSEA	0.154	0.081	0.018
CFI	0.911	0.980	0.999
SRMR	0.051	0.027	0.006

^ final model

Table 17. Modification Indices for Mental Health

	Model 1	Model 2	Model 3^
cov(e.Blue,e.Depressed)	471.536	56.426	5.834
cov(e.Blue,e.NotCalm)	270.858	32.182	
cov(e.Blue,e.NotHappy)	55.611	15.586	
cov(e.Blue,e.Nervous)	10.563	29.996	8.581
cov(e.Depressed,e.NotCalm)	232.014	25.271	

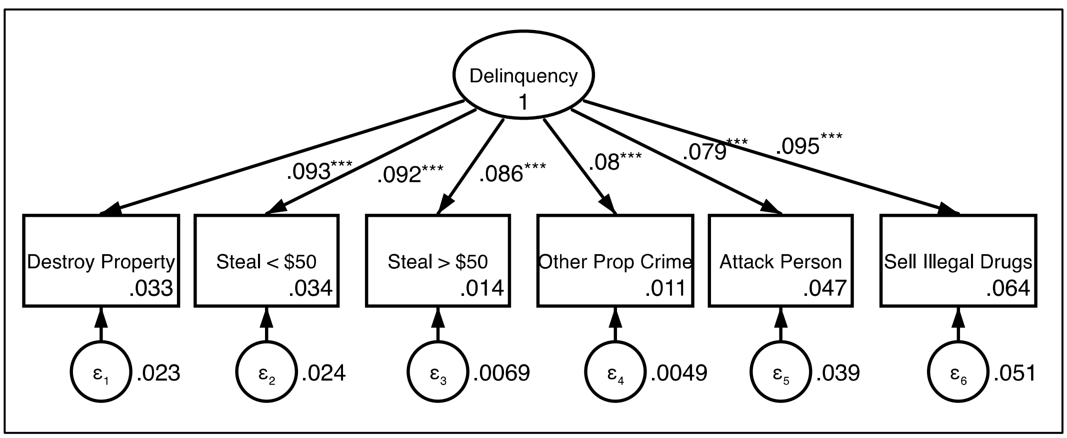
cov(e.Depressed,e.NotHappy)	97.009		
cov(e.Depressed,e.Nervous)	9.036		
cov(e.NotCalm,e.NotHappy)	711.023		
cov(e.NotCalm,e.Nervous)	23.750	186.625	
cov(e.NotHappy,e.Nervous)	110.696	25.311	5.834

^ final model
Note: e. indicates error.

<u>Delinquency CFA</u>

As for mental health, an iterative process was used to finalize the model of the latent construct delinquency. Delinquency is a measure of 6 variables indicating whether or not an individual committed a delinquent act during the year of the survey: destroying property, committing some other property crime, stealing something worth more than $50, stealing something worth less than $50, attacking someone, and selling illegal drugs. *Figure 11* shows the initial SEM model of these variables loaded onto a single construct for delinquency.

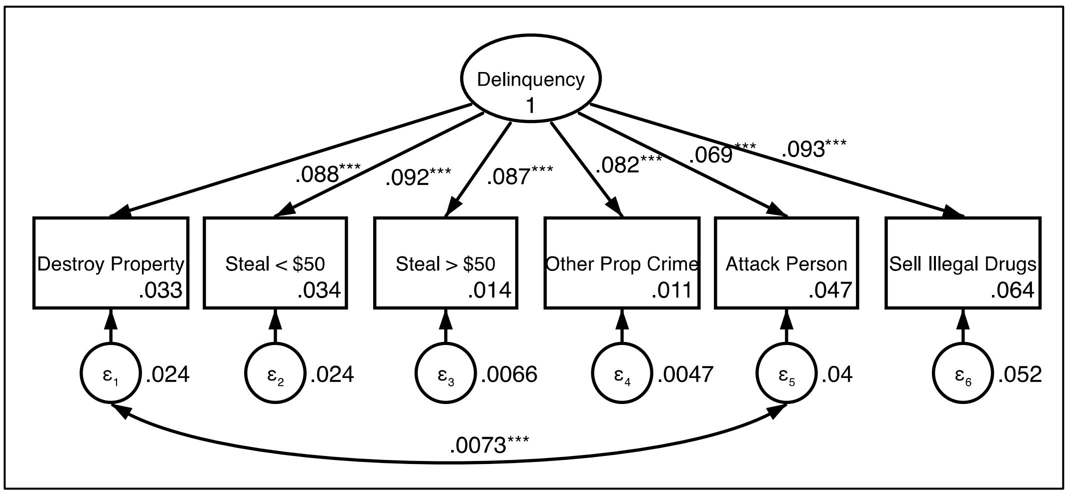
Figure 11. CFA for Delinquency – Model 1



*** p<0.01

All coefficients and error terms were significant at p<0.01, indicating the variables are describing one common underlying concept. The goodness of fit statistics (RMSEA, CFI, and SRMR) for this model are shown in *Table 18* under Model 1. The RMSEA was 0.088 – which was not within the 0.08 threshold for a good fit. The SRMR was within the threshold of a good fit at 0.045; and the CFI was 0.936, which did not exceed 0.95 as is needed for a good fit. An examination of the modification indices for the model showed that there were a number of significant pathways that were not included (see *Table 19*). The most influential pathway (i.e., the one with the largest MI) was between the errors of destroy property and attack someone (MI = 98.820) and, therefore, was included in Model 2 (see *Figure 12*).

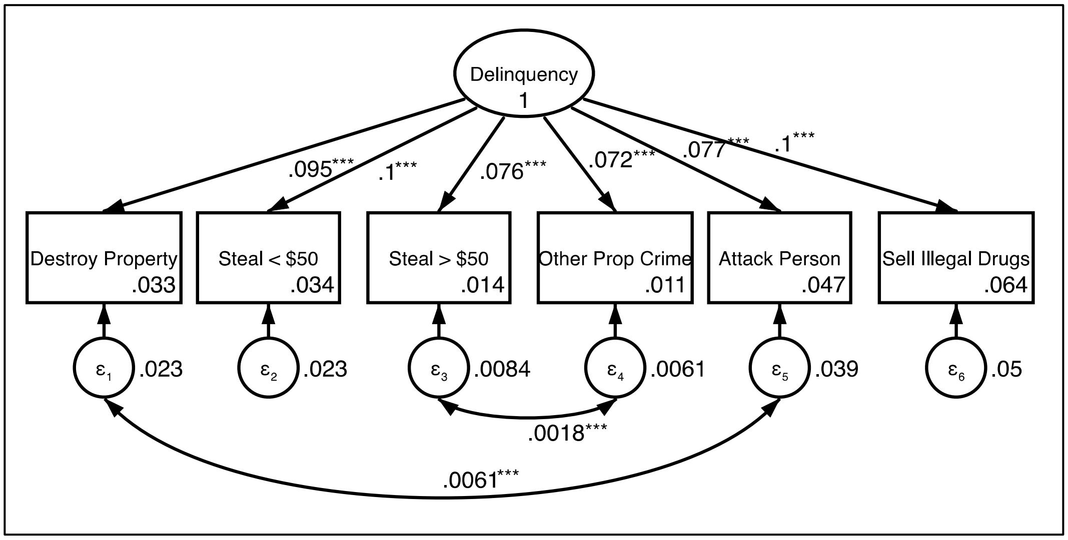
Figure 12. CFA for Delinquency – Model 2



*** p<0.01

For Model 2, the goodness of fit statistics improved and both CFI (0.981) and SRMR (0.027) were within their respective thresholds for a good fit, but the RMSEA was still shy of being within 0.05 (at 0.051) (see *Table 18*). The modification indices were again examined, and they showed a number of significant pathways (see *Table 19*). The largest modification index was between the errors of stealing more than $50 and other property crime (MI = 27.372), so this was included in Model 3 (*Figure 13* below).

Figure 13. CFA for Delinquency – Model 3



*** p<0.01

With the two additional pathways in the model, the construct for delinquency had GOF statistics that were all within their respective thresholds (see *Table 18*). Finally, the modification indices were run one more time to investigate the strength of any remaining significant pathways (shown in *Table 19*). The MI for Model 3 suggest that only a few pathways remained significant; and the ones that were had much smaller MI than the prior pathways that were included in the model. Thus, Model 3 was determined to be the final model for the delinquency latent construct.

Table 18. Goodness of Fit Statistics for Delinquency

	Model 1	Model 2	Model 3^
RMSEA	0.088	0.051	0.033
CFI	0.936	0.981	0.993
SRMR	0.045	0.027	0.017

^ final model

Table 19. Modification Indices for Delinquency

	Model 1	Model 2	Model 3^
cov(e.StealUnder50,e.StealOver50)			3.954
cov(e.StealUnder50,e.SellDrugs)	12.395	14.261	
cov(e.StealUnder50,e.OtherPropCrime)	4.525	8.349	

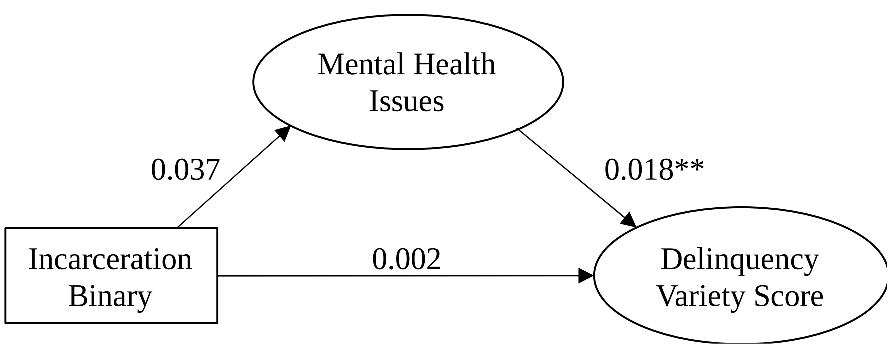
cov(e.StealUnder50,e.DestroyProp)			10.037
cov(e.StealUnder50,e.Attack)		5.149	
cov(e.StealOver50,e.SellDrugs)	71.266	12.422	5.023
cov(e.StealOver50,e.OtherPropCrime)		27.372	
cov(e.StealOver50,e.DestroyProp)	7.648		
cov(e.StealOver50,e.Attack)	26.810	5.987	
cov(e.SellDrugs,e.Attack)	9.895	13.326	7.412
cov(e.DestroyProp,e.Attack)	98.820		
cov(e.OtherPropCrime,e.DestroyProp)	7.211		
cov(e.OtherPropCrime,e.Attack)	15.196		

^ final model
Note: e. indicates error.

5.3.2 Mental Health as a Mediator

Next, using the final latent constructs for mental health and delinquency, this research examined mental health as a mediator between incarceration and offending.[38] The first outcome examined was delinquency variety score using SEM with MLMV. *Figure 14* shows the results using a binary measure of incarceration and *Figure 15* shows the results using a proportion measure of incarceration.

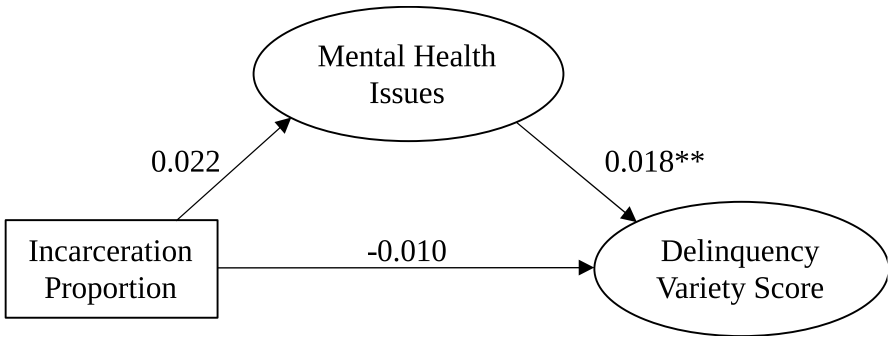
Figure 14. Mental Health Mediation Between Binary Incarceration and Delinquency Variety Score



*** p<.01, **p<.05, *p<.10
Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix D* for full model). Significances are based on robust standard errors.[39]

[38] All models were run in three steps: (1) with only the variables of interest, (2) with controls, and (3) with controls and pre-incarceration mental health. The progression of models and the final full models for all measures are presented in *Appendix D*.
[39] A note on standard errors: Initial SEM regressions were run using regular (i.e., OIM), robust, clustered robust, and bootstrap standard errors for comparison. The results indicated that robust,

Figure 15. Mental Health Mediation Between Proportion Incarcerated and Delinquency Variety Score



*** p<.01, **p<.05, *p<.10
Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix D* for full model) Significances are based on robust standard errors.

For both measures of incarceration, the only significant pathway was between mental health and delinquency variety score – with worse mental health (i.e., more mental health issues) increasing delinquency variety score. Every unit increase in mental health issues was associated with a 0.018 unit increase in delinquency variety score ($p<0.05$) (*Figures 14* and *15*). However, the direct impacts of incarceration on mental health and of incarceration on delinquency variety score were not significant.

The results for delinquency as a binary measure are shown in *Figures 16* and *17*. Mental health issues had a significant, positive impact on whether or not an individual engaged in delinquency. Every unit increase in mental health issues was associated with about a 90.3% ((1.903-1)*100) increase in the odds of delinquency ($p<0.05$). Again, incarceration (binary and proportion) did not have a significant impact on mental health or binary delinquency.

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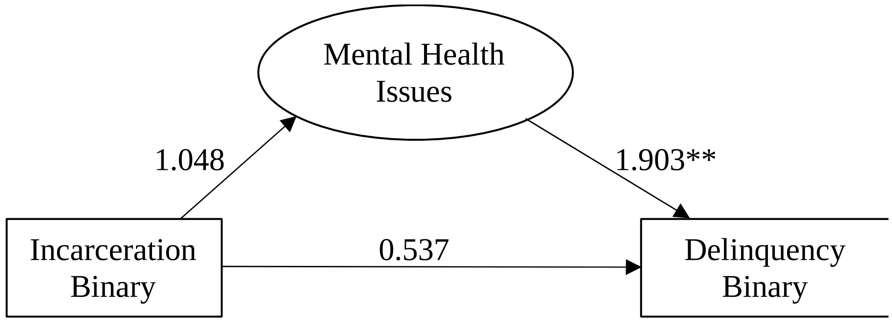
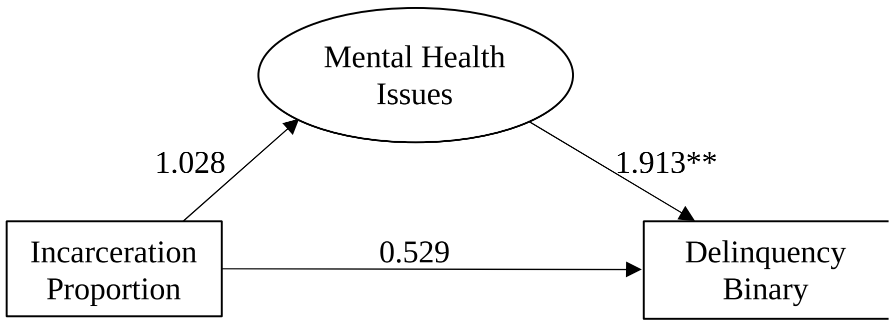
clustered robust, and bootstrap all produced very similar results. However, OIM standard errors produced more significant findings than the other options. In order to provide conservative estimates, robust standard errors were used for all SEM and GSEM analyses.

Figure 16. Mental Health Mediation Between Binary Incarceration and Binary Delinquency



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix D* for full model). Significances are based on robust standard errors.

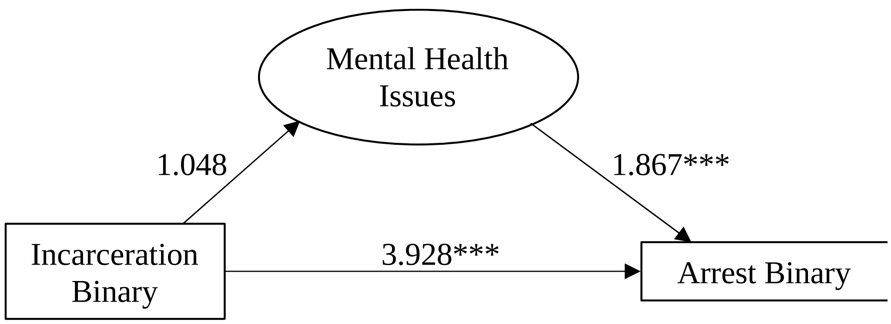
Figure 17. Mental Health Mediation Between Proportion Incarcerated and Binary Delinquency



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix D* for full model). Significances are based on robust standard errors.

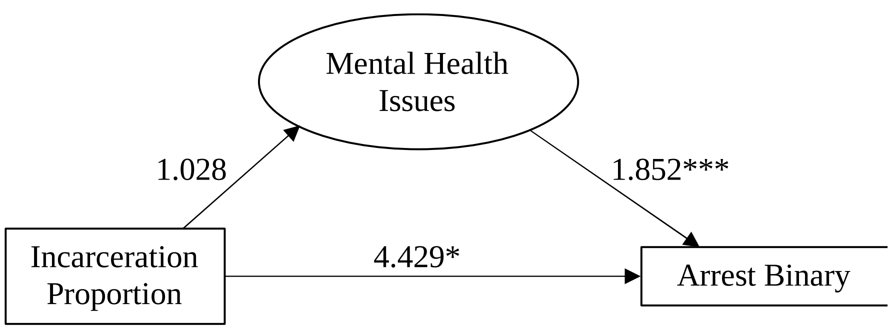
Finally, *Figures 18* and *19* show the results for incarceration binary and proportion, respectively, with the outcome of binary arrest. Similar to the two delinquency measures, mental health issues had a significant, positive impact on arrest. A unit increase in mental health issues was associated with around a 86.7% (1.867-1)*100) increase in the odds of arrest (p<0.01). Unlike for delinquency as the outcome, both incarceration measures had a significant impact on arrest. Those who were incarcerated had a 292.8% ((3.928-1)*100) increase in the odds of arrest (p<0.01); and a unit increase in proportion of the year spent incarcerated was associated with a 342.9% ((4.429-1)*100) increase in the odds of arrest (p<0.10).

Figure 18. Mental Health Mediation Between Binary Incarceration and Binary Arrest



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix D* for full model). Significances are based on robust standard errors.

Figure 19. Mental Health Mediation Between Proportion Incarceration and Binary Arrest



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix D* for full model). Significances are based on robust standard errors.

Taken together, these results indicate that mental health had a significant impact on all measures of offending and incarceration only had an impact on odds of arrest. These findings echo the findings from *Section 5.2* in that when mental health is included in the model, incarceration is no longer significant except for its impact on arrest. However, these analyses also indicated that, when examined in a pathway, incarceration did not have a significant impact on mental health issues – indicating that there was no mediation effect of mental health on the relationship between incarceration and offending,[40] which is not in support of *Hypothesis 3*; however, it could be that the lack of mediation effect is due to demographic differences in mediation that are masked when the sample is examined as a whole. This is explored in the next research question.

[40] Coefficients and significances for the pathways from incarceration to offending are shown in *Appendix D*.

5.4 Is there moderated mediation of the incarceration-offending link by demographic characteristics?

Next, this research examined how mental health as a mediator between incarceration and offending may vary by demographic characteristics (i.e., moderated mediation). To do this, the models used in the prior section were re-run with an addition – groupings by race and sex. This means each model was run with each race category and sex category interacted with the independent variables, and the Wald test for equality of coefficients was used to examine whether there were significant differences between races and sexes. Again, delinquency as a latent variable was examined using SEM and the binary measures of delinquency and arrest were examined using GSEM.

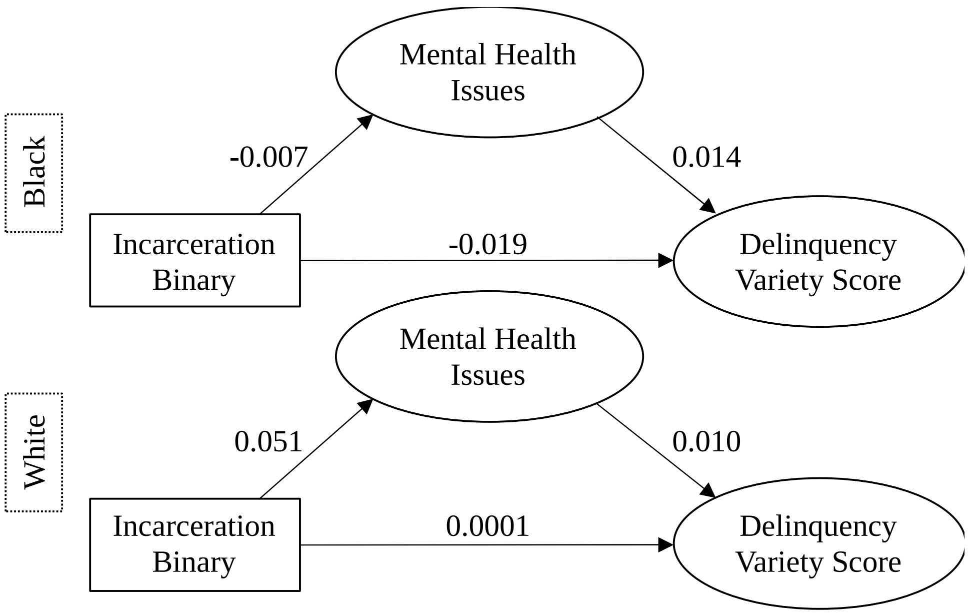
5.4.1 Moderated Mediation by Race

Starting with SEM to examine delinquency variety score, results for incarceration binary and incarceration proportion are shown in *Figures 20* and *21*, respectively (below).[41] Across both measures of incarceration, there were no significant relationships among variables of interest for either race. Compared to analyses in the prior section which found that mental health issues had a significant, positive relationship with delinquency variety score, this indicates that the impact of mental health on delinquency variety score did not vary (i.e., was not moderated) by race. The coefficients for each relationship in the model were also compared across race using a Wald test; but, as expected due to the lack of significant coefficients in

[41] All models were run in three steps: (1) with only the variables of interest, (2) with controls, and (3) with controls and pre-incarceration mental health. The progression of models and the final full models for all measures are presented in *Appendix E*.

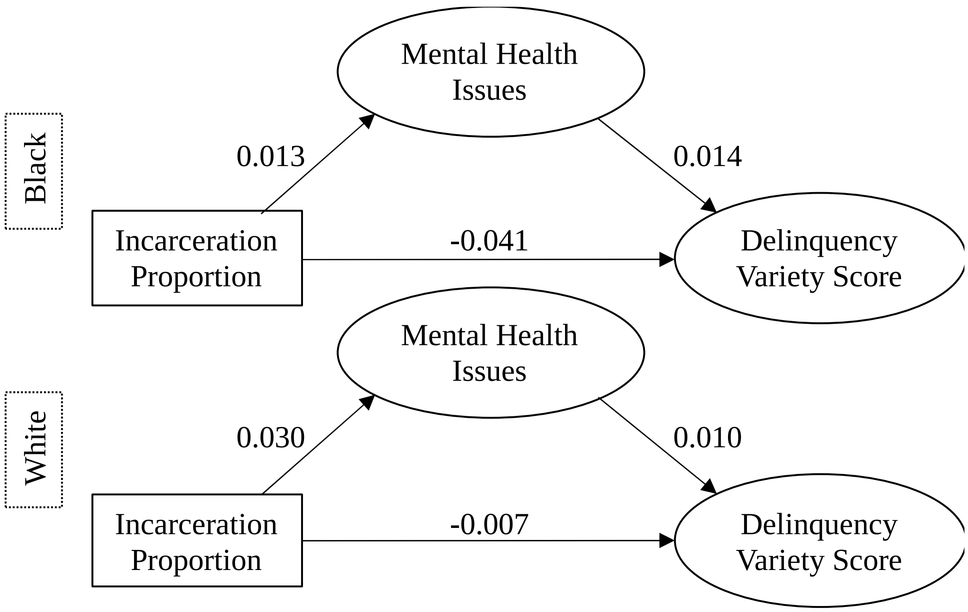
Figure 20, there were no significant differences in coefficients for any of the relationships between races (see *Appendix E* for results). That is, the Wald test results failed to reject the null hypothesis that the coefficients were equal (p>0.10).

Figure 20. Mental Health Mediation Between Binary Incarceration and Delinquency Variety Score, By Race



*** p<.01, **p<.05, *p<.10
Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix E* for full model). Significances are based on robust standard errors.

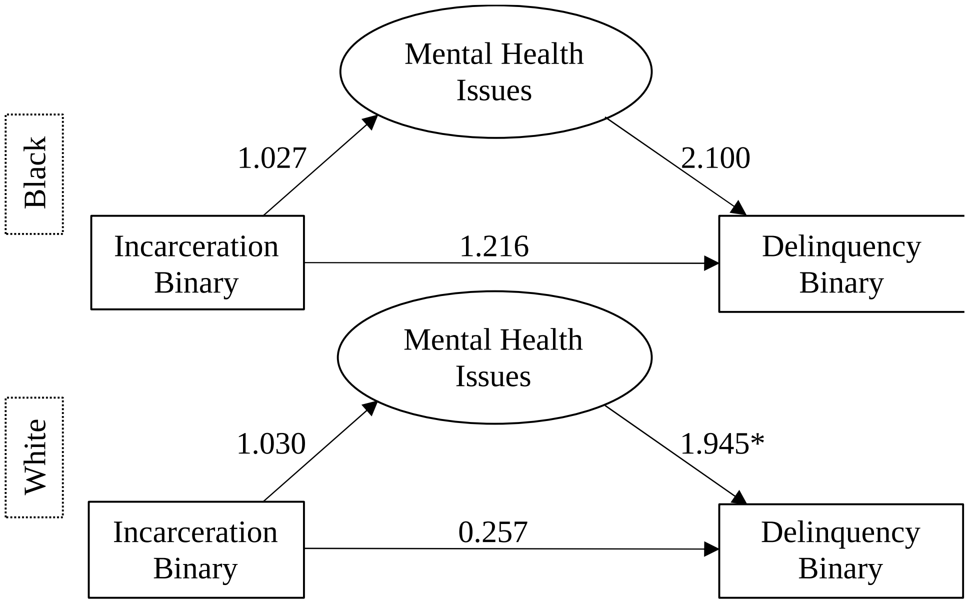
Figure 21. Mental Health Mediation Between Proportion Incarcerated and Delinquency Variety Score, By Race



*** p<.01, **p<.05, *p<.10
Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix E* for full model). Significances are based on robust standard errors.

GSEM results for delinquency as a binary measure are shown in *Figures 22* and *23* (below). For incarceration measured as a binary, the only significant pathway was between mental health and delinquency for White individuals (*Figure 22* below). Every unit increase in mental health issues was associated with a 94.5% ((1.945-1)*100) increase in the odds of delinquency (p<0.10). However, incarceration did not significantly impact mental health or odds of delinquency for White individuals; and, for Black individuals, none of the pathways were significant.

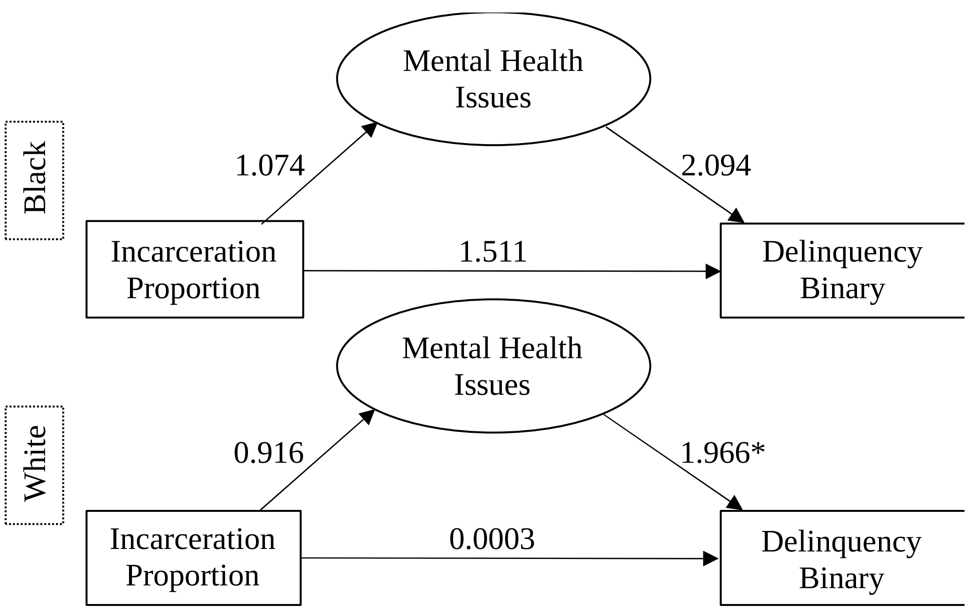
Figure 22. Mental Health Mediation Between Binary Incarceration and Binary Delinquency, By Race



*** p<.01, **p<.05, *p<.10

Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix E* for full model). Significances are based on robust standard errors.

Figure 23. Mental Health Mediation Between Proportion Incarcerated and Binary Delinquency, By Race



*** p<.01, **p<.05, *p<.10

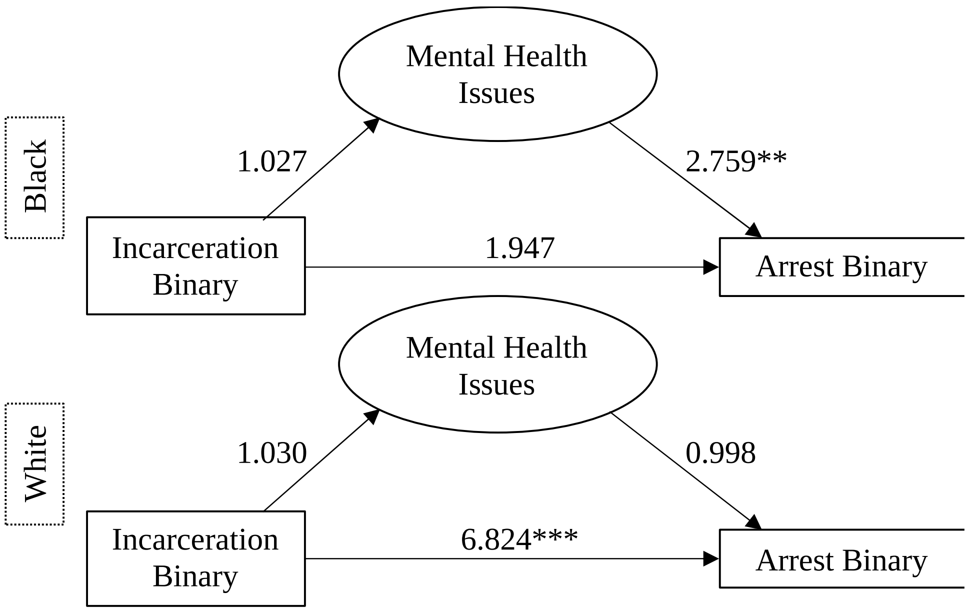
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix E* for full model). Significances are based on robust standard errors.

Results were similar for proportion of the year incarcerated (*Figure 23* above). Black individuals had no significant pathways between incarceration, mental health, and delinquency. For Whites, the only significant pathway was from mental health to delinquency – every unit increase in mental health issues was associated with a 96.6% ((1.966-1)*100) increase in the odds of delinquency ($p<0.10$). The individual relationships within these pathways were also tested for significant differences between the coefficients for Black and White persons. Although there was a significant, positive relationship between mental health issues and delinquency binary for White persons, this relationship was only marginally significant; and the Wald test for equality of coefficients failed to reject the null hypothesis ($p>0.10$) that the coefficients for mental health issues-delinquency binary were equal for Black and White persons – indicating the two coefficients were not significantly different (results of Wald test in *Appendix E*).

Next, binary arrest was examined as the outcome measure (see *Figures 24* and *25*). *Figure 24* (below) shows the results for incarceration measured as binary with notable racial differences. Black individuals had a significant, positive relationship between mental health and arrest, but no impact of incarceration on arrest. Every unit increase in mental health issues was associated with a 175.9% ((2.759-1)*100) increase in odds of arrest ($p<0.05$). However, for White individuals, mental health did not have a significant impact on arrest. Instead, incarceration had a significant, positive impact on arrest. White persons who were incarcerated had a 582.4%

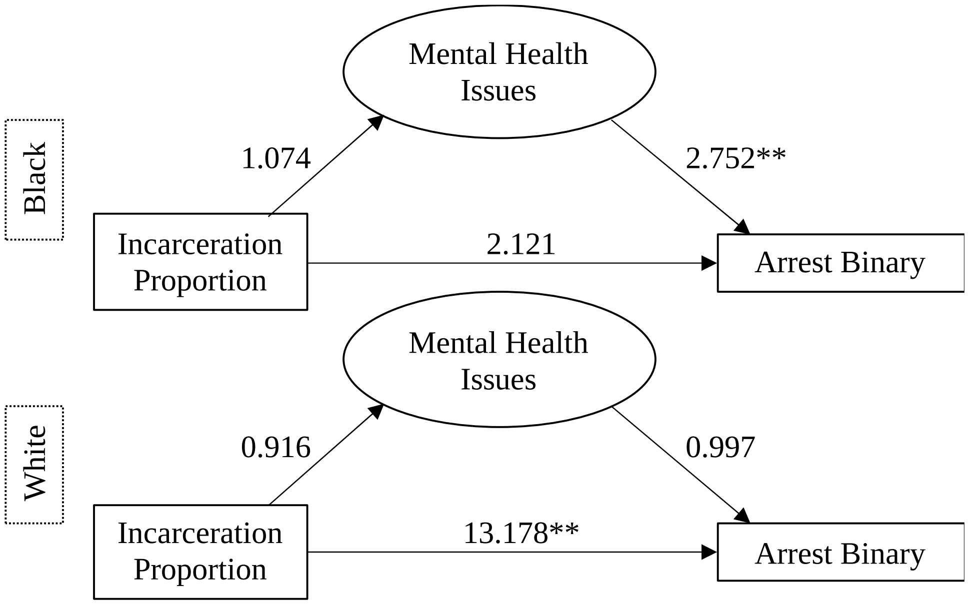
((6.824-1)*100) increase in the odds of arrest (p<0.01). For both Black and White individuals, incarceration did not significantly impact mental health.

Figure 24. Mental Health Mediation Between Binary Incarceration and Binary Arrest, By Race



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix E* for full model). Significances are based on robust standard errors.

Figure 25. Mental Health Mediation Between Proportion Incarcerated and Binary Arrest, By Race



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix E* for full model). Significances are based on robust standard errors.

As shown in *Figure* 25 (above), incarceration measured as a proportion had similar results to the binary measure. Neither Blacks nor Whites had a significant relationship between proportion of the year incarcerated and mental health. The pathway between mental health and arrest was significant for Blacks, and the pathway between incarceration and arrest was significant for Whites. Every unit increase in mental health issues was associated with a 175.2% ((2.752-1)*100) increase in odds of arrest for Black individuals (p<0.05). And every unit increase in proportion of the year incarcerated was associated with a 1217.8% ((13.178-1)*100) increase in the odds of arrest for White individuals (p<0.05).

Again, the coefficients for the relationships within the incarceration-mental health issues-arrest binary pathway were compared across race using a Wald Test (see

Appendix E). Results for the relationships between incarceration and mental health issues and incarceration and arrest failed to reject the null hypothesis (p>0.10) that the coefficients were equal across races. However, results for the relationship between mental health issues and arrest binary rejected the null hypothesis (p<.10) and indicated that the impact of mental health issues on arrest binary was significantly higher for Black individuals than for White individuals.

Overall, there were some racial differences in the models examined. For delinquency (as a variety score or binary measure), Black individuals had no significant pathways, whereas White individuals had significant, positive relationships between mental health issues and delinquency. For arrest, these findings varied. Black individuals had significant, positive relationships between mental health issues and arrest; and White individuals had significant, positive relationships between incarceration and arrest. When examining differences in individual relationships, the only significant differences across race were for the impact of mental health issues on arrest binary – Black individuals had a significantly higher association between mental health and arrest than did White individuals.

Despite the variation in findings across models, there was one similarity across all models: incarceration (both binary and proportion) had no impact on mental health for either race. Because none of the models had significant pathways from *both* incarceration to mental health and mental health to offending, there is no evidence of a mediation effect of mental health on the incarceration-offending relationship.[42] This

[42] Coefficients and significances for the pathways from incarceration to offending by race are shown in *Appendix E*.

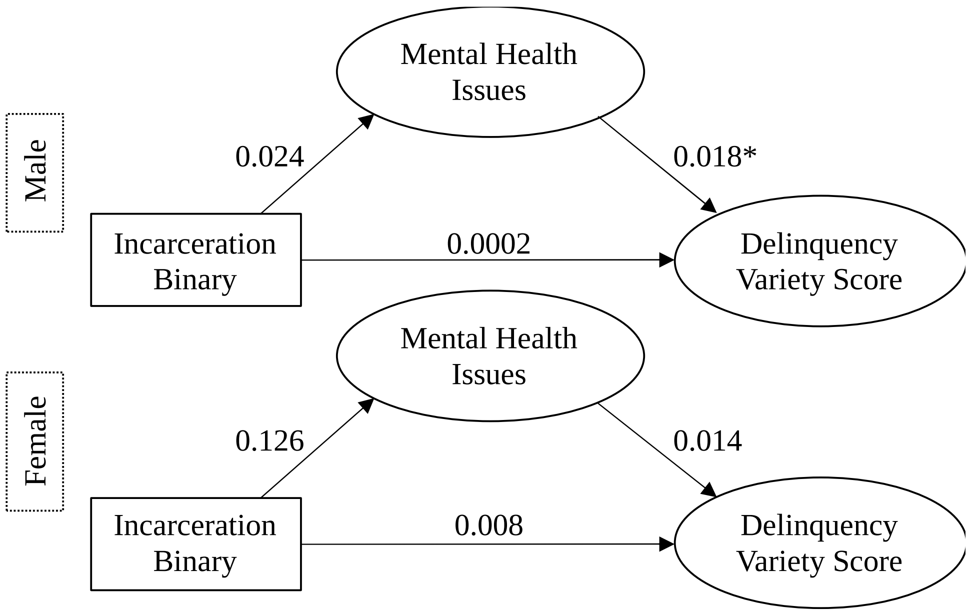
is not in support of *Hypothesis 4a* which predicted that mental health would more strongly mediate the relationship between incarceration and offending for Black individuals compared to White individuals.

5.4.2 Moderated Mediation by Sex

Next, the same analyses were done using sex as the moderator rather than race.[43] *Figures 26* and *27* show the results for delinquency variety score as the offending measure and incarceration measured as a binary and proportion, respectively. For both males and females, incarceration (binary and proportion) did not have a significant impact on mental health or on delinquency variety score. For females, mental health also did not have a significant impact on delinquency variety score – meaning that none of the pathways of interest in the model were significant. For males, however, mental health issues had a significant, positive impact on delinquency. Every unit increase in mental health issues was associated with about a 0.018 unit increase in delinquency variety score ($p<0.10$). However, using the Wald test to examine differences in individual pathways across sex, there were no significant differences in the coefficients (failing to reject the null hypothesis). This indicates that, although males had a significant, positive relationship between mental health issues and delinquency variety score, this impact was not significantly different from that for females (see *Appendix F* for Wald test results).

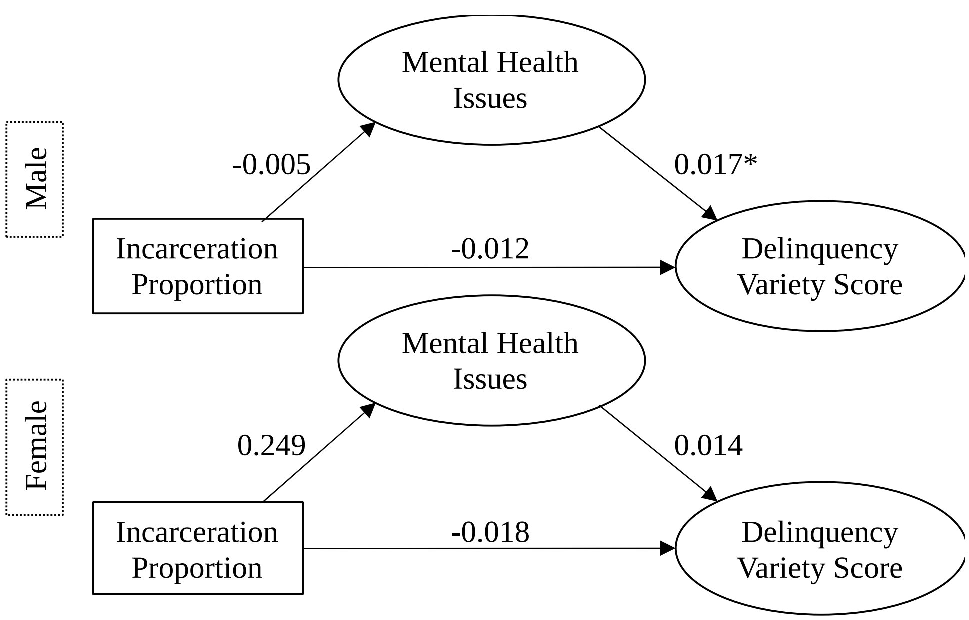
[43] All models were run in three steps: (1) with only the variables of interest, (2) with controls, and (3) with controls and pre-incarceration mental health. The progression of models and the final full models for all measures are presented in *Appendix F*.

Figure 26. Mental Health Mediation Between Binary Incarceration and Delinquency Variety Score, By Sex



*** p<.01, **p<.05, *p<.10
Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix F* for full model). Significances are based on robust standard errors.

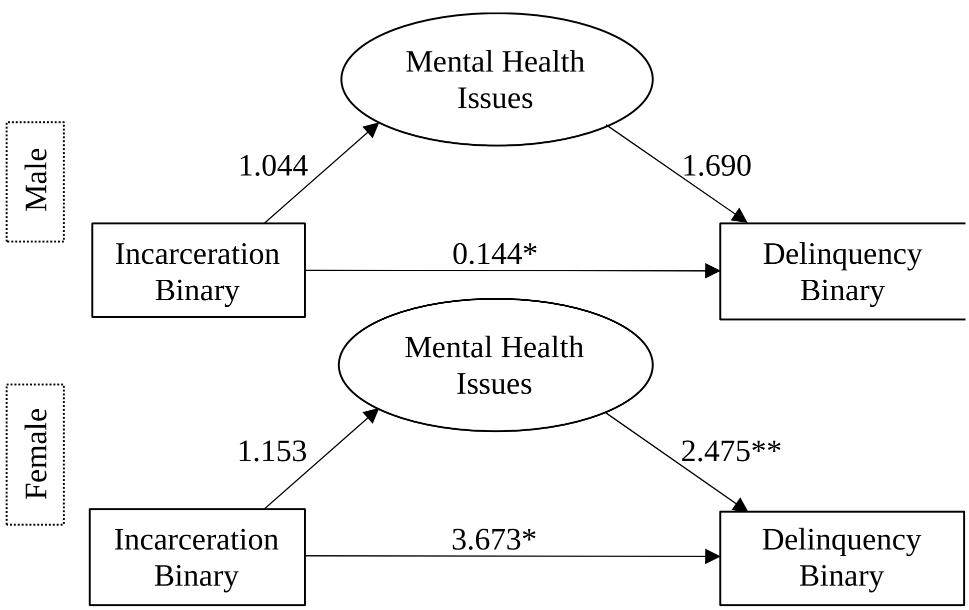
Figure 27. Mental Health Mediation Between Proportion Incarcerated and Delinquency Variety Score, By Sex



*** p<.01, **p<.05, *p<.10
Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix F* for full model). Significances are based on robust standard errors.

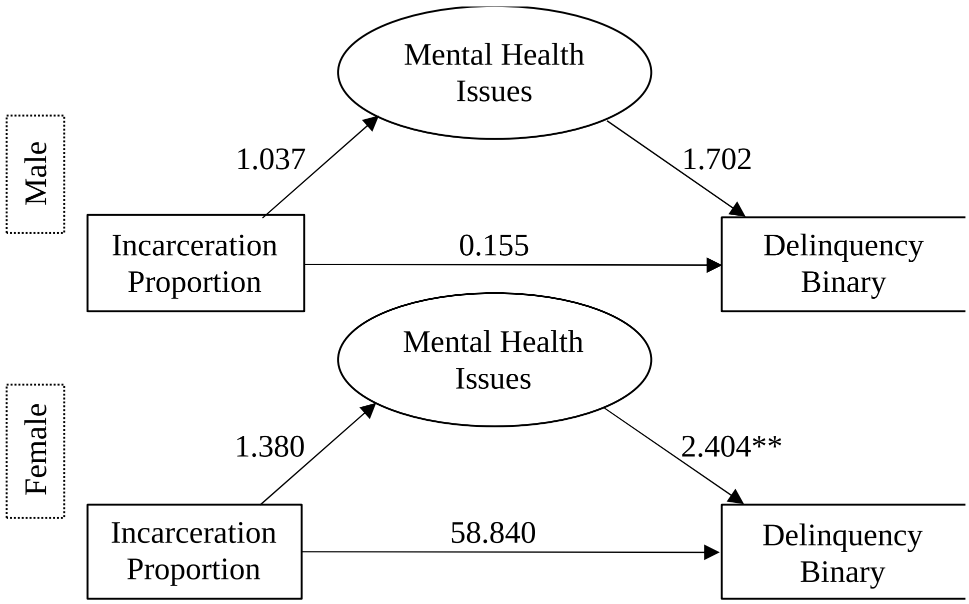
Results for delinquency as a binary measure are shown in *Figure 28* (incarceration binary) and *Figure 29* (incarceration proportion). For incarceration as a binary measure, neither sex had a significant pathway between incarceration and mental health (see *Figure 28*). Both sexes had significant pathways between incarceration and delinquency, however they were in opposite directions. For males, being incarcerated led to a 85.6% ((0.144-1)*100) *decrease* in the odds of delinquency (p<0.10). For females, being incarcerated led to a 267.3% ((3.673-1)*100) *increase* in the odds of delinquency (p<0.10). Further, the impact of mental health on delinquency was only significant for women – a one unit increase in mental health issues was associated with a 147.5% ((2.475-1)*100) increase in odds of delinquency (p<0.05).

Figure 28. Mental Health Mediation Between Binary Incarceration and Binary Delinquency, By Sex



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix F* for full model). Significances are based on robust standard errors.

Figure 29. Mental Health Mediation Between Proportion Incarcerated and Binary Delinquency, By Sex



*** p<.01, **p<.05, *p<.10
Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix F* for full model). Significances are based on robust standard errors.

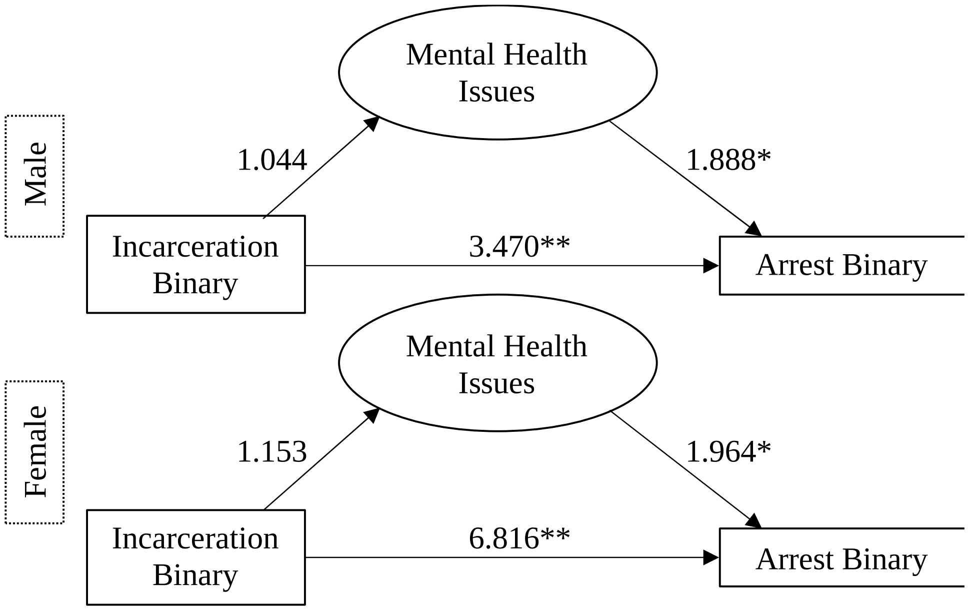
Figure 29 (above) shows the results for incarceration as a proportion of the year with binary delinquency as the outcome. Once again, incarceration had no significant impact on mental health for males or females. Further, incarceration also had no significant impact on odds of delinquency for either sex. In fact, the only pathway with a difference based on sex was between mental health and delinquency. For only women, mental health had a significant, positive impact on delinquency. Every unit increase in mental health issues was associated with a 140.4% ((2.404-1)*100) increase in the odds of delinquency.

The relationships within the pathways shown in *Figures 28* and *29* were also examined for differences in coefficients by sex using a Wald test (see *Appendix F*).

For the incarceration-mental health issues relationship and the mental health issues-delinquency binary relationship, the results failed to reject the null hypothesis – indicating the coefficients for these relationships were not significantly different for men compared to women. However, for the incarceration binary-delinquency binary relationship, the null hypothesis was rejected ($p<0.05$) indicating that the impact of incarceration binary on delinquency was significantly greater for women than for men.

Finally, differences in mediation based on sex were examined for arrest as the offending measure (*Figures 30* and *31*). As with the prior models, for both measures of incarceration and across both sexes, incarceration did not have a significant impact on mental health. However, binary incarceration did have a significant, positive impact on arrest for both sexes (see *Figure 30*). Having been incarcerated was associated with a 247.0% increase in the odds of arrest for men and a 581.6% increase in the odds of arrest for women ($p<0.05$). Additionally, mental health had a significant, positive relationship with arrest, with an increase of one unit in mental health issues being associated with an 88.8% and 96.4% increase in the odds of arrest for males and females, respectively ($p<0.10$).

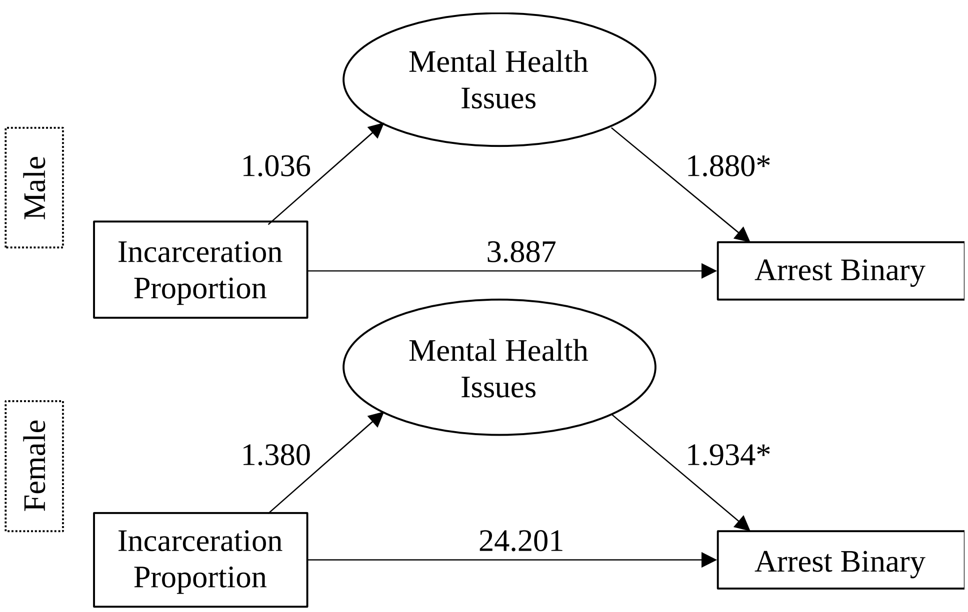
Figure 30. Mental Health Mediation Between Binary Incarceration and Binary Arrest, By Sex



*** p<.01, **p<.05, *p<.10

Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix F* for full model). Significances are based on robust standard errors.

Figure 31. Mental Health Mediation Between Proportion Incarcerated and Binary Arrest, By Sex



*** p<.01, **p<.05, *p<.10

Note: Odds ratios are shown. For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix F* for full model). Significances are based on robust standard errors.

For incarceration measured as a proportion, the impact of incarceration on arrest was no longer significant for males or females and the impact of mental health on arrest remained significant and positive (see *Figure 31*). A one unit increase in mental health issues was associated with an 88.0% increase in odds of arrest for men and a 93.4% increase in odds of arrest for women ($p<0.10$). Again, the coefficients of the individual relationships were compared across sex using a Wald test and results failed to reject all null hypotheses – indicating none of the relationships were significantly different for males compared to females (see *Appendix F* for results).

In sum, there were some differences between males and females in the models of interest in this research. Namely, males saw a significant, positive impact of mental health issues on offending when offending was measured as delinquency variety score and binary arrest but not when it was measured as binary delinquency. On the other hand, mental health issues had a significant, positive impact on offending for both binary measures of offending but not delinquency variety score for women. The direct impact of incarceration on offending was significant for both sexes but only when incarceration and offending were both binary measures. However, the impact of binary incarceration on odds of delinquency for men was negative, whereas the other pathways were positive – and this relationship was the only one that had a significant difference in coefficients for men compared to women. Finally, the impact of incarceration (both proportion and binary) on mental health was not significant in any of the models (for either men or women). Due to the lack of significance of incarceration on mental health and the varied significance for mental health on offending, this indicates a lack of support for *Hypothesis 4b* which predicted that mental health would more strongly mediate the relationship between incarceration and offending for women compared to men.[44]

Despite the lack of mediation and moderated mediation findings, mental health issues still had a significant, positive impact on offending in a number of models in this and the prior section. It could be that mental health impacts offending through additional factors or stressors, which is examined in the next section.

[44] Coefficients and significances for the pathways from incarceration to offending by sex are shown in *Appendix F*.

5.5 How do stressors after incarceration and mental health (unemployment, being unmarried, and physical health issues) proliferate to generate future offending?

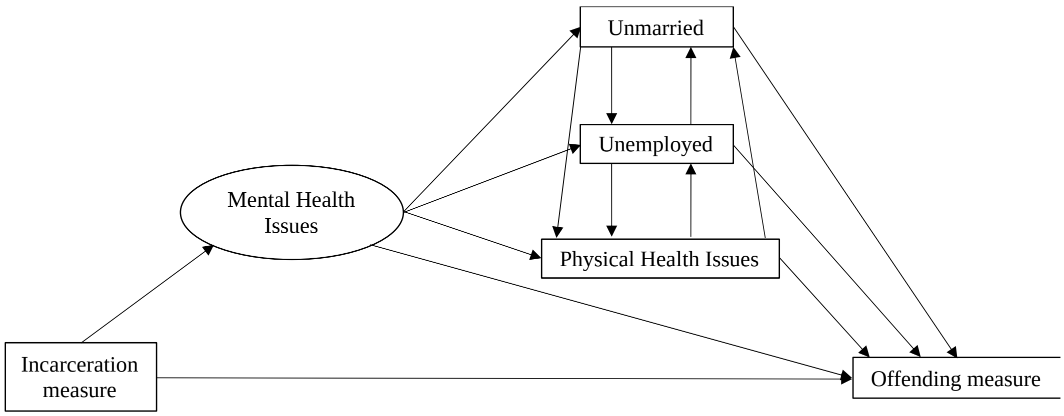
5.5.1 Exploring Individual Stressors After Mental Health

The final research question of this dissertation sought to explore how additional stressors after incarceration and mental health impact future offending. This question was more open-ended and did not have hypotheses; but, instead, the goal was to examine the various pathways from incarceration to offending through mental health issues and other potential stressors (i.e., unemployment, being unmarried, and having poor physical health). In order to do this, the additional stressors were added into the models in between mental health and offending, creating a 3-year follow-up from incarceration to offending[45] – mental health in year 1, additional factors in year 2, and offending in year 3 – and each potential pathway from mental health through the stressors (individually and in concert with one another) was examined (see *Figure 32* below). Due to the number of pathways in the models, coefficients are not shown in the figures (see *Appendix G* for coefficients for direct and indirect pathways); instead, pathways are identified by the color of the arrow: gray indicating *not significant*, purple indicating *significant and positive*, and orange indicating *significant and negative*. As with the prior analyses, each model was examined with incarceration measured as a binary and a proportion and the 3

[45] A 3-year follow-up is in line with research that suggests that recidivism generally occurs within the first 3 years after release from incarceration (Langan & Levin, 2002).

measures of offending: delinquency variety score, binary delinquency, and binary arrest.[46]

Figure 32. Mental Health and Additional Stressors Mediation Between Incarceration and Offending – General Model

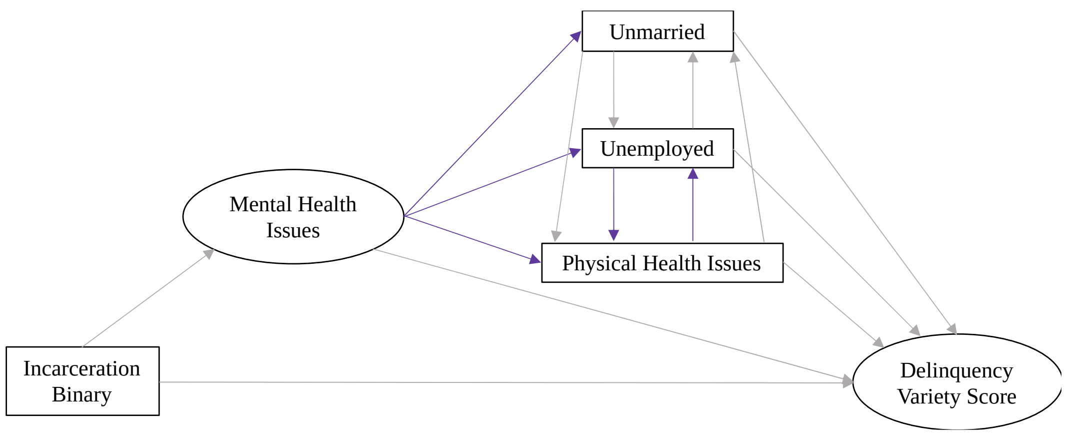


Figures 33 and *34* (below) show the results for these models using delinquency variety score as the offending measure. After including unmarried, unemployed, and physical health issues, incarceration (binary and proportion) did not have a significant impact on mental health or delinquency variety score. This was consistent with prior findings for delinquency variety score in *Section 5.3*. However, unlike the prior findings, after including additional stressors, mental health was no longer significantly associated with delinquency variety score. Mental health *was* significantly, positively related to all three stressors. Each unit increase in mental health issues was associated with a 0.112 increase in being unemployed ($p<0.01$), a 0119 increase in being unmarried ($p<0.01$), and a 0.663 increase in physical health issues ($p<0.01$). Findings were nearly identical for incarceration binary and incarceration proportion. Additionally, there were significant, positive, direct paths

[46] All models were run in three steps: (1) with only the variables of interest, (2) with controls, and (3) with controls and pre-incarceration mediators. The progression of models and the final full models for all measures are presented in *Appendix G*.

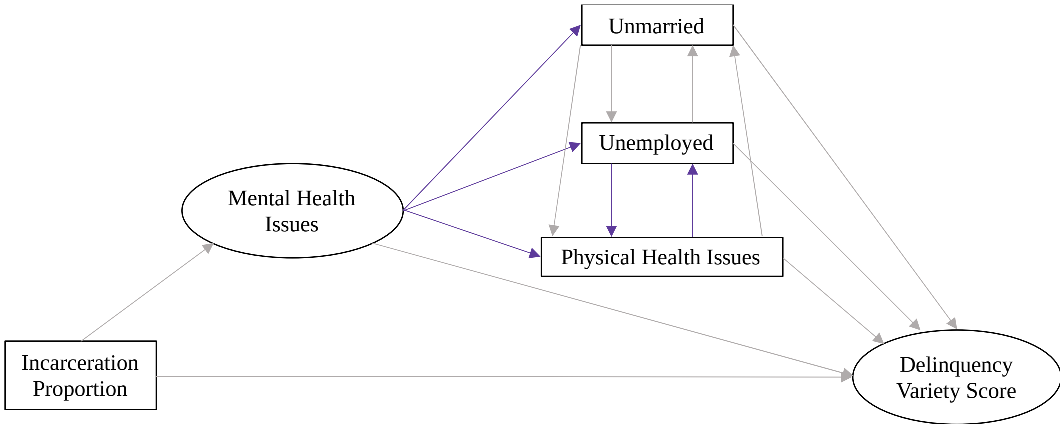
between unemployment and physical health issues – being unemployed was associated with more physical health issues, and more physical health issues was associated with being unemployed. Yet, none of the stressors had significant, direct paths to delinquency variety score, which indicates the lack of a mediation pathway through these factors to delinquency variety score. Mediation would be expected if each direct pathway was significant. Each potential indirect pathway was examined and the results indicated that, as expected, there were no significant pathways from incarceration to delinquency variety score through the additional factors (see *Appendix G*).

Figure 33. Multiple Mediation from Incarceration Binary to Delinquency Variety Score



Note: For visual clarity, coefficients, controls, latent constructs, and errors are not shown here (see *Appendix G* for full model). Significances are based on robust standard errors. Gray arrows indicate the relationship is not significant; purple arrows indicate the relationship is significant and positive; orange arrows indicate the relationship is significant and negative.

Figure 34. Multiple Mediation from Proportion Incarcerated to Delinquency Variety Score

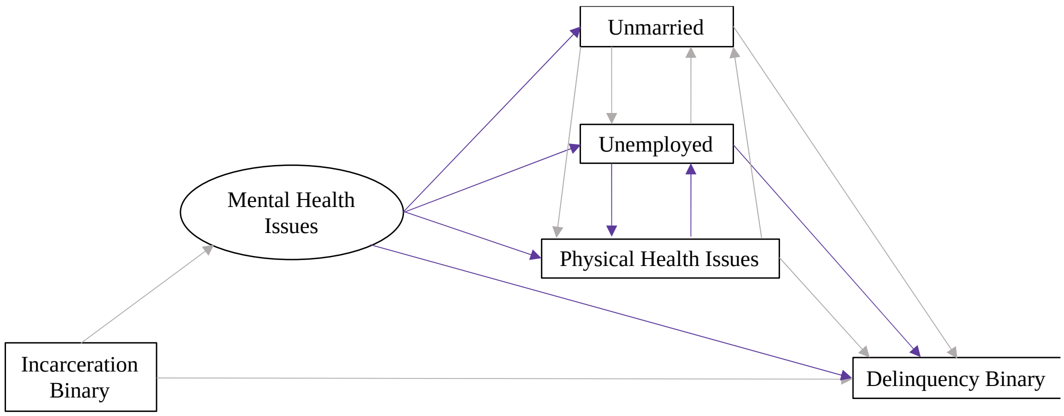


Note: For visual clarity, coefficients, controls, latent constructs, and errors are not shown here (see *Appendix G* for full model). Significances are based on robust standard errors. Gray arrows indicate the relationship is not significant; purple arrows indicate the relationship is significant and positive; orange arrows indicate the relationship is significant and negative.

Next, the models were analyzed with offending measured as binary delinquency (direct and indirect pathways are presented in *Appendix G*). Similar to delinquency variety score, incarceration (binary and proportion) did not have a significant relationship with either mental health or binary delinquency. Mental health issues had a significant, positive impact on odds of delinquency (increasing them by 95.5%, $p<0.01$) and a significant, positive relationship with all additional stressors. Every unit increase in mental health issues was associated with a 12.3% increase in the odds of being unemployed ($p<0.01$), a 12.8% increase in the odds of being unmarried ($p<0.01$), and a 94.6% increase in physical health issues ($p<0.01$).

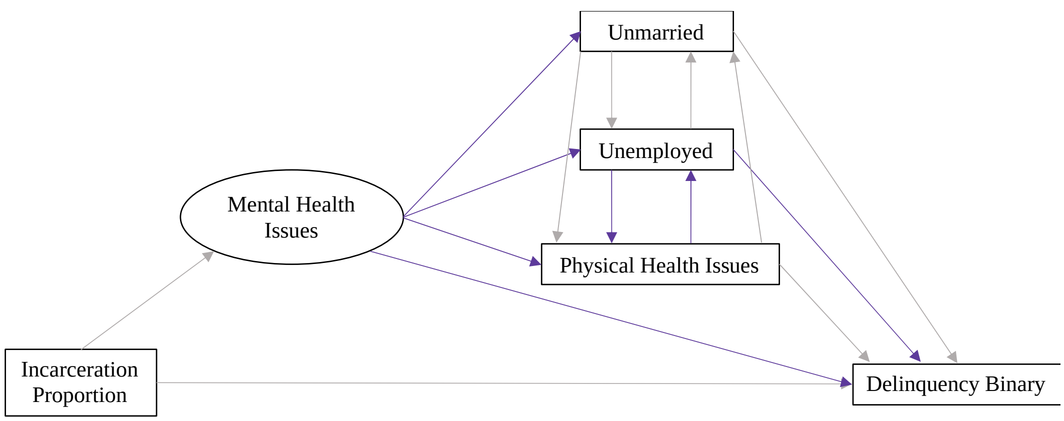
Again, there were significant, positive, direct pathways between unemployed and physical health issues, but – unlike delinquency variety score – unemployed had a significant, positive relationship with binary delinquency. Being unemployed increased the odds of delinquency by around 50% ($p<0.10$). Despite this, the lack of a significant path from incarceration to mental health indicated there was not a mediation effect.

Figure 35. Multiple Mediation from Binary Incarceration to Binary Delinquency



Note: For visual clarity, coefficients, controls, latent constructs, and errors are not shown here (see *Appendix G* for full model). Significances are based on robust standard errors. Gray arrows indicate the relationship is not significant; purple arrows indicate the relationship is significant and positive; orange arrows indicate the relationship is significant and negative.

Figure 36. Multiple Mediation from Proportion Incarcerated to Binary Delinquency

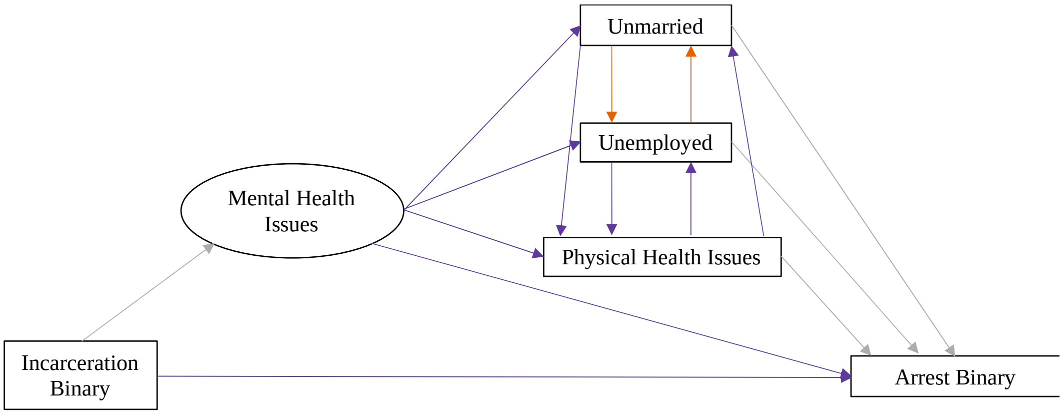


Note: For visual clarity, coefficients, controls, latent constructs, and errors are not shown here (see *Appendix G* for full model). Significances are based on robust standard errors. Gray arrows indicate the relationship is not significant; purple arrows indicate the relationship is significant and positive; orange arrows indicate the relationship is significant and negative.

Finally, pathways from incarceration to offending were examined with binary arrest as the offending measure. Significant, positive direct pathways are presented with purple arrows and significant, negative direct pathways are presented with orange arrows in *Figures 37* and *38* (for incarceration binary and proportion, respectively). Similar to delinquency binary, mental health issues had a significant, positive impact on odds of arrest and on all additional factors (marriage, employment, and physical health). Every unit increase in mental health issues was associated with a 160.3% increase in the odds of arrest ($p<0.01$), an 8.7% increase in the odds of being unemployed ($p<0.01$), a 15.5% increase in the odds of being unmarried ($p<0.01$), and a 97.2% increase in physical health issues ($p<0.01$). Again, findings were very similar between the two measures of incarceration.

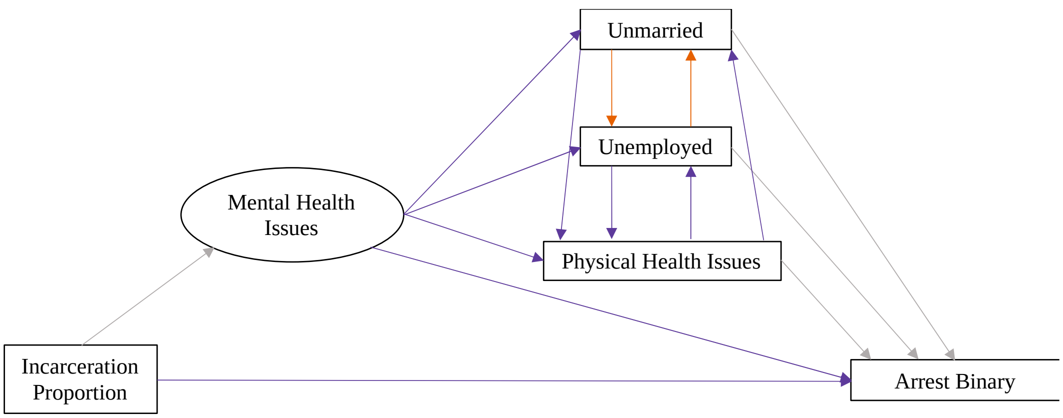
However, unlike prior measures of offending, incarceration had a significant, direct impact on arrest – increasing the odds of arrest by 307.6% for binary incarceration ($p<0.01$) and 605.4% for proportion incarcerated ($p<0.01$). Further, the direct paths between additional factors were all significant – marriage, employment, and physical health all had significant, reciprocal relationships with each other. Interestingly, all of the relationships were positive except between unemployed and unmarried. Being unemployed decreased the odds of being unmarried by 4.3% ($p<0.05$) and being unmarried decreased the odds of being unemployed by 2.2% ($p<0.05$). Despite this, incarceration still did not have a significant, direct impact on mental health issues, and none of the additional stressors had significant, direct impacts on arrest, which does not lend support for a mediation effect and was not in support of *Hypothesis 5*. All potential mediation pathways were examined (see *Appendix G*), and the results confirmed that there was not mediation via any of the pathways from incarceration and mental health through additional stressors.

Figure 37. Multiple Mediation from Binary Incarceration to Binary Arrest



Note: For visual clarity, coefficients, controls, latent constructs, and errors are not shown here (see *Appendix G* for full model). Significances are based on robust standard errors. Gray arrows indicate the relationship is not significant; purple arrows indicate the relationship is significant and positive; orange arrows indicate the relationship is significant and negative.

Figure 38. Multiple Mediation from Proportion Incarcerated to Binary Arrest



Note: For visual clarity, coefficients, controls, latent constructs, and errors are not shown here (see *Appendix G* for full model). Significances are based on robust standard errors. Gray arrows indicate the relationship is not significant; purple arrows indicate the relationship is significant and positive; orange arrows indicate the relationship is significant and negative.

5.5.2 Exploring Number of Stressors After Mental Health

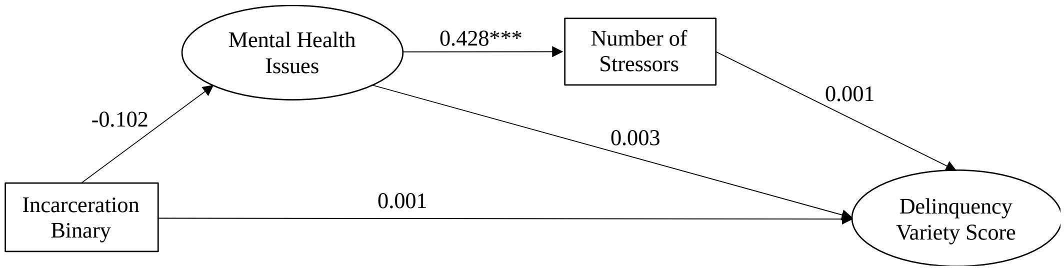
Despite no evidence of significant, indirect pathways from incarceration to offending through mental health, being unemployed, being unmarried, and physical health issues, there were consistently significant, direct paths from mental health to the additional stressors, and some significant direct paths between the additional stressors and offending. This suggested that perhaps it is not the order or specific type of additional stressor that is important in determining offending outcomes; but, instead, it could be the *number* of additional stressors an individual experiences. This possibility was explored by creating a new variable, *Number of Stressors*, which was a count of the number of additional stressors an individual experienced (from 0 to 3). To do this, physical health issues was dichotomized so that 0 = good, very good, or excellent health and 1 = fair or poor health; and *Number of Stressors* was created as the sum of the three. Each offending measure was then examined with each measure of incarceration and number of stressors as a part of the pathway.[47,48]

Figures 39 and *40* show the results for incarceration binary and proportion, respectively, with delinquency variety score as the outcome. The only significant, direct path was between mental health issues and number of stressors. A unit increase in mental health issues led to a 0.428 unit increase in the number of stressors ($p<0.01$). However, incarceration had no significant impact on mental health or on delinquency and number of stressors has no significant impact on delinquency,

[47] All models were run in three steps: (1) with only the variables of interest, (2) with controls, and (3) with controls and pre-incarceration mediators The progression of models and the final full models for all measures are presented in *Appendix H*.
[48] Coefficients and significances for the pathways from incarceration to offending through mental health and number of stressors are shown in *Appendix H*.

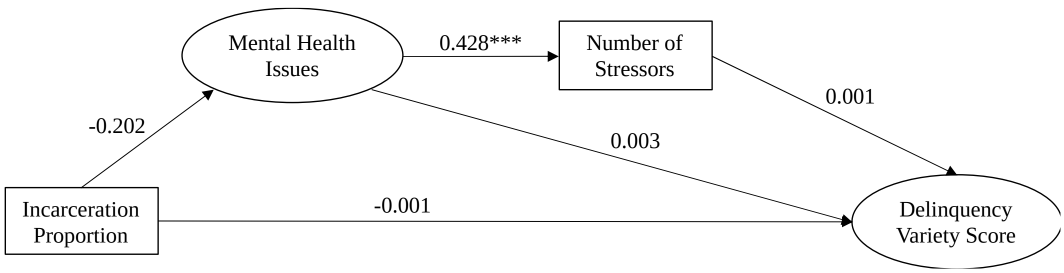
indicating a lack of mediation effect (which will be discussed further at the end of this section). Results were consistent for both incarceration measured as a binary and as a proportion of the year.

Figure 39. Multiple Mediation from Binary Incarceration to Delinquency Variety Score – Number of Stressors



Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix H* for full model). Significances are based on robust standard errors.

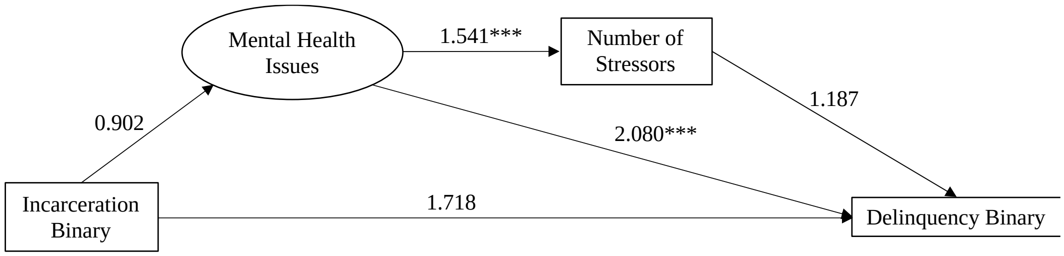
Figure 40. Multiple Mediation from Proportion Incarcerated to Delinquency Variety Score – Number of Stressors



Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix H* for full model). Significances are based on robust standard errors.

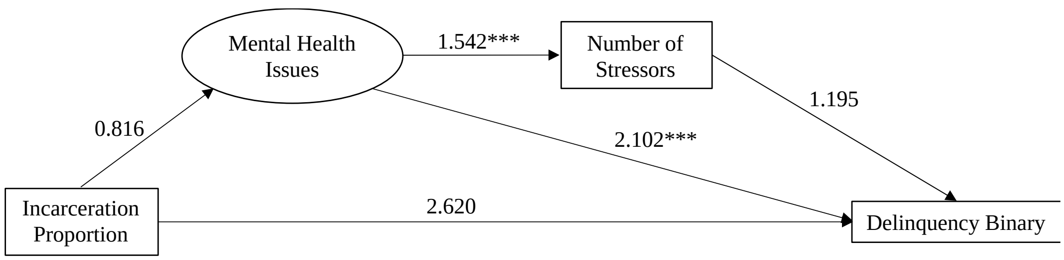
When measuring offending as binary delinquency, the results were very similar, with the addition of a significant pathway from mental health to delinquency binary (see *Figures 41* and *42*). Every unit increase in mental health issues was associated with a 54.1% increase in the number of stressors ($p<0.01$) and a 108.0% increase in the odds of delinquency ($p<0.01$). None of the other direct paths were significant, including from incarceration to mental health and from number of stressors to delinquency – indicating no mediation effect.

Figure 41. Multiple Mediation from Binary Incarceration to Binary Delinquency – Number of Stressors



Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix H* for full model). Significances are based on robust standard errors.

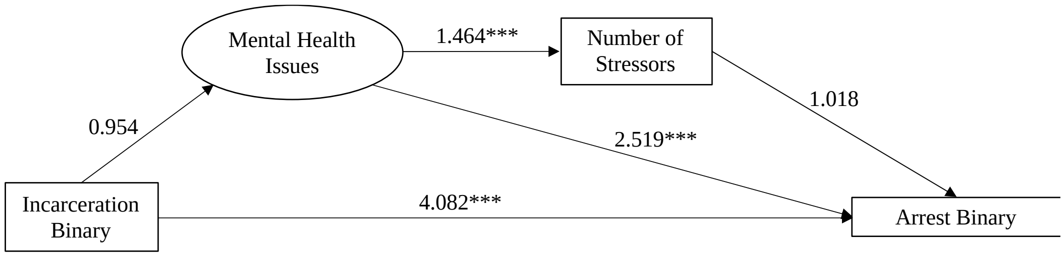
Figure 42. Multiple Mediation from Proportion Incarcerated to Binary Delinquency – Number of Stressors



Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix H* for full model). Significances are based on robust standard errors.

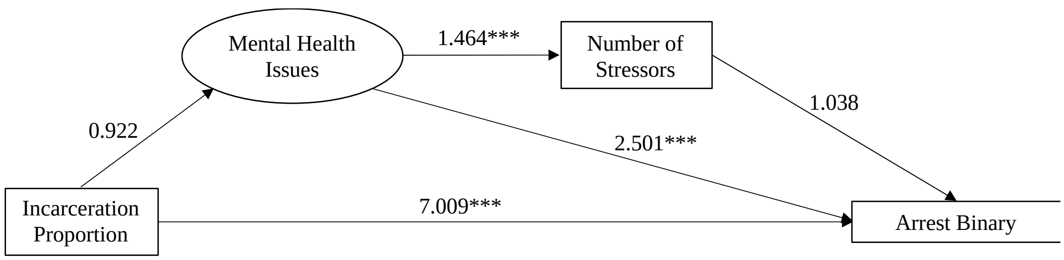
Lastly, the impact of the number of stressors after mental health was examined as a mediator between incarceration and binary arrest (see *Figures 43* and *44*). The findings indicated that mental health issues, again, had a significant, positive impact on the number of stressors (increasing them by 46.4%, p<0.01) and the odds of arrest (increasing them by 151.9%, p<0.01). Unlike delinquency as the outcome, incarceration (both binary and proportion) also impacted the odds of arrest (increasing it by at least 308.2%, p<0.01). However, once again, the direct paths between incarceration and mental health and number of stressors and arrest were not significant.

Figure 43. Multiple Mediation from Binary Incarceration to Binary Arrest – Number of Stressors



Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix H* for full model). Significances are based on robust standard errors.

Figure 44. Multiple Mediation from Proportion Incarcerated to Binary Arrest – Number of Stressors



Note: For visual clarity, controls, latent constructs, and errors are not shown here (see *Appendix H* for full model). Significances are based on robust standard errors.

Taken together, these findings indicated a lack of mediation effect for mental health and the additional factors in the pathway from incarceration to offending – failing to find support for *Hypothesis 5*. Suggesting that, along with order and type of stressors post-incarceration, the number of stressors post-incarceration is of little importance in determining offending outcomes.

5.6 Summary

Overall, there was very little support for the hypotheses proposed in this research (see *Table 20* for a list of hypotheses and their results). The only hypotheses supported were *Hypothesis 1a*, *1b*, and *1c*, which described the base relationships of interest in this research. Incarceration had a significant, positive relationship with offending (in support of *Hypothesis 1a*). Incarceration as a binary measure significantly increased within-individual offending risk for all outcome measures. Incarceration as a proportion also significantly increased within-individual offending risk for all outcome measures, and the effects were larger than were those for incarceration binary. Incarceration also had a significant, positive relationship with within-individual mental health issues (supporting *Hypothesis 1b*), with incarceration as a proportion having a larger impact on mental health issues than incarceration binary. Finally, mental health had a significant, positive relationship with offending (*Hypothesis 1c*). An increase in mental health issues led to increases in within-individual delinquency variety score, odds of delinquency, and odds of arrest – all of which gave support for *Hypothesis 1c*.

This research did not find support for *Hypotheses 2, 3, 4a,* or *4b*. *Hypothesis 2* proposed that mental health would moderate the relationship between incarceration and offending. Mental health issues were associated with significant, positive within-individual changes in all outcome measures, and, after including mental health, incarceration no longer had a significant impact on delinquency, but it still significantly impacted arrest. However, the interaction between incarceration and mental health was not significant, failing to find evidence of moderation.

Hypothesis 3 proposed that mental health would mediate (rather than moderate) the relationship between incarceration and offending. Results showed that incarceration did not significantly impact mental health issues. This was counter to the results in *Hypothesis 1b,* but, unlike *Hypothesis 1b*, this was explored using between-individual effects, rather than within-individual.[49] On the other hand, similar to *Hypothesis* 1c, there was a significant, positive relationship between mental health issues and all measures of offending. Despite this, because there was no significant relationship between incarceration and mental health, the indirect path from incarceration to offending (through mental health) was not significant for any of the incarceration or offending measures.

Hypotheses 4a and *4b* suggested that perhaps there were racial and gender differences in how mental health mediates the impact of incarceration on offending. There were some demographic differences in the direct relationships among incarceration, mental health issues, and offending. In particular, Wald tests of equality of coefficients showed that the impact of incarceration binary on delinquency binary was significantly larger for women compared to men, and the impact of mental health issues on arrest binary was significantly higher for Black persons than for White persons. Despite these significant differences, none of the indirect pathways from incarceration to offending through mental health issues were significant for any race or gender – failing to find support for moderated mediation.

Finally, this research took an exploratory approach to examine how stressors after incarceration may proliferate (stemming from mental health issues) to lead to

[49] Results will be discussed further in *Chapter 6*.

offending (*Hypothesis 5*). First, being unemployed, being unmarried, and physical health issues were examined as individual factors that could be stressful and could play a part within the pathway from incarceration to offending. Although mental health issues was significantly related to all three stressors and there were some significant, direct pathways between the stressors, physical health issues and being unmarried were not significantly related to offending in any of the models. Only the direct path from unemployed to binary delinquency was significant. But, despite this, the indirect pathway from incarceration to binary delinquency (through mental health issues and unemployment) was not significant due to the lack of significance between incarceration and mental health issues. To explore this further, this research examined whether the number of stressors (rather than the type and order) was impactful in determining offending outcomes. Mental health issues significantly predicted the number of stressors experienced, but the number of stressors did not impact offending and incarceration maintained its lack of impact on mental health, making the indirect pathways not significant from incarceration to offending (through mental health and number of stressors). All of this indicated that the experience of these stressors after incarceration was not significant in determining offending outcomes. The findings described above (and their implications) are discussed further in the following chapter.

Table 20. Hypotheses Results

#	Hypothesis	Results
Is there a relationship between incarceration and offending, incarceration and mental health, and mental health and offending?		
1a	Incarceration will have a positive association with offending.	+
1b	Incarceration will have a positive association with mental health issues.	+

1c	Mental health issues will have a positive association with offending.	+
Does mental health moderate the association between incarceration and offending?		
2	The impact of incarceration on offending will vary by mental health – those with worse mental health will have worse offending outcomes.	NS
Does mental health mediate the association between incarceration and offending?		
3	The impact of incarceration on offending will be partially mediated by mental health.	NS
Is there moderated mediation of the incarceration-offending link by race or sex?		
4a	Mental health will more strongly mediate the relationship between incarceration and offending for Black individuals compared to White individuals.	NS
4b	Mental health will more strongly mediate the relationship between incarceration and offending for women compared to men.	NS
How do stressors after incarceration proliferate to generate future offending?		
5	The impact of incarceration on offending will be partially mediated by mental health and additional factors.	NS

+ indicates support
NS indicates lack of support

Chapter 6: Discussion

This dissertation sought to explore the role of mental health in pathways from incarceration to offending, specifically focusing on mental health as a stressor. In general, this research failed to find support for most of the hypotheses of interest, particularly those examining between-individual effects. Despite such null findings, this research produced notable findings regarding how mental health is examined in the context of incarceration and offending as well as how mental health impacts other areas of life. The following sections will discuss the current findings in the context of extant literature (*Section 6.1*), conclusions on the role of mental health based on this research (*Section 6.2*), how the findings relate back to the Stress Process Paradigm (*Section 6.3*), the limitations of this research (*Section 6.4*), and future directions for exploration (*Section 6.5*).

6.1 Current Findings in Context

This research found that the within-individual relationships between incarceration and offending, incarceration and mental health, and mental health and offending were all significant, which is largely in line with extant literature. The other aspects of this research that sought to dig deeper into the role of mental health (examining between-individual differences) were not significant, but the findings still provide important insight into an area of research that is largely un-explored.

6.1.1 Incarceration, Mental Health, and Offending

<u>Incarceration and Offending</u>

There is variability in extant research findings on the incarceration-offending relationship. Some research finds incarceration to have a negative impact on offending (though this is largely in settings that specifically emphasize rehabilitation);

some finds little to no impact (largely in studies that account for selection bias); and some finds a positive or criminogenic effect (mostly studies examining the effect of pretrial incarceration) (Loeffler & Nagin, 2022). The findings here add to the literature in support of the criminogenic effect, but only for some of the relationships.

When looking at the initial relationships between incarceration and offending, this research found incarceration to have a positive and significant relationship with delinquency variety score (i.e., number of different delinquent acts), odds of committing delinquent acts, and odds of being arrested all within individuals. For the findings on delinquency, there is a lack of current studies examining the impact of incarceration on delinquency for comparison. This is possibly because, after being incarcerated, rearrest and reincarceration are of more interest for policymakers because they add more strain on an already overwhelmed system. Additionally, measuring delinquency is difficult to do, it can vary definitionally, and it often relies on self-reporting delinquent behavior. Comparatively, whether or not a person is arrested is a defined event and is easier to examine because arrest data are collected by law enforcement. The finding here of a significant, positive relationship between incarceration and arrest is in line with prior research that finds incarceration to increase the likelihood of rearrest (Leslie & Pope, 2017; Mears et al., 2012; Mueller-Smith, 2015; Nagin et al., 2009).

This research also found that (in models where incarceration was significant) the impact of time spent incarcerated (measured as proportion of the panel incarcerated) had a larger impact on within-individual offending than did whether or not the individual was incarcerated. This is somewhat counter to Mears et al. (2015)

who found that only incarceration up to 1 year had a positive impact on offending, while incarceration from 1-2 years had a negative impact and 2 or more years had no impact. However, the measure of proportion of the panel incarcerated for this research was examined using a 2-year panel, meaning differences between incarceration less than a year versus more than a year were not examined. It could be that incarceration up to 1 year and incarceration from 1-2 years had differential impacts that were masked when examined as a single timeframe. Alternatively, it could be that the positive impact of incarceration proportion on within-individual offending was true for periods of incarceration longer than 1 year. Due to the structure of the data requiring 2-year timeframes, this could not be delineated in the analyses.

Importantly, this relationship between incarceration and offending did not hold for all of the models. Namely, as mediators and controls were added, incarceration no longer had a significant impact on either measure of delinquency, but it maintained its significant impact on arrest. This was true both for HFE models and for SEM models – meaning that the difference in what the models were estimating (within-individual change versus between-individual change) was not the sole explanation for why incarceration did not maintain its relationship with offending across all models.

This could be for a couple of reasons. First, initial models investigating the relationship between incarceration and offending used a 2-year follow up (*Sections 5.1*, *5.2*, and *5.3*). This was a function of the panels being 2-year panels and incarceration being lagged 1 panel prior to offending. Later models (*Section 5.5*), however, stretched this follow up time to 3 years. Thus, it could be that the impact of incarceration on delinquency simply does not extend beyond 2 years and requires more granular follow-up timeframes to capture the relationship.

Second, the lack of impact of incarceration on delinquency could be due to varied effects that were masked by looking at the entire sample. For example, the first mediation models (*Section 5.3*) used a 2-year follow up and failed to find a significant relationship between incarceration and delinquency (variety score or binary). However, when models were examined for race and sex separately (*Section 5.4*) results indicated there were some demographic differences. Specifically for delinquency binary as the outcome, incarceration had a significant, negative effect for males but a significant, positive effect for females (see *6.1.4 Moderated Mediation* for further discussion on these findings). Thus, these two effects would have cancelled each other out and made the relationship appear non-significant in models that did not differentiate by sex. This finding of differences by sex in the direction of the impact of incarceration on delinquency is somewhat counter to prior literature, which has suggested that the incarceration-offending relationship is significant and positive for both males and females (Mears et al., 2012). However, the majority of offending research focuses on only male samples (e.g., Nagin et al., 2009), so these differences in findings could be due simply to a lack of a substantial research base (Mears et al., 2012) (see *Section 6.1.4* for more on race and sex differences).

Third, the lack of significance between incarceration and delinquency in models with more variables could simply be due to the inclusion of additional variables. Early models examining incarceration and offending did not include mental health or any of the additional stressors that were explored later in this research. Specifically, with just the addition of mental health in the HFE models in *Section 5.2*, incarceration no longer had a significant impact on delinquency variety score or delinquency binary. Similarly, the SEM models that included mental health in *Section 5.3* showed a lack of significant relationship between incarceration and both measures of delinquency. This suggests that perhaps the initial impact was spurious and only significant due to omitted variable bias (this is discussed further in *Section 6.2*). In fact, common critiques of the incarceration and offending literature involve the lack of robust controls and appropriate comparison groups in order to make definitive conclusions about the impact of incarceration on offending (Loeffler & Nagin, 2022; Nagin et al., 2009). Though this research did not utilize comparison groups, it does add to the literature on the import of controlling for as many relevant variables as possible in order to get closer to the "true" relationships among variables.

Finally, the finding of no significant relationship between incarceration and delinquency could have been due to missingness on the delinquency variable. As discussed in *4.3.1 Missingness*, the population that was asked the delinquency questions was reduced (beginning in 2004) to those who had ever been arrested and 10% of the remaining sample. This resulted in a reduction in the sample size of the delinquency question from around 8,000 to around 2,000. For HFE models, which used listwise deletion, this greatly impacted the size and power of the entire analysis. However, for SEM, which used MLMV, this only impacted the parts of the model that included delinquency. In other words, for HFE, all respondents who had missing delinquency values were excluded from the analysis; for SEM, respondents who had missing delinquency values were excluded from analyses that examined impacts on delinquency (such as the impact of incarceration on delinquency or mental health on delinquency), but those respondents could still be included in other relationships if they had reported data (such as the impact of incarceration on mental health). Thus, both HFE and SEM models examining the impact of incarceration on delinquency suffered from the large extent of missing data on the delinquency variables. Although it did not appear that selecting largely on those who had been arrested skewed the respondents toward a more delinquent sample (see *Section 4.3.1* for more), it could be that the loss of sample size and power resulted in the lack of significant results.

Overall, the lack of significant findings for the incarceration-delinquency relationship are likely due to all of these factors: large follow-up times missing short-term impacts, differences among subgroups that are masked when looking at the entire sample, the inclusion of additional variables, and a large number of missings on the delinquency variables. On the other hand, incarceration maintained a significant and positive relationship with arrest throughout all of the models, which is in line with research that suggests that incarceration is associated with an increased likelihood of arrest (Leslie & Pope, 2017; Mears et al., 2012; Mueller-Smith, 2015; Nagin et al., 2009). In addition to the fact that arrest did not suffer the same missing data issues as delinquency, this finding is likely due to the increased supervision that often occurs after incarceration along with the stigma of having a criminal record. Individuals are often placed on probation or parole (i.e., community supervision) after a period of incarceration, which means they are more likely to be caught committing criminal activity simply due to the fact that they are being watched. Prior studies have found support for this mechanism in the incarceration-arrest relationship. Specifically, being under supervision increases the likelihood that an individual is caught for a new crime or a technical violation of their supervision, leading to an arrest and eventually reincarceration (Bonta et al., 2008; Ortiz & Wrigley, 2022; Phelps, 2020; Western & Harding, 2022). The stigma (or labeling) associated with having a criminal record is also commonly used to explain the incarceration-arrest relationship. This mechanism suggests that the both the internal (e.g., internalized self-worth) and external (e.g., society's reactions and opinions) stigmas associated with having a criminal record lead to difficulties with reintegration and pro-social activities, which then leads to a higher likelihood of engaging in crime and being arrested (Moore et al., 2016; Western & Harding, 2022). Although this research was not focused on (and therefore did not account for) the additional mechanisms of increased supervision and stigma, it found support for the significant, positive association between incarceration and arrest that prior research has reported.

Incarceration and Mental Health

This research also found that incarceration had a significant, positive impact on mental health issues (i.e., contributing to worse mental health). This is in line with a breadth of research that indicates that those who have been incarcerated are more likely to experience poor mental health outcomes than those who have not been incarcerated (Haney, 2012; Porter & Novisky, 2016; Schnittker et al., 2012; Turney et al., 2012). Further, initial models indicated that the impact of incarceration on mental health was stronger for proportion of the panel incarcerated than for binary incarceration, which echoes the findings from Porter and DeMarco (2019) who found that longer time served was associated with more mental health symptoms and a higher likelihood of depression.

However, unlike prior studies, this research only found a significant relationship between incarceration and mental health issues for within-individual impacts (using HFE). When examining between-individual impacts with SEM, incarceration did not significantly impact mental health issues. This could be due to differences in the methods themselves or differences in what was included in the models. As mentioned, HFE produces within-individual impacts – meaning that (for incarceration as a binary) a specific individual experiencing incarceration was associated (on average) with an increase in their own mental health issues. For SEM, on the other hand, between-individual impacts present the impact of incarceration on mental health issues for the group of individuals who had experienced incarceration compared to the group who had not; and the results here found that there were not significant between-individual effects. Thus, it could be that experiencing incarceration has a significant impact on mental health issues for the individual, but, as a group, those who have been incarcerated do not tend to have worse mental health issues than those who have not been incarcerated.

As previously mentioned, this finding is opposed to some of the current literature which finds significant between group differences in mental health outcomes of incarceration (e.g., Mallik-Kane & Visher, 2008; Turney et al., 2012). However, similar to this research, other studies have failed to find between-individual effects. For example, Semenza and Silver (2022) found that the number of months incarcerated had limited influence on the level of depressive/anxious symptoms (between individuals). Yet, unlike this research, they found that within-individual change in the number of months incarcerated was *not* associated with changes in depressive symptoms. However, this was examined using lagged latent growth models (LLG)[50] – rather than the HFE used here – which, again, highlights the potential for varying findings when using different analytic strategies, even when both strategies are estimating within-individual effects.

For this research, the varying results for the impact of incarceration on mental health issues could also have been due to the inclusion of different variables in the HFE models and the SEM models. Specifically, the HFE models predicting mental health issues only included the main controls of drug use, education, income, age, race, and gender. On the other hand, the SEM models included an additional control: pre-incarceration mental health issues. Further, examination of the model progression for the SEM models (see *Appendix* D) indicated that the impact of incarceration on mental health issues was significant up until pre-incarceration mental health issues was accounted for. This indicates that perhaps the impact of incarceration on mental health issues was largely driven by pre-incarceration mental health issues and not incarceration itself.

Prior research has seldom controlled for prior mental health, largely due to a lack of longitudinal data with repeated measures that allow for such analysis. One study that did account for this was, again, Semenza and Silver (2022). In addition to studying the impact of incarceration on depressive symptoms, they examined the impact of depressive symptoms on incarceration (both between- and within-

[50] The specifics of LLG models are not explored here. For more, see Semenza & Silver (2022).

individual). They found that depressive symptoms had a significant, positive association with incarceration (increasing the number of months incarcerated in the subsequent year) for both between- and within-individuals. Thus, it could be that mental health corresponds to offending (and subsequently incarceration as a result of that offending), but the impact of incarceration on mental health is solely an artifact of pre-incarceration mental health.

Overall, the differences in findings between the HFE and SEM models in this research were likely due to a combination of the differences in what the models themselves are estimating (between- vs. within-individual effects) and the variables included in the analyses. Additional research is needed to further untangle the complicated (and potentially reciprocal) relationship between incarceration and mental health.

Mental Health and Offending

One of the most consistent findings of this research was that mental health issues had a significant, positive impact on offending (for all three offending measures). That is to say: having more mental health issues was associated with higher delinquency variety score, greater odds of delinquency, and greater odds of arrest, both between- and within-individual. This echoed extant literature which finds that post-incarceration poor mental health is associated with higher likelihoods of criminal behavior and reincarceration (Mallik-Kane & Visher, 2008; Semenza & Silver, 2022; Wallace & Wang, 2020). Importantly, this relationship held when controls and additional stressors were included in the models, and it was significant even with the reduction in sample size due to missing values of delinquency (see

Section 4.3.1) – indicating that the impact of mental health on offending is rather robust and mental health is an important predictor of offending (more in *Section 6.2*).

6.1.2 Moderation

Results of this research indicated no evidence of mental health moderating the relationship between incarceration and offending. This finding is surprising given prior evidence that individuals with mental illness are likely to view their incarceration experience negatively, and a negative and stressful incarceration is more likely to lead to negative outcomes (Ashkar & Kenny, 2008; Listwan et al., 2013; Porter, 2019). Additional research has suggested that post-incarceration outcomes vary by mental health status, which also lent support to the idea that mental health may moderate the relationship between incarceration and offending (Mallik-Kane & Visher, 2008). However, the findings here indicated no moderation impact for any of the offending variables – both delinquency (which had a smaller sample size) and arrest (which had nearly the full sample size). Given these findings, it could be that the reduced sample size for delinquency, in particular, made it more difficult to detect a significant impact (resulting in no moderation being found), or it could be that extant research has captured just the impact of mental health on offending, regardless of incarceration. It may be true that those with mental illness are more likely to view incarceration as stressful, but perhaps it is the mental illness itself, rather than the stress of incarceration, impacting later outcomes. In the same vein, mental health impacting post-incarceration outcomes may be solely based on the mental health status of the individual and not the experience of incarceration.

6.1.3 Mediation

This research further found no support for mental health as a mediator between incarceration and offending – largely due to the lack of relationship between incarceration (proportion or binary) and mental health issues in the SEM models (as previously discussed). Additionally, after including mental health in the models, incarceration no longer had a significant impact on delinquency variety score or delinquency binary, but it still significantly impacted arrest (see *Section 6.1.1* for more discussion on incarceration's lack of impact on delinquency). Further, after including just mental health (none of the controls) in the initial pathway models, incarceration had a significant, positive impact on mental health issues. The relationship remained significant when controls were added to the model but lost its significance when pre-incarceration mental health was added (see *Appendix D* for model progressions). That is to say: incarceration had a significant, positive impact on mental health issues which then had a significant, positive impact on offending (indicating a mediation relationship) for between-individuals, even after controlling for drug use, education, income, age, race, and sex. However, after adding in a control for pre-incarceration mental health issues, the impact of incarceration on mental health issues was no longer significant; and, thus, the finding of a mediation relationship was no longer significant.

This finding supports the previously posited idea that the relationship detected between incarceration and mental health may be spurious and suffering from the omission of pre-incarceration mental health. Similar to the findings in this research, a study that examined the potentially reciprocal relationship between mental health and incarceration also found that depressive symptoms had a significant, positive association with incarceration for both between- and within-individuals, but that incarceration did not have a significant reciprocal relationship with depressive symptoms (Semenza & Silver, 2022). Although that study did not examine mental health as a mediator, it did find support for the import of pre-incarceration mental health due to the impact of mental health on incarceration being significant, while the impact of incarceration on mental health was not.

The only known study that has examined mental health as a mediator to post-incarceration outcomes (Link et al., 2019) did not begin the mediation pathway with incarceration – instead it examined the impact of post-incarceration depression and physical health limitations on crime and reincarceration through a number of other factors. Thus, the significant findings from Link et al. (2019) of a mediation effect of depression on post-incarceration outcomes are not completely in disagreement with the findings here (more in *Section 6.2*). Yet, this also indicates that more research is needed (using varying methods) to further delineate this relationship.

6.1.4 Moderated Mediation

Similarly, this research found no support for moderated mediation by race and sex – again, due to the lack of relationship between incarceration and mental health. Across all models (black, white, male, female), there were no significant relationships between incarceration and mental health by any of the demographic factors after pre-incarceration mental health was included in the SEM models. This is counter to prior research which has found that longer time spent incarcerated was associated with worse mental health for Black females and Black males, but it was associated with better mental health for White males (Porter et al., 2021). However, unlike the current research, the authors were only able to account for prior mental health treatment but not pre-incarceration mental health, which may have impacted the findings of significant paths from incarceration to mental health and significant differences in those paths by race and sex. Additionally, the current research did not examine combinations of race and sex (e.g., White males), so it could be that demographic variations in the impact of incarceration on mental health depended on both factors rather than just one (as was examined here).

Unlike the incarceration-mental health issues relationship, there were racial differences for the mental health issues-offending relationship and incarceration-offending relationship. Namely, for mental health issues-offending, mental health issues significantly increased odds of delinquency for White individuals, but, for Black individuals, mental health issues significantly increased odds of arrest (there were no racial differences for delinquency variety score). This could indicate a difference in how mental health issues are responded to and/or how different individuals are policed. White individuals with mental health issues may be more likely to receive leniency from police officers and/or receive referrals for mental health services rather than being arrested, while Black individuals with mental health issues may be more likely to be treated or seen as threatening by police and have a police encounter result in arrest. Further, arrest may be more likely to be used as a way to "deal with" Black individuals in a mental health crisis, compared to White individuals in a mental health crisis. Either or both of these reasons could then lead to the result that White individuals with mental health issues have significant relationships with delinquency (because they are committing delinquent acts but not being arrested) and Black individuals with mental health issues have significant relationships with arrest (because they are committing delinquent acts and being arrested).

Additionally, this finding could have been due to missingness on the dependent variables. As previously mentioned, individuals who were incarcerated and in poor mental health were more likely to have missing observations for delinquency and arrest than were those who were incarcerated and in good mental health and this issue was far more prevalent for the outcome delinquency (see *Section 4.3.1*). Thus, the finding that White individuals have a significant relationship between mental health issues and delinquency but Black individuals do not may have been due to Black individuals being more likely to be incarcerated and have poor mental health, and, accordingly, more likely to have missing delinquency. This possibility was examined by looking at the distribution of race in the full sample and by incarceration and mental health status (i.e., incarcerated and in good mental health or incarcerated and in poor mental health) (see *Appendix I*). Results indicated that Back individuals made up around 26% of the full sample and White individuals made up around 52%. These proportions were similar among those who had been incarcerated and were in good mental health. However, for those who had been incarcerated and were in poor mental health, White individuals made up only 31%, while Black individuals comprised nearly 49%. This indicated that Black persons were more likely to have been incarcerated and in poor mental health (compared to White individuals), and, since those incarcerated and in poor mental health were more likely to be missing, Black persons were therefore more likely to have missing responses for delinquency.

Thus, the failure to find a significant relationship between mental health issues and delinquency for Black individuals may have been a result of the Black individuals being more likely to have missing values, rather than a true lack of an effect.

For the incarceration-offending relationship, there were no significant relationships between any of the incarceration measures and delinquency (binary or variety score). While this could mean that incarceration had no impact on delinquency, this finding is also likely impacted by the large number of missing values for delinquency (see *Section 5.1.1*). The only racial differences in the incarceration-offending relationship were for arrest as the outcome. For both incarceration binary and proportion, White individuals had a significant, positive relationship with arrest, while Black individuals did not have a significant relationship. This finding is opposed to extant literature which has found that Black individuals have higher rates of rearrest, reconviction, and reincarceration than White individuals (Jung et al., 2010; McGovern et al., 2009; Ropes Berry et al., 2020). However, most of this research does not consider or control for mental health. Taken together with the findings about the mental health-offending relationship, mental health issues have a significant, positive relationship with arrest for Black individuals (while controlling for incarceration) and incarceration has a significant, positive relationship with arrest for White individuals (while controlling for mental health). This could indicate that mental health issues are the more salient predictor of arrest after incarceration for Black individuals, while experiencing incarceration itself is more salient for arrest for White individuals. This supports the idea that arrest is more frequently used as a means of dealing with Black persons with mental health issues but not for White individuals with mental health issues.

There were also sex differences for the mental health issues-offending relationships and incarceration-offending relationships. For males, mental health issues had a significant positive impact on delinquency variety score; and, for females, mental health issues had a significant impact on odds of delinquency. However, the impact of mental health issues on delinquency variety score for males was small in magnitude (0.018) and only marginally significant ($p<0.10$), whereas the impact of mental health issues on delinquency binary for females was large in magnitude (mental health issues was associated with an approximately 133% increase in the odds of delinquency) and significant ($p<0.05$). This could indicate that mental health is more salient in determining the number of different delinquent acts for men but, for women, more salient for whether or not they engage in delinquency at all. Alternatively, this could be a result of missing values for the dependent variable. As was done with race, the distribution of sex was examined for the full sample and by incarceration and mental health status (see *Appendix I*). The full sample was about 51% male and 49% female, and sample of those who had been incarceration and were in good mental health mirrored those proportions (50% male and 50% female). On the other hand, those who had been incarcerated and were in poor mental health were much more likely to be male (81%) than female (19%). As previously discussed, those who had been incarcerated and were in poor mental health were also more likely to have missing delinquency. Taken together, the marginally significant relationship between mental health issues and delinquency variety score for males (as well as the non-significant relationship between mental health issues and delinquency binary) may have been a result of males having more missing observations. Instead, it could be that males had significant, positive relationships with both measures of delinquency, but it was not able to be detected due to the nature of the data.

For arrest, both males and females had significant ($p<0.05$) and large magnitude (around 88% and 95% increase in the odds of arrest, respectively) relationships between mental health issues and odds of arrest. Since both men and women with mental health issues are (relatively) similarly likely to be arrested, this could indicate a reliance on the criminal justice system in general as a way to "deal with" individuals in a mental health crisis regardless of gender. Further, it could be, again, that these findings are incomplete without the combinations of demographic factors (e.g., Black males, White females, etc.), which were not explored in this study.

Finally, there were a lack of significant relationships between incarceration (binary and proportion) and delinquency variety score for both males and females. There was, however, a significant difference by sex in the relationship between incarceration binary and delinquency binary: men had a significant, negative relationship, while women had a significant, positive relationship. This is counter to research that tends to find that incarceration has a significant, positive impact on offending for males (Mears et al., 2012; Ropes Berry et al., 2020). On the other hand, for incarceration binary and arrest, both men and women had significant, positive relationships. Thus, once again, the differing findings for delinquency binary may be due to the fact that males were more likely to having missing delinquency outcomes, making the true impact difficult to determine, rather than males actually having a negative relationship between incarceration and delinquency.

Overall, though there was no evidence of moderated mediation in the current analyses, there were varying results based on race and sex. White individuals who had been incarcerated had a significant, positive relationship with arrest, but Black individuals did not; whereas Black individuals with mental health issues had significant, positive relationship with arrest and White individuals did not. This could indicate that mental health issues among Black persons are more likely to be met with arrest and those among White persons are more likely to be met with alternative sanctions or interventions. Further, only White individuals had a significant, positive relationship between mental health issues and delinquent acts, but this may have been due to Black individuals being more likely to have missing delinquency values. Both males and females had a significant, positive relationship between mental health issues and arrest and between incarceration and arrest. Interestingly, men who had been incarcerated were less likely to commit delinquent acts, while women who had been incarcerated were more likely. However, again, this was likely due to males being more likely to have missing delinquency values.

6.1.5 Multiple Mediation

Finally, this research explored the potential for multiple mediation from incarceration to offending, through mental health issues and additional stressors (being unemployed, being unmarried, and physical health issues). Despite the numerous potential paths examined (96), none of the mediation pathways were significant predictors of offending. This was true when examining individual stressors, pathways of multiple individual stressors, and a count of number of stressors. Again, this stemmed, in large part, from the lack of a significant relationship between incarceration and mental health. However, as expected, mental health issues had a significant and positive association with each individual stressor (increasing the likelihood of being unmarried, increasing the likelihood of being unemployed, and increasing physical health issues) as well as the number of stressors experienced (more mental health issues was associated with more stressors). This is in support of findings from prior literature. Those with mental health issues are more likely to be unemployed (Banerjee et al., 2017; Mallik-Kane & Visher, 2008); more likely to be unmarried (Breslau et al., 2011); and more likely to have physical health issues (Ohrnberger et al., 2017b).

Interestingly, the relationships between each stressor and offending were variable. The only individual stressor with a significant relationship with offending (specifically delinquency as a binary measure) was being unemployed, which supports extant literature that finds that not having a job and barriers to employment are related to an increased likelihood of criminal activity (Uggen et al., 2005). On the other hand, being unmarried and having more physical health issues did not have significant impacts on offending in this research. Prior studies have found that getting divorced is associated with an increase in offending (Bersani & DiPietro, 2016). However, this research did not examine the change in marital status and, rather, focused on the impact of being unmarried (controlling for pre-incarceration marriage status) on offending. Thus, these disparate findings could be because being unmarried in and of itself does not impact offending, but the change of status from married to unmarried *does* have a significant impact on offending.

Research on physical health has varied findings: some research finding that better physical health is associated with higher likelihood of criminal activity (Wallace & Wang, 2020) and other research finding worse physical health to be associated with increases in criminal involvement (Mallik-Kane & Visher, 2008). These opposing findings suggest two potential ways that physical health may operate. On one hand, having better physical health may impact an individual's physical ability to engage in criminal activity (i.e., those with better physical abilities are more capable of engaging in criminal activities). On the other hand, having worse physical health may impede traditional, non-criminal paths (such as obtaining legal employment) and contribute positively to the likelihood of criminal activity. The null findings here suggested a third way of operating: that post-incarceration physical health (as well as pre-incarceration physical health) did not have a significant impact on offending at all. Because this research controls for pre-incarceration physical health, it could be that prior studies find spurious effects without controlling for prior health (e.g., Mallik-Kane & Visher, 2008). It could also be that physical health has varying (positive and negative) impacts on offending depending on some other factor that was not examined here and, therefore, the "true" impact is still unknown.

It is worth noting that the lack of a significant impact between being unmarried and delinquency and physical health issues and delinquency could also have been due to the large number of missing values for delinquency. Arrest did not suffer from the same missingness, but none of the additional stressors (including being unemployed) were significantly related to arrest. Thus, it could be that being unemployed is the only additional stressor that impacts delinquency and the lack of relationship among the other stressors and delinquency is accurate; or it could be that additional stressors only impact delinquent activity (and not arrest), but the large number of missing values for delinquency made it difficult to detect smaller impacts for being unmarried and physical health issues.

Additionally, in the multiple mediation analysis presented here, there were notable relationships among the additional stressors. Namely, when examining delinquency as the outcome (variety score or binary), physical health issues and employment had significant, positive reciprocal relationships – an increase in physical health issues was associated with an increased likelihood of being unemployed and vice versa. However, the relationships between unmarried and unemployed and unmarried and physical health issues were not significant. Further, the magnitude of the impact of unemployed on physical health issues was much larger than that of physical health issues on unemployed. This provides some support for the importance of employment (or unemployment) in other aspects of life, but, because this study examined all additional stressors in the same year, it is not possible to identify the time ordering or to determine which variable is more likely to predict the other. It could be that this bidirectional relationship is masking a unidirectional and time-dependent relationship. Further research is needed to examine such a possibility.

When examining arrest as the outcome, all three additional stressors had significant relationships with one another, but not all in the same direction. The relationships between unemployed and physical health issues and unmarried and physical health issues were positive, while the relationship between unmarried and unemployed was negative. Those who were unemployed were more likely to have physical health issues (and vice versa) and those who were unmarried were more likely to have physical health issues (and vice versa). The findings between unemployed and physical health issues echo those for delinquency as the outcome: employment and physical health are significantly linked (though the time-ordering of the relationship is unknown in this research). Unlike for delinquency as the outcome, those who were unmarried were *less* likely to be unemployed, and those who were unemployed were *less* likely to be unmarried for arrest as the outcome. This finding could indicate that being unemployed gives an individual more time to be on the dating market and find a partner, and being unmarried may give an individual more time to devote to finding a job. But, again due to the nature of the analyses in this dissertation, the time order is not able to be examined, so this finding could also be masking the "true" relationship among the variables.

Finally, and importantly, throughout most of the models in this and prior sections, mental health issues maintained a significant, positive relationship with each measure of offending (including after additional stressors and pre-incarceration controls were introduced into the models) – indicating the import of mental health across multiple other facets of life.

As an additional check, stressors after mental health were also examined in magnitude (i.e., the number of different stressors experienced) rather than by type. The results indicated that the number of stressors had no significant impact on offending outcomes across all offending measures; but, importantly, mental health issues had a significant impact on the subsequent number of stressors experienced. Again, this indicated that mental health was particularly important for other areas of life. This is explored further in the *6.2 The Role of Mental Health*.

6.1.6 Explaining Model Differences

The prior sections described the findings of this research along with a number of potential explanations for these findings – including differences in within- versus between-individual models, differences in what control variables were included in the models, and a large number of missing values for delinquency. For clarity and ease of comparison, these explanations are restated here.

<u>Between- vs. Within-Individual Models</u>

Some of the relationships of interest in this research had notable differences in findings based on the model used – specifically for the relationships between incarceration and offending and incarceration and mental health. Examining within-individual differences using HFE found that incarceration had a significant and positive impact on all measures of offending and a significant positive impact on mental health issues (see *Section 6.1.1* for more). On the other hand, examining between-individual differences using SEM found that incarceration only had a significant, positive impact on arrest but not on either measure of delinquency and not on mental health issues (see *Sections 6.1.3* and *6.1.5*).

These differences could suggest that the mechanisms of these relationships are dependent on the type of analysis (between-individual or within-individual). That is, perhaps the experience of incarceration has a significant, positive impact on offending and mental health issues for an individual (i.e., within-individual), but, on average, offending and mental health issues are not more likely to be experienced by the group of people who experienced incarceration compared to the group who did not experience incarceration (i.e., between-individual). This finding highlights the need to estimate models in different ways in order to provide more insight into the relationships of interest. However, this research also included different controls in the SEM models compared to the HFE models, which may have also impacted the findings and is discussed next.

Inclusion of Pre-Incarceration Mental Health

As previously discussed, the relationship between incarceration and offending and incarceration and mental health issues was significant for the initial relationships examined using HFE analysis in *Section 6.1.1*. In those models, pre-incarceration mental health was not controlled for because the goal was to first identify the base relationships of interest and then build up the analyses from there. But, based on the results from the SEM analysis that incarceration did not have a significant impact on mental health issues nor on delinquency after including pre-incarceration mental health, it could be that the significant HFE results were due to the omission of pre-incarceration mental health (rather than the differences in what the models are estimating). This was examined by running the incarceration-offending and incarceration-mental health issues models again using HFE, but this time with the inclusion of pre-incarceration mental health.

The results from these additional analyses are presented in *Appendix J*, and the findings were largely in line with those from the SEM analyses in this research. That is, once pre-incarceration mental health was included in the HFE models, incarceration no longer had a direct impact on delinquency or mental health issues, but it maintained it's significant, positive impact on arrest. For the incarceration-mental health relationship, this is, again, in support of the findings from Semenza and Silver (2022), who found that (controlling for pre-incarceration mental health) incarceration did not have a significant impact on mental health for between- or within-individual models; and it suggests that the differences in findings between the HFE and SEM models in this research were not due to differences in what is being estimated (between- vs. within-individual) but, instead, due to the omission of pre-incarceration mental health as a control in the initial HFE models.

Yet, neither the differences in model estimations nor the differences in controls included sheds light on why the results of both the HFE and SEM analyses differed for different measures of offending (delinquency compared to arrest). This is discussed in the following section.

Delinquency vs. Arrest

After further exploration, the main relationships of interest in this research had similar findings across HFE and SEM models – this includes the finding that incarceration did not have a significant association with delinquency but did with arrest (after controlling for pre-incarceration mental health issues). As previously mentioned, this difference in findings across measures of offending is likely due to two things: (1) missing values for delinquency and (2) variation in the incarceration-offending relationship by demographic characteristics.

First, the differences in findings across measures of offending may have been due to delinquency having a larger number of missing values than arrest (see *Section 4.3* for more). Because the NLSY97 changed who was asked the delinquency questions starting in 2004, all analyses that use delinquency post 2004 were limited to a smaller sample size. Prior to 2004, nearly all respondents answered the delinquency questions, but starting in 2004 this dropped to around a quarter of the total sample. This change reduced the sample size for both the HFE and SEM analyses, though in slightly different ways. Because the HFE analyses used listwise deletion, the sample size was reduced to only those who received and answered the delinquency questions – which reduces the power of the analyses and makes it more difficult to detect significant associations. Thus, the lack of significant findings for incarceration and both measures of delinquency (after including mental health in the models) may have been a false negative due to a loss of statistical power. For the SEM analyses, MLMV and equationwise deletion allowed for more of the total data to be used, however the incarceration-delinquency relationships were still limited to only the sample size for delinquency; so, similarly, the low sample size and loss of statistical power may have resulted in false negatives for these relationships. For arrest, on the other hand, there were few missing values, meaning both the HFE and SEM analyses could use much more of the available data and have more statistical power – which is likely why the incarceration-arrest relationships were significant and positive across models.

Second, the differences in findings across measures of offending may have been because the analyses were looking at the entire sample and not allowing for race and sex differences. Results of the moderated mediation analysis[51] indicated that there were some demographic differences in the incarceration-delinquency relationship. For race, White persons had significant, positive associations between mental health

[51] Further discussion of the moderated mediation analyses and differences in the findings is in *Section 5.4*.

issues and delinquency binary, while Black individuals did not. Due to these differences, there is the potential that examining the sample as a whole masked racial differences in the incarceration-delinquency relationship. For sex, males had a significant, negative relationship between incarceration and delinquency binary, while females had a significant, positive relationship. Again, not allowing for sex differences in estimates may have masked these findings and resulted in the finding of no significant relationship between incarceration and delinquency.

It is important to note that the explanations posed above are not mutually exclusive for illuminating why there were differences in the model findings in this research. Thus, any combination of these explanations may have led to the differences in findings for different measures of offending. Perhaps, for example, the true relationship between incarceration and delinquency is significant and positive (even after controlling for mental health) only when using between-individual analysis and only for Black individuals and women, but this very specific relationship was unable to be detected due to the loss of power from the missing values. Under that scenario, all three explanations coincided to result in the non-significant incarceration-delinquency relationship, despite the significant incarceration-arrest relationship. Due to the nature of the data, it is not possible to know a definitive reason for these differences in findings, but this research indicates that further exploration into this area is needed.

6.2 The Role of Mental Health

While mental health did not serve as a moderator or mediator in the incarceration-offending relationship, it did consistently have a significant, positive relationship with subsequent stressors and with offending. However, after including pre-incarceration mental health, incarceration did not have a significant impact on mental health, as was expected – indicating that the relationship between incarceration and mental health was potentially spurious or potentially variable for within- versus between-individual effects. This finding highlights the importance of further examining mental health in determining life outcomes, regardless of incarceration status. In other words, though incarceration is undoubtedly an impactful experience, this research suggests that it may not directly impact mental health between-individuals. Instead, pre-incarceration mental health fully explained any impact that incarceration had on post-incarceration mental health in the SEM models. And, controlling for pre-incarceration mental health and other pre-incarceration stressors, post-incarceration mental health still had significant, positive impacts on later stressors and later offending.

Thus, results from these analyses would indicate that perhaps the pathways to offending do not depend upon incarceration (as hypothesized here). Rather, mental health may be of most import in pathways to offending. In order to examine this possibility further, follow-up analyses were run on the multiple mediation models to examine coefficients, standard errors, and p-values for pathways from mental health issues to offending (still controlling for incarceration but not including it in the pathway). Results for these pathways are presented in *Appendix K*. As with the previous analyses that included incarceration, mediation was not expected unless all direct paths were significant. The findings showed that the only significant pathways leading to offending (from mental health issues) were through physical health issues and unemployment for binary delinquency as the outcome. That is, mental health issues had a direct and positive impact on odds of delinquency, but mental health issues also had an indirect and positive impact on odds of delinquency through the following pathways: mental health issues → unemployed → delinquency, and mental health issues → physical health issues → unemployed → delinquency.

In all, these findings show support for the import of mental health in the reentry process. Even if incarceration does not have a direct impact on mental health, mental health remains an integral aspect of reentry that impacts multiple facets of life.

6.3 Theoretical Implications

The findings presented here have important implications for understanding reentry within the context of Stress Proliferation. The hypotheses of this research were based on the premise that incarceration can function as both a stressful event and a chronic strain, impacting allostatic load and later stressors (such as mental health) (Nowotny et al., 2017; Turney et al., 2012). However, after accounting for pre-incarceration mental health, incarceration did not have a significant impact on mental health, which, at face value, may seem to indicate that incarceration does not act as a stressor; but the explanation is likely more complex. It would be an oversight to consider incarceration as non-stressful, particularly given the adverse experiences that can happen both during (e.g., removal from routine, exposure to violence, exposure to illness) and after incarceration (e.g., social isolation, reentry barriers) (Baćak et al., 2019; Massoglia & Pridemore, 2015). However, it could be that within the Stress Proliferation framework, incarceration functions differently depending on the other factors of interest. With regards to mental health, this research suggests that incarceration functions more as an outcome of stress proliferation rather than a source of it. This is evidenced in the findings that pre-incarceration mental health issues had a significant and positive impact on incarceration, but incarceration had no significant impacts on mental health or delinquency.

On the other hand, this research suggested that mental health served as a source of stress and contributed to its proliferation. Pre-incarceration mental health had a significant, positive impact directly on incarceration and post-incarceration mental health – but did not impact post-incarceration mental health *through* incarceration. Further, mental health had a significant, positive relationship with each individual stressor, the number of additional stressors, and each measure of offending. Thus, the stressful experience of having mental health issues contributed to whether or not an individual was incarcerated (as well as the amount of time spent incarcerated); but, regardless of incarceration, the stress of mental health issues proliferated to additional stressors in other arenas of life (unemployment, being unmarried, and physical health issues) and offending. This provides evidence for mental health as an integral source of stress and an aspect of stress proliferation, particularly during reentry – where (beyond only offending) employment, family ties, and physical health serve as important markers of the success (or failure) of post-incarceration reintegration.

The findings of a significant positive relationship between mental health issues and future incarceration but no significant relationship between incarceration and future mental health issues may also have been due to the function of stress and the allostatic load response. When an individual experiences stress and the accompanying increased use of the physiologic systems, there are five potential responses:

(1) Normal: stress is experienced, the physiologic response occurs (elevated physiologic levels), the stress is adapted to, and physiologic response gradually returns to baseline.

(2) Repeated hits: the stress response is experienced repeatedly in a short period of time, impairing the individual's ability to adapt to stressors.

(3) Lack of adaptation: the same stressor is experienced repeatedly, but the individual fails to learn to adapt to stressors of the same kind.

(4) Prolonged response: stress is experienced, but the individual is unable to turn off the stress response, leading to an elevated and longer duration of the physiologic response.

(5) Inadequate response: stress is experienced, but the physiologic response is not adequate to response to the stress, leading to an increase in other systems to take over the response (e.g., excessive levels of cortisol) (McEwen, 2002).

The final four responses all result in a cumulative toll on the physiologic systems – i.e., an increase in the allostatic load (McEwen, 2002). In other words, the stress response functions similar to a rubber band (Logan & Barksdale, 2008). Under normal conditions, the rubber band can stretch and adapt to stressors and increased allostatic load, and, as long as there is adequate recovery time, it will return to its normal shape (i.e., maintain the ability to deal with stress and regulate the physiologic systems). But under undue stress, the rubbery band may lose its elasticity or break (i.e., allostatic load or overload leading to the inability to cope with stressors). It is not the case that if allostatic load is great enough the individual will be normalized to functioning at that high level and will be able to cope with stress. Continued increases in allostatic load are associated with continued increases in poor outcomes (Beese et al., 2022; Logan & Barksdale, 2008; McEwen, 2002, 2004; Seeman et al., 2013).

In the context of this research, the significant findings may be indicative of a non-normal stress response. For example, the significant impact of mental health issues on incarceration could be due repeated hits of stressors (first mental health issues and then incarceration). The significant impact of mental health issues on later mental health issues could be indicative of a lack of adaptation stress response, where the individual did not learn how to adapt to the stress of mental health issues. On the other hand, the lack of significant findings for other relationships may indicate something unexpected: a normal stress response. For example, the lack of significant relationship between incarceration and mental health could suggest that the response to the stress of incarceration was normal and the individual was able to adapt to it. Perhaps incarceration functions differently as a stressor than mental health does, leading to different stress responses.

This research did not examine these different theoretical mechanisms, however, the findings of lack of significant relationships between variables of interest indicate that there could be variation in the stress response based on the type of stressor. Future research should explore how variables function as stressors (e.g., as sources of stress or outcomes of stress) and the mechanisms of stress response for different stressors to further elucidate these processes of stress proliferation within reentry.

6.4 Limitations

There are several limitations of the research reported here due to (1) the data used and (2) the methods used.

This research used data from the NLSY97, and there are some inherent limitations that result from use of this data in particular and panel data in general.[52] First, the NLSY97 has limited measurements of mental health (every other year from 2000 to 2010, and more sporadically after that). As a main measure of interest in this research, the discontinuous mental health data meant that initial analyses (using HFE) had to be adjusted to 2-year panels in order to have a measurement of mental health within each panel. This reduced the granularity with which the research questions could be examined – in particular, a lot could happen in that 2-year time period that is unknown and unaccounted for by combining it all together. Further, the main measures used in this research had differing reference periods (e.g., in the last month, in the last week, since the date of last interview) (see *Appendix B* for survey question wording). Again, this means that combining measures into larger periods of time (such as a year or 2 years) misses important variation that could happen within those periods and may not be the most accurate representation of that measure.

This lack of granularity impacts the measure of mental health issues, in particular, because the MHI-5 questions were only asked every other year (as previously mentioned) and the reference period was for how the respondent felt over

[52] See *Section 4.3* for more discussion on the limitations of the NLSY97.

the last month. Thus, the measure of mental health is actually only measuring how an individual felt over a one-month period of a two-year timeframe. Mental health issues can occur episodically (i.e., a short period of poor mental health) or be continued and chronic (i.e., long-term poor mental health) (Vrshek-Schallhorn et al., 2015). In both cases, mental health varies over time. By only capturing one month of mental health for every two years, this research could be missing mental health changes that occur specifically as a result of stressors (e.g., incarceration), thus diluting the findings of the impact of stress on later mental health.

Another measurement issue that results from the data available in the NLSY97 is in the delinquency variable. In this research, delinquency was a composite measure of six criminal acts that respondents were asked (destroying property, stealing something worth more than $50, stealing something worth less than $50, committing some other property crime, attacking someone, and selling drugs). Thus, this measurement was limited because it only captured the specified six acts and did not capture other criminal activity (such as more violent crimes). Additionally, the measures of crime are relatively lower-level offenses that may be more common of younger individuals in their teens, while the age of respondents in these analyses was in their 20s. Therefore, the delinquency variables only capture a small subset of potential criminal activity and may not be representative of the type of criminal activity that the respondents in their 20s would be engaged in, which may have played a role in the some of the lack of significant findings for delinquency as the outcome.

Second, like most panel data, the NLSY97 also suffers from missing values over the years of the survey. Although response rates have remained quite high over time, there are still missing values for certain measures if a respondent refused to answer a question or did not know the answer. This was particularly true for questions regarding delinquency in the later years used for this analysis. Some analyses were able to work with all available data (i.e., SEM and GSEM, to an extent), but individual relationships between delinquency and the independent variables of interest were still limited in analysis to only respondents who reported delinquency. Other analyses in this research used listwise deletion to deal with missing values (i.e., HFE), which also had the potential to introduce bias into the findings. In particular, missing values may have impacted the findings that incarceration had no impact on delinquency, that mental health did not moderate the relationship between incarceration and delinquency, that Black individuals and males had no significant relationship between incarceration and delinquency, and that being unmarried and having physical health issues was not significantly related to delinquency.

Third, this research examined incarceration and mental health issues as stressors, however the NLSY97 data is not able to actually capture the potential stress of these experiences. In fact, the measures of incarceration (as a binary and as a proportion of the panel incarcerated) and mental health (using the MHI-5 scale) do not provide insight into how stressful (or not stressful) the respondent found these experiences to be. Therefore, viewing incarceration and mental health as stressful experiences that lead to increased allostatic load and higher likelihood of future stressors is assumed but not directly examined in this research. As a result, some of the lack of significant findings may very well have been due to how stressful respondents actually found these experiences to be, but the true extent to which this impacted the results cannot be known.

The use of FE (specifically HFE) and SEM brought their own limitations to this analysis. As just mentioned, HFE is not able to utilize observations that have missing values in any of the measures, requiring listwise deletion. This reduces the sample size (which is normally not an issue for panel data sets with large amounts of data, such as this one), however, analyses indicated that there were significant differences in whether the outcome was missing based on a respondent's incarceration and mental health status. This was partially addressed by using SEM (and GSEM) in later analyses to capture as much available data as possible (though this still suffered from missing values, as previously discussed). However, using SEM to examine all available data reduces some of SEM's functionality. Namely, SEM's ability to estimate goodness of fit (GOF) statistics (as was done for the latent variables in *Section 5.3.1*) does not function when SEM uses MLMV. Further, GSEM, regardless of what data is used, does not allow for GOF to be estimated. This means that the models used in this research were largely identified theoretically – which is an important part of model specification, but it is more ideal to have both theoretical and statistical identification.

Limitations such as these are an unfortunate, but inevitable, part of research, but they also provide opportunity for future research.

6.5 Future Directions

This research provided new insight into the role of mental health in reentry and highlighted some avenues for future exploration. First, this research found that mental health played a large role in multiple outcomes (being unemployed, being unmarried, having physical health issues, engaging in delinquency, and being arrested), regardless of incarceration and while controlling for prior mental health. This suggests that mental health may play a role in other outcomes along the reentry pathway but also that controlling for prior mental health is integral. Future research should explore other aspects of reentry to gain a fuller understanding of how mental health functions in the pathway as well as the processes of stress proliferation. For example, past research has suggested that mental health impacts additional factors like family conflict and financial problems (Link et al., 2019) and housing and substance use (Mallik-Kane & Visher, 2008), and that these factors impact future offending. Further explication of the directions and significances of pathways through multiple factors is needed.

Additionally, although this research did not find significance in the moderated mediation pathways, there were a number of significant relationships among the main variables of interest by race and sex. Namely, mental health mattered more for arrest for Black individuals than for Whites, while incarceration mattered more for arrest for Whites than for Blacks. Interestingly, mental health mattered more for delinquency for Whites than for Blacks; however, this may have been due to Black individuals having more missing values for delinquency. For both males and females, being incarcerated or having mental health issues significantly predicted being arrested; but incarceration decreased the odds of delinquency for men while it increased them for women. Again, this finding may have suffered from males having more missing values for delinquency. Future research is needed to determine the extent to which these findings were impacted by missing data and to further explore racial and gender differences in pathways of the reentry process.

In examining additional factors and pathways, future research should continue utilizing methods such as SEM. Reentry has long been acknowledged as a process with multiple intertwining factors, but much of extant research does not use methods that allow for examination of pathways (let alone multiple pathways in the same model). SEM is particularly useful for pathway research because it allows for the estimation of multiple relationships at one time (including latent variables), and it can produce coefficients for both direct and indirect pathways.

Finally, this research built upon a relatively small research base focusing on the impact of mental health in pathways to offending, but there are a number of areas that could be further investigated. Namely, exploring combinations of demographics and ethnicity to examine how pathways may differ across demographics (Porter et al., 2021); examining how the impact of a change in a status (e.g., mental health, employment, marriage), rather than just the status itself, may impact the pathways (Bersani & DiPietro, 2016; Wallace & Wang, 2020); examining outcomes in subsequent years to ensure time order (Semenza & Silver, 2022); and exploring the impact of mental health on outcomes over longer follow-up periods to examine the endurance of stress and longer processes of stress proliferation (Semenza & Silver, 2022).

CHAPTER 7: CONCLUSION

This research explored pathways from incarceration to offending via mental health issues and other factors, within a Stress Proliferation framework. Using ten years of longitudinal data from the NLSY97 (for both men and women), it sought to provide further explication on the mechanisms of and variation in offending outcomes. The findings indicated that mental health did not serve as a moderator of or mediator between incarceration and offending, and this included exploration of pathways by race and gender. Further, mental health along with other factors (being unemployed, being unmarried, physical health issues) did not serve as mediators in the pathway from incarceration to offending. The null findings were, in part, due to a lack of a significant relationship between incarceration and mental health between individuals (which was the first step in the pathways examined). Despite this, the current research produced some key takeaways.

First, incarceration only had a significant relationship with mental health for within-individual analysis, but not between-individual analysis. Mental health appears to be more strongly predicted by prior mental health than by incarceration. This is counter to some literature that finds a significant impact of incarceration on mental health, but such studies often do not control for pre-incarceration mental health (Porter & DeMarco, 2019). Other studies that do control for pre-incarceration mental health find similar null effects of incarceration on mental health (Semenza & Silver, 2022). This highlights the importance of controlling for pre-incarceration factors (i.e., selection) but also the importance of examining relationships using varying methods (i.e., between- vs. within-individual).

Second, incarceration was not significant in most pathways to offending that included mental health. There is a large faction of research focused on the impact of incarceration on offending. The findings are varied, but most reviews of the literature indicate a null to positive effect of incarceration on offending (Loeffler & Nagin, 2022). However, much of the research on incarceration and offending does not consider mental health. This research suggests that mental health may be more important in determining offending outcomes than incarceration and should be considered more often in research focusing on the reentry process.

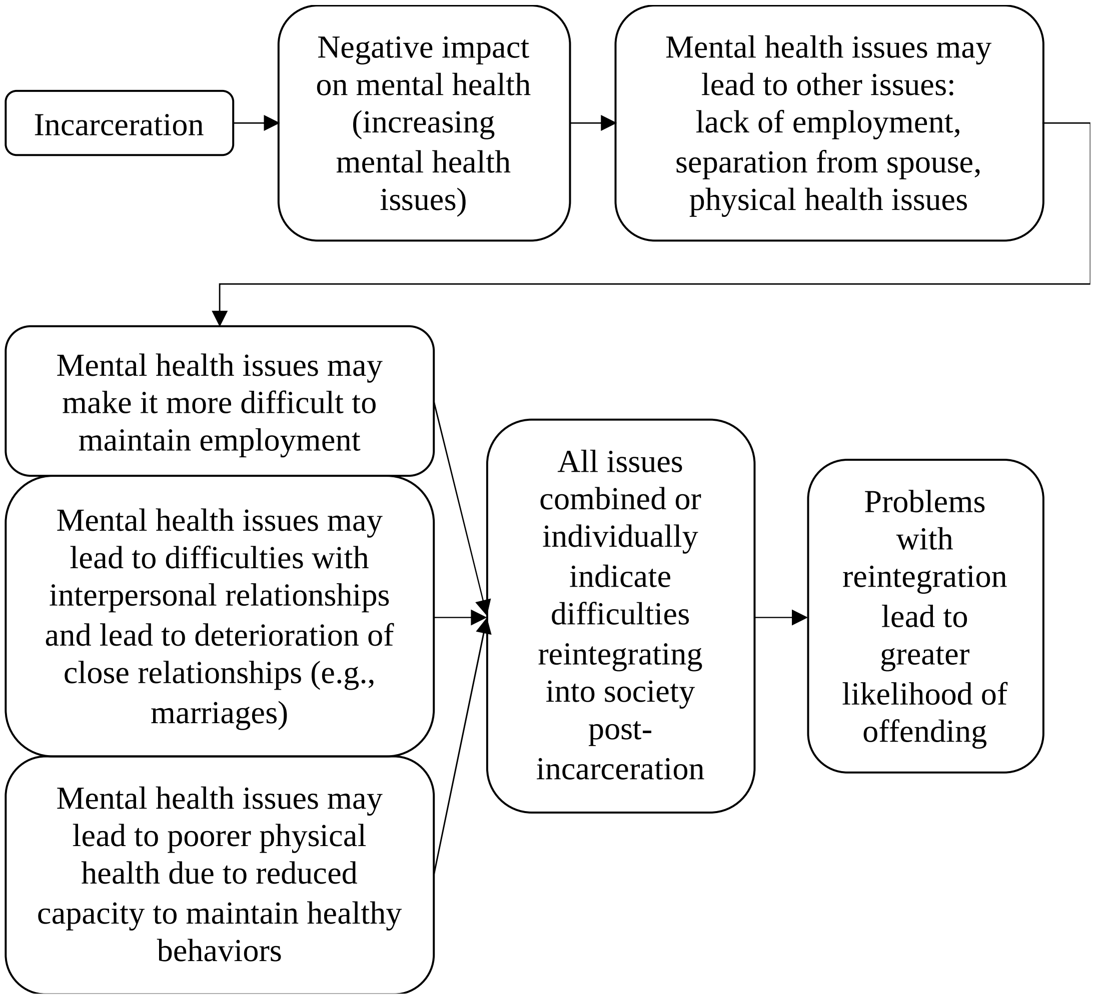
Third, mental health issues had a significant, positive impact on additional stressors (unmarried, unemployed, physical health issues) and offending, even when controlling for pre-incarceration mental health and pre-incarceration stressors. This suggests that the role of mental health in the reentry process may be more salient than previously considered. In the context of stress proliferation, this indicates that mental health acts as a stressor in its own right and as a source of stress proliferation on other aspects of life.

Overall, this research supports the idea that reentry is a complex process, involving multiple factors and pathways. Mental health, in particular, impacts many facets of life, regardless of incarceration status, and consequently plays a large role in the process of reentry. Further research into the numerous pathways leading to offending, and the role of mental health within these pathways, is needed to gain a fuller understanding of the processes of reentry.

APPENDICES

A: Theoretical Rationale

A.1 Theoretical Diagram



B: Measures and Descriptive Statistics

B.1 NLSY97 Variables of Interest

Measure	Question(s)	Response Options	Survey Waves
Incarceration	Respondent's monthly incarceration status	0 = not incarcerated in this month 1 = incarcerated during all or some of this month	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
Delinquency	Since the last interview, have you purposely damaged or destroyed property that did not belong to you?	0 = no 1 = yes	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
	Since the last interview, have you stolen something from a store or something that did not belong to you worth less than $50?	0 = no 1 = yes	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
	Since the last interview, have you stolen something from a store, person or house, or something that did not belong to you worth $50 or more including stealing a car?	0 = no 1 = yes	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
	Since the last interview, have you committed other property crimes such as fencing, receiving, possessing or selling stolen property, or cheated someone by selling them something that was worthless or worth much less than what you said it was?	0 = no 1 = yes	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
		0 = no	2000, 2001, 2002, 2003, 2004, 2005,

	Since the last interview, have you attacked someone with the idea of seriously hurting them or have had a situation end up in a serious fight or assault of some kind?	1 = yes	2006, 2007, 2008, 2009, 2010, 2011
	Since the last interview, have you sold or helped to sell marijuana (pot, grass), hashish (hash), or other hard drugs such as heroin, cocaine, or LSD?	0 = no 1 = yes	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
Arrest	Respondent's monthly arrest status	0 = not arrested in this month 1 to 98 = number of times arrested in this month	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
Mental health	How much of the time during the last month have you been a very nervous person?	1 = all of the time 2 = most of the time 3 = some of the time 4 = none of the time	2000, 2002, 2004, 2006, 2008, 2010
	How much of the time during the last month have you felt downhearted and blue?	1 = all of the time 2 = most of the time 3 = some of the time 4 = none of the time	2000, 2002, 2004, 2006, 2008, 2010
	How much of the time during the last month have you felt so down in the dumps that nothing could cheer you up?	1 = all of the time 2 = most of the time 3 = some of the time 4 = none of the time	2000, 2002, 2004, 2006, 2008, 2010
	How much of the time during the last month have you felt calm and peaceful?*	1 = all of the time 2 = most of the time	2000, 2002, 2004, 2006, 2008, 2010

		3 = some of the time 4 = none of the time	
	How much of the time during the last month have you been a happy person?*	1 = all of the time 2 = most of the time 3 = some of the time 4 = none of the time	2000, 2002, 2004, 2006, 2008, 2010
Physical health	In general, how is your health?*	1 = excellent 2 = very good 3 = good 4 = fair 5 = poor	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
Employment	Respondent's weekly employment status	0 = no information reported 1 = not associated with an employer, not actively searching 2 = not working 3 = associated with an employer 4 = unemployed 5 = out of the labor force 6 = active military service	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011
Marriage	Marital status as of the survey date	0 = never married 1 = married	2000, 2001, 2002, 2003, 2004, 2005,

		2 = separated 3 = divorced 4 = widowed	2006, 2007, 2008, 2009, 2010, 2011

* indicates the item was reverse coded so that higher numbers indicate better health

B.2 Descriptive Statistics by Year

	2000		2001		2002		2003		2004		2005	
	n	M or %	n	M or %	n	M or %	n	M or %	n	M or %	n	M or %
IVs												
Incarceration binary	8,845	1.18%	8,813	1.55%	8,872	2.03%	8,706	1.39%	8,635	1.93%	8,571	2.39%
Incarceration proportion[1]	105	42.78%	137	43.61%	178	48.36%	121	64.60%	167	53.14%	205	59.76%
DVs												
Delinquency variety score	8,036	0.364	7,852	0.290	7,867	0.238	7,731	0.190	1,826	0.255	2,058	0.210
Attack someone	8,028	8.41%	7,848	6.88%	7,863	6.12%	7,730	4.86%	1,819	7.09%	2,035	4.91%
Destroy property	8,024	6.84%	7,849	4.85%	7,863	3.90%	7,727	2.99%	1,812	4.36%	2,044	3.33%
Other property crime	8,028	2.89%	7,845	2.46%	7,861	1.81%	7,728	1.40%	1,820	1.10%	2,038	1.37%
Steal something worth <$50	8,026	8.29%	7,846	6.09%	7,864	4.58%	7,729	3.58%	1,815	4.30%	2,047	3.52%
Steal something worth >$50	8,026	3.49%	7,847	2.33%	7,864	1.89%	7,729	1.55%	1,815	2.04%	2,043	1.52%
Help sell illegal drugs	8,028	6.53%	7,848	6.41%	7,861	5.56%	7,722	4.66%	1,813	6.78%	2,035	6.54%
Delinquency binary	8,036	21.04%	7,852	17.92%	7,867	15.09%	7,731	12.53%	1,826	16.05%	2,085	13.12%
Arrests binary	8,845	6.07%	8,813	6.25%	8,772	5.94%	8,706	5.12%	8,635	4.63%	8,571	4.61%
Mediators												
Mental health issues	8,019	9.676	n/a	n/a	7,865	9.876	n/a	n/a	7,180	9.479	n/a	n/a
Blue	8,023	3.131	n/a	n/a	7,866	3.117	n/a	n/a	7,347	3.207	n/a	n/a
Depressed	8,028	3.545	n/a	n/a	7,871	3.551	n/a	n/a	7,323	3.624	n/a	n/a
Nervous	8,025	3.205	n/a	n/a	7,872	3.091	n/a	n/a	7,388	3.271	n/a	n/a
Not calm	8,027	2.628	n/a	n/a	7,871	2.593	n/a	n/a	7,408	2.622	n/a	n/a
Not happy	8,027	2.813	n/a	n/a	7,872	2.781	n/a	n/a	7,422	2.792	n/a	n/a
Unemployed	8,813	22.05%	8,774	17.36%	8,730	16.13%	8,667	15.30%	8,590	15.09%	8,521	13.37%
Unmarried	6,413	96.49%	7,875	94.65%	7,894	92.53%	7,749	89.28%	7,493	85.59%	7,329	81.72%
Physical health issues	8,076	1.995	7,879	2.039	7,893	2.092	7,752	2.092	7,494	2.120	7,335	2.170
Controls												
Education												
No education	8,060	60.79%	7,856	43.41%	7,857	24.40%	7,697	17.12%	7,435	14.47%	7,281	12.35%

High school/GED	8,060	39.11%	7,856	56.16%	7,857	72.79%	7,697	76.65%	7,435	74.12%	7,281	70.28%
Associate's degree	8,060	0.10%	7,856	0.37%	7,857	0.94%	7,697	2.39%	7,435	3.77%	7,281	4.64%
Bachelor's degree	8,060	0.00%	7,856	0.06%	7,857	0.87%	7,697	3.78%	7,435	7.42%	7,281	11.33%
Master's degree or higher	8,060	0.00%	7,856	0.00%	7,857	0.00%	7,697	0.05%	7,435	0.21%	7,281	0.40%
Drug use	7,713	26.41%	7,666	27.37%	7,565	25.70%	7,234	23.84%	6,914	22.29%	7,022	21.83%
Income	3,501	$49,838	4,844	$52,665	5,954	$52,921	6,309	$50,279	5,935	$58,586	6,110	$55,111
Age	8,080	17.938	7,882	18.907	7,896	19.936	7,754	20.888	7,502	21.923	7,338	22.892
	2006		2007		2008		2009		2010		2011	
	n	M or %	n	M or %	n	M or %	n	M or %	n	M or %	n	M or %
IVs												
Incarceration binary	8,496	2.81%	8,444	3.14%	8,373	3.03%	8,321	3.17%	8,228	3.03%	8,163	2.78%
Incarceration proportion[1]	239	60.43%	265	63.46%	254	66.99%	264	61.77%	249	62.15%	227	63.48%
DVs												
Delinquency variety score	2,241	0.198	2,308	0.185	2,424	0.161	2,556	0.130	2,593	0.130	2,622	0.111
Attack someone	2,230	6.68%	2,296	5.44%	2,406	5.03%	2,546	2.95%	2,585	3.83%	2,611	2.83%
Destroy property	2,227	2.65%	2,292	2.36%	2,413	1.95%	2,549	1.18%	2,582	1.28%	2,608	1.30%
Other property crime	2,227	1.39%	2,295	1.13%	2,408	1.16%	2,548	0.78%	2,586	0.62%	2,603	0.69%
Steal something worth <$50	2,232	2.64%	2,299	2.48%	2,415	2.28%	2,546	2.55%	2,586	2.44%	2,603	2.15%
Steal something worth >$50	2,233	1.12%	2,298	1.61%	2,417	0.87%	2,546	0.86%	2,583	1.20%	2,603	0.85%
Help sell illegal drugs	2,227	5.39%	2,293	5.54%	2,410	4.94%	2,543	4.76%	2,577	3.65%	2,602	3.31%
Delinquency binary	2,241	13.79%	2,308	12.13%	2,424	11.39%	2,556	8.72%	2,593	8.87%	2,622	7.93%
Arrests binary	8,496	4.58%	8,444	3.87%	8,373	3.56%	8,321	3.62%	8,228	3.09%	8,163	2.73%
Mediators												
Mental health issues	7,164	9.379	n/a	n/a	7,128	9.561	n/a	n/a	7,122	9.272	n/a	n/a
Blue	7,351	3.241	n/a	n/a	7,295	3.224	n/a	n/a	7,292	3.309	n/a	n/a
Depressed	7,375	3.659	n/a	n/a	7,291	3.655	n/a	n/a	7,289	3.678	n/a	n/a
Nervous	7,409	3.278	n/a	n/a	7,346	3.198	n/a	n/a	7,345	3.324	n/a	n/a
Not calm	7,462	2.637	n/a	n/a	7,380	2.59	n/a	n/a	7,361	2.623	n/a	n/a
Not happy	7,474	2.811	n/a	n/a	7,397	2.767	n/a	n/a	7,386	2.779	n/a	n/a
Unemployed	8,441	11.86%	8,386	12.07%	8,318	13.10%	8,270	15.78%	8,180	18.04%	8,103	17.70%
Unmarried	7,548	77.95%	7,404	75.08%	7,486	72.00%	7,544	69.11%	7,462	66.19%	7,399	64.12%

Physical health issues	7,555	2.150	7,417	2.209	7,472	2.237	7,556	2.271	7,473	2.308	7,419	2.330
Controls												
Education												
No education	7,502	12.84%	7,369	12.09%	7,444	11.93%	7,498	10.99%	7,423	10.56%	7,363	10.16%
High school/GED	7,502	65.78%	7,369	61.66%	7,444	59.47%	7,498	58.61%	7,423	57.67%	7,363	56.95%
Associate's degree	7,502	5.25%	7,369	5.84%	7,444	6.06%	7,498	6.46%	7,423	6.80%	7,363	7.23%
Bachelor's degree	7,502	15.50%	7,369	18.70%	7,444	19.94%	7,498	20.22%	7,423	20.17%	7,363	19.87%
Master's degree or higher	7,502	0.63%	7,369	1.71%	7,444	2.61%	7,498	3.72%	7,423	4.80%	7,363	5.80%
Drug use	6,988	20.08%	7,141	18.77%	7,130	18.90%	7,068	17.42%	7,000	17.54%	6,986	17.13%
Income	6,147	$56,342	6,235	$57,383	6,425	$60,200	6,659	$60,742	6,527	$60,275	6,528	$63,160
Age	7,559	23.864	7,418	24.815	7,490	25.846	7,559	26.767	7,479	27.857	7,423	28.742

Notes: Sex and race do not change over the years and, therefore, are excluded. Mental health questions were only asked every other year during this time period.

C: Hybrid Fixed Effects Regression

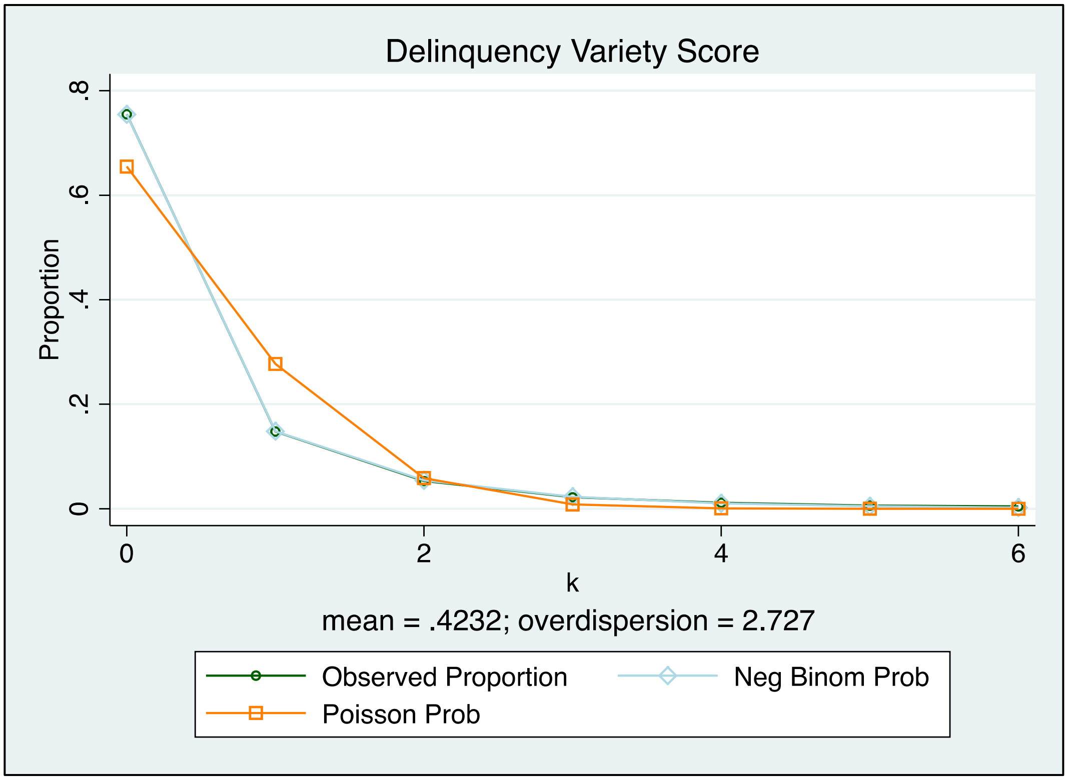
C.1 Hausman Test

Outcome measure	Incarceration measure	Coefficients		Difference (b-B)	sqrt(diag(V_b-V_B)) S.E.	Chi Sq.
		Fixed (b)	Random (B)			
Delinquency Variety Score	Binary	-0.161	0.260	-0.421	0.047	1233.86***
Delinquency Variety Score	Proportion	-0.627	0.687	-1.314	0.199	1388.25***
Delinquency Binary	Binary	-0.396	0.447	-0.844	0.108	489.83***
Delinquency Binary	Proportion	-1.077	1.159	-2.236	0.397	471.03***
Arrest Binary	Binary	-0.699	0.928	-1.628	0.051	1527.55***
Arrest Binary	Proportion	-1.627	1.365	-2.992	0.190	764.46***

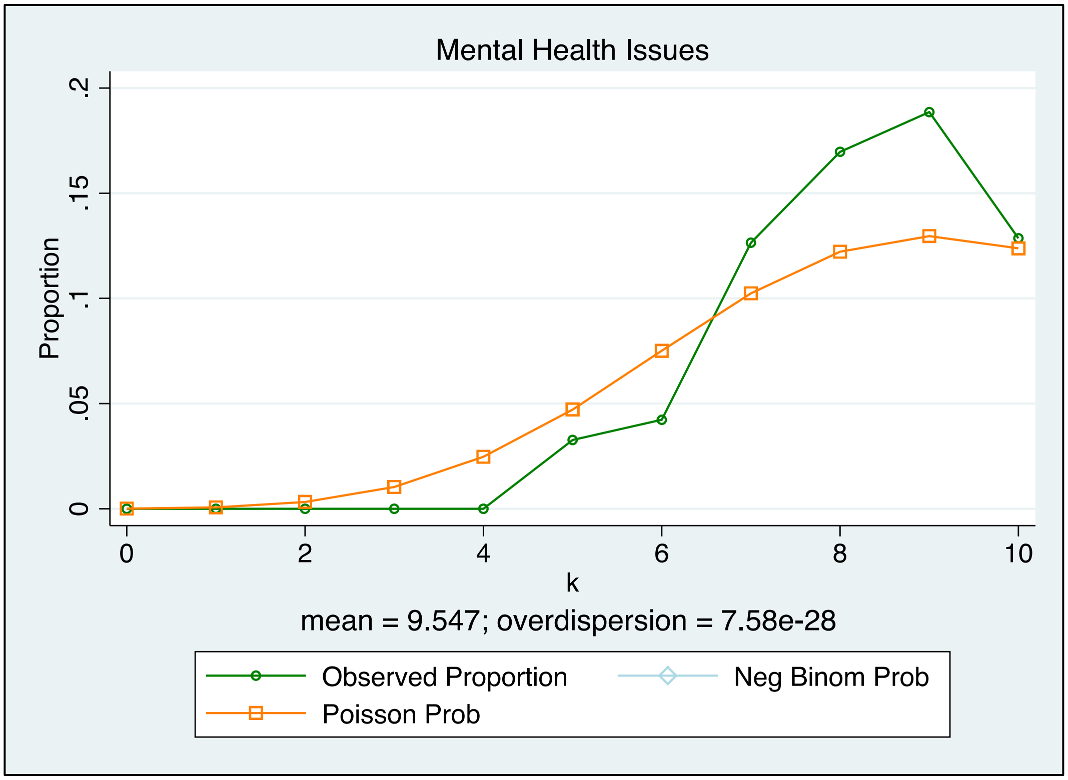
*** $p<0.01$

Note: All models include controls drug use, age, income, education, and year. All independent variables are lagged 1 panel prior to the dependent variables.

C.2 Delinquency Variety Score Distribution



C.3 Mental Health Issues Distribution



C.4 Impact of 2004 Delinquency Data Issue on HFE Results

Incarceration and Delinquency Variety Score

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 11,718	*n = 12,238*	*n = 11,718*	*n = 12,238*
	IRR (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)
Incarceration	1.205** (0.105)	1.210** (0.113)	1.507* (0.368)	1.478* (0.407)
Drug use	3.015*** (0.169)	3.145*** (0.182)	3.028*** (0.169)	3.160*** (0.183)
Education[1]				
High school/GED	0.705*** (0.042)	0.662*** (0.041)	0.703*** (0.042)	0.660*** (0.041)
Associate's	0.898 (0.159)	0.886 (0.165)	0.897 (0.159)	0.884 (0.164)
Bachelor's	0.298*** (0.047)	0.281*** (0.045)	0.296*** (0.046)	0.278*** (0.045)
Master's or higher	0.122** (0.118)	0.117** (0.113)	0.121** (0.116)	0.115** (0.111)
Income	0.999* (4.54E-07)	0.999* (4.91E-07)	0.999* (4.54E-07)	0.999* (4.91E-07)
Age	0.910*** (0.008)	0.927*** (0.008)	0.911*** (0.008)	0.928*** (0.008)
Male	1.761*** (0.103)	1.726*** (0.105)	1.767*** (0.103)	1.733*** (0.105)
Race[2]				
Black	1.121* (0.076)	1.130* (0.077)	1.121* (0.073)	1.130* (0.077)
Other race	1.038 (0.076)	1.007 (0.077)	1.038 (0.076)	1.007 (0.077)
Constant	0.752 (0.150)	0.454*** (0.091)	0.740 (0.147)	0.446*** (0.089)

*** p<.01, **p<.05, *p<.10

(1) with reported 2004 delinquency data

(2) with 2005 delinquency data imputed for 2004

[1] reference category is high school drop out

[2] reference category is White

Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

Incarceration and Delinquency Binary

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 11,718	*n = 12,238*	*n = 11,718*	*n = 12,238*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)

Incarceration	1.389** (0.188)	1.306** (0.170)	2.097* (0.822)	1.608* (0.613)
Drug use	4.926*** (0.363)	4.596*** (0.329)	4.975*** (0.366)	4.634*** (0.332)
Education[1]				
High school/GED	0.652*** (0.057)	0.630*** (0.053)	0.648*** (0.056)	0.625*** (0.052)
Associate's	0.857 (0.211)	0.853 (0.205)	0.855 (0.211)	0.848 (0.204)
Bachelor's	0.224*** (0.047)	0.228*** (0.047)	0.221*** (0.046)	0.224*** (0.046)
Master's or higher	0.077** (0.096)	0.080** (0.096)	0.075** (0.094)	0.078** (0.094)
Income	0.999 (6.60E-07)	0.999 (6.50E-07)	0.999 (6.62E-07)	0.999 (6.52E-07)
Age	0.893*** (0.011)	0.927*** (0.011)	0.894*** (0.011)	0.927*** (0.011)
Male	2.134*** (0.173)	1.955*** (0.152)	2.146*** (0.174)	1.969*** (0.153)
Race[2]				
Black	1.141 (0.104)	1.131 (0.099)	1.139 (0.104)	1.131 (0.100)
Other race	0.915 (0.090)	0.877 (0.083)	0.916 (0.090)	0.878 (0.083)
Constant	0.682 (0.187)	0.335*** (0.087)	0.674 (0.185)	0.329*** (0.085)

*** p<.01, **p<.05, *p<.10
(1) with reported 2004 delinquency data
(2) with 2005 delinquency data imputed for 2004
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

Mental Health and Delinquency Variety Score

	(1)	(2)
	n = 11,319	*n = 11,833*
	IRR (S.E.)	*IRR* (S.E.)
Mental Health Issues	1.061*** (0.009)	1.056*** (0.010)
Drug use	2.895*** (0.165)	3.034*** (0.179)
Education[1]		
High school/GED	0.728*** (0.044)	0.681*** (0.043)

Associate's	0.923 (0.165)	0.909 (0.171)
Bachelor's	0.310*** (0.049)	0.296*** (0.048)
Master's or higher	3.15E-09*** (8.50E-10)	3.97E-09*** (1.12E-09)
Income	0.999 (4.64E-07)	0.999 (5.02E-07)
Age	0.911*** (0.008)	0.928*** (0.008)
Male	1.912*** (0.112)	1.874*** (0.115)
Race[2]		
Black	1.158** (0.076)	1.168* (0.080)
Other race	1.065 (0.078)	1.030 (0.079)
Constant	0.390*** (0.083)	0.241*** (0.053)

*** p<.01, **p<.05, *p<.10
(1) with reported 2004 delinquency data
(2) with 2005 delinquency data imputed for 2004
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

Mental Health and Delinquency Binary

	(1)	(2)
	n = 11,319	*n = 11,833*
	OR (S.E.)	*OR* (S.E.)
Mental Health Issues	1.094*** (0.015)	1.072*** (0.014)
Drug use	4.738*** (0.362)	4.433*** (0.328)
Education[1]		
High school/GED	0.675*** (0.060)	0.648*** (0.055)
Associate's	0.899 (0.221)	0.886 (0.212)
Bachelor's	0.227*** (0.048)	0.237*** (0.049)
Master's or higher	3.03E-09 (7.88E-10)	3.01E-09 (7.68E-10)
Income	0.999 (6.80E-07)	0.999 (6.67E-07)

Age	0.895*** (0.011)	0.929*** (0.011)
Male	2.419*** (0.203)	2.161*** (0.172)
Race[2]		
Black	1.193* (0.111)	1.180* (0.106)
Other race	0.941 (0.095)	0.900 (0.087)
Constant	0.249*** (0.077)	0.147*** (0.043)

*** p<.01, **p<.05, *p<.10
(1) with reported 2004 delinquency data
(2) with 2005 delinquency data imputed for 2004
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

Mental Health as a Moderator of Incarceration-Delinquency Variety Score Relationship

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 6,153	*n* = 6,650	*n* = 6,153	*n* = 6,650
	IRR (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)
Incarceration	1.768 (0.740)	1.890 (0.860)	1.086 (1.072)	2.854 (3.573)
Mental health issues	1.062*** (0.013)	1.052*** (0.015)	1.056*** (0.012)	1.049*** (0.014)
Mental health issues X incarceration	0.960 (0.036)	0.953 (0.040)	1.019 (0.080)	0.927 (0.107)
Drug use	2.540*** (0.210)	2.802*** (0.255)	2.545*** (0.211)	2.803*** (0.256)
Education[1]				
High school/GED	0.825** (0.075)	0.795** (0.079)	0.821** (0.075)	0.791** (0.079)
Associate's	0.915 (0.174)	0.969 (0.193)	0.913 (0.174)	0.968 (0.193)
Bachelor's	0.328*** (0.057)	0.314*** (0.057)	0.325*** (0.057)	0.311*** (0.056)
Master's or higher	1.36E-09*** (3.80E-10)	4.88E-09*** (1.55E-09)	8.38E-10*** (2.35E-10)	7.04E-09*** (2.24E-09)
Income	0.999 (5.75E-07)	0.999 (6.46E-07)	0.999 (5.71E-07)	0.999 (6.44E-07)
Age	0.892***	1.001	0.892***	1.001

	(0.011)	(0.013)	(0.011)	(0.013)
Male	1.319*** (0.113)	1.346*** (0.127)	1.318*** (0.113)	1.349*** (0.127)
Race[2]				
Black	1.144 (0.106)	1.147 (0.116)	1.142 (0.106)	1.146 (0.116)
Other race	1.028 (0.106)	0.935 (0.106)	1.030 (0.106)	0.937 (0.107)
Pre-incarceration mental health issues	1.027** (0.012)	1.044*** (0.014)	1.028** (0.012)	1.044*** (0.014)
Constant	5.781*** (2.252)	0.025*** (0.010)	5.325*** (2.073)	0.025*** (0.010)

*** p<.01, **p<.05, *p<.10
(1) with reported 2004 delinquency data
(2) with 2005 delinquency data imputed for 2004
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

Mental Health as a Moderator of Incarceration-Delinquency Binary Relationship

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 6,111	*n = 6.608*	*n = 6,111*	*n = 6.608*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)
Incarceration	2.867 (1.951)	3.303 (2.127)	1.629 (3.383)	3.439 (3.732)
Mental health issues	1.099*** (0.023)	1.067*** (0.021)	1.091*** (0.022)	1.065*** (0.021)
Mental health issues X incarceration	0.927 (0.067)	0.919 (0.055)	1.011 (0.178)	0.812 (0.131)
Drug use	3.961*** (0.457)	4.089*** (0.464)	3.995*** (0.461)	4.114*** (0.468)
Education[1]				
High school/GED	0.755* (0.113)	0.751** (0.105)	0.749* (0.112)	0.741** (0.104)
Associate's	0.832 (0.240)	0.940 (0.260)	0.826 (0.240)	0.930 (0.258)
Bachelor's	0.220*** (0.057)	0.237*** (0.058)	0.216*** (0.056)	0.231*** (0.056)
Master's or higher	3.89E-09 (2.48E-10)	4.02E-09 (2.46E-10)	4.43E-09 (5.86E-10)	5.33E-09 (2.80E-10)
Income	1.000 (9.44E-07)	1.000 (9.36E-07)	1.000 (9.46E-07)	1.000 (9.39E-07)
Age	0.832***	1.017	0.832***	1.018

	(0.018)	(0.019)	(0.018)	(0.019)
Male	1.611*** (0.213)	1.536*** (0.193)	1.609*** (0.213)	1.552*** (0.196)
Race[2]				
Black	1.191 (0.173)	1.157 (0.160)	1.188 (0.174)	1.159 (0.161)
Other race	0.958 (0.150)	0.843 (0.125)	0.961 (0.151)	0.846 (0.126)
Pre-incarceration mental health issues	1.043** (0.021)	1.061*** (0.020)	1.043** (0.021)	1.062*** (0.020)
Constant	1.320 (0.835)	0.008*** (0.005)	1.429 (0.906)	0.008*** (0.005)

*** p<.01, **p<.05, *p<.10
(1) with reported 2004 delinquency data
(2) with 2005 delinquency data imputed for 2004
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

D: Mental Health as a Mediator

D.1 Delinquency Variety Score Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 8,984	*n = 8,984*	*n = 8,984*	*n = 8,984*	*n = 8,984*	*n = 8,984*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
Delinquency Variety Score						
Incarceration	0.009 (0.012)	0.00008 (0.011)	0.002 (0.012)	0.0001 (0.012)	-0.014 (0.012)	-0.010 (0.012)
Mental Health Issues	0.028*** (0.009)	0.020** (0.008)	0.018** (0.007)	0.028*** (0.009)	0.019** (0.008)	0.018** (0.007)
Male		0.0006 (0.004)	0.001 (0.004)		0.0008 (0.004)	0.001 (0.004)
Black[1]		0.003 (0.004)	0.004 (0.004)		0.003 (0.004)	0.004 (0.004)
Other race[1]		0.005 (0.005)	0.005 (0.005)		0.005 (0.005)	0.005 (0.005)
Income		-3.72E-08 (3.03E-08)	-3.15E-08 (3.00E-08)		-3.15E-08 (3.02E-8)	-3.38E-08 (3.01E-08)
Age		-0.0008 (0.001)	-0.001 (0.001)		-0.0009 (0.001)	-0.001 (0.001)
Drug Use		0.040*** (0.009)	0.040*** (0.009)		0.041*** (0.009)	0.040*** (0.009)
Education		-0.004* (0.002)	-0.004 (0.002)		-0.004* (0.002)	-0.004 (0.002)
Mental Health Issues						

Incarceration	0.090*** (0.031)	0.089*** (0.031)	0.037 (0.037)	0.098** (0.045)	0.098** (0.045)	0.022 (0.049)
Pre-Incarceration Mental Health Issues			0.089*** (0.003)			0.089* (0.003)
Incarceration						
Pre-Incarceration Mental Health Issues			0.003** (0.001)			0.002** (0.001)
Constant			-0.001 (0.010)			-0.004 (0.008)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Significances are based on robust standard errors.

D.2 Delinquency Variety Score Full Models

	Binary IV	Proportion IV
	n = 8,984	*n = 8,984*
	Coef (S.E.)	Coef (S.E.)
Main Model		
Delinquency Variety Score		
Incarceration	0.002 (0.012)	-0.010 (0.012)
Mental Health Issues	0.018** (0.007)	0.018** (0.007)
Male	0.001 (0.004)	0.001 (0.004)
Black[1]	0.004 (0.004)	0.004 (0.004)
Other race[1]	0.005 (0.005)	0.005 (0.005)
Income	-3.15E-08 (3.00E-08)	-3.38E-08 (3.01E-08)
Age	-0.001 (0.001)	-0.001 (0.001)
Drug Use	0.040*** (0.009)	0.040*** (0.009)
Education	-0.004 (0.002)	-0.004 (0.002)
Mental Health Issues		
Incarceration	0.037 (0.037)	0.022 (0.049)
Pre-Incarceration Mental Health Issues	0.089*** (0.003)	0.089* (0.003)
Incarceration		
Pre-Incarceration Mental Health Issues	0.003** (0.001)	0.002** (0.001)
Constant	-0.001 (0.010)	-0.004 (0.008)
Latent Variables		
Destroy Property		
Delinquency Variety Score	1.000 (constrained)	1.000 (constrained)
Constant	0.022 (0.030)	0.023 (0.030)
Steal Under $50		
Delinquency Variety Score	1.497*** (0.334)	1.498*** (0.334)

Constant	0.022 (0.044)	0.023 (0.044)
Steal Over $50		
Delinquency Variety Score	1.100*** (0.296)	1.098*** (0.296)
Constant	0.014 (0.032)	0.015 (0.032)
Other Property Crime		
Delinquency Variety Score	0.642*** (0.178)	0.640*** (0.178)
Constant	0.010 (0.019)	0.011 (0.019)
Attack Someone		
Delinquency Variety Score	1.106*** (0.287)	1.107*** (0.288)
Constant	0.052 (0.033)	0.054 (0.033)
Sell Illegal Drugs		
Delinquency Variety Score	1.873*** (0.383)	1.877*** (0.383)
Constant	0.052 (0.055)	0.054 (0.056)
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	0.873*** (0.031)	0.873*** (0.031)
Down or Blue		
Mental Health Issues	1.309*** (0.040)	1.308*** (0.040)
Constant	0.648*** (0.028)	0.648*** (0.028)
Depressed		
Mental Health Issues	1.009*** (0.032)	1.009*** (0.032)
Constant	0.486*** (0.025)	0.486*** (0.025)
Not Calm		
Mental Health Issues	0.967*** (0.033)	0.967*** (0.033)
Constant	1.545*** (0.031)	1.545*** (0.031)
Not Happy		
Mental Health Issues	1.091*** (0.037)	1.091*** (0.037)

Constant	1.266*** (0.029)	1.266*** (0.029)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Significances are based on robust standard errors.

D.3 Delinquency Binary Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 7,622	*n = 7,523*	*n = 7,160*	*n = 7,622*	*n = 7,523*	*n = 7,160*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Delinquency Binary						
Incarceration	1.357 (0.374)	0.711 (0.299)	0.537 (0.310)	1.280 (0.634)	0.499 (0.401)	0.528 (0.656)
Mental Health Issues	2.596*** (0.489)	2.142*** (0.525)	1.903** (0.489)	2.591*** (0.488)	2.147*** (0.527)	1.913** (0.493)
Male		1.262 (0.227)	1.309 (0.255)		1.262 (0.227)	1.305 (0.253)
Black[1]		1.201 (0.232)	1.202 (0.255)		1.202 (0.232)	1.205 (0.256)
Other race[1]		0.859 (0.185)	0.997 (0.226)		0.859 (0.185)	0.996 (0.227)
Income		0.999 (1.85E-06)	0.999* (2.00E-06)		0.999 (0.000)	0.999* (0.000)
Age		0.985 (0.053)	0.980 (0.058)		0.985 (0.052)	0.981 (0.057)
Drug Use		7.745*** (1.508)	8.283*** (1.785)		7.737*** (1.507)	8.242*** (1.773)
Education		0.788** (0.087)	0.812* (0.093)		0.789** (0.087)	0.818* (0.092)
Constant	0.125*** (0.001)	0.058** (0.076)	0.039** (0.057)	0.126*** (0.008)	0.057** (0.074)	0.037** (0.054)
Mental Health Issues						

Incarceration	1.092*** (0.034)	1.090*** (0.034)	1.048 (0.047)	1.104** (0.049)	1.103** (0.049)	1.028 (0.064)
Pre-Incarceration Mental Health Issues			1.091*** (0.004)			1.091*** (0.003)
Incarceration						
Pre-Incarceration Mental Health Issues			1.002*** (0.001)			1.001** (0.000)
Constant			0.995 (0.007)			0.996 (0.004)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

D.4 Delinquency Binary Full Models

	Binary IV	Proportion IV
	n = 7,170	*n = 7,170*
	Coef (S.E.)	Coef (S.E.)
Main Model		
Delinquency Binary		
Incarceration	0.537 (0.310)	0.528 (0.656)
Mental Health Issues	1.903** (0.489)	1.913** (0.493)
Male	1.309 (0.255)	1.305 (0.253)
Black[1]	1.202 (0.255)	1.205 (0.256)
Other race[1]	0.997 (0.226)	0.996 (0.227)
Income	0.999* (2.00E-06)	0.999* (0.000)
Age	0.980 (0.058)	0.981 (0.057)
Drug Use	8.283*** (1.785)	8.242*** (1.773)
Education	0.812* (0.093)	0.818* (0.092)
Control	0.039** (0.057)	0.037** (0.054)
Mental Health Issues		
Incarceration	1.048 (0.047)	1.028 (0.064)
Pre-Incarceration Mental Health Issues	1.091*** (0.004)	1.091*** (0.003)
Incarceration		
Pre-Incarceration Mental Health Issues	1.002*** (0.001)	1.001** (0.000)
Constant	0.995 (0.007)	0.996 (0.004)
Latent Variable		
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	0.890*** (0.032)	0.890*** (0.032)
Down or Blue		

Mental Health Issues	1.315*** (0.042)	1.315*** (0.042)
Constant	0.668*** (0.029)	0.668*** (0.029)
Depressed		
Mental Health Issues	1.010*** (0.034)	1.010*** (0.034)
Constant	0.500*** (0.025)	0.500*** (0.025)
Not Calm		
Mental Health Issues	0.980*** (0.034)	0.980*** (0.034)
Constant	1.553*** (0.031)	1.553*** (0.031)
Not Happy		
Mental Health Issues	1.117*** (0.037)	1.116*** (0.037)
Constant	1.264*** (0.029)	1.264*** (0.029)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

D.5 Arrest Binary Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 7,170	*n = 7,170*	*n = 7,170*	*n = 7,170*	*n = 7,170*	*n = 7,170*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Arrest Binary						
Incarceration	6.201*** (1.194)	4.524*** (1.601)	3.928*** (1.824)	5.924*** (1.545)	6.498*** (3.951)	4.428* (3.853)
Mental Health Issues	2.282*** (0.394)	2.226*** (0.494)	1.002*** (0.001)	2.332*** (0.399)	2.207*** (0.489)	1.852*** (0.432)
Male		1.764*** (0.291)	1.872*** (0.334)		1.795*** (0.295)	1.896*** (0.338)
Black[1]		1.861*** (0.336)	1.912*** (0.377)		1.835*** (0.331)	1.901*** (0.373)
Other race[1]		1.481** (0.298)	1.562** (0.335)		1.469* (0.293)	1.559** (0.332)
Income		0.999 (0.000)	0.999 (0.000)		0.999 (0.000)	0.999 (0.000)
Age		1.005 (0.051)	0.984 (0.055)		1.003 (0.051)	0.982 (0.054)
Drug Use		4.547*** (0.730)	5.117*** (0.902)		4.633*** (0.740)	5.185*** (0.912)
Education		0.604*** (0.070)	0.606*** (0.071)		0.591*** (0.069)	0.594*** (0.070)
Constant	0.034*** (0.002)	0.021*** (0.027)	0.995 (0.007)	0.036*** (0.002)	0.023*** (0.029)	0.021*** (0.030)
Mental Health Issues						

Incarceration	1.087*** (0.034)	1.090*** (0.034)	1.048 (0.047)	1.098** (0.049)	1.103** (0.049)	1.028 (0.064)
Pre-Incarceration Mental Health Issues			1.091*** (0.003)			1.091*** (0.004)
Incarceration						
Pre-Incarceration Mental Health Issues			1.002*** (0.001)			1.001** (0.000)
Constant			0.995 (0.007)			0.996 (0.004)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

D.6 Arrest Binary Full Models

	Binary IV	Proportion IV
	n = 7,170	*n = 7,170*
	Coef (S.E.)	Coef (S.E.)
Main Model		
Arrest Binary		
Incarceration	3.928*** (1.824)	4.428* (3.853)
Mental Health Issues	1.002*** (0.001)	1.852*** (0.432)
Male	1.872*** (0.334)	1.896*** (0.338)
Black[1]	1.912*** (0.377)	1.901*** (0.373)
Other race[1]	1.562** (0.335)	1.559** (0.332)
Income	0.999 (0.000)	0.999 (0.000)
Age	0.984 (0.055)	0.982 (0.054)
Drug Use	5.117*** (0.902)	5.185*** (0.912)
Education	0.606*** (0.071)	0.594*** (0.070)
Control	0.995 (0.007)	0.021*** (0.030)
Mental Health Issues		
Incarceration	1.048 (0.047)	1.028 (0.064)
Pre-Incarceration Mental Health Issues	1.091*** (0.003)	1.091*** (0.004)
Incarceration		
Pre-Incarceration Mental Health Issues	1.002*** (0.001)	1.001** (0.000)
Constant	0.995 (0.007)	0.996 (0.004)
Latent Variable		
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	0.890*** (0.032)	0.890*** (0.032)
Down or Blue		

Mental Health Issues	1.316*** (0.042)	1.316*** (0.042)
Constant	0.668*** (0.029)	0.668*** (0.029)
Depressed		
Mental Health Issues	1.010*** (0.034)	1.010*** (0.034)
Constant	0.500*** (0.025)	0.500*** (0.025)
Not Calm		
Mental Health Issues	0.979*** (0.034)	0.979*** (0.034)
Constant	1.554*** (0.031)	1.553*** (0.032)
Not Happy		
Mental Health Issues	1.116*** (0.037)	1.115*** (0.037)
Constant	1.265*** (0.029)	1.265*** (0.029)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

D.7 Pathways from Incarceration to Offending – Through Mental Health

			Coef. (S.E.)
Incarceration Binary	Mental Health Issues	Delinquency Variety Score	0.001 (0.001)
Incarceration Proportion	Mental Health Issues	Delinquency Variety Score	0.0004 (0.001)
Incarceration Binary	Mental Health Issues	Delinquency Binary	1.03 (0.032)
Incarceration Proportion	Mental Health Issues	Delinquency Binary	1.018 (0.042)
Incarceration Binary	Mental Health Issues	Arrest Binary	1.029 (0.032)
Incarceration Proportion	Mental Health Issues	Arrest Binary	1.017 (0.040)

*** p<.01, **p<.05, *p<.10

Note: Coefficients for binary measures are exponentiated to present odds ratios. Significances are based on robust standard errors.

E: Moderated Mediation by Race

E.1 Delinquency Variety Score Model Progression

	Black					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 2,335	*n = 2,335*	*n = 2,335*	*n = 2,335*	*n = 2,335*	*n = 2,335*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
Delinquency Variety Score						
Incarceration	-0.014 (0.013)	-0.022 (0.015)	-0.019 (0.014)	-0.026 (0.025)	-0.051 (0.033)	-0.041 (0.030)
Mental Health Issues	0.021 (0.014)	0.009 (0.014)	0.014 (0.014)	0.021 (0.014)	0.009 (0.014)	0.014 (0.014)
Male		-0.003 (0.010)	-0.002 (0.010)		-0.003 (0.010)	-0.003 (0.010)
Income		-1.32E-08 (7.63E-08)	-1.41E-08 (7.74E-08)		-1.24E-08 (7.68E-08)	-1.41E-08 (7.750E-08)
Age		0.004 (0.003)	0.004 (0.003)		0.004 (0.003)	0.004 (0.003)
Drug Use		0.067*** (0.024)	0.067*** (0.024)		0.068*** (0.024)	0.067*** (0.024)
Education		-0.001 (0.006)	-0.001 (0.006)		-0.001 (0.006)	-0.001 (0.006)
Mental Health Issues						
Incarceration	0.030 (0.045)	0.029 (0.045)	-0.007 (0.053)	0.067 (0.063)	0.066 (0.063)	0.013 (0.070)
Pre-Incarceration Mental Health Issues			0.081*** (0.006)			0.081*** (0.006)

Incarceration						
Pre-Incarceration Mental Health Issues			0.004 (0.003)			0.003 (0.002)
Constant			0.006 (0.026)			-0.003 (0.020)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
Note: Significances are based on robust standard errors.

	White					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 4,665	*n = 4,665*	*n = 4,665*	*n = 4,665*	*n = 4,665*	*n = 4,665*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
Delinquency Variety Score						
Incarceration	0.003 (0.009)	0.000 (0.008)	0.000 (0.008)	-0.004 (0.006)	-0.008 (0.006)	-0.007 (0.006)
Mental Health Issues	0.015* (0.009)	0.011 (0.007)	0.010 (0.006)	0.015* (0.009)	0.011 (0.007)	0.010 (0.006)
Male		0.000 (0.003)	0.000 (0.002)		0.000 (0.003)	0.000 (0.002)
Income		-1.19E-08 (2.22E-08)	-5.97E-09 (2.19E-08)		-1.13E-08 (2.21E-08)	-7.59E-09 (2.19E-08)
Age		-0.001 (0.001)	-0.001 (0.001)		-0.001 (0.001)	-0.001 (0.001)
Drug Use		0.014** (0.006)	0.014* (0.006)		0.014** (0.006)	0.014** (0.007)

Education		-0.002 (0.001)	-0.002 (0.002)		-0.002 (0.002)	-0.002 (0.002)
Mental Health Issues						
Incarceration	0.113* (0.058)	0.113* (0.058)	0.051 (0.060)	0.123 (0.088)	0.123 (0.088)	0.030 (0.078)
Pre-Incarceration Mental Health Issues			0.098*** (0.005)			0.098*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			0.002** (0.001)			0.001 (0.001)
Constant			-0.006 (0.010)			-0.003 (0.007)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
Note: Significances are based on robust standard errors.

E.2 Delinquency Variety Score Full Models

	Black		White	
	Binary IV	Proportion IV	Binary IV	Proportion IV
	n = 2,335	*n = 2,335*	*n = 4,665*	*n = 4,665*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
General Model				
Delinquency Variety Score				
Incarceration	-0.019 (0.014)	-0.041 (0.030)	0.000 (0.008)	-0.007 (0.006)
Mental Health Issues	0.014 (0.014)	0.014 (0.014)	0.010 (0.006)	0.010 (0.006)
Male	-0.002 (0.010)	-0.003 (0.010)	0.000 (0.002)	0.000 (0.002)
Income	-1.41E-08 (7.74E-08)	-1.41E-08 (7.750E-08)	-5.97E-09 (2.19E-08)	-7.59E-09 (2.19E-08)
Age	0.004 (0.003)	0.004 (0.003)	-0.001 (0.001)	-0.001 (0.001)
Drug Use	0.067*** (0.024)	0.067*** (0.024)	0.014* (0.006)	0.014** (0.007)
Education	-0.001 (0.006)	-0.001 (0.006)	-0.002 (0.002)	-0.002 (0.002)
Mental Health Issues				
Incarceration	-0.007 (0.053)	0.013 (0.070)	0.051 (0.060)	0.030 (0.078)
Pre-Incarceration Mental Health Issues	0.081*** (0.006)	0.081*** (0.006)	0.098*** (0.005)	0.098*** (0.005)
Incarceration				
Pre-Incarceration Mental Health Issues	0.004 (0.003)	0.003 (0.002)	0.002** (0.001)	0.001 (0.001)
Constant	0.006 (0.026)	-0.003 (0.020)	-0.006 (0.010)	-0.003 (0.007)
Latent Variables				
Destroy Property				
Delinquency Variety Score	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	-0.084 (0.073)	-0.084 (0.073)	0.020 (0.021)	0.021 (0.021)
Steal Under $50				
Delinquency Variety Score	0.920*** (0.384)	0.921*** (0.385)	2.861*** (1.193)	2.859*** (1.190)
Constant	-0.076 (0.078)	-0.077 (0.078)	0.031 (0.056)	0.034 (0.056)
Steal Over $50				

Delinquency Variety Score	0.287*** (0.249)	0.290*** (0.250)	2.937*** (1.233)	2.934*** (1.234)
Constant	-0.022 (0.035)	-0.023 (0.035)	0.031 (0.057)	0.034 (0.057)
Other Property Crime				
Delinquency Variety Score	0.539*** (0.329)	0.539*** (0.329)	0.841*** (0.507)	0.840*** (0.506)
Constant	-0.050 (0.045)	-0.050 (0.045)	0.012 (0.016)	0.013 (0.016)
Attack Someone				
Delinquency Variety Score	1.088*** (0.494)	1.090*** (0.494)	1.005*** (0.632)	1.006*** (0.632)
Constant	-0.060 (0.072)	-0.061 (0.072)	0.055 (0.021)	0.056 (0.021)
Sell Illegal Drugs				
Delinquency Variety Score	1.449*** (0.700)	1.445*** (0.696)	2.949*** (1.202)	2.951*** (1.201)
Constant	-0.125 (0.098)	-0.125 (0.098)	0.079 (0.060)	0.082 (0.060)
Nervous				
Mental Health Issues	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	0.884*** (0.057)	0.884*** (0.057)	0.824*** (0.045)	0.824*** (0.045)
Down or Blue				
Mental Health Issues	1.396*** (0.092)	1.396*** (0.092)	1.238*** (0.045)	1.238*** (0.045)
Constant	0.711*** (0.055)	0.711*** (0.055)	0.603*** (0.041)	0.603*** (0.041)
Depressed				
Mental Health Issues	1.124*** (0.072)	1.124*** (0.072)	0.932*** (0.037)	0.932*** (0.037)
Constant	0.538*** (0.053)	0.537*** (0.053)	0.425*** (0.033)	0.425*** (0.033)
Not Calm				
Mental Health Issues	0.982*** (0.073)	0.983*** (0.073)	0.972*** (0.040)	0.972*** (0.040)
Constant	1.514*** (0.059)	1.514*** (0.059)	1.516*** (0.043)	1.516*** (0.043)
Not Happy				
Mental Health Issues	1.110*** (0.083)	1.111*** (0.083)	1.056*** (0.044)	1.056*** (0.044)
Constant	1.341*** (0.059)	1.340*** (0.059)	1.226*** (0.040)	1.226*** (0.040)

*** p<.01, **p<.05, *p<.10

Note: Significances are based on robust standard errors.

E.3 Delinquency Binary Model Progression

	Black					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n= 2,046	*n = 2,025*	*n = 1,864*	*n= 2,046*	*n = 2,025*	*n = 1,864*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Delinquency Binary						
Incarceration	1.397 (0.711)	1.101 (0.841)	1.216 (1.134)	1.347 (1.291)	0.646 (0.911)	1.511 (2.864)
Mental Health Issues	2.661*** (0.899)	2.162* (0.998)	2.100 (1.099)	2.648*** (0.893)	2.163* (0.993)	2.094 (1.096)
Male		0.800 (0.287)	0.599 (0.235)		0.806 (0.289)	0.599 (0.235)
Income		0.999 (3.72E-06)	0.999 (3.78E-06)		0.999 (3.75E-06)	0.999 (3.77E-06)
Age		1.068 (0.110)	1.024 (0.114)		1.070 (0.110)	1.025 (0.114)
Drug Use		8.473*** (3.216)	9.984*** (4.204)		8.548*** (3.256)	9.959*** (4.211)
Education		0.882 (0.206)	0.959 (0.225)		0.882 (0.206)	0.958 (0.225)
Constant	0.134*** (0.018)	0.015 (0.038)	0.021 (0.061)	0.135*** (0.018)	0.015 (0.038)	0.021 (0.061)
Mental Health Issues						
Incarceration	1.031 (0.047)	1.029 (0.046)	1.027 (0.064)	1.070 (0.068)	1.068 (0.067)	1.074 (0.093)
Pre-Incarceration Mental Health Issues			1.082*** (0.007)			1.082*** (0.007)

Incarceration						
Pre-Incarceration Mental Health Issues			1.003* (0.002)			1.002* (0.001)
Constant			0.995 (0.016)			0.992 (0.011)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

	White					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 3,892	*n = 3,842*	*n = 3,707*	*n = 3,892*	*n = 3,842*	*n = 3,707*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Delinquency Binary						
Incarceration	0.852 (0.384)	0.625 (0.368)	0.257 (0.283)	0.359 (0.302)	0.244 (0.282)	0.000 (0.002)
Mental Health Issues	2.823*** (0.728)	2.180** (0.718)	1.945* (0.689)	2.825*** (0.728)	2.187** (0.721)	1.966* (0.698)
Male		1.408 (0.343)	1.709 (0.461)		1.412 (0.344)	1.732** (0.464)
Income		0.999 (2.19E-06)	0.999 (2.41E-06)		0.999 (2.20E-06)	0.999 (2.42E-06)
Age		0.972 (0.070)	0.986 (0.081)		0.971 (0.070)	0.982 (0.080)
Drug Use		7.147*** (1.968)	7.301*** (2.207)		7.142*** (1.971)	7.297*** (2.207)

Education		0.840 (0.117)	0.872 (0.125)		0.839 (0.116)	0.872 (0.125)
Constant	0.130*** (0.013)	0.079 (0.137)	0.026* (0.052)	0.132*** (0.013)	0.083 (0.143)	0.028* (0.056)
Mental Health Issues						
Incarceration	1.120* (0.065)	1.121** (0.065)	1.030 (0.076)	1.132 (0.099)	1.132 (0.099)	0.916 (0.087)
Pre-Incarceration Mental Health Issues			1.100*** (0.005)			1.100*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			1.001* (0.001)			1.000 (0.000)
Constant			0.998 (0.007)			1.001 (0.004)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

E.4 Delinquency Binary Full Models

	Black		White	
	Binary IV	Proportion IV	Binary IV	Proportion IV
	n = 1,864	*n = 1,864*	*n = 3,707*	*n = 3,707*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
General Model				
Delinquency Binary				
Incarceration	1.216 (1.134)	1.511 (2.864)	0.257 (0.283)	0.000 (0.002)
Mental Health Issues	2.100 (1.099)	2.094 (1.096)	1.945* (0.689)	1.966* (0.698)
Male	0.599 (0.235)	0.599 (0.235)	1.709 (0.461)	1.732** (0.464)
Income	0.999 (3.78E-06)	0.999 (3.77E-06)	0.999 (2.41E-06)	0.999 (2.42E-06)
Age	1.024 (0.114)	1.025 (0.114)	0.986 (0.081)	0.982 (0.080)
Drug Use	9.984*** (4.204)	9.959*** (4.211)	7.301*** (2.207)	7.297*** (2.207)
Education	0.959 (0.225)	0.958 (0.225)	0.872 (0.125)	0.872 (0.125)
Constant	0.021 (0.061)	0.021 (0.061)	0.026* (0.052)	0.028* (0.056)
Mental Health Issues				
Incarceration	1.027 (0.064)	1.074 (0.093)	1.030 (0.076)	0.916 (0.087)
Pre-Incarceration Mental Health Issues	1.082*** (0.007)	1.082*** (0.007)	1.100*** (0.005)	1.100*** (0.005)
Incarceration				
Pre-Incarceration Mental Health Issues	1.003* (0.002)	1.002* (0.001)	1.001* (0.001)	1.000 (0.000)
Constant	0.995 (0.016)	0.992 (0.011)	0.998 (0.007)	1.001 (0.004)
Latent Variable				
Nervous				
Mental Health Issues	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	0.911*** (0.058)	0.912*** (0.058)	0.844*** (0.045)	0.844*** (0.045)
Down or Blue				
Mental Health Issues	1.384*** (0.098)	1.384*** (0.098)	1.265*** (0.049)	1.265*** (0.049)

Constant	0.761*** (0.055)	0.761*** (0.055)	0.609*** (0.041)	0.609*** (0.041)
Depressed				
Mental Health Issues	1.125*** (0.078)	1.125*** (0.078)	0.937*** (0.039)	0.937*** (0.039)
Constant	0.558*** (0.053)	0.558*** (0.053)	0.441*** (0.033)	0.441*** (0.033)
Not Calm				
Mental Health Issues	1.007*** (0.077)	1.008*** (0.077)	0.993*** (0.041)	0.993*** (0.041)
Constant	1.522*** (0.060)	1.522*** (0.060)	1.521*** (0.043)	1.520*** (0.043)
Not Happy				
Mental Health Issues	1.145*** (0.086)	1.146*** (0.087)	1.098*** (0.044)	1.097*** (0.044)
Constant	1.341*** (0.059)	1.340*** (0.059)	1.213*** (0.039)	1.214*** (0.039)

*** p<.01, **p<.05, *p<.10

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

E.5 Arrest Binary Model Progression

	Black					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 2,240	*n = 2,027*	*n = 1,864*	*n = 2,240*	*n = 2,027*	*n = 1,864*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Arrest Binary						
Incarceration	2.883*** (0.927)	1.489 (1.084)	1.947 (1.790)	2.279* (0.959)	1.864 (1.941)	2.121 (3.086)
Mental Health Issues	2.323*** (0.645)	2.562** (1.003)	2.759** (1.144)	2.298*** (0.635)	2.553** (1.001)	2.752** (1.140)
Male		1.990** (0.568)	1.793* (0.562)		1.989** (0.569)	1.804* (0.565)
Income		0.999** (4.01E-06)	0.999** (4.98E-06)		0.999** (4.01E-06)	0.999** (5.01E-06)
Age		1.071 (0.094)	1.033 (0.102)		1.071 (0.095)	1.034 (0.103)
Drug Use		4.670*** (1.292)	4.994*** (1.557)		4.656*** (1.284)	5.007*** (1.560)
Education		0.624** (0.136)	0.614** (0.129)		0.624** (0.136)	0.612** (0.129)
Constant	0.054*** (0.005)	0.007** (0.015)	0.008* (0.020)	0.056*** (0.006)	0.007** (0.015)	0.008** (0.020)
Mental Health Issues						
Incarceration	1.026 (0.046)	1.029 (0.046)	1.027 (0.064)	1.064 (0.067)	1.067 (0.067)	1.074 (0.093)
Pre-Incarceration Mental Health Issues			1.082*** (0.007)			1.082*** (0.007)

Incarceration						
Pre-Incarceration Mental Health Issues			1.003* (0.002)			1.002* (0.001)
Constant			0.995 (0.016)			0.992 (0.011)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

	White					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 4,338	*n = 3,348*	*n = 3,707*	*n = 4,338*	*n = 3,348*	*n = 3,707*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Arrest Binary						
Incarceration	15.245*** (4.453)	9.917*** (4.120)	6.824*** (3.664)	26.754*** (12.977)	23.234*** (18.490)	13.178** (13.381)
Mental Health Issues	1.909** (0.489)	1.481 (0.471)	0.998 (0.335)	2.045*** (0.506)	1.475 (0.459)	0.997 (0.328)
Male		1.682** (0.432)	1.966** (0.559)		1.684** (0.433)	1.928** (0.553)
Income		0.999 (2.03E-06)	0.999 (1.98E-06)		0.999 (1.97E-06)	0.999 (1.96E-06)
Age		1.015 (0.081)	1.022 (0.087)		1.007 (0.080)	1.018 (0.085)
Drug Use		4.575*** (1.171)	5.227*** (1.427)		4.859*** (1.241)	5.392*** (1.478)

Education		0.591*** (0.101)	0.614*** (0.105)		0.575*** (0.099)	0.601*** (0.103)
Constant	0.025*** (0.002)	0.011** (0.022)	0.008** (0.016)	0.026*** (0.003)	0.014** (0.028)	0.009** (0.019)
Mental Health Issues						
Incarceration	1.119** (0.065)	1.121** (0.065)	1.030 (0.076)	1.126 (0.099)	1.132 (0.099)	0.916 (0.087)
Pre-Incarceration Mental Health Issues			1.100*** (0.005)			1.100*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			1.001* (0.001)			1.000 (0.000)
Constant			0.998 (0.007)			1.001 (0.004)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

E.6 Arrest Binary Full Models

	Black		White	
	Binary IV	Proportion IV	Binary IV	Proportion IV
	n = 1,864	*n = 1,864*	*n = 3,707*	*n = 3,707*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
General Model				
Arrest Binary				
Incarceration	1.947 (1.790)	2.121 (3.086)	6.824*** (3.664)	13.178** (13.381)
Mental Health Issues	2.759** (1.144)	2.752** (1.140)	0.998 (0.335)	0.997 (0.328)
Male	1.793* (0.562)	1.804* (0.565)	1.966** (0.559)	1.928** (0.553)
Income	0.999** (4.98E-06)	0.999** (5.01E-06)	0.999 (1.98E-06)	0.999 (1.96E-06)
Age	1.033 (0.102)	1.034 (0.103)	1.022 (0.087)	1.018 (0.085)
Drug Use	4.994*** (1.557)	5.007*** (1.560)	5.227*** (1.427)	5.392*** (1.478)
Education	0.614** (0.129)	0.612** (0.129)	0.614*** (0.105)	0.601*** (0.103)
Constant	0.008* (0.020)	0.008** (0.020)	0.008** (0.016)	0.009** (0.019)
Mental Health Issues				
Incarceration	1.027 (0.064)	1.074 (0.093)	1.030 (0.076)	0.916 (0.087)
Pre-Incarceration Mental Health Issues	1.082*** (0.007)	1.082*** (0.007)	1.100*** (0.005)	1.100*** (0.005)
Incarceration				
Pre-Incarceration Mental Health Issues	1.003* (0.002)	1.002* (0.001)	1.001* (0.001)	1.000 (0.000)
Constant	0.995 (0.016)	0.992 (0.011)	0.998 (0.007)	1.001 (0.004)
Latent Variable				
Nervous				
Mental Health Issues	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	0.911*** (0.058)	0.911*** (0.058)	0.844*** (0.045)	0.844*** (0.045)
Down or Blue				
Mental Health Issues	1.385*** (0.098)	1.385*** (0.098)	1.264*** (0.049)	1.264*** (0.049)

Constant	0.760*** (0.055)	0.760*** (0.055)	0.609*** (0.041)	0.609*** (0.041)
Depressed				
Mental Health Issues	1.123*** (0.077)	1.124*** (0.078)	0.936*** (0.039)	0.936*** (0.039)
Constant	0.559*** (0.053)	0.559*** (0.053)	0.441*** (0.033)	0.442*** (0.033)
Not Calm				
Mental Health Issues	1.004*** (0.077)	1.005*** (0.077)	0.993*** (0.041)	0.993*** (0.041)
Constant	1.525*** (0.060)	1.524*** (0.060)	1.520*** (0.043)	1.520*** (0.043)
Not Happy				
Mental Health Issues	1.141*** (0.086)	1.143*** (0.086)	1.097*** (0.044)	1.096*** (0.044)
Constant	1.343*** (0.059)	1.342*** (0.059)	1.213*** (0.039)	1.214*** (0.039)

*** p<.01, **p<.05, *p<.10

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

E.7 Wald Test for Equality of Coefficients, By Race

Independent Variable	Dependent Variable	Chi Sq
Incarceration Binary-Delinquency Variety Score Pathway		
Incarceration Binary	Mental Health Issues	0.530
Mental Health Issues	Delinquency Variety Score	0.070
Incarceration Binary	Delinquency Variety Score	1.440
Incarceration Proportion-Delinquency Variety Score Pathway		
Incarceration Proportion	Mental Health Issues	0.030
Mental Health Issues	Delinquency Variety Score	0.060
Incarceration Proportion	Delinquency Variety Score	1.260
Incarceration Binary-Delinquency Binary Pathway		
Incarceration Binary	Mental Health Issues	0.000
Mental Health Issues	Delinquency Binary	0.010
Incarceration Binary	Delinquency Binary	1.160
Incarceration Proportion-Delinquency Binary Pathway		
Incarceration Proportion	Mental Health Issues	1.550
Mental Health Issues	Delinquency Binary	0.010
Incarceration Proportion	Delinquency Binary	2.340
Incarceration Binary-Arrest Binary Pathway		
Incarceration Binary	Mental Health Issues	0.000
Mental Health Issues	**Arrest Binary**	**3.640***
Incarceration Binary	Arrest Binary	1.390
Incarceration Proportion-Arrest Binary Pathway		
Incarceration Proportion	Mental Health Issues	1.540
Mental Health Issues	**Arrest Binary**	**3.680***
Incarceration Proportion	Arrest Binary	1.060

*** p<.01, **p<.05, *p<.10
Note: Bold indicates significant relationship.

E.8 Pathways from Incarceration to Offending – Through Mental Health, By Race

			Black	White
			Coef. (S.E.)	Coef. (S.E.)
Incarceration Binary	Mental Health Issues	Delinquency Variety Score	-0.0001 (0.0007)	0.0005 (0.0007)
Incarceration Proportion	Mental Health Issues	Delinquency Variety Score	0.0002 (0.001)	0.0003 (0.0008)
Incarceration Binary	Mental Health Issues	Delinquency Binary	1.020 (0.049)	1.020 (0.050)
Incarceration Proportion	Mental Health Issues	Delinquency Binary	1.054 (0.077)	0.942 (0.067)
Incarceration Binary	Mental Health Issues	Arrest Binary	1.027 (0.066)	0.999 (0.010)
Incarceration Proportion	Mental Health Issues	Arrest Binary	1.074 (0.099)	1.000 (0.029)

*** p<.01, **p<.05, *p<.10
Note: Coefficients for binary measures are exponentiated to present odds ratios. Significances are based on robust standard errors.

F: Moderated Mediation by Sex

F.1 Delinquency Variety Score Model Progression

	Male					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 4,599	*n = 4,599*	*n = 4,599*	*n = 4,599*	*n = 4,599*	*n = 4,599*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
Delinquency Variety Score						
Incarceration	0.007 (0.015)	-0.002 (0.014)	0.000 (0.015)	-0.004 (0.013)	-0.016 (0.012)	-0.012 (0.012)
Mental Health Issues	0.035*** (0.012)	0.020* (0.011)	0.018* (0.010)	0.034*** (0.012)	0.020* (0.011)	0.017* (0.010)
Black[1]		0.003 (0.005)	0.003 (0.005)		0.003 (0.005)	0.003 (0.005)
Other race[1]		0.007 (0.007)	0.008 (0.007)		0.008 (0.007)	0.008 (0.007)
Income		-5.39E-08 (3.71E-08)	-4.53E-08 (3.58E-08)		-5.03E-08 (3.64E-08)	-4.82E-08 (3.63E-08)
Age		-0.002 (0.002)	-0.002 (0.002)		-0.002 (0.002)	-0.002 (0.002)
Drug Use		0.042*** (0.009)	0.042*** (0.010)		0.042*** (0.010)	0.042*** (0.010)
Education		-0.005* (0.003)	-0.004 (0.003)		-0.005 (0.003)	-0.005 (0.003)
Mental Health Issues						
Incarceration	0.109*** (0.032)	-0.107*** (0.032)	0.024 (0.038)	-0.126*** (0.045)	-0.126*** (0.045)	-0.005 (0.049)

Pre-Incarceration Mental Health Issues			0.084*** (0.005)			0.084*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			0.008*** (0.002)			0.007*** (0.002)
Constant			-0.032 (0.020)			-0.034** (0.017)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Significances are based on robust standard errors.

	Female					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 4,385	*n = 4,385*	*n = 4,385*	*n = 4,385*	*n = 4,385*	*n = 4,385*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
Delinquency Variety Score						
Incarceration	0.017 (0.019)	0.008 (0.017)	0.008 (0.017)	-0.001 (0.021)	-0.018 (0.023)	-0.018 (0.023)
Mental Health Issues	0.023 (0.016)	0.014 (0.013)	0.014 (0.011)	0.023 (0.016)	0.014 (0.013)	0.014 (0.011)
Black[1]		0.005 (0.006)	0.005 (0.006)		0.005 (0.006)	0.005 (0.007)
Other race[1]		0.001 (0.007)	0.007 (0.007)		0.001 (0.007)	0.0003 (0.007)

Income		1.11E-08 (5.83E-08)	1.07E-08 (05.81E-08)		1.04E-08 (5.82E-08)	1.01E-08 (5.81E-08)
Age		0.002 (0.002)	0.002 (0.002)		0.002 (0.002)	0.002 (0.002)
Drug Use		0.036** (0.015)	0.035** (0.014)		0.036** (0.015)	0.036** (0.015)
Education		-0.003 (0.003)	-0.003 (0.003)		-0.003 (0.004)	-0.003 (0.004)
Mental Health Issues						
Incarceration	-0.211** (0.091)	-0.211** (0.091)	0.126 (0.102)	-0.434*** (0.128)	-0.435*** (0.128)	0.249 (0.173)
Pre-Incarceration Mental Health Issues			0.088*** (0.005)			0.088*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			0.001** (0.000)			0.000* (0.000)
Constant			-0.005 (0.004)			-0.003 (0.002)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Significances are based on robust standard errors.

F.2 Delinquency Variety Score Full Models

	Male		Female	
	Binary IV	Proportion IV	Binary IV	Proportion IV
	n = 4,599	*n = 4,599*	*n = 4,385*	*n = 4,385*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
General Model				
Delinquency Variety Score				
Incarceration	0.000 (0.015)	-0.012 (0.012)	0.008 (0.017)	-0.018 (0.023)
Mental Health Issues	0.018* (0.010)	0.017* (0.010)	0.014 (0.011)	0.014 (0.011)
Black[1]	0.003 (0.005)	0.003 (0.005)	0.005 (0.006)	0.005 (0.007)
Other race[1]	0.008 (0.007)	0.008 (0.007)	0.007 (0.007)	0.0003 (0.007)
Income	-4.53E-08 (3.58E-08)	-4.82E-08 (3.63E-08)	1.07E-08 (5.81E-08)	1.01E-08 (5.81E-08)
Age	-0.002 (0.002)	-0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Drug Use	0.042*** (0.010)	0.042*** (0.010)	0.035** (0.014)	0.036** (0.015)
Education	-0.004 (0.003)	-0.005 (0.003)	-0.003 (0.003)	-0.003 (0.004)
Mental Health Issues				
Incarceration	0.024 (0.038)	-0.005 (0.049)	0.126 (0.102)	0.249 (0.173)
Pre-Incarceration Mental Health Issues	0.084*** (0.005)	0.084*** (0.005)	0.088*** (0.005)	0.088*** (0.005)
Incarceration				
Pre-Incarceration Mental Health Issues	0.008*** (0.002)	0.007*** (0.002)	0.001** (0.000)	0.000* (0.000)
Constant	-0.032 (0.020)	-0.034** (0.017)	-0.005 (0.004)	-0.003 (0.002)
Latent Variables				
Destroy Property				
Delinquency Variety Score	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	0.047 (0.041)	0.048 (0.042)	-0.045 (0.055)	-0.043 (0.055)
Steal Under $50				
Delinquency Variety Score	1.284*** (0.324)	1.286*** (0.323)	1.902*** (0.627)	1.902*** (0.630)

Constant	0.054 (0.051)	0.056 (0.051)	-0.106 (0.096)	-0.104 (0.097)
Steal Over $50				
Delinquency Variety Score	0.831*** (0.301)	0.830*** (0.301)	1.557*** (0.516)	1.548*** (0.513)
Constant	0.036 (0.034)	0.037 (0.034)	-0.094 (0.090)	-0.091 (0.090)
Other Property Crime				
Delinquency Variety Score	0.779*** (0.233)	0.778*** (0.233)	0.402*** (0.252)	0.400*** (0.251)
Constant	0.033 (0.030)	0.034 (0.030)	-0.023 (0.030)	-0.022 (0.030)
Attack Someone				
Delinquency Variety Score	1.522*** (0.442)	1.526*** (0.441)	0.575*** (0.303)	0.571*** (0.303)
Constant	0.098 (0.060)	0.101 (0.061)	0.002 (0.039)	0.003 (0.039)
Sell Illegal Drugs				
Delinquency Variety Score	2.151*** (0.633)	2.160*** (0.629)	1.514*** (0.432)	1.515*** (0.432)
Constant	0.119 (0.084)	0.123 (0.085)	-0.072 (0.075)	-0.070 (0.076)
Nervous				
Mental Health Issues	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	0.870*** (0.044)	0.870*** (0.044)	0.929*** (0.045)	0.929*** (0.045)
Down or Blue				
Mental Health Issues	1.371*** (0.063)	1.371*** (0.063)	1.272*** (0.054)	1.271*** (0.053)
Constant	0.613*** (0.039)	0.612*** (0.039)	0.738*** (0.042)	0.738*** (0.042)
Depressed				
Mental Health Issues	1.053*** (0.051)	1.052*** (0.051)	1.021*** (0.044)	1.021*** (0.044)
Constant	0.506*** (0.034)	0.506*** (0.034)	0.476*** (0.038)	0.475*** (0.038)
Not Calm				
Mental Health Issues	1.007*** (0.054)	1.007*** (0.054)	0.916*** (0.042)	0.916*** (0.042)
Constant	1.496*** (0.046)	1.495*** (0.046)	1.659*** (0.041)	1.658*** (0.041)
Not Happy				
Mental Health Issues	1.150*** (0.062)	1.150*** (0.062)	1.085*** (0.048)	1.085*** (0.047)

Constant	1.275*** (0.047)	1.275*** (0.047)	1.275*** (0.039)	1.275*** (0.039)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Significances are based on robust standard errors.

F.3 Delinquency Binary Model Progression

	Male					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 3,852	*n = 3,779*	*n = 3,533*	*n = 3,852*	*n = 3,779*	*n = 3,533*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Delinquency Binary						
Incarceration	0.886 (0.297)	0.400* (0.219)	0.144* (0.147)	0.729 (0.454)	0.198 (0.251)	0.155 (0.342)
Mental Health Issues	2.831*** (0.707)	1.623 (0.529)	1.690 (0.608)	2.807*** (0.701)	1.624 (0.530)	1.702 (0.612)
Black[1]		1.044 (0.238)	0.871 (0.228)		1.047 (0.238)	0.876 (0.228)
Other race[1]		0.978 (0.244)	1.124 (0.297)		0.977 (0.245)	1.107 (0.293)
Income		0.999* (2.15E-06)	0.999 (2.20E-06)		0.999* (2.16E-06)	0.999 (2.20E-06)
Age		0.994 (0.063)	0.989 (0.069)		0.995 (0.063)	0.993 (0.069)
Drug Use		7.445*** (1.770)	8.684*** (2.380)		7.396*** (1.759)	8.565*** (2.339)
Education		0.878 (0.116)	0.873 (0.121)		0.885 (0.116)	0.887 (0.122)
Constant	0.145*** (0.012)	0.067* (0.103)	0.052* (0.091)	0.146*** (0.012)	0.063* (0.097)	0.044* (0.078)
Mental Health Issues						
Incarceration	1.112*** (0.035)	1.110*** (0.035)	1.044 (0.047)	1.134*** (0.051)	1.133*** (0.051)	1.037 (0.063)

Pre-Incarceration Mental Health Issues			1.082*** (0.005)			1.083*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			1.005*** (0.001)			1.003*** (0.001)
Constant			0.983 (0.013)			0.986 (0.009)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

	Female					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 3,770	*n = 3,744*	*n = 3,627*	*n = 3,770*	*n = 3,744*	*n = 3,627*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Delinquency Binary						
Incarceration	3.671** (1.974)	2.990 (2.277)	3.673* (2.811)	10.384 (16.316)	3.483 (6.710)	58.840 (191.648)
Mental Health Issues	3.267*** (1.057)	3.782*** (1.634)	2.475** (1.079)	3.300*** (1.063)	3.638*** (1.555)	2.404** (1.043)
Black[1]		1.871* (0.696)	2.329** (0.905)		1.834 (0.676)	2.251** (0.873)
Other race[1]		0.666 (0.294	0.845 (0.396)		0.645 (0.284)	0.836 (0.391)

Income		0.999 (3.51E-06)	0.999 (4.73E-06)		0.999 (3.44E-06)	0.999 (5.15E-06)
Age		0.980 (0.100)	0.979 (0.107)		0.979 (0.101)	0.994 (0.112)
Drug Use		9.870*** (3.470)	9.634*** (3.573)		9.898*** (3.503)	9.585*** (3.561)
Education		0.589** (0.122)	0.685* (0.133)		0.582*** (0.120)	0.687* (0.132)
Constant	0.087*** (0.012)	0.041 (0.104)	0.022 (0.059)	0.089*** (0.012)	0.043 (0.109)	0.016 (0.045)
Mental Health Issues						
Incarceration	1.236** (0.112)	1.236** (0.112)	1.153 (0.135)	1.546*** (0.198)	1.547*** (0.197)	1.380 (0.347)
Pre-Incarceration Mental Health Issues			1.093*** (0.005)			1.093*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			1.001** (0.000)			1.000* (0.000)
Constant			0.996 (0.004)			0.999 (0.001)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

F.4 Delinquency Binary Full Models

	Male		Female	
	Binary IV	Proportion IV	Binary IV	Proportion IV
	n = 3,533	*n = 3,533*	*n = 3,627*	*n = 3,627*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
General Model				
Delinquency Binary				
Incarceration	0.144* (0.147)	0.155 (0.342)	3.673* (2.811)	58.840 (191.648)
Mental Health Issues	1.690 (0.608)	1.702 (0.612)	2.475** (1.079)	2.404** (1.043)
Black[1]	0.871 (0.228)	0.876 (0.228)	2.329** (0.905)	2.251** (0.873)
Other race[1]	1.124 (0.297)	1.107 (0.293)	0.845 (0.396)	0.836 (0.391)
Income	0.999 (2.20E-06)	0.999 (2.20E-06)	0.999 (4.73E-06)	0.999 (5.15E-06)
Age	0.989 (0.069)	0.993 (0.069)	0.979 (0.107)	0.994 (0.112)
Drug Use	8.684*** (2.380)	8.565*** (2.339)	9.634*** (3.573)	9.585*** (3.561)
Education	0.873 (0.121)	0.887 (0.122)	0.685* (0.133)	0.687* (0.132)
Constant	0.052* (0.091)	0.044* (0.078)	0.022 (0.059)	0.016 (0.045)
Mental Health Issues				
Incarceration	1.044 (0.047)	1.037 (0.063)	1.153 (0.135)	1.380 (0.347)
Pre-Incarceration Mental Health Issues	1.082*** (0.005)	1.083*** (0.005)	1.093*** (0.005)	1.093*** (0.005)
Incarceration				
Pre-Incarceration Mental Health Issues	1.005*** (0.001)	1.003*** (0.001)	1.001** (0.000)	1.000* (0.000)
Constant	0.983 (0.013)	0.986 (0.009)	0.996 (0.004)	0.999 (0.001)
Latent Variable				
Nervous				
Mental Health Issues	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	0.908*** (0.043)	0.907*** (0.043)	0.927*** (0.046)	0.926*** (0.046)
Down or Blue				

Mental Health Issues	1.434*** (0.069)	1.434*** (0.068)	1.241*** (0.055)	1.241*** (0.055)
Constant	0.626*** (0.039)	0.626*** (0.039)	0.761*** (0.042)	0.761*** (0.042)
Depressed				
Mental Health Issues	1.077*** (0.055)	1.077*** (0.055)	1.006*** (0.045)	1.006*** (0.045)
Constant	0.527*** (0.033)	0.527*** (0.033)	0.485*** (0.038)	0.485*** (0.038)
Not Calm				
Mental Health Issues	1.076*** (0.057)	1.076*** (0.057)	0.891*** (0.043)	0.891*** (0.043)
Constant	1.489*** (0.047)	1.489*** (0.047)	1.677*** (0.042)	1.677*** (0.042)
Not Happy				
Mental Health Issues	1.245*** (0.063)	1.245*** (0.063)	1.065*** (0.049)	1.064*** (0.049)
Constant	1.255*** (0.046)	1.255*** (0.046)	1.288*** (0.039)	1.288*** (0.039)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

__F.5 Arrest Binary Model Progression__

	Male					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 4,317	*n = 3,785*	*n = 3,533*	*n = 4,317*	*n = 3,785*	*n = 3,533*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Arrest Binary						
Incarceration	3.932*** (0.828)	3.676*** (1.482)	3.470** (1.853)	3.138*** (0.886)	4.393** (2.968)	3.887 (3.652)
Mental Health Issues	2.578*** (0.566)	2.188** (0.668)	1.888* (0.632)	2.650*** (0.578)	2.188** (0.666)	1.880* (0.626)
Black[1]		1.916*** (0.426)	1.753** (0.438)		1.891*** (0.420)	1.749** (0.435)
Other race[1]		1.507* (0.389)	1.630* (0.422)		1.505* (0.365)	1.643* (0.423)
Income		0.999 (1.82E-06)	0.999 (2.04E-06)		0.999 (1.84E-06)	0.999 (2.05E-06)
Age		1.011 (0.063)	0.989 (0.067)		1.010 (0.063)	0.986 (0.066)
Drug Use		5.629*** (1.182)	6.744*** (1.588)		5.737*** (1.201)	6.819*** (1.601)
Education		0.662*** (0.099)	0.644*** (0.101)		0.645*** (0.097)	0.630*** (0.099)
Constant	0.050*** (0.004)	0.025** (0.039)	0.027** (0.046)	0.053*** (0.004)	0.027 (0.042)	0.030** (0.051)
Mental Health Issues						
Incarceration	1.106*** (0.035)	1.110*** (0.035)	1.044 (0.047)	1.128*** (0.051)	1.133*** (0.051)	1.036 (0.063)

Pre-Incarceration Mental Health Issues			1.082*** (0.005)			1.083*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			1.005*** (0.001)			1.003*** (0.001)
Constant			0.983 (0.013)			0.986 (0.009)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

	Female					
	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 4,149	*n = 3,474*	*n = 3,627*	*n = 4,149*	*n = 3,474*	*n = 3,627*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Arrest Binary						
Incarceration	13.623*** (7.374)	11.853*** (7.805)	6.816** (6.314)	156.253*** (243.715)	184.395*** (324.407)	24.201 (74.558)
Mental Health Issues	3.289*** (0.936)	2.444** (0.845)	1.964* (0.695)	3.367*** (0.941)	2.345** (0.809)	1.934* (0.678)
Black[1]		1.724* (0.546)	2.128** (0.712)		1.704* (0.538)	2.074** (0.691)
Other race[1]		1.501 (0.531)	1.473 (0.576)		1.494 (0.531)	1.431 (0.560)

Income		0.999* (3.15E-06)	0.999 (2.79E-06)		0.999* (3.26E-06)	0.999 (2.89E-06)
Age		1.009 (0.091)	0.984 (0.097)		1.016 (0.093)	0.985 (0.097)
Drug Use		3.217*** (0.918)	3.400*** (1.051)		3.175*** (0.914)	3.438*** (1.059)
Education		0.531*** (0.090)	0.560*** (0.089)		0.534*** (0.089)	0.558*** (0.088)
Constant	0.018*** (0.002)	0.031 (0.067)	0.023 (0.056)	0.018*** (0.002)	0.027* (0.058)	0.023 (0.057)
Mental Health Issues						
Incarceration	1.237** (0.112)	1.236** (0.112)	1.153 (0.135)	1.552*** (0.195)	1.546*** (0.197)	1.380 (0.347)
Pre-Incarceration Mental Health Issues			1.093*** (0.005)			1.093*** (0.005)
Incarceration						
Pre-Incarceration Mental Health Issues			1.001** (0.000)			1.000* (0.000)
Constant			0.996 (0.004)			0.999 (0.001)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

F.6 Arrest Binary Full Models

	Male		Female	
	Binary IV	Proportion IV	Binary IV	Proportion IV
	n = 3,533	*n = 3,533*	*n = 3,627*	*n = 3,627*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
General Model				
Arrest Binary				
Incarceration	3.470** (1.853)	3.887 (3.652)	6.816** (6.314)	24.201 (74.558)
Mental Health Issues	1.888* (0.632)	1.880* (0.626)	1.964* (0.695)	1.934* (0.678)
Black[1]	1.753** (0.438)	1.749** (0.435)	2.128** (0.712)	2.074** (0.691)
Other race[1]	1.630* (0.422)	1.643* (0.423)	1.473 (0.576)	1.431 (0.560)
Income	0.999 (2.04E-06)	0.999 (2.05E-06)	0.999 (2.79E-06)	0.999 (2.89E-06)
Age	0.989 (0.067)	0.986 (0.066)	0.984 (0.097)	0.985 (0.097)
Drug Use	6.744*** (1.588)	6.819*** (1.601)	3.400*** (1.051)	3.438*** (1.059)
Education	0.644*** (0.101)	0.630*** (0.099)	0.560*** (0.089)	0.558*** (0.088)
Constant	0.027** (0.046)	0.030** (0.051)	0.023 (0.056)	0.023 (0.057)
Mental Health Issues				
Incarceration	1.044 (0.047)	1.036 (0.063)	1.153 (0.135)	1.380 (0.347)
Pre-Incarceration Mental Health Issues	1.082*** (0.005)	1.083*** (0.005)	1.093*** (0.005)	1.093*** (0.005)
Incarceration				
Pre-Incarceration Mental Health Issues	1.005*** (0.001)	1.003*** (0.001)	1.001** (0.000)	1.000* (0.000)
Constant	0.983 (0.013)	0.986 (0.009)	0.996 (0.004)	0.999 (0.001)
Latent Variables				
Nervous				
Mental Health Issues	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)	1.000 (constr.)
Constant	0.908*** (0.043)	0.908*** (0.043)	0.927*** (0.046)	0.926*** (0.046)
Down or Blue				

Mental Health Issues	1.435*** (0.069)	1.435*** (0.069)	1.241*** (0.055)	1.241*** (0.055)
Constant	0.626*** (0.039)	0.626*** (0.039)	0.761*** (0.042)	0.761*** (0.042)
Depressed				
Mental Health Issues	1.076*** (0.055)	1.076*** (0.055)	1.006*** (0.045)	1.006*** (0.045)
Constant	0.528*** (0.033)	0.528*** (0.033)	0.485*** (0.038)	0.484*** (0.038)
Not Calm				
Mental Health Issues	1.075*** (0.057)	1.075*** (0.057)	0.890*** (0.043)	0.890*** (0.043)
Constant	1.491*** (0.047)	1.490*** (0.047)	1.677*** (0.042)	1.677*** (0.042)
Not Happy				
Mental Health Issues	1.243*** (0.063)	1.243*** (0.063)	1.065*** (0.049)	1.064*** (0.049)
Constant	1.257*** (0.047)	1.257*** (0.047)	1.288*** (0.039)	1.288*** (0.039)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

F.7 Wald Test for Equality of Coefficients, By Sex

Independent Variable	Dependent Variable	Chi Sq
Incarceration Binary-Delinquency Variety Score Pathway		
Incarceration Binary	Mental Health Issues	0.890
Mental Health Issues	Delinquency Variety Score	0.060
Incarceration Binary	Delinquency Variety Score	0.120
Incarceration Proportion-Delinquency Variety Score Pathway		
Incarceration Proportion	Mental Health Issues	1.990
Mental Health Issues	Delinquency Variety Score	0.050
Incarceration Proportion	Delinquency Variety Score	0.050
Incarceration Binary-Delinquency Binary Pathway		
Incarceration Binary	Mental Health Issues	0.630
Mental Health Issues	Delinquency Binary	0.460
Incarceration Binary	**Delinquency Binary**	**6.420****
Incarceration Proportion-Delinquency Binary Pathway		
Incarceration Proportion	Mental Health Issues	1.220
Mental Health Issues	Delinquency Binary	0.380
Incarceration Proportion	Delinquency Binary	2.280
Incarceration Binary-Arrest Binary Pathway		
Incarceration Binary	Mental Health Issues	0.630
Mental Health Issues	Arrest Binary	0.010
Incarceration Binary	Arrest Binary	0.400
Incarceration Proportion-Arrest Binary Pathway		
Incarceration Proportion	Mental Health Issues	1.220
Mental Health Issues	Arrest Binary	0.000
Incarceration Proportion	Arrest Binary	0.320

*** p<.01, **p<.05, *p<.10
Note: Bold indicates significant relationship.

F.8 Pathways from Incarceration to Offending – Through Mental Health, By Sex

			Male	Female
			Coef. (S.E.)	Coef. (S.E.)
Incarceration Binary	Mental Health Issues	Delinquency Variety Score	0.0004 (0.0007)	0.002 (0.002)
Incarceration Proportion	Mental Health Issues	Delinquency Variety Score	-0.00009 (0.0009)	0.004 (0.004)
Incarceration Binary	Mental Health Issues	Delinquency Binary	1.023 (0.029)	1.138 (0.141)
Incarceration Proportion	Mental Health Issues	Delinquency Binary	1.019 (0.035)	1.326 (0.347)
Incarceration Binary	Mental Health Issues	Arrest Binary	1.028 (0.034)	1.101 (0.103)
Incarceration Proportion	Mental Health Issues	Arrest Binary	1.023 (0.041)	1.237 (0.247)

*** p<.01, **p<.05, *p<.10

Note: Coefficients for binary measures are exponentiated to present odds ratios. Significances are based on robust standard errors.

G: Exploring Individual Stressors After Mental Health

G.1 Delinquency Variety Score Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 2,240	*n = 1,923*	*n = 1,760*	*n = 2,240*	*n = 1,923*	*n = 1,760*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
Delinquency Variety Score						
Incarceration	0.000 (0.003)	0.000 (0.003)	0.001 (0.003)	-0.001 (0.003)	-0.002 (0.002)	0.000 (0.002)
Mental Health Issues	0.005* (0.003)	0.003 (0.003)	0.003 (0.003)	0.005* (0.003)	0.003 (0.003)	0.003 (0.003)
Unemployed	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)	0.003 (0.002)	0.002 (0.002)	0.003 (0.002)
Unmarried	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)
Physical Health Issues	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Male		-0.001 (0.001)	0.000 (0.001)		-0.001 (0.001)	0.000 (0.001)
Black[1]		-0.001 (0.001)	-0.000 (0.001)		-0.001 (0.001)	-0.000 (0.001)
Other race[1]		-0.002 (0.002)	-0.001 (0.001)		-0.002 (0.002)	-0.001 (0.001)
Income		0.000 (0.000)	0.000 (0.000)		0.000 (0.000)	0.000 (0.000)
Age		0.000 (0.000)	0.000 (0.000)		0.000 (0.000)	0.000 (0.000)

Drug Use		0.007** (0.003)	0.004 (0.003)		0.007** (0.003)	0.004 (0.003)
Education		-0.001* (0.001)	-0.001 (0.000)		-0.001* (0.001)	-0.001 (0.000)
Unemployed						
Mental Health Issues	0.116*** (0.024)	0.113*** (0.026)	0.114*** (0.026)	0.116*** (0.024)	0.113*** (0.026)	0.114*** (0.026)
Constant	0.162*** (0.008)	0.147*** (0.008)	0.052** (0.022)	0.162*** (0.008)	0.148*** (0.008)	0.052** (0.022)
Unmarried						
Mental Health Issues	0.094*** (0.026)	0.117*** (0.028)	0.118*** (0.028)	0.093*** (0.026)	0.116*** (0.028)	0.117*** (0.028)
Constant	0.743*** (0.009)	0.728*** (0.010)	0.628*** (0.027)	0.744*** (0.009)	0.728*** (0.010)	0.629*** (0.027)
Physical Health Issues						
Mental Health Issues	0.626*** (0.064)	0.651*** (0.072)	0.692*** (0.074)	0.626*** (0.064)	0.651*** (0.072)	0.693*** (0.073)
Constant	2.379*** (0.021)	2.374*** (0.023)	1.796*** (0.069)	2.380*** (0.021)	2.375*** (0.023)	1.796*** (0.068)
Mental Health Issues						
Incarceration	0.000 (0.044)	-0.061 (0.052)	-0.102 (0.056)	-0.075 (0.071)	-0.202 (0.077)	-0.210 (0.088)
Pre-Incarceration Mental Health Issues			0.087*** (0.007)			0.087*** (0.007)
Incarceration						
Pre-Incarceration Mental Health Issues			0.003 (0.002)			0.000 (0.001)
Pre-Incarceration Unemployed			0.114*** (0.026)			0.073*** (0.019)

Pre-Incarceration Unmarried			0.033*** (0.008)			0.019*** (0.004)
Pre-Incarceration Physical Health Issues			0.001 (0.005)			-0.003 (0.003)
Constant			-0.028 (0.021)			0.001 (0.012)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Significances are based on robust standard errors.

G.2 Delinquency Variety Score Full Models

	Binary IV	Proportion IV
	n = 1,760	*n = 1,760*
	Coef (S.E.)	Coef (S.E.)
Main Model		
Delinquency Variety Score		
Incarceration	0.001 (0.003)	0.000 (0.002)
Mental Health Issues	-0.003 (0.003)	-0.003 (0.003)
Unemployed	0.002 (0.002)	0.003 (0.002)
Unmarried	0.000 (0.001)	0.000 (0.001)
Physical Health Issues	0.001 (0.001)	0.001 (0.001)
Male	0.000 (0.001)	0.000 (0.001)
Black[1]	-0.000 (0.001)	-0.000 (0.001)
Other race[1]	-0.001 (0.001)	-0.001 (0.001)
Income	0.000 (0.000)	0.000 (0.000)
Age	0.000 (0.000)	0.000 (0.000)
Drug Use	0.004 (0.003)	0.004 (0.003)
Education	-0.001 (0.000)	-0.001 (0.000)
Unemployed		
Unmarried	-0.014 (0.019)	-0.014 (0.019)
Physical Health Issues	0.029*** (0.010)	0.029*** (0.010)
Mental Health Issues	0.112*** (0.026)	0.112*** (0.026)
Constant	0.307*** (0.041)	0.306*** (0.041)
Unmarried		
Unemployed	-0.024 (0.030)	-0.024 (0.030)
Physical Health Issues	0.000 (0.011)	0.000 (0.011)

Mental Health Issues	0.119*** (0.028)	0.118*** (0.028)
Constant	0.885*** (0.038)	0.884*** (0.038)
Physical Health Issues		
Unemployed	0.208*** (0.069)	0.208*** (0.069)
Unmarried	-0.002 (0.051)	-0.002 (0.051)
Mental Health Issues	0.663*** (0.073)	0.664*** (0.073)
Constant	3.226*** (0.113)	3.226*** (0.113)
Mental Health Issues		
Incarceration	0.103 (0.056)	0.211 (0.088)
Pre-Incarceration Mental Health Issues	0.087*** (0.007)	0.086*** (0.007)
Incarceration		
Pre-Incarceration Mental Health Issues	-0.003 (0.002)	0.000 (0.001)
Pre-Incarceration Unemployed	0.114*** (0.026)	0.073*** (0.019)
Pre-Incarceration Unmarried	0.033*** (0.008)	0.019*** (0.004)
Pre-Incarceration Physical Health Issues	0.001 (0.005)	-0.003 (0.003)
Constant	0.042 (0.039)	0.005 (0.019)
Latent Variables		
Destroy Property		
Delinquency Variety Score	1.000 (constrained)	1.000 (constrained)
Constant	0.013*** (0.009)	0.013*** (0.009)
Steal Under $50		
Delinquency Variety Score	6.734*** (4.533)	6.734*** (4.516)
Constant	0.026*** (0.062)	0.026*** (0.062)
Steal Over $50		
Delinquency Variety Score	4.244*** (2.730)	4.246*** (2.721)
Constant	0.012*** (0.039)	0.012*** (0.039)

Other Property Crime		
Delinquency Variety Score	2.473*** (1.696)	2.472*** (1.690)
Constant	0.006*** (0.023)	0.006*** (0.023)
Attack Someone		
Delinquency Variety Score	3.883*** (2.440)	3.879*** (2.427)
Constant	0.031*** (0.036)	0.031*** (0.036)
Sell Illegal Drugs		
Delinquency Variety Score	5.024*** (3.499)	5.020*** (3.483)
Constant	0.037*** (0.047)	0.036*** (0.047)
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	1.834*** (0.106)	1.837*** (0.106)
Down or Blue		
Mental Health Issues	-1.255*** (0.077)	-1.254*** (0.077)
Constant	3.482*** (0.097)	3.475*** (0.097)
Depressed		
Mental Health Issues	-0.966*** (0.063)	-0.965*** (0.063)
Constant	2.694 (0.085)	2.689*** (0.085)
Not Calm		
Mental Health Issues	-0.956*** (0.057)	-0.956*** (0.057)
Constant	3.726*** (0.090)	3.723*** (0.090)
Not Happy		
Mental Health Issues	-1.072*** (0.065)	-1.072*** (0.065)
Constant	3.708*** (0.091)	3.704*** (0.091)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Significances are based on robust standard errors.

G.3 Pathways from Incarceration to Delinquency Variety Score – Through Mental Health and Individual Stressors

						Coef. (S.E.)
Pathways from Binary Incarceration						
		Incarceration	Mental Health Issues	Unmarried	Delinquency	1.90E-06 (1.39E-05)
	Incarceration	Mental Health Issues	Unmarried	Unemployed	Delinquency	4.42E-07 (7.31E-07)
Incarceration	Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Delinquency	3.50E-08 (6.21E-08)
	Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Delinquency	2.57E-08 (5.89E-07)
Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Delinquency	1.94E-09 (4.46E-08)
		Incarceration	Mental Health Issues	Unemployed	Delinquency	-2.83E-05 (2.89E-05)
	Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Delinquency	-2.24E-06 (2.69E-06)
Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Delinquency	-1.77E-10 (4.24E-09)
	Incarceration	Mental Health Issues	Unemployed	Unmarried	Delinquency	-4.36E-08 (3.21E-07)
Incarceration	Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Delinquency	-8.55E-10 (1.36E-08)
		Incarceration	Mental Health Issues	Physical	Delinquency	-6.68E-05 (7.66E-05)
	Incarceration	Mental Health Issues	Physical	Unmarried	Delinquency	-7.83E-09 (1.35E-07)

Incarceration	Mental Health Issues	Physical	Unmarried	Unemployed	Delinquency	-1.86E-09 (2.95E-08)
	Incarceration	Mental Health Issues	Physical	Unemployed	Delinquency	-5.08E-06 (5.56E-06)
Incarceration	Mental Health Issues	Physical	Unemployed	Unmarried	Delinquency	-7.27E-09 (5.38E-08)
Pathways from Proportion Incarcerated						
		Incarceration	Mental Health Issues	Unmarried	Delinquency	3.29E-06 (2.81E-05)
	Incarceration	Mental Health Issues	Unmarried	Unemployed	Delinquency	9.09E-07 (1.47E-06)
Incarceration	Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Delinquency	7.10E-08 (1.24E-07)
	Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Delinquency	5.21E-08 (1.20E-06)
Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Delinquency	3.98E-09 (9.16E-08)
		Incarceration	Mental Health Issues	Unemployed	Delinquency	-5.85E-05 (5.68E-05)
	Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Delinquency	-4.58E-06 (5.32E-06)
Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Delinquency	-3.05E-10 (7.45E-09)
	Incarceration	Mental Health Issues	Unemployed	Unmarried	Delinquency	-7.63E-08 (6.53E-07)
Incarceration	Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Delinquency	-1.75E-09 (2.79E-08)
		Incarceration	Mental Health Issues	Physical Health Issues	Delinquency	-1.38E-04 (1.51E-04)

	Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Delinquency	-1.37E-08 (2.43E-07)
Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Delinquency	-3.86E-09 (6.15E-08)
	Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Delinquency	-1.05E-05 (1.09E-05)
Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Delinquency	-1.26E-08 (1.09E-07)

*** p<.01, **p<.05, *p<.10

Note: Significances are based on robust standard errors.

G.4 Delinquency Binary Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 2,264	*n = 1,938*	*n = 1,772*	*n = 2,264*	*n = 1,938*	*n = 1,772*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Delinquency Binary						
Incarceration	1.640* (0.483)	1.348 (0.545)	1.654 (0.675)	1.924 (0.871)	2.124 (1.475)	2.597 (1.794)
Mental Health Issues	2.541*** (0.520)	1.855** (0.449)	1.958*** (0.482)	2.538*** (0.519)	1.872*** (0.452)	1.974*** (0.485)
Unemployed	1.206 (0.244)	1.308 (0.317)	1.534* (0.375)	1.228 (0.245)	1.313 (0.317)	1.541* (0.377)
Unmarried	2.097*** (0.467)	1.515 (0.387)	1.369 (0.356)	2.111*** (0.471)	1.510 (0.386)	1.366 (0.356)
Physical Health Issues	1.111 (0.088)	1.124 (0.109)	1.081 (0.112)	1.114 (0.088)	1.129 (0.110)	1.090 (0.113)
Male		0.905 (0.172)	0.967 (0.193)		0.895 (0.171)	0.962 (0.192)
Black[1]		1.139 (0.241)	1.133 (0.256)		1.128 (0.240)	1.116 (0.255)
Other race[1]		0.652* (0.165)	0.641* (0.172)		0.651* (0.164)	0.639* (0.171)
Income		1.000 (0.000)	1.000 (0.000)		1.000 (0.000)	1.000 (0.000)
Age		0.932 (0.058)	0.976 (0.063)		0.932 (0.058)	0.974 (0.063)
Drug Use		4.698*** (0.940)	4.016*** (0.840)		4.736*** (0.948)	4.054*** (0.849)

Education		0.738*** (0.081)	0.751** (0.086)		0.741*** (0.082)	0.753** (0.087)
Constant	0.033*** (0.009)	0.125 (0.218)	0.025** (0.046)	0.033*** (0.009)	0.124 (0.216)	0.026** (0.047)
Unemployed						
Mental Health Issues	1.121*** (0.027)	1.124*** (0.029)	1.126*** (0.029)	1.120*** (0.027)	1.124*** (0.029)	1.126*** (0.029)
Constant	1.178*** (0.009)	1.160*** (0.009)	1.050** (0.023)	1.178*** (0.009)	1.160*** (0.009)	1.050** (0.023)
Unmarried						
Mental Health Issues	1.100*** (0.028)	1.125*** (0.032)	1.127*** (0.032)	1.099*** (0.028)	1.124*** (0.032)	1.126*** (0.032)
Constant	2.105*** (0.019)	2.073*** (0.021)	1.872*** (0.050)	2.105*** (0.019)	2.073*** (0.021)	1.873*** (0.050)
Physical Health Issues						
Mental Health Issues	1.875*** (0.119)	1.923*** (0.137)	2.006*** (0.147)	1.875*** (0.119)	1.923*** (0.137)	2.009*** (0.147)
Constant	10.794*** (0.226)	10.754*** (0.241)	6.010*** (0.412)	10.807*** (0.226)	10.764*** (0.241)	6.011*** (0.411)
Mental Health Issues						
Incarceration	0.986 (0.043)	0.939 (0.049)	0.902 (0.051)	0.912 (0.063)	0.815 (0.063)	0.809 (0.071)
Pre-Incarceration Mental Health Issues			1.091*** (0.007)			1.090*** (0.007)
Incarceration						
Pre-Incarceration Mental Health Issues			1.003 (0.002)			1.000 (0.001)
Pre-Incarceration Unemployed			1.119*** (0.029)			1.075*** (0.020)

Pre-Incarceration Unmarried			1.033*** (0.009)			1.019*** (0.004)
Pre-Incarceration Physical Health Issues			1.000 (0.005)			0.997 (0.003)
Constant			0.974 (0.020)			1.001 (0.012)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

G.5 Delinquency Binary Full Models

	Binary IV	Proportion IV
	n = 1,772	*n = 1,772*
	Coef (S.E.)	Coef (S.E.)
Main Model		
Delinquency Binary		
Incarceration	1.654 (0.676)	2.597 (1.794)
Mental Health Issues	1.955*** (0.480)	1.971*** (0.483)
Unemployed	1.540* (0.376)	1.548* (0.378)
Unmarried	1.368 (0.356)	1.365 (0.356)
Physical Health Issues	1.082 (0.112)	1.091 (0.113)
Male	0.967 (0.193)	0.962 (0.192)
Black[1]	1.133 (0.256)	1.116 (0.255)
Other race[1]	0.641* (0.172)	0.639* (0.171)
Income	1.000 (0.000)	1.000 (0.000)
Age	0.976 (0.063)	0.974 (0.063)
Drug Use	4.016*** (0.840)	4.055*** (0.849)
Education	0.751** (0.086)	0.753** (0.087)
Constant	0.025** (0.046)	0.026** (0.047)
Unemployed		
Unmarried	0.984 (0.019)	0.985 (0.019)
Physical Health Issues	1.030*** (0.010)	1.030*** (0.010)
Mental Health Issues	1.123*** (0.029)	1.123*** (0.029)
Constant	1.065** (0.027)	1.065** (0.027)
Unmarried		
Unemployed	0.975 (0.029)	0.975 (0.029)

Physical Health Issues	0.999 (0.011)	0.999 (0.011)
Mental Health Issues	1.128*** (0.032)	1.127*** (0.032)
Constant	1.871*** (0.050)	1.872*** (0.050)
Physical Health Issues		
Unemployed	1.235*** (0.084)	1.235*** (0.084)
Unmarried	0.993 (0.045)	0.993 (0.045)
Mental Health Issues	1.946*** (0.141)	1.949*** (0.141)
Constant	5.981*** (0.402)	5.981*** (0.401)
Mental Health Issues		
Incarceration	0.901 (0.051)	0.808 (0.071)
Pre-Incarceration Mental Health Issues	1.091*** (0.007)	1.090*** (0.007)
Incarceration		
Pre-Incarceration Mental Health Issues	1.003 (0.002)	1.000 (0.001)
Pre-Incarceration Unemployed	1.119*** (0.029)	1.075*** (0.020)
Pre-Incarceration Unmarried	1.033*** (0.009)	1.019*** (0.004)
Pre-Incarceration Physical Health Issues	1.000 (0.005)	0.997 (0.003)
Constant	0.974 (0.020)	1.001 (0.012)
Latent Variable		
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	1.000*** (0.061)	1.002*** (0.061)
Down or Blue		
Mental Health Issues	1.256*** (0.077)	1.254*** (0.077)
Constant	0.764*** (0.057)	0.768*** (0.057)
Depressed		
Mental Health Issues	0.964*** (0.063)	0.963*** (0.063)

Constant	0.602*** (0.047)	0.605*** (0.047)
Not Calm		
Mental Health Issues	0.958*** (0.057)	0.958*** (0.057)
Constant	1.655*** (0.056)	1.656*** (0.056)
Not Happy		
Mental Health Issues	1.077*** (0.065)	1.076*** (0.065)
Constant	1.384*** (0.056)	1.386*** (0.056)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

G.6 Pathways from Incarceration to Binary Delinquency – Through Mental Health and Individual Stressors

						Coef. (S.E.)
Pathways from Binary Incarceration						
		Incarceration	Mental Health Issues	Unmarried	Delinquency	0.996070 (0.004)
	Incarceration	Mental Health Issues	Unmarried	Unemployed	Delinquency	1.000085 (0.000)
Incarceration	Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Delinquency	1.000003 (0.000)
	Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Delinquency	1.000007 (0.000)
Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Delinquency	1.000001 (0.000)
		Incarceration	Mental Health Issues	Unemployed	Delinquency	0.994855 (0.004)
	Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Delinquency	0.999802 (0.000)
Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Delinquency	1.000001 (0.000)
	Incarceration	Mental Health Issues	Unemployed	Unmarried	Delinquency	1.000100 (0.000)
Incarceration	Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Delinquency	1.000000 (0.000)
		Incarceration	Mental Health Issues	Physical Health Issues	Delinquency	0.994431 (0.008)
	Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Delinquency	1.000039 (0.000)

Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Delinquency	0.999999 (0.000)
	Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Delinquency	0.999087 (0.001)
Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Delinquency	1.000017 (0.000)
Pathways from Proportion Incarcerated						
		Incarceration	Mental Health Issues	Unmarried	Delinquency	0.992106 (0.008)
	Incarceration	Mental Health Issues	Unmarried	Unemployed	Delinquency	1.000174 (0.000)
Incarceration	Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Delinquency	1.000007 (0.000)
	Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Delinquency	1.000015 (0.000)
Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Delinquency	1.000002 (0.000)
		Incarceration	Mental Health Issues	Unemployed	Delinquency	0.989453 (0.008)
	Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Delinquency	0.999554 (0.001)
Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Delinquency	1.000002 (0.000)
	Incarceration	Mental Health Issues	Unemployed	Unmarried	Delinquency	1.000203 (0.000)
Incarceration	Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Delinquency	0.999999 (0.000)
		Incarceration	Mental Health Issues	Physical Health Issues	Delinquency	0.987361 (0.016)

	Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Delinquency	1.000079 (0.001)
Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Delinquency	0.999998 (0.000)
	Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Delinquency	0.998123 (0.002)
Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Delinquency	1.000033 (0.000)

*** p<.01, **p<.05, *p<.10

Note: Coefficients are exponentiated to present odds ratios. Significances are based on robust standard errors.

G.7 Arrest Binary Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 6,803	*n = 5,910*	*n = 5,446*	*n = 6,803*	*n = 5,910*	*n = 5,446*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Arrest Binary						
Incarceration	6.389*** (1.603)	3.749*** (1.181)	4.075*** (1.404)	11.479*** (3.816)	6.594*** (2.586)	7.053*** (3.032)
Mental Health Issues	2.773*** (0.549)	2.303*** (0.503)	2.605*** (0.574)	2.778*** (0.547)	2.291*** (0.496)	2.568*** (0.561)
Unemployed	1.145 (0.227)	1.157 (0.260)	1.262 (0.293)	1.209 (0.235)	1.206 (0.268)	1.301 (0.301)
Unmarried	1.619*** (0.298)	0.966 (0.210)	0.927 (0.210)	1.643*** (0.302)	0.974 (0.211)	0.935 (0.211)
Physical Health Issues	0.994 (0.078)	0.954 (0.089)	0.929 (0.094)	1.006 (0.080)	0.965 (0.090)	0.944 (0.097)
Male		1.723*** (0.313)	1.722*** (0.333)		1.707*** (0.310)	1.733*** (0.333)
Black[1]		1.101 (0.234)	0.909 (0.208)		1.076 (0.230)	0.887 (0.206)
Other race[1]		1.100 (0.234)	1.002 (0.225)		1.084 (0.229)	0.990 (0.220)
Income		1.000** (0.000)	1.000** (0.000)		1.000** (0.000)	1.000** (0.000)
Age		0.942 (0.052)	0.917 (0.053)		0.942 (0.051)	0.916 (0.053)
Drug Use		4.301*** (0.776)	4.273*** (0.830)		4.423*** (0.801)	4.388*** (0.854)

Education		0.576*** (0.057)	0.545*** (0.059)		0.573*** (0.057)	0.541*** (0.059)
Constant	0.018*** (0.004)	0.145 (0.216)	0.140 (0.216)	0.018*** (0.004)	0.139 (0.205)	0.138 (0.211)
Unemployed						
Mental Health Issues	1.081*** (0.015)	1.084*** (0.016)	1.087*** (0.016)	1.081*** (0.015)	1.083*** (0.016)	1.087*** (0.016)
Constant	1.150*** (0.005)	1.144*** (0.005)	1.061*** (0.014)	1.151*** (0.005)	1.144*** (0.005)	1.061*** (0.014)
Unmarried						
Mental Health Issues	1.147*** (0.019)	1.153*** (0.021)	1.154*** (0.021)	1.147*** (0.019)	1.153*** (0.021)	1.154*** (0.021)
Constant	1.980*** (0.011)	1.956*** (0.012)	1.717*** (0.030)	1.981*** (0.011)	1.956*** (0.012)	1.717*** (0.030)
Physical Health Issues						
Mental Health Issues	1.932*** (0.074)	1.956*** (0.083)	2.002*** (0.084)	1.932*** (0.074)	1.956*** (0.082)	2.003*** (0.084)
Constant	9.659*** (0.112)	9.600*** (0.119)	5.174*** (0.204)	9.664*** (0.112)	9.604*** (0.119)	5.172*** (0.203)
Mental Health Issues						
Incarceration	1.038 (0.041)	1.012 (0.049)	0.955 (0.050)	1.002 (0.062)	0.967 (0.074)	0.917 (0.077)
Pre-Incarceration Mental Health Issues			1.099*** (0.004)			1.099*** (0.004)
Incarceration						
Pre-Incarceration Mental Health Issues			1.002** (0.001)			1.001** (0.001)
Pre-Incarceration Unemployed			1.048*** (0.011)			1.032*** (0.008)

Pre-Incarceration Unmarried			1.018*** (0.003)			1.010*** (0.002)
Pre-Incarceration Physical Health Issues			0.999 (0.002)			0.997** (0.001)
Constant			0.979** (0.008)			0.991* (0.005)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

G.8 Arrest Binary Full Models

	Binary IV	Proportion IV
	n = 5,446	*n = 5,446*
	Coef (S.E.)	Coef (S.E.)
Main Model		
Arrest Binary		
Incarceration	4.076*** (1.404)	7.054*** (3.032)
Mental Health Issues	2.603*** (0.573)	2.566*** (0.560)
Unemployed	1.267 (0.294)	1.306 (0.302)
Unmarried	0.927 (0.210)	0.934 (0.211)
Physical Health Issues	0.929 (0.094)	0.944 (0.097)
Male	1.722*** (0.333)	1.733*** (0.333)
Black[1]	0.909 (0.208)	0.887 (0.206)
Other race[1]	1.002 (0.225)	0.990 (0.220)
Income	1.000** (0.000)	1.000** (0.000)
Age	0.917 (0.053)	0.916 (0.053)
Drug Use	4.273*** (0.830)	4.389*** (0.854)
Education	0.545*** (0.059)	0.541*** (0.059)
Constant	0.140 (0.216)	0.138 (0.211)
Unemployed		
Unmarried	0.978** (0.010)	0.978** (0.010)
Physical Health Issues	1.021*** (0.006)	1.021*** (0.006)
Mental Health Issues	1.087*** (0.016)	1.087*** (0.016)
Constant	1.077*** (0.015)	1.077*** (0.015)
Unmarried		
Unemployed	0.957** (0.018)	0.957** (0.018)

Physical Health Issues	1.014** (0.007)	1.014** (0.007)
Mental Health Issues	1.155*** (0.021)	1.155*** (0.021)
Constant	1.715*** (0.030)	1.715*** (0.030)
Physical Health Issues		
Unemployed	1.160*** (0.051)	1.160*** (0.051)
Unmarried	1.054** (0.024)	1.054** (0.024)
Mental Health Issues	1.972*** (0.082)	1.973*** (0.082)
Constant	5.142*** (0.200)	5.140*** (0.200)
Mental Health Issues		
Incarceration	0.955 (0.050)	0.916 (0.077)
Pre-Incarceration Mental Health Issues	1.099*** (0.004)	1.099*** (0.004)
Incarceration		
Pre-Incarceration Mental Health Issues	1.002** (0.001)	1.001** (0.001)
Pre-Incarceration Unemployed	1.048*** (0.011)	1.032*** (0.008)
Pre-Incarceration Unmarried	1.018*** (0.003)	1.010*** (0.002)
Pre-Incarceration Physical Health Issues	0.999 (0.002)	0.997** (0.001)
Constant	0.979** (0.008)	0.991* (0.005)
Latent Variable		
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	0.917*** (0.036)	0.917*** (0.036)
Down or Blue		
Mental Health Issues	1.232*** (0.042)	1.232*** (0.042)
Constant	0.682*** (0.032)	0.682*** (0.032)
Depressed		
Mental Health Issues	0.920*** (0.035)	0.920*** (0.035)

Constant	0.520*** (0.026)	0.520*** (0.026)
Not Calm		
Mental Health Issues	0.959*** (0.034)	0.959*** (0.034)
Constant	1.564*** (0.033)	1.564*** (0.033)
Not Happy		
Mental Health Issues	1.047*** (0.037)	1.047*** (0.037)
Constant	1.297*** (0.031)	1.297*** (0.031)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

G.9 Pathways from Incarceration to Binary Arrest – Through Mental Health and Individual Stressors

						Coef. (S.E.)
Pathways from Binary Incarceration						
		Incarceration	Mental Health Issues	Unmarried	Arrest	1.000509 (0.002)
	Incarceration	Mental Health Issues	Unmarried	Unemployed	Arrest	1.000035 (0.000)
Incarceration	Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Arrest	0.999998 (0.000)
	Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Arrest	1.000026 (0.000)
Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Arrest	0.999998 (0.000)
		Incarceration	Mental Health Issues	Unemployed	Arrest	0.999102 (0.001)
	Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Arrest	1.000041 (0.000)
Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Arrest	1.000001 (0.000)
	Incarceration	Mental Health Issues	Unemployed	Unmarried	Arrest	0.999988 (0.000)
Incarceration	Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Arrest	0.999999 (0.000)
		Incarceration	Mental Health Issues	Physical Health Issues	Arrest	1.002331 (0.004)
	Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Arrest	1.000032 (0.000)

Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Arrest	1.000002 (0.000)
	Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Arrest	0.999845 (0.000)
Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Arrest	0.999998 (0.000)
Pathways from Proportion Incarcerated						
		Incarceration	Mental Health Issues	Unmarried	Arrest	1.000861 (0.003)
	Incarceration	Mental Health Issues	Unmarried	Unemployed	Arrest	1.000076 (0.000)
Incarceration	Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Arrest	0.999998 (0.000)
	Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Arrest	1.000038 (0.000)
Incarceration	Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Arrest	0.999996 (0.000)
		Incarceration	Mental Health Issues	Unemployed	Arrest	0.998098 (0.002)
	Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Arrest	1.00006 (0.000)
Incarceration	Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Arrest	1.000001 (0.000)
	Incarceration	Mental Health Issues	Unemployed	Unmarried	Arrest	0.999979 (0.000)
Incarceration	Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Arrest	0.999999 (0.000)
		Incarceration	Mental Health Issues	Physical Health Issues	Arrest	1.003494 (0.007)

	Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Arrest	1.000055 (0.000)
Incarceration	Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Arrest	1.000005 (0.000)
	Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Arrest	0.999669 (0.000)
Incarceration	Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Arrest	0.999996 (0.000)

*** p<.01, **p<.05, *p<.10

Note: Coefficients are exponentiated to present odds ratios. Significances are based on robust standard errors.

H: Exploring Number of Stressors After Mental Health

H.1 Delinquency Variety Score Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 2,295	*n = 1,930*	*n = 1,768*	*n = 2,295*	*n = 1,930*	*n = 1,768*
	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)	Coef (S.E.)
Delinquency Variety Score						
Incarceration	0.000 (0.003)	0.000 (0.003)	0.001 (0.003)	-0.002 (0.003)	-0.002 (0.002)	-0.001 (0.002)
Mental Health Issues	0.006* (0.003)	0.004 (0.003)	0.003 (0.003)	0.006* (0.003)	0.004 (0.003)	0.003 (0.003)
Number of Stressors	0.002* (0.001)	0.002 (0.002)	0.001 (0.001)	0.002* (0.001)	0.002 (0.002)	0.001 (0.001)
Male		-0.001 (0.001)	-0.001 (0.001)		-0.001 (0.001)	-0.001 (0.001)
Black[1]		-0.001 (0.001)	-0.001 (0.001)		-0.001 (0.001)	-0.001 (0.001)
Other race[1]		-0.002 (0.001)	-0.001 (0.001)		-0.002 (0.001)	-0.001 (0.001)
Income		0.000 (0.000)	0.000 (0.000)		0.000 (0.000)	0.000 (0.000)
Age		0.000 (0.000)	0.000 (0.000)		0.000 (0.000)	0.000 (0.000)
Drug Use		0.006** (0.003)	0.004 (0.003)		0.006** (0.003)	0.004 (0.003)
Education		-0.001** (0.001)	-0.001 (0.001)		-0.001** (0.001)	-0.001 (0.001)

Number of Stressors						
Mental Health Issues	0.380*** (0.045)	0.421*** (0.050)	0.428*** (0.052)	0.378*** (0.045)	0.420*** (0.050)	0.428*** (0.051)
Constant	1.022*** (0.015)	1.002*** (0.016)	0.647*** (0.045)	1.023*** (0.015)	1.003*** (0.016)	0.648*** (0.045)
Mental Health Issues						
Incarceration	0.010 (0.042)	-0.061 (0.051)	-0.102 (0.056)	-0.057 (0.064)	-0.196 (0.077)	-0.202 (0.089)
Pre-Incarceration Mental Health Issues			0.086*** (0.007)			0.086*** (0.007)
Incarceration						
Pre-Incarceration Mental Health Issues			0.002 (0.002)			-0.001 (0.001)
Pre-Incarceration Number of Stressors			0.050*** (0.010)			0.029*** (0.006)
Constant			-0.030 (0.020)			-0.004 (0.011)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Significances are based on robust standard errors.

H.2 Delinquency Variety Score Full Models

	Binary IV	Proportion IV
	n = 1,768	*n = 1,768*
	Coef (S.E.)	Coef (S.E.)
General Model		
Delinquency Variety Score		
Incarceration	0.001 (0.003)	-0.001 (0.002)
Mental Health Issues	0.003 (0.003)	0.003 (0.003)
Number of Stressors	0.001 (0.001)	0.001 (0.001)
Male	-0.001 (0.001)	-0.001 (0.001)
Black[1]	-0.001 (0.001)	-0.001 (0.001)
Other race[1]	-0.001 (0.001)	-0.001 (0.001)
Income	0.000 (0.000)	0.000 (0.000)
Age	0.000 (0.000)	0.000 (0.000)
Drug Use	0.004 (0.003)	0.004 (0.003)
Education	-0.001 (0.001)	-0.001 (0.001)
Number of Stressors		
Mental Health Issues	0.428*** (0.052)	0.428*** (0.051)
Constant	0.647*** (0.045)	0.648*** (0.045)
Mental Health Issues		
Incarceration	-0.102 (0.056)	-0.202 (0.089)
Pre-Incarceration Mental Health Issues	0.086*** (0.007)	0.086*** (0.007)
Incarceration		
Pre-Incarceration Mental Health Issues	0.002 (0.002)	-0.001 (0.001)
Pre-Incarceration Number of Stressors	0.050*** (0.010)	0.029*** (0.006)
Constant	-0.030 (0.020)	-0.004 (0.011)
Latent Variables		

Destroy Property		
Delinquency Variety Score	1.000 (constrained)	1.000 (constrained)
Constant	0.006*** (0.010)	0.006*** (0.010)
Steal Under $50		
Delinquency Variety Score	6.791*** (4.589)	6.790*** (4.590)
Constant	-0.016*** (0.061)	-0.015*** (0.061)
Steal Over $50		
Delinquency Variety Score	4.277*** (2.767)	4.279*** (2.768)
Constant	-0.014*** (0.040)	-0.014*** (0.040)
Other Property Crime		
Delinquency Variety Score	2.484*** (1.707)	2.483*** (1.706)
Constant	-0.009*** (0.022)	-0.009*** (0.022)
Attack Someone		
Delinquency Variety Score	3.898*** (2.455)	3.893*** (2.450)
Constant	0.007*** (0.035)	0.008*** (0.035)
Sell Illegal Drugs		
Delinquency Variety Score	5.072*** (3.538)	5.066*** (3.534)
Constant	0.005*** (0.045)	0.005*** (0.045)
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	1.008*** (0.061)	1.009*** (0.061)
Down or Blue		
Mental Health Issues	1.266*** (0.079)	1.265*** (0.079)
Constant	0.762*** (0.058)	0.766*** (0.058)
Depressed		
Mental Health Issues	0.964*** (0.064)	0.964*** (0.064)
Constant	0.611*** (0.047)	0.613*** (0.047)

Not Calm		
Mental Health Issues	0.951*** (0.056)	0.952*** (0.056)
Constant	1.665*** (0.056)	1.666*** (0.056)
Not Happy		
Mental Health Issues	1.069*** (0.064)	1.068*** (0.064)
Constant	1.398*** (0.055)	1.400*** (0.056)

*** p<.01, **p<.05, *p<.10
[1] reference category is White
Note: Significances are based on robust standard errors.

H.3 Delinquency Binary Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 2,321	*n = 1,945*	*n = 1,780*	*n = 2,321*	*n = 1,945*	*n = 1,780*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Delinquency Binary						
Incarceration	1.723* (0.479)	1.394 (0.567)	1.718 (0.706)	2.221** (0.896)	2.133 (1.473)	2.620 (1.791)
Mental Health Issues	2.663*** (0.523)	2.000*** (0.470)	2.080*** (0.491)	2.670*** (0.524)	2.019*** (0.473)	2.102*** (0.494)
Number of Stressors	1.199* (0.126)	1.180 (0.158)	1.187 (0.169)	1.210* (0.126)	1.184 (0.158)	1.195 (0.170)
Male		0.906 (0.168)	0.949 (0.184)		0.897 (0.167)	0.945 (0.184)
Black[1]		1.193 (0.248)	1.190 (0.262)		1.180 (0.246)	1.171 (0.261)
Other race[1]		0.647* (0.163)	0.635* (0.169)		0.646* (0.163)	0.633* (0.169)
Income		1.000 (0.000)	1.000 (0.000)		1.000 (0.000)	1.000 (0.000)
Age		0.936 (0.058)	0.978 (0.063)		0.936 (0.058)	0.977 (0.063)
Drug Use		4.852*** (0.961)	4.093*** (0.841)		4.892*** (0.969)	4.130*** (0.849)
Education		0.719*** (0.077)	0.731*** (0.082)		0.721*** (0.078)	0.731*** (0.082)
Constant	0.069*** (0.009)	0.182 (0.310)	0.032* (0.057)	0.069*** (0.009)	0.181 (0.309)	0.033* (0.058)

Number of Stressors						
Mental Health Issues	1.457*** (0.065)	1.530*** (0.077)	1.541*** (0.079)	1.455*** (0.065)	1.528*** (0.076)	1.542*** (0.079)
Constant	2.787*** (0.040)	2.728*** (0.043)	1.903*** (0.085)	2.789*** (0.040)	2.730*** (0.043)	1.905*** (0.085)
Mental Health Issues						
Incarceration	0.997 (0.041)	0.939 (0.048)	0.902 (0.051)	0.929 (0.059)	0.820** (0.063)	0.816 (0.072)
Pre-Incarceration Mental Health Issues			1.090*** (0.007)			1.089*** (0.007)
Incarceration						
Pre-Incarceration Mental Health Issues			1.051*** (0.011)			1.029*** (0.007)
Pre-Incarceration Number of Stressors			1.002 (0.002)			0.999 (0.001)
Constant			0.971 (0.019)			0.996 (0.011)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

H.4 Delinquency Binary Full Models

	Binary IV	Proportion IV
	n = 1,780	*n = 1,780*
	Coef (S.E.)	Coef (S.E.)
General Model		
Delinquency Binary		
Incarceration	1.718 (0.706)	2.620 (1.791)
Mental Health Issues	2.080*** (0.491)	2.102*** (0.494)
Number of Stressors	1.187 (0.169)	1.195 (0.170)
Male	0.949 (0.184)	0.945 (0.184)
Black[1]	1.190 (0.262)	1.171 (0.261)
Other race[1]	0.635* (0.169)	0.633* (0.169)
Income	1.000 (0.000)	1.000 (0.000)
Age	0.978 (0.063)	0.977 (0.063)
Drug Use	4.093*** (0.841)	4.130*** (0.849)
Education	0.731*** (0.082)	0.731*** (0.082)
Constant	0.032* (0.057)	0.033* (0.058)
Number of Stressors		
Mental Health Issues	1.541*** (0.079)	1.542*** (0.079)
Constant	1.903*** (0.085)	1.905*** (0.085)
Mental Health Issues		
Incarceration	0.902 (0.051)	0.816 (0.072)
Pre-Incarceration Mental Health Issues	1.090*** (0.007)	1.089*** (0.007)
Incarceration		
Pre-Incarceration Mental Health Issues	1.051*** (0.011)	1.029*** (0.007)
Pre-Incarceration Number of Stressors	1.002 (0.002)	0.999 (0.001)

Constant	0.971 (0.019)	0.996 (0.011)
Latent Variable		
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	1.008*** (0.061)	1.010*** (0.061)
Down or Blue		
Mental Health Issues	1.266*** (0.078)	1.265*** (0.078)
Constant	0.764*** (0.057)	0.768*** (0.058)
Depressed		
Mental Health Issues	0.963*** (0.063)	0.962*** (0.063)
Constant	0.612*** (0.047)	0.615*** (0.047)
Not Calm		
Mental Health Issues	0.954*** (0.056)	0.954*** (0.056)
Constant	1.665*** (0.056)	1.666*** (0.056)
Not Happy		
Mental Health Issues	1.074*** (0.064)	1.073*** (0.064)
Constant	1.396*** (0.055)	1.398*** (0.055)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

H.5 Arrest Binary Model Progression

	Binary IV			Proportion IV		
	(1)	(2)	(3)	(1)	(2)	(3)
	n = 7,019	*n = 5,926*	*n = 5,468*	*n = 7,019*	*n = 5,926*	*n = 5,468*
	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)	OR (S.E.)
Arrest Binary						
Incarceration	6.247*** (1.425)	3.744*** (1.165)	4.082*** (1.390)	10.413*** (3.056)	6.535*** (2.530)	7.009*** (2.954)
Mental Health Issues	2.637*** (0.504)	2.255*** (0.485)	2.519*** (0.540)	2.651*** (0.506)	2.250*** (0.481)	2.501*** (0.531)
Number of Stressors	1.276** (0.126)	1.037 (0.139)	1.018 (0.143)	1.324*** (0.129)	1.059 (0.142)	1.038 (0.146)
Male		1.727*** (0.315)	1.716*** (0.332)		1.706*** (0.311)	1.721*** (0.330)
Black[1]		1.120 (0.235)	0.933 (0.211)		1.093 (0.231)	0.907 (0.208)
Other race[1]		1.093 (0.234)	0.993 (0.224)		1.076 (0.228)	0.982 (0.219)
Income		1.000** (0.000)	1.000** (0.000)		1.000* (0.000)	1.000** (0.000)
Age		0.946 (0.052)	0.920 (0.053)		0.946 (0.051)	0.920 (0.053)
Drug Use		4.267*** (0.736)	4.210*** (0.777)		4.379*** (0.759)	4.320*** (0.800)
Education		0.578*** (0.058)	0.545*** (0.059)		0.574*** (0.057)	0.540*** (0.058)
Constant	0.020*** (0.002)	0.111 (0.162)	0.107 (0.162)	0.020*** (0.002)	0.108 (0.156)	0.107 (0.162)

Number of Stressors						
Mental Health Issues	1.452*** (0.040)	1.459*** (0.045)	1.464*** (0.045)	1.451*** (0.040)	1.458*** (0.045)	1.464*** (0.045)
Constant	2.473*** (0.020)	2.471*** (0.022)	1.757*** (0.048)	2.474*** (0.020)	2.471*** (0.022)	1.757*** (0.048)
Mental Health Issues						
Incarceration	1.059 (0.039)	1.010 (0.049)	0.954 (0.051)	1.028 (0.055)	0.970 (0.075)	0.922 (0.079)
Pre-Incarceration Mental Health Issues			1.098*** (0.004)			1.098*** (0.004)
Incarceration						
Pre-Incarceration Mental Health Issues			1.002** (0.001)			1.001 (0.001)
Pre-Incarceration Number of Stressors			1.022*** (0.004)			1.012*** (0.002)
Constant			0.979*** (0.008)			0.989** (0.005)

*** p<.01, **p<.05, *p<.10
(1) without controls
(2) with controls
(3) with controls and pre-incarceration mediators
[1] reference category is White
Note: Coefficients are presented as odds ratios. Significances are based on robust standard errors.

H.6 Arrest Binary Full Models

	Binary IV	Proportion IV
	n = 5,468	*n = 5,468*
	Coef (S.E.)	Coef (S.E.)
General Model		
Arrest Binary		
Incarceration	4.082*** (1.390)	7.009*** (2.954)
Mental Health Issues	2.519*** (0.540)	2.501*** (0.531)
Number of Stressors	1.018 (0.143)	1.038 (0.146)
Male	1.716*** (0.332)	1.721*** (0.330)
Black[1]	0.933 (0.211)	0.907 (0.208)
Other race[1]	0.993 (0.224)	0.982 (0.219)
Income	1.000** (0.000)	1.000** (0.000)
Age	0.920 (0.053)	0.920 (0.053)
Drug Use	4.210*** (0.777)	4.320*** (0.800)
Education	0.545*** (0.059)	0.540*** (0.058)
Constant	0.107 (0.162)	0.107 (0.162)
Number of Stressors		
Mental Health Issues	1.464*** (0.045)	1.464*** (0.045)
Constant	1.757*** (0.048)	1.757*** (0.048)
Mental Health Issues		
Incarceration	0.954 (0.051)	0.922 (0.079)
Pre-Incarceration Mental Health Issues	1.098*** (0.004)	1.098*** (0.004)
Incarceration		
Pre-Incarceration Mental Health Issues	1.002** (0.001)	1.001 (0.001)
Pre-Incarceration Number of Stressors	1.022*** (0.004)	1.012*** (0.002)

Constant	0.979*** (0.008)	0.989** (0.005)
Latent Variable		
Nervous		
Mental Health Issues	1.000 (constrained)	1.000 (constrained)
Constant	0.924*** (0.036)	0.924*** (0.036)
Down or Blue		
Mental Health Issues	1.240*** (0.043)	1.239*** (0.043)
Constant	0.685*** (0.032)	0.685*** (0.032)
Depressed		
Mental Health Issues	0.922*** (0.035)	0.922*** (0.035)
Constant	0.525*** (0.026)	0.525*** (0.026)
Not Calm		
Mental Health Issues	0.948*** (0.033)	0.948*** (0.033)
Constant	1.580*** (0.034)	1.580*** (0.034)
Not Happy		
Mental Health Issues	1.036*** (0.036)	1.036*** (0.036)
Constant	1.314*** (0.031)	1.314*** (0.031)

*** p<.01, **p<.05, *p<.10

[1] reference category is White

Note: Coefficients in main model are presented as odds ratios. Significances are based on robust standard errors.

H.7 Pathways from Incarceration to Offending – Through Mental Health and Number of Stressors

				Coef. (S.E.)
Incarceration Binary	Mental Health Issues	Number of Stressors	Delinquency Variety Score	-0.000056 (0.000)
Incarceration Proportion	Mental Health Issues	Number of Stressors	Delinquency Variety Score	-0.000112 (0.000)
Incarceration Binary	Mental Health Issues	Number of Stressors	Delinquency Binary	0.992350 (0.008)
Incarceration Proportion	Mental Health Issues	Number of Stressors	Delinquency Binary	0.984450 (0.014)
Incarceration Binary	Mental Health Issues	Number of Stressors	Arrest Binary	0.999690 (0.003)
Incarceration Proportion	Mental Health Issues	Number of Stressors	Arrest Binary	0.998853 (0.005)

*** p<.01, **p<.05, *p<.10

Note: Coefficients for binary measures are exponentiated to present odds ratios. Significances are based on robust standard errors.

I: Discussion – Moderated Mediation

I.1 Incarceration and Mental Health Issues, by Race and Sex

	Overall	Inc & +MH	Inc & -MH
Race			
n	107,808	44,392	3,924
White	51.93%	51.65%	31.40%
Black	25.99%	26.27%	48.84%
Other Race	22.08%	22.09%	19.77%
Sex			
n	107,808	44,392	3,924
Male	51.19%	50.14%	81.40%
Female	48.81%	49.86%	18.60%

Note: Inc & +MH indicates incarcerated and in good mental health; Inc & -MH indicates incarcerated and in poor mental health. Descriptives shown are across all years, so *n* counts each individual in each year.

J: Discussion – Explaining Model Differences

J.1 HFE Model Incarceration Predicting Delinquency Variety Score, with Pre-Incarceration Mental Health

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 11,718	*n = 6,408*	*n = 11,718*	*n = 6,408*
	IRR (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)
Incarceration	1.205** (0.105)	1.164 (0.122)	1.507* (0.368)	1.278 (0.334)
Pre-Incarceration Mental Health Issues		1.038*** (0.012)		1.038*** (0.012)
Drug use	3.015*** (0.169)	2.674*** (0.216)	3.028*** (0.169)	2.682*** (0.217)
Education[1]				
High school/GED	0.705*** (0.042)	0.772*** (0.069)	0.703*** (0.042)	0.768*** (0.069)
Associate's	0.898 (0.159)	0.824 (0.154)	0.897 (0.159)	0 821 (0.154)
Bachelor's	0.298*** (0.047)	0.304*** (0.053)	0.296*** (0.046)	0.301*** (0.052)
Master's or higher	0.122** (0.118)	0.117** (0.115)	0.121** (0.116)	0.115** (0.112)
Income	0.999* (4.54E-07)	0.999 (5.56E-07)	0.999* (4.54E-07)	0.999 (5.56E-07)
Age	0.910*** (0.008)	0.894*** (0.012)	0.911*** (0.008)	0.895*** (0.012)
Male	1.761*** (0.103)	1.246*** (0.104)	1.767*** (0.103)	1.250*** (0.105)
Race[2]				
Black	1.121* (0.076)	1.136 (0.104)	1.121* (0.073)	1.134 (0.104)
Other race	1.038 (0.076)	1.029 (0.105)	1.038 (0.076)	1.030 (0.105)
Constant	0.752 (0.150)	1.055 (0.378)	0.740 (0.147)	1.045 (0.375)

*** p<.01, **p<.05, *p<.10
(1) without pre-incarceration mental health issues
(2) with pre-incarceration mental health issues
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

J.2 HFE Model Incarceration Predicting Delinquency Binary, with Pre-Incarceration Mental Health

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 11,718	*n = 6,408*	*n = 11,718*	*n = 6,408*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)
Incarceration	1.389** (0.188)	1.345 (0.250)	2.097* (0.822)	1.808 (0.988)
Pre-Incarceration Mental Health Issues		1.065*** (0.021)		1.064*** (0.021)
Drug use	4.926*** (0.363)	4.224*** (0.467)	4.975*** (0.366)	4.263*** (0.472)
Education[1]				
High school/GED	0.652*** (0.057)	0.687** (0.100)	0.648*** (0.056)	0.680*** (0.099)
Associate’s	0.857 (0.211)	0.714 (0.204)	0.855 (0.211)	0.709 (0.203)
Bachelor’s	0.224*** (0.047)	0.202*** (0.051)	0.221*** (0.046)	0.198*** (0.050)
Master’s or higher	0.077** (0.096)	0.066* (0.092)	0.075** (0.094)	0.064** (0.089)
Income	0.999 (6.60E-07)	1.000 (9.15E-07)	0.999 (6.62E-07)	1.000 (9.19E-07)
Age	0.893*** (0.011)	0.832*** (0.018)	0.894*** (0.011)	0.832*** (0.018)
Male	2.134*** (0.173)	1.466*** (0.186)	2.146*** (0.174)	1.472*** (0.188)
Race[2]				
Black	1.141 (0.104)	1.176 (0.166)	1.139 (0.104)	1.173 (0.167)
Other race	0.915 (0.090)	0.959 (0.146)	0.916 (0.090)	0.960 (0.147)
Constant	0.682 (0.187)	3.159** (1.835)	0.674 (0.185)	3.203** (1.864)

*** p<.01, **p<.05, *p<.10
(1) without pre-incarceration mental health issues
(2) with pre-incarceration mental health issues
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

J.3 HFE Model Incarceration Predicting Arrest Binary, with Pre-Incarceration Mental Health

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 30,413	*n = 23,855*	*n = 30,413*	*n = 23,855*
	OR (S.E.)	*OR* (S.E.)	*OR* (S.E.)	*OR* (S.E.)
Incarceration	2.262*** (0.282)	2.522*** (0.396)	3.060*** (0.959)	3.944*** (1.679)
Pre-Incarceration Mental Health Issues		1.039*** (0.014)		1.040*** (0.015)
Drug use	3.452*** (0.207)	3.717*** (0.277)	3.532*** (0.215)	3.826*** (0.290)
Education[1]				
High school/GED	0.401*** (0.029)	0.383*** (0.036)	0.387*** (0.028)	0.367*** (0.035)
Associate's	0.281*** (0.057)	0.254*** (0.056)	0.270*** (0.055)	0.243*** (0.054)
Bachelor's	0.111*** (0.022)	0.102*** (0.021)	0.104*** (0.020)	0.094*** (0.019)
Master's or higher	0.149*** (0.070)	0.142*** (0.069)	0.141*** (0.067)	0.132*** (0.065)
Income	0.999*** (7.04E-07)	0.999*** (8.23E-07)	0.999*** (7.15E-07)	0.999*** (8.35E-07)
Age	0.957*** (0.010)	0.952*** (0.013)	0.959*** (0.010)	0.955*** (0.013)
Male	3.087*** (0.216)	3.063*** (0.260)	3.220*** (0.228)	3.189*** (0.274)
Race[2]				
Black	1.274*** (0.098)	1.234** (0.115)	1.288*** (0.101)	1.237** (0.118)
Other race	1.005 (0.081)	1.038 (0.101)	1.008 (0.084)	1.040 (0.104)
Constant	0.082*** (0.020)	0.054*** (0.020)	0.075*** (0.019)	0.047*** (0.018)

*** p<.01, **p<.05, *p<.10
(1) without pre-incarceration mental health issues
(2) with pre-incarceration mental health issues
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as odds ratios (OR) with robust standard errors.

J.4 HFE Model Incarceration Predicting Mental Health, with Pre-Incarceration Mental Health

	Binary IV		Proportion IV	
	(1)	(2)	(1)	(2)
	n = 29,379	*n = 22,983*	*n = 29,379*	*n = 22,983*
	IRR (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)	*IRR* (S.E.)
Incarceration	1.037*** (0.013)	1.006 (0.013)	1.135*** (0.040)	1.047 (0.042)
Pre-Incarceration Mental Health Issues		1.043*** (0.001)		1.043*** (0.001)
Drug use	1.066*** (0.004)	1.047*** (0.004)	1.066*** (0.004)	1.047*** (0.004)
Education[1]				
High school/GED	0.952*** (0.006)	0.975*** (0.0036)	0.952*** (0.006)	0.976*** (0.006)
Associate's	0.941*** (0.010)	0.969*** (0.009)	0.941*** (0.010)	0.970*** (0.009)
Bachelor's	0.929*** (0.007)	0.961*** (0.007)	0.929*** (0.007)	0.961*** (0.007)
Master's or higher	0.937*** (0.013)	0.969** (0.013)	0.937*** (0.013)	0.969** (0.012)
Income	0.999*** (3.13E-08)	0.999*** (3.01E-08)	0.999*** (3.13E-08)	0.999*** (3.01E-08)
Age	0.997*** (0.001)	1.002*** (0.001)	0.997*** (0.001)	1.002*** (0.001)
Male	0.923*** (0.004)	0.959*** (0.003)	0.923*** (0.004)	0.959*** (0.003)
Race[2]				
Black	0.989** (0.006)	0.992* (0.004)	0.988** (0.006)	0.992* (0.004)
Other race	0.984*** (0.006)	0.989** (0.004)	0.984*** (0.006)	0.989** (0.004)
Constant	10.706*** (0.154)	6.236*** (0.116)	10.705*** (0.153)	6.237*** (0.116)

*** p<.01, **p<.05, *p<.10
(1) without pre-incarceration mental health issues
(2) with pre-incarceration mental health issues
[1] reference category is high school drop out
[2] reference category is White
Note: Results presented as incidence-rate ratios (IRR) with robust standard errors.

K: Discussion – The Role of Mental Health

K.1 Pathways from Mental Health to Delinquency Variety Score

					Coef. (S.E.)
Pathways Through Individual Stressors					
		Mental Health Issues	Unmarried	Delinquency Variety Score	0.000018 (0.000)
	Mental Health Issues	Unmarried	Unemployed	Delinquency Variety Score	0.000004 (0.000)
Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Delinquency Variety Score	0.000000 (0.000)
	Mental Health Issues	Unmarried	Physical Health Issues	Delinquency Variety Score	0.000000 (0.000)
Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Delinquency Variety Score	0.000000 (0.000)
		Mental Health Issues	Unemployed	Delinquency Variety Score	-0.000273 (0.000)
	Mental Health Issues	Unemployed	Physical Health Issues	Delinquency Variety Score	-0.000022 (0.000)
Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Delinquency Variety Score	0.000000 (0.000)
	Mental Health Issues	Unemployed	Unmarried	Delinquency Variety Score	0.000000 (0.000)
Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Delinquency Variety Score	0.000000 (0.000)
		Mental Health Issues	Physical Health Issues	Delinquency Variety Score	-0.000655 (0.001)

	Mental Health Issues	Physical Health Issues	Unmarried	Delinquency Variety Score	0.000000 (0.000)
Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Delinquency Variety Score	0.000000 (0.000)
	Mental Health Issues	Physical Health Issues	Unemployed	Delinquency Variety Score	-0.000049 (0.000)
Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Delinquency Variety Score	0.000000 (0.000)
Pathways Through Number of Stressors					
		Mental Health Issues	Number of Stressors	Delinquency Variety Score	0.000544 (0.001)

Note: Significances are based on robust standard errors.

K.2 Pathways from Mental Health to Binary Delinquency

					Coef. (S.E.)
Pathways Through Individual Stressors					
		Mental Health Issues	Unmarried	Delinquency	1.038353 (0.034)
	Mental Health Issues	Unmarried	Unemployed	Delinquency	0.999189 (0.001)
Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Delinquency	0.999969 (0.000)
	Mental Health Issues	Unmarried	Physical Health Issues	Delinquency	0.999937 (0.000)
Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Delinquency	0.999990 (0.000)
		Mental Health Issues	Unemployed	Delinquency	1.050442* (0.031)
	Mental Health Issues	Unemployed	Physical Health Issues	Delinquency	1.001893 (0.003)
Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Delinquency	0.999989 (0.000)
	Mental Health Issues	Unemployed	Unmarried	Delinquency	0.999034 (0.001)
Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Delinquency	1.000002 (0.000)
		Mental Health Issues	Physical Health Issues	Delinquency	1.055614 (0.076)
	Mental Health Issues	Physical Health Issues	Unmarried	Delinquency	0.999624 (0.002)

Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Delinquency	1.000008 (0.000)
	Mental Health Issues	Physical Health Issues	Unemployed	Delinquency	1.008767* (0.006)
Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Delinquency	0.999842 (0.000)
Pathways Through Number of Stressors					
		Mental Health Issues	Number of Stressors	Delinquency	1.077029 (0.067)

Note: Coefficients are exponentiated to present odds ratios. Significances are based on robust standard errors.

K.3 Pathways from Mental Health to Binary Arrest

					Coef. (S.E.)
Pathways Through Individual Stressors					
		Mental Health Issues	Unmarried	Arrest	0.989073 (0.032)
	Mental Health Issues	Unmarried	Unemployed	Arrest	0.999234 (0.001)
Mental Health Issues	Unmarried	Unemployed	Physical Health Issues	Arrest	1.000035 (0.000)
	Mental Health Issues	Unmarried	Physical Health Issues	Arrest	0.999459 (0.001)
Mental Health Issues	Unmarried	Physical Health Issues	Unemployed	Arrest	1.000036 (0.000)
		Mental Health Issues	Unemployed	Arrest	1.019110 (0.019)
	Mental Health Issues	Unemployed	Physical Health Issues	Arrest	0.999135 (0.001)
Mental Health Issues	Unemployed	Physical Health Issues	Unmarried	Arrest	0.999988 (0.000)
	Mental Health Issues	Unemployed	Unmarried	Arrest	1.000272 (0.001)
Mental Health Issues	Unemployed	Unmarried	Physical Health Issues	Arrest	1.000014 (0.000)
		Mental Health Issues	Physical Health Issues	Arrest	0.950393 (0.067)
	Mental Health Issues	Physical Health Issues	Unmarried	Arrest	0.999292 (0.002)

Mental Health Issues	Physical Health Issues	Unmarried	Unemployed	Arrest	0.999950 (0.000)
	Mental Health Issues	Physical Health Issues	Unemployed	Arrest	1.003352 (0.003)
Mental Health Issues	Physical Health Issues	Unemployed	Unmarried	Arrest	1.000046 (0.000)
Pathways Through Number of Stressors					
		Mental Health Issues	Number of Stressors	Arrest	1.006638 (0.054)

Note: Coefficients are exponentiated to present odds ratios. Significances are based on robust standard errors.

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