2018

It's About Time: Length of Incarceration, Gang Membership, and Recidivism among Illinois Prison Releasees

Henry Douglas Otto

Recommended Citation

LOYOLA UNIVERSITY CHICAGO

IT'S ABOUT TIME: LENGTH OF INCARCERATION, GANG MEMBERSHIP, AND

RECIDIVISM AMONG ILLINOIS PRISON RELEASEES

A THESIS SUBMITTED TO

THE FACULTY OF THE GRADUATE SCHOOL

IN CANDIDACY FOR THE DEGREE OF

MASTER OF ARTS

PROGRAM IN CRIMININAL JUSTICE & CRIMINOLOGY

BY H. DOUGLAS OTTO

CHICAGO, IL

DECEMBER 2018

ACKNOWLEDGMENTS

Seems these days I'm captive in this borrowed time.
- Parquet Courts, "Borrowed Time"

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ASMD	Absolute Standardized Mean Difference
ATE	Average Treatment Effect
CHRI	Criminal History Record Information
GED	General Education Diploma
IDOC	Illinois Department of Corrections
IPTW	Inverse Probability of Treatment Weighting
MCAR	Missing Completely at Random
MGT-Push	Meritorious Good Time-Push
MMWS	Marginal Mean Weighting through Stratification
RNR	Risk-Need-Responsivity

ABSTRACT

This study explored the effect of time spent incarcerated on recidivism among a sample of individuals released from IDOC facilities from 2011 to 2014 (N = 72,716). Gang members were compared to non-gang members in order to evaluate the potentially heterogeneous nature of the effect of length of stay on recidivism within the competing frameworks of deterrence theory and social learning theory. The samples were further split into separate analyses based on the current felony class, and length of stay was operationalized as incarceration in months and split into quartiles based on the distribution of each felony class sample. The results indicate that the effect of length of incarceration on recidivism is dependent not only on gang affiliation but also on felony class. Ultimately, these findings indicate that the effect of length of incarceration on recidivism is too heterogeneous to draw any universal conclusions that can reliably inform sentencing policy.

CHAPTER ONE

INTRODUCTION

In September of 2009, the Illinois Department of Corrections (IDOC) implemented a new good-time provision intended to reduce overcrowding in IDOC prison facilities. This provision, titled Meritorious Good Time-Push (MGT-Push), removed the 60-day minimum IDOC prisoners were required to serve before becoming eligible for release for good-time conduct credit (Young, 2010). Following a fervor of sensationalized portrayals of the program as a reckless endangerment to public safety by Illinois media and politicians, then-governor Pat Quinn rescinded the program in December of 2009. Under the MGT-Push program, sentences were reduced by an average of just 36 days (Eisenman, 2010; Young, 2010). Still, however, political opportunists essentially argued that this slight reduction in average prison time served by prisoners significantly contributed to an increase in crime, including violent offenses. So, what is it about that missed incarceration time that some claim is crucial to improving public safety?

One of the main propositions as to the utility of incarceration is that it serves as a premier deterrent force in society against criminal activity (Gaines & Miller, 2012). This assumption holds that criminal offending will decline as a result of increasing lengths of incarceration. Deterrence can include general deterrence (punishing one person changes the behaviors of others) and specific, or individual deterrence (punishing one person changes that person's behaviors). The proposition of incarceration as a form of deterrence contends that, generally, would-be criminals will opt out of offending because they perceive the risk of offending as not

worth any potential benefit when the risk is a sufficiently long (severe) period of detention. More specifically, when a person is incarcerated for committing a certain crime, deterrence theory suggests they will be dissuaded from repeating that crime in the future if they have first-hand experience of the consequences of taking that risk (Beccaria 1764/1963). At the core of the issue regarding the effect of differing lengths of incarceration on recidivism is whether longer periods of incarceration actually have this deterrent effect on individuals compared to shorter lengths of incarceration. If they do, then incarcerating offenders for longer periods of time may be justified, if the cost of the incarceration is less than the cost of the criminal behavior avoided. However, if there is no effect, or a criminogenic effect, then this practice is not only impractical but also self-defeating. A null effect would have serious practical implications in the United States considering the extent to which incarceration is relied on and invested in as a tool for public safety. There are many other reasons for incarceration (retribution, rehabilitation, incapacitation, etc.), though deterrence still maintains an important position in the guiding philosophies behind sentencing policy today (Schmalleger, 2012).

One study found that time spent in prison has more than doubled in the United States since the late 1980s (The Pew Charitable Trusts, 2015). These longer lengths of incarceration, coupled with a massive increase in the prison population during that time (The Sentencing Project, 2017), have shown to generate significant financial cost (The Pew Charitable Trusts, 2015). Thus, if the effect of longer lengths of incarceration on recidivism is null or inconsistent, the return on investment may not be worthwhile, both financially and for the general wellbeing of society. Furthermore, the practice of extending lengths of stay would be considered inefficient and wasteful within the classical deterrence theory framework (Beccaria, 1764/1963) regarding the utilitarian purpose of incarceration. While prior research has shown that this relationship

between time served and recidivism does indeed appear inconsistent, this prior research generally has not explored the effect as it might change from subgroup to subgroup (Gendreau et al., 1996; Nagin et al., 2009).

Because prior research suggests gang peer groups are more likely to hold distinct values and beliefs that mediate persistent criminal behavior (Esbensen et al., 2009; Matsuda et al., 2013), they provide an opportunity to explore the merit of social learning theory (Akers, 1997) versus deterrence theory in the context of the effect of longer lengths of incarceration on recidivism. Disparate effects of deterrence observed between both groups (gang members versus non-gang members) could have implications for sentencing policy, as it would support the possibility that certain offender background characteristics might provide insight as to how some policies have different outcomes for different people. Exploring more than one theoretical explanation can provide further clues as to why previous research findings have been inconclusive as to a general effect of longer lengths of incarceration on recidivism.

Additional research is thus required in order to assess both the strength and consistency of the effect of time spent in prison on recidivism across different groups of offenders based on salient offender characteristics. Without a clearer understanding of the possible nuances of the effect that length of incarceration may or may not have on recidivism across different populations, sentencing policy may have unintended consequences that could exacerbate issues present in the criminal justice system, such as mass incarceration and prison overcrowding. Should the notion that reducing lengths of incarceration puts public safety in jeopardy prevail in political arenas without more in-depth understanding of its actual effect, missed opportunities of potentially beneficial reform such as MGT-Push will continue to pass by.

Based on the competing frameworks of the deterrence and social learning theories of criminal behavior, the potential nuances and disparate effects that longer lengths of incarceration may have on recidivism will be explored by comparing how they affect gang members and non-gang members. Ultimately, this research will seek to contribute to the understanding of the effect of incarceration lengths on recidivism in an effort to support more evidence-based sentencing policy by examining the relationship between recidivism and length of incarceration among a large sample of adults released from prison in Illinois. With a better understanding of which offender characteristics predict which policies or practices work to the benefit of some people and to the detriment of others, greater efficiency in sentencing policy and within the larger criminal justice system can be achieved.

CHAPTER TWO

LITERATURE REVIEW

In general, the relevant literature on the effect of length of incarceration on recidivism is largely inconclusive. Nagin and his colleagues (2009) provided a general overview of the relevant research available at the time, identifying 17 studies with components analyzing the effects of length of stay in a custodial setting. Of those 17, only three utilized matching techniques, whereas the rest relied on regression analyses (Nagin, 2009). Only one of these studies (Loughran et al., 2009) utilized propensity score matching, and most of the studies identified did not analyze the effect of time served as the primary focus of the research, and instead included it only as a control variable (Nagin et al., 2009). Nagin and his colleagues (2009) concluded that the combined results from the 17 cited studies were too varied and methodologically limited to warrant adopting any conclusion regarding the relationship between length of incarceration and future criminal behavior. Specifically, Nagin and his colleagues (2009) argued that regression analyses of dose-response relationships are flawed in that they cannot adequately control for the differences in pre- and posttreatment ages of offenders the same way matching techniques can.

The various methodological limitations of prior studies concerning the effect of time spent in prison on recidivism as noted by Nagin and his colleagues (2009) are reflected in the findings from the Gendreau et. al. (1999) meta-analysis. The meta-analysis included 23 studies and 222 effect sizes, with a weighted effect size of about a 3 percent increase in recidivism for

those spending more time versus less time in prison (Gendreau et al., 1999). As the authors noted however, the descriptive statistics of the samples in these studies were unfortunately limited and inconsistent (Gendreau et al., 1999). For example, most of the studies did not specify offender race and only included a follow-up period of 6 months to 1 year. Furthermore, the operationalization of length of stay in prison as a dichotomous variable is a less nuanced approach compared to more modern conceptualizations. Thus, the findings from this meta-analysis cannot be readily accepted due to the pervasive risk of selection bias present in the studies included. As Smith et al. (2002) concluded in an updated meta-analysis, "[meta-analysis] is a blunt instrument when the studies involved are so uninformative about essential study features that there is no recourse but to generate better primary studies at the individual level," (p. 21).

The earliest research on the effects of length of stay in prison mostly focused on parolees and parole outcomes as they relate to time incarcerated (Jaman et al., 1972; Beck & Hoffman, 1976; Gottfredson et al., 1977). Gottfredson and his colleagues (1977) examined the effect of time served in prison on a sample of Ohio parolees (N = 5,578) paroled between 1965 and 1972. This study attempted to account for non-randomization by organizing the parolees into subgroups based on risk classification scores determined by prior criminal history. In general, Gottfredson and his colleagues (1977) found no discernible pattern in the observed effects of time served in prison on parole success across different subgroups. The findings suggested that the effect of time served in prison on recidivism might be highly heterogeneous across different offender sub-populations, although the causal validity of these findings is limited due to dated methodologies. Using 1965 parole data from California, Jaman et al. (1972) presented perhaps

the first matching-based examination of time served as it relates to parole outcomes. This study analyzed two separate groups – male robbers and male burglars – and compared the parole outcomes between those who served less time and those who served more time, relative to each group (1972). Jaman et al. (1972) found that both robbers and burglars with less time served are less likely to recidivate. However, due to statistical limitations at the time, the authors were not able to control for differences between the "less time" and "more time" groups for robbers, leaving the groups potentially statistically incomparable (1972). This selection bias (among other important methodological shortcomings) limited the validity of these findings and demonstrated the importance of adequate matching techniques to account for the nonrandomized nature of observational samples.

Orsagh and Chen (1988) attempted to explain the heretofore mixed findings as products of conceptual shortcomings rather than simply methodological ones. They hypothesized that the relationship between time served and recidivism is nonlinear, and instead resembles a U-shaped function where extremely short time served and excessively long time served result in higher rates of recidivism, and appropriate amounts of time served decrease rates of recidivism (Orsagh & Chen, 1988). As such, there should then exist an optimal sentence length that will maximize the specific deterrent effect of the sentence (Orsagh & Chen, 1988).

Using a sample of North Carolina prisoners released in 1980 (N = 1,425), Orsagh and Chen (1988) conducted linear and nonlinear regression analyses. Orsagh and Chen (1988) found that the nonlinear model compared to a linear model fit the data better, supporting their hypothesis. In addition, Orsagh and Chen (1988) reran the linear and nonlinear analyses for inmates convicted of robbery and inmates convicted of burglary, finding disparate results for

these groups. They concluded by arguing that time served is significantly related to recidivism, but the relationship varies in direction and strength across offense types and offender characteristics (1988). While the Gendreau and colleagues (1999) meta-analysis did not find overall support for the U-shaped effect hypothesis, Weinrath and Gartrell (2001) did find some slight inconsistent support among a sample of Canadian offenders incarcerated for drunk driving. However, these inconclusive findings could be the result of a dearth of proper matching techniques in quasi-experimental study designs, speaking more to methodological rather than conceptual inadequacies.

While some recent studies (Abrams, 2010; Baay, 2012; Budd & Desmond, 2014; Lovins, 2013) investigating the effect of time spent in prison on recidivism did not use matching techniques to help control for selection bias, other studies employed a higher degree of methodological rigor to their methods (Caudill & Trulson, 2016; Loughran et al., 2009; Meade et al., 2013; Mears et al., 2016; Noe, 2009; Rydberg & Clark, 2016; Snodgrass et al., 2011; Walker & Bishop, 2016; Wermink et al., 2017). As such, the findings from these studies should hold more weight when making a general determination as to the effect of time served in prison and recidivism. The results from these studies are summarized below in Table 1.

Table 1. Matching-based Studies of Time Spent Incarcerated and Recidivism

Authors	Year	Sample	Time	Outcome Measure	Findings
Caudill & Trulson	2016	221 Texas juveniles in "blended sentence"	Years, continuous	Felony rearrest	Longer time incarcerated is associated with lower risk of recidivism
Loughran et al.	2009	921 Arizona/Pennsylvania juveniles	Months,	Rate or rearrest/self-	No significant effect of length of stay on re-

			4 dose-response groups	reported re-offending	arrest or re-offending
Meade et al.	2013	2,052 Ohio offenders	Months, quintiles	Felony rearrest	Limited deterrent effect that diminished after 5 years in prison
Mears et al.	2016	90,423 Florida offenders	Months, 4 dose-response groups	Felony reconviction	Initial increase in recidivism, decrease after 1 year, and no effect after 2 years
Noe	2009	414 first-time juvenile arrestees from NYC	Months, less v. more dichotomy	Rearrest	Incarceration effect disappears after matching
Rydberg & Clark	2016	104,447 parolees from 4 U.S. states	Months, quartiles	Revocation/new prison sentence	Increase in time served is related to increased odds of revocation, decreased odds of re-incarceration
Snodgrass et al.	2011	4,683 Dutch violent, property, drug offenders	Months, 6 dose-response groups	Reconviction/rate of reconviction/aggregate sentence length	No apparent effect of length of stay on reconviction/rate of reconviction, modest effect on sentence length
Walker & Bishop	2016	637 Washington state juveniles in community placement	Months, 5 dose-response groups	Felony charge	Slight effect up to 9 months, no effect after 12 months
Wermink et al.	2017	1,467 Dutch prisoners	Months, 5 dose-response groups	Reoffending, reconviction, or reincarceration	Overall null effect on rates of recidivism across the 3 measures

While these studies were of higher methodological quality than previous studies (Nagin et al., 2009; Smith et al., 2002) they were still unsupportive of a clear and consistent effect of time spent in prison on recidivism. However, most of these studies did find some statistically significant effects, albeit none were categorically strong effect sizes (Caudill & Trulson, 2016; Meade et al., 2013; Mears et al., 2016; Rydberg & Clark, 2016; Snodgrass et al., 2011; Walker & Bishop, 2016). The persistent inconsistency of findings despite methodological improvements over time lends credence to the suggestion that the effect of longer lengths of incarceration on recidivism might be highly heterogeneous depending demographic and case characteristics, as suggested in previous studies (Nagin et al., 2009; Orsagh & Chen, 1988; Rydberg & Clark, 2016, Wermink et al., 2017). Inconsistencies could also be due to state and local policies and practices that differ between jurisdictions. Additionally, the lack of consistency in how length of incarceration is operationalized may hold some bearing on the lack of consistency in general findings. As the table above demonstrates, most recent studies operationalize time as months broken down into discrete dose-response groups. However, the number of groups differ from study to study, and the ranges of each group are mostly arbitrarily based on natural cut-offs. This discrepancy might also contribute to the inconsistencies of the effect of length of stay on recidivism in prior observed results. These findings from prior research suggest that the heterogeneity of the effect across different populations requires more attention and conceptual development.

Rydberg and Clark (2016) found heterogeneous dose-response effects of length of incarceration on recidivism across different offense types, and the validity of these findings is more reliable due to more advanced selection bias reduction strategies. While most studies

utilized propensity score matching to better approximate random assignment, Rydberg and Clark (2016) utilized Marginal Mean Weighting through Stratification (MMWS). This method combines propensity score matching with Inverse Probability of Treatment Weighting (IPTW) to reduce significant differences between treatment groups and the sample as a whole based on pre-treatment covariates (Rydberg & Clark, 2016; Hong, 2012). As Rydberg and Clark (2016) demonstrated, the implementation of MMWS reduced the overall standard difference between treatment groups by 80 percent, thus greatly reducing the chance for confounding selection bias. In support of the previously mentioned suggestions that the relationship between time served in prison and recidivism is highly variant, Rydberg and Clark (2016) found that dose-response curves are heterogeneous across different offense categories (i.e., sex offenses vs. property offenses). Some relationships were linear whereas others were curvilinear, and effect sizes were larger for revocations than for reconvictions (2016). These findings support the notion that studies of the effect of length of incarceration on recidivism should differentiate between salient subject characteristics.

What is it then about subject characteristics that the length of time spent incarcerated might have such disparate effects for different offenders? One of the conventional or contemporary theoretical notions as to the utility of prison might be that it reduces crime by exerting a deterrent effect on offenders (others include retribution, incapacitation, and rehabilitation). Deterrence theory holds that humans are inherently rational beings and that all decisions are made via cost-benefit analyses (Beccaria, 1764/1963; Cornish & Clarke, 1986). Thus, as long as the punishment for a crime is swift, certain, and proportionately severe (Beccaria, 1764/1963), would-be offenders will opt to decline the decision to commit a crime, as

the risk (incarceration) will outweigh any possible benefit. Deterrence theory would then support the U-shaped curve hypothesis (Orsagh & Chen, 1988), as too lenient punishments would result in recidivism and overly-severe punishments would elevate the risk of future criminality as well.

One problem with the deterrence theory explanation of the effect of time served in prison on recidivism is that it does not explain why not all effects are curvilinear (Gendreau et al., 1999; Rydberg & Clark, 2016). As findings from the Pratt and colleagues (2006) meta-analysis demonstrated, deterrence had a larger effect size among certain populations than others. This finding might help to explain why the effects of time spent incarcerated on recidivism have historically been so inconclusive and is consistent with the notion that it is a largely heterogeneous effect (Nagin et al., 2009).

The Pratt and colleagues (2006) meta-analysis also points to another theoretical explanation of the disparate effects of time spent in prison on recidivism. Pratt et al. (2006) found that deterrent effect sizes were larger among college students and white-collar criminals. Social learning theory (Akers, 1997) might explain these disparate findings as the result of certain offenses and offender characteristics or demographics being more in line with non-conforming attitudes and associations than others. Akers' (1997) articulation of social learning theory held that when a person has an excess of non-conforming definitions (or attitudes), they will *differentially associate* with delinquent peer groups that share these same definitions. Through the process of mimicry and differential reinforcement, behavior is conditioned and reinforced (Akers, 1997). This theory would argue that the process of differential association and reinforcement might nullify conformity such that time spent incarcerated for criminal behavior would exert no appreciable effect on future criminal behavior, regardless of its extent.

Prior research testing the empirical validity of social learning theory indicates there is objective merit to its propositions (Pratt et al., 2010). Others have expanded on the different mechanisms by which peer association facilitates social learning of delinquent values. Warr (2002) argues that concepts such as status, loyalty, and fear of ridicule influence patterns of socialization and influence among peer groups. As Warr argues, these values are established by peer groups themselves: "By creating their own ethical reality, [peer groups] nullify the cultural definitions that exist outside the group and that may control the behavior of those very members in situations away from their companions," (Warr, 2002, pp. 65). There is evidence that peer groups such as gangs inhibit similar processes as those described by Warr (2002). Additionally, prior research indicates that gang members indeed ascribe to unique values and norms not shared with non-gang members (Esbensen et al., 2009). Matsuda and colleagues (2013) provide empirical support for the hypothesis that gang members are more likely to exhibit violent tendencies as mediated by their adherence to "street" attitudes and beliefs, which prioritize status values such as respect and toughness (Anderson, 1999). Their findings suggest that gang membership increases adherence to these values, which in turn facilitates violent behavior. Evidence thus exists to support the notion that gang members not only prioritize certain values distinctly different than those of non-gang members, but that these values also predispose gang members to higher likelihoods of criminal offending.

With these empirical and theoretical implications in mind, testing the heterogeneous effect of length of incarceration on recidivism between different offender subgroups is important for understanding the nuanced relationship between these two variables. Designating gang members and non-gang members allows the ability to test whether or not longer lengths of

incarceration have a universal deterrent effect, as the strength of peer influence among gang members may insulate them from societal norms more easily imparted on non-gang members with less influential peer groups. While the non-gang members in the current study have all by necessity exhibited some form of serious criminal behavior (i.e., they were sentenced to prison) and thus some extent of rejection of overall societal norms, there is no theoretical basis to assume they share the same differential peer relations, values, and processes of social learning to the extent that gang members might. The findings in the current study would support social learning theory (Akers, 1997) if there were a statistically significant deterrent association between longer lengths of incarceration and recidivism for non-gang members and no deterrent effect for gang members. In contrast, deterrence theory (Beccaria, 1764/1963) would be supported if longer lengths of incarceration had a statistically significant deterrent effect on recidivism for all samples regardless of offender characteristics, gang member or non-gang member.

Considering these relevant theoretical and empirical findings, the current study seeks to examine the effect of longer lengths of incarceration compared to shorter lengths of incarceration on recidivism using a sample of prisoners released from IDOC prisons from 2011 to 2014. Given the previously cited evidence that this relationship may be considerably heterogeneous (Gottfredson et al., 1977; Nagin et al., 2009; Rydberg & Clark, 2016), and in order to test the validity of both deterrence theory and social learning theory, separate analyses will be conducted for gang members and non-gang members. This study will ultimately answer the following questions:

1. Is there a relationship between length of incarceration and recidivism after other characteristics are taken into account?

2. Does the relationship between the length of incarceration and recidivism differ between gang members and non-gang members?

Based on prior findings and theoretical proposals, it is hypothesized that there will be a statistically significant deterrent effect for inmates that fall within the second quartile of the distribution of total time served in months, and a criminogenic effect for inmates in the third and fourth quartiles of the distribution, compared to those in the first quartile, based on Classical deterrence theory. Additionally, it is hypothesized that this effect will be stronger and more pronounced when the sample includes only non-gang members, and that the deterrent effect will be less or non-existent among gang members, based on propositions of social learning theory (Akers, 1997).

CHAPTER THREE

DATA AND METHODS

The data utilized in this study were provided by IDOC and supplemented by data from

Illinois' Criminal History Record Information (CHRI) system. Specifically, data for exits from

Illinois state prison facilities were obtained from IDOC, as well as information on all arrests

prior to and following the release of each individual from prison between state fiscal years 2011

to 2015. However, some cases were excluded based on several relevant factors. First, only those

who had been out of prison for at least three years since their release to when the CHRI data

were generated (N = 37,626) were included in the analysis in order to allow for a large enough

follow-up period. For this reason, only exits from IDOC prisons between 2011 and 2014 were

analyzed. This helps to more accurately capture patterns of recidivism events. Second, when an

individual experienced more than one exit during the time period studied (N = 44,551), only the

first prison exit recorded in the data was included in order to avoid providing more statistical

weight to the characteristics of those individuals. Third, those admitted to prison for parole

violations (N = 40,624) were excluded in this analysis in order to avoid possible confounding

effects related to the circumstances under which they were admitted to prison compared to those

admitted to prison for new offenses. Fourth, those who exited prison because they died or were

deported (N = 457) were also excluded in order to avoid analyzing cases that artificially

contribute to non-recidivism outcomes, since the recidivism data only include arrests occurring

in Illinois. Additionally, all individuals returning to non-Illinois zip codes (N = 4,968) were

excluded from the analyses because they similarly might contribute to non-recidivism outcomes. Finally, individuals categorized as "other" in terms of race were excluded due to relatively low frequency (N = 670; Rydberg & Clarke, 2016). After these exclusions and before weighting procedures, the overall sample total of cases was 72,716.

The independent variable of interest, total time spent incarcerated, incorporated both jail and prison time for the current conviction in months. The variable was then split into four discrete ordered categories based around the quartiles of the distribution of time spent incarcerated across the sample (Meade, Steiner, Makarios, & Travis, 2013; Rydberg & Clarke, 2016). This helps to ensure that the distribution of individuals across the groupings is more balanced than simply defining the categories based on natural breaks in time (i.e., 6 months, 12 months, 18 months, etc.).

When attempting to control for possibly confounding variables in the analysis of the effect of time spent incarcerated on recidivist outcomes, Nagin, Cullen, and Johnson (2009) identified several control variables that must be accounted for, including age upon release, race, gender, offense type, and criminal history. They argued that age has been shown to be inversely related to reoffending rates such that as age increases, offending rates generally decline as well. In order to account for more variability among age groups, age was included as a continuous measure.

In addition to age, gender and race are the other two necessary demographic variables identified by Nagin and colleagues (2009) to be required for the analysis of time spent incarcerated on recidivism. Race is often included as a covariate in studies in which recidivism is the dependent variable and is often found to have a statistically significant effect (Gendreau, Little, & Goggin, 1996; Nagin et al., 2009; Piquero, Jennings, Diamond, & Reingle, 2015). Race

was categorically defined as "White," "Black," and "Hispanic." As previously noted, those cases

identified as "Other" were excluded due to low frequency (N = 670). Black individuals were

used as the reference category due to their higher representation in the general sample (over

55%). Gender is also routinely included in studies regarding recidivism (Nagin et al., 2009), and

more recent research has identified disparate recidivistic patterns between males and females

(Olson, Stalans, & Escobar, 2015). Gender was defined here as a dichotomous categorization of

male or female.

In terms of case characteristic variables, criminal history and holding offense type were

also included as covariates. Criminal history is often measured by prior arrests (Gendreau et al.,

1996) among other measures such as prior convictions. Although the data included substantial

detail regarding the nature of prior arrests and criminal history, a limited number of criminal

history variables were included in order to preserve parsimony. Specifically, the number of

arrests for non-violent and violent arrests, and a dichotomous categorization of whether or not

the individual had previously served time in prison were included. Relevant research has found

that individuals with prior prison sentences and individuals with prior violent (domestic and non-

domestic) arrest histories have higher odds of recidivism upon release from prison (Beck &

Shipley, 1997; Olson et al., 2015). Although the available data allowed for the computation of

both prior arrests and prior conviction, analyses were performed to determine if there were high

degrees of correlation between prior arrests and prior convictions. Because none of these

measures of prior criminal history met the parametric assumption of linearity required for a

Pearson correlation, Spearman's Rho was used instead. The measures for the number of prior

arrests and prior convictions for non-violent offenses were found to be strongly correlated,

significant at the 95 percent confidence level (r_s = .78, p < .001). The number of prior arrests and

prior convictions for violent offenses were moderately correlated (r_s = .61, p < .001). Finally,

prior non-violent arrests were moderately correlated with prior violent arrests (r_s = .37, p < .001).

These findings indicate that measuring criminal history as the number of prior arrests for non-

violent and violent offenses is adequate.

Because nearly a third of prior arrests for violent offenses were for domestic violence,

two measures were used for prior violent offense arrests: one measuring only prior arrests for

domestic violence and one recording prior arrests for all other violent offenses. Finally, the

current conviction offense type (i.e., that which led to their prison sentence) is a categorical

variable with five separate categories of person (violent), property, drug, sex, and other crimes.

Because defendants can be sentenced to prison for more than one offense type, the offense type

that the inmate was held in prison for was defined as the offense that carries the longest prison

sentence (i.e., the most serious offense for which the individual was sentenced to prison).

Other demographic and case characteristic variables not identified by Nagin and

colleagues (2009) were also included. These other variables include education level, marital

status, mental health treatment, need for drug treatment, current holding offense class, last

security level before release, region of the state where the inmate was released, and the number

of days at risk for recidivism.

Meade et al. (2013) found felony class to be a significant predictor of time served.

Consistent with those findings, the data in this study showed that time spent incarcerated has a

significantly high level of association with the current holding felony class (X^2 = 25,031, df = 3,

Cramer's V = .587, p < .001). As such, this variable will be included as a control variable in the

overall, gang, and non-gang member models, and separate analyses for gang members and non-

gang members will be conducted for those sentenced for Class 3 or 4 felonies and for those sentenced for more serious felony classes.

Sociological theorists have indicated that education level may be an important predictor of recidivism (Andrews & Bonta, 1994; Gendreau et al., 1996). In addition, research supports the possibility that education level may also impact sentencing (Wooldredge, Griffin, & Rauschenberg, 2005), and thus, length of stay. Based on prior research (Meade, et al., 2013; Olson et al., 2015), education level was dichotomously categorized as whether or not the individual had completed high school or received their General Education Diploma (GED). Marital status has also been shown to be a significant predictor of recidivism, (Gendreau et al., 1996; Olson et al., 2015) and has the potential to serve as a proxy measure for social support. Marital status is a dichotomous measure of whether the individual is single or married.

Prior research indicates that differences in recidivist risk factors for individuals with mental illness and those without mental illness are negligible (Bonta, Law, & Hanson 1998). However, due to the documented situational and systemic differences in the experiences of the mentally ill in the criminal justice system, it is still an important covariate to include as an independent variable (Lamb & Weinberger, 1998). Unfortunately, in the current study, whether or not the individual had ever received treatment for a mental health issue was the only measure of mental illness. As such, this measurement might not capture those who have untreated current mental health issues and might confound prior treatment effects with mental health status.

Drug use and abuse is commonly cited as a complicating factor in desistance efforts (Olson et al., 2015; Schroeder, Giordano, & Cernkovich, 2007). Similar to the measure of mental illness used in this study, the variable included to account for drug abuse was a proxy measure. Drug abuse was measured as whether or not the individual was recommended for drug treatment

upon intake screening and processing for the prison sentence being studied. One limitation

concerning this variable is that it does not measure to what degree the treatment was accessed or

provided, if at all, during the period of incarceration being studied. However, prior research in

Illinois suggests a low percentage of those identified as in need of substance abuse treatment

actually access it while in prison (Sneed, 2017). In addition, individuals who spent between 6

and 30 months incarcerated were more likely to receive treatment than those who served fewer

than 6 months or more than 30 months.

Prior research indicates that individuals held in higher security may have higher odds of

recidivism because they lack treatment and socializing opportunities that individuals held in

lower security prisons have (Meade et al., 2013; Mears & Bales, 2009). Thus, included in this

study was a variable accounting for the individuals' latest security level held at the time of

release from prison. The security levels as defined by IDOC were "Minimum," "Medium," and

"Maximum." Additionally, "Pending" cases were accounted for in a separate category. These are

usually individuals who were not imprisoned long enough to be assigned to one of the three

conventional security levels, and as such must be controlled for.

Region of release can serve as a proxy measure of criminal opportunities and networks

that can lead to recidivism (Olson et al., 2015), as well as variations in policing resources and

practices that may influence the odds of arrest. Previous research has found that recidivism

among individuals released from Illinois prisons was higher for those who returned to Cook

County (which includes the City of Chicago) compared to the rest of the state (IDOC, 2005).

However, in order to account for variation between more rural and urban counties, location of

return was categorized as mostly urban and mostly or completely rural, in addition to Cook

County. These county determinations were made by the United States Census Bureau based on

population thresholds, density, and land use, among other metrics (Ratcliffe, Burd, Holder, & Fields, 2016; U.S. Census Bureau, 2012). Due to a relatively low number of counties determined to be completely rural, all rural counties were grouped together leaving three distinct categories of Cook, mostly urban, and mostly or completely rural counties for the variable included in the model.

During the follow-up period post-release from prison, individuals may be re-incarcerated due to parole violations, and thus have less opportunity to be rearrested for a subsequent offense (Olson et al., 2015). In order to account for this possible confounding effect, the number of total days at risk for recidivism (i.e., days not incarcerated in prison post-release) were calculated and included as a control variable.

The outcome variable, recidivism, was measured as rearrest for any new offense within three years of being released. As previously mentioned, gang members have been shown to have higher likelihoods of recidivism for a violent offense (Matsuda et al., 2013), so models with rearrest for a violent offense will also be analyzed. Research has shown that when recidivism is defined as reconviction or readmission to prison as opposed to rearrest, recidivism rates are lower (Langan & Levin, 2002; Olson, 2014). All of these measures are limited in that they cannot feasibly measure all recidivism as defined as post-sanction criminal behavior, but reconviction and readmission to prison may be too limited and underrepresenting as measures of recidivism. While rearrest is measuring recidivism as instances in which police had probable cause to make an arrest and not necessarily whether the individual engaged in criminal behavior, it is broader than the other measures. Models with recidivism defined as rearrest for a violent offense were analyzed in order to observe potentially disparate effects of time spent in prison between different measures of recidivism. Because most recidivism occurs relatively soon after

an individual's release (Olson, 2014), a follow-up period of three years was likely sufficient to record recidivism.

The following tables provide descriptive information on the variables included in the analyses. The groupings created for the total time incarcerated variable approximate quantiles, as the respective percentages of the total for each category are near 25 percent. The mean exit age was about 34 years old, and the highest representation of race at over half of the sample was Black. Unsurprisingly, males were vastly more accounted for than females, as there were nearly 9 men for every 1 woman. The majority of individuals were not married (84.6 percent), and just over half of individuals returned to Cook County. Only about a quarter of the sample stated that they had ever received treatment for a mental health issue, and over half of the sample was recommended for drug treatment upon intake, which may indicate a relatively high prevalence of drug abuse or addiction among those sentenced to prison.

Individuals sentenced for drug offenses accounted for the highest of all holding offense types (34.5%), which was about 10 percentage points higher than those sentenced for person offenses. Only about 5 percent of were sentenced for a sex offense, which included offenses such as rape or sexual abuse, as well as offenses such as prostitution and sex offender registration violations. About two-thirds were held in minimum-level security facilities at the time of their exit, while just over 30 percent were held in medium-level facilities. Less than 2 percent were held in maximum-level facilities before their exit. The mean number of prior arrests for a non-violent offense was about 12.6, while the mean number of arrests for a non-domestic violent offense was less than 2, and less than 1 prior arrest for domestic violence offenses on average. Almost one-half had previously served a prison sentence.

Finally, those held for Class 3 or 4 felony offenses accounted for roughly one-half of the sample, while those held for Class M, X, 1, or 2 felony offenses accounted for the other half. Gang members made up only about 30 percent (N = 21,889) of the overall sample.

Table 2. Sample Counts and Percentages, by Variable

Variable	Count	Percentage
Total Time Incarcerated		
Less than 10.5 Months	18,239	25.1%
10.5 thru 17 Months	20,746	28.5%
18 thru 29 Months	15,978	22.0%
30 or More Months	17,753	24.4%
Total	72,716	100%
Exit Age		
Mean	34.22	---
Total	72,716	100%
Race		
Black	40,694	56.0%
White	22,432	30.8%
Hispanic	9,590	13.2%
Total	72,716	100%
Gender		
Female	7,056	9.7%
Male	65,660	90.3%
Total	72,716	100%
Education Level		
High School/GED	37,448	51.5%
No High School/GED	35,268	48.5%
Total	72,716	100%
Region of Release		
Cook	37,792	52.0%
Mostly Urban	29,425	40.5%
Mostly/Completely Rural	5,499	7.6%
Total	72,716	100%
Marital Status		
Not Married	61,533	84.6%
Married	11,183	15.4%

Total	72,716	100%
Previously Received Treatment for Mental Health		
No	55,025	75.7%
Yes	17,691	24.3%
Total	72,716	100%
Recommended for Drug Treatment		
No	34,258	47.1%
Yes	38,458	52.9%
Total	72,716	100%
Current Holding Offense Type		
Person Crimes	19,150	26.3%
Property Crimes	23,142	31.8%
Drug Crimes	25,081	34.5%
Sex Crimes	4,068	5.6%
Other	1,275	1.8%
Total	72,716	100%
Last Security Level Before Release		
Minimum	46,556	64.0%
Medium	22,532	31.0%
Maximum	1,119	1.5%
Pending	2,509	3.5%
Total	72,716	100%
Current Holding Felony Class		
Classes 3 or 4	37,122	49.3%
Classes M, X, 1, or 2	35,594	51.1%
Total	72,716	100%
Prior Non-Violent Arrests		
Mean	12.60	---
Total	72,716	100%
Prior Non-DV Violent Arrests		
Mean	1.80	---
Total	72,716	100%
Prior Domestic Violence Arrests		
Mean	0.86	---
Total	72,716	100%
Prior Prison		
No	35,429	48.7%
Yes	37,287	51.3%

	Total	72,716	100%
Active Gang Member			
	No	50,817	69.9%
	Yes	21,899	30.1%
	Total	72,716	100%
Days at Risk			
	Mean	1,679	---
	Total	72,716	100%

Chi-square tests of association and ANOVA tests were done to assess the relationship between the independent covariates and the dependent measures of rearrest for any new offense and rearrest for any violent offense, within three years. Overall, 59.2 percent recidivated for any new offense compared to the 40.8 percent that did not recidivate. The table between recidivism for any new offense and total time incarcerated seems to suggest a deterrent effect as time incarcerated increases, as 62.2 percent of those in the first quartile recidivated while 55.1 percent in the fourth quartile recidivated. While the significance test suggests these two variables were significantly associated, the relationship appeared to be weak (Cramer's V = .052, $p < .001$). An ANOVA test between the continuous form of time spent incarcerated (months) and rearrest for any new offense was also significant at the 95 percent confidence level (F = 206.6, Eta = .0025, $p < .001$). A Spearman's Rho correlation test (again used instead of Pearson's R due to skewness of the distribution in time incarcerated when measured in months) between total time incarcerated and rearrest for any offense indicated that the two measures were weakly correlated (r_s = -.04, $p < .001$). In terms of demographics, race and age appeared to have the strongest associations with recidivism, while the holding offense type appeared to have the strongest association with recidivism among the case characteristic variables (Cramer's V = .226, $p <$ .001).

Additionally, region of release had a relatively strong association with recidivism, as two-thirds of those released to Cook County recidivated, which was more than any other region (Cramer's V = .186, p <.001). The number of prior non-violent arrests had the strongest association with recidivism among the other measures of prior criminal history examined (F = 6736.5, Eta = .0814, p < .001). The mean number of prior arrests for non-violent offenses for those who did not recidivate was 9.3 and 14.9 for those who did recidivate. While the association between the holding crime class and recidivism was relatively weak (Phi = .041, p < .001), gang membership had a stronger association (Phi = .150, p < .001).

Table 3. Chi-Square Tests of Association Between Rearrest for Any Crime and Variables

Covariate	No Rearrest for Any Crime	Rearrest	Total	Total Sample
Total Time Incarcerated				
$X^2 = 196.6.1$, df = 3, Cramer's V = .052, p < .001				
Less than 10 .5 Months	37.8%	62.2%	100%	25.1%
10.5 thru 17 Months	40.4%	59.6%	100%	28.5%
18 thru 29 Months	40.0%	60.0%	100%	22.0%
30 or More Months	44.9%	55.1%	100%	24.4%
Total	40.8%	59.2%	100%	100.0%
Race				
$X^2 = 3187$, df = 2, Cramer's V = .209, p < .001				
Black	31.9%	68.1%	100%	56.0%
White	49.6%	50.4%	100%	30.8%
Hispanic	57.7%	42.3%	100%	13.2%
Total	40.8%	59.2%	100%	100.0%
Gender				
$X^2 = 119.3$, df = 1, Phi = .041, p < .001				
Female	46.4%	53.2%	100%	9.7%
Male	40.1%	59.9%	100%	90.3%
Total	40.8%	59.2%	100%	100.0%
Education Level				
$X^2 = 190.1$, df = 1, Phi = .051, p < .001				
No High School Grad/No GED	43.2%	56.8%	100%	51.5%

High School Grad or GED	38.2%	61.8%	100%	48.5%
Total	40.8%	59.2%	100%	100.0%

Region Released

	X² = 2513.6, df = 2, Cramer's V = .186, p < .001			
Cook County	33.3%	66.7%	100%	52.0%
Mostly Urban	45.9%	54.1%	100%	40.4%
Mostly/Completely Rural	64.8%	35.2%	100%	7.6%
Total	40.8%	59.2%	100%	100.0%

Marital Status

	X² = 806.9.5, df = 1, Phi = .105, p < .001			
Not Married	38.6%	61.4%	100.0%	84.6%
Married	52.9%	47.1%	100.0%	15.4%
Total	40.8%	59.2%	100.0%	100.0%

Recommended for Drug Treatment

	X² = 5.19, df = 1, Phi = .008, p = .02			
No	41.2%	58.8%	100%	47.1%
Yes	40.4%	59.6%	100%	52.9%
Total	40.8%	59.2%	100%	100.0%

Previously Received Treatment for Mental Illness

	X² = 15.3, df = 1, Phi = .015, p < .001			
No	40.4%	59.6%	100%	75.7%
Yes	42.0%	58.0%	100%	24.3%
Total	40.8%	59.2%	100%	100.0%

Current Holding Offense Type

	X² = 3703, df = 4, Cramer's V = .226, p < .001			
Person Crimes	36.9%	63.1%	100%	26.3%
Property Crimes	35.8%	65.1%	100%	31.8%
Drug Crimes	42.3%	57.7%	100%	34.5%
Sex Crimes	84.5%	15.5%	100%	5.6%
Other Crimes	35.8%	64.2%	100%	1.8%
Total	40.8%	59.2%	100%	100.0%

Current Holding Felony Class

	X² = 122.8, df = 1, Phi = .041, p < .001			
Classes 3 or 4	38.8%	61.2%	100%	48.9%
Classes M, X, 1, or 2	42.8%	57.2%	100%	51.1%
Total	40.8%	59.2%	100%	100.0%

Last Prison Security Level Upon Release

	X² = 38.4, df = 3, Cramer's V = .023, p < .001			

Minimum	40.4%	59.6%	100%	64.0%
Medium	42.0%	58.0%	100%	31.0%
Maximum	40.5%	59.5%	100%	1.5%
Pending/Other	36.2%	63.8%	100%	3.5%
Total	40.8%	59.2%	100%	100.0%
Prior Prison Sentence				
	$X^2 = 597.7$, df = 1, Phi = .091, p < .001			
No	45.3%	54.7%	100%	48.7%
Yes	36.4%	63.6%	100%	51.3%
Total	40.8%	59.2%	100%	100.0%
Active Gang Member				
	$X^2 = 1626.7$, df = 1, Phi = .150, p < .001			
No	45.6%	54.4%	100%	69.9%
Yes	29.6%	70.4%	100%	30.1%
Total	40.8%	59.2%	100%	100.0%

Table 4. ANOVA Tests Between Rearrest for Any Crime and Variables

Covariate	No Recidivism	Recidivism	Total
Total Months Incarcerated	F = 206.6, Eta = .0025, p < .001		
Average	28.8	25.3	26.7
Release Age in Years	F = 2794.5, Eta = .0338, p < .001		
Average	36.8	32.5	34.2
Prior Non-Violent Arrests	F = 6736.5, Eta = .0814, p < .001		
Average	9.3	14.9	12.6
Prior Non-DV Violent Arrests	F = 174.5, Eta = .0021, p < .001		
Average	1.4	2.0	1.8
Prior DV Arrests	F = 68.6, Eta = .0008, p < .001		
Average	0.79	0.91	0.86
Days at Risk	F = 54.1, Eta = .0007, p < .001		
Average	1695.1	1665.6	1677.6

Overall, fewer than 20 percent of individuals were rearrested for a violent offense within

three years, considerably less than those recidivating for any new offense (59.2%). Some notable

differences include the fact that those incarcerated for a person offense had the highest *violent*

rearrest rate (28.3%), while those incarcerated for property offenses had the highest recidivism

rate for *any type* of offense (65.1%). The mean number of prior arrests for a non-domestic

violent offense was 2.6 for those who recidivated for a violent offense compared to 2 for those

who recidivated for any offense. This measure also had a stronger level of association with

rearrest for a *violent* offense than for *any* offense (Eta = .0216 and .0021, respectively).

Table 5. Chi-Square Tests of Association Between Rearrest for a Violent Crime and Variables

Covariate	No Rearrest for a Violent Crime	Rearrest for a Violent Crime	Total	Total Sample
Total Time Incarcerated				
X² = 71.1, df = 3, Cramer's V = .031, p < .001				
Less than 10 .5 Months	80.4%	19.6%	100%	25.1%
10.5 thru 17 Months	79.2%	20.8%	100%	28.5%
18 thru 29 Months	79.4%	20.6%	100%	22.0%
30 or More Months	82.4%	17.6%	100%	24.4%
Total	80.3%	19.7%	100%	100%
Race				
X² = 396.1, df = 2, Cramer's V = .074, p < .001				
Black	77.8%	22.2%	100%	56.0%
White	82.9%	17.1%	100%	30.8%
Hispanic	85.1%	14.9%	100%	13.2%
Total	80.3%	19.7%	100%	100%
Gender				
X² = 351.9, df = 1, Phi = .070, p < .001				
Female	88.8%	11.2%	100%	9.7%
Male	79.4%	20.6%	100%	90.3%
Total	80.3%	19.7%	100%	100%
Education Level				
X² = 215.2, df = 1, Phi = .054, p < .001				
No High School Grad/No GED	82.4%	17.6%	100%	51.5%
High School Grad or GED	78.1%	21.9%	100%	48.5%
Total	80.3%	19.7%	100%	100%
Region Released				
X² = 86.6, df = 2, Cramer's V = .035, p < .001				

Cook County	80.2%	19.8%	100%	52.0%
Mostly Urban	79.6%	20.4%	100%	40.4%
Mostly/Completely Rural	85.0%	15.0%	100%	7.6%
Total	80.3%	19.7%	100%	100%
Marital Status				
	$X^2 = 301.3$, df = 1, Phi = .064, p < .001			
Not Married	79.2%	20.8%	100.0%	84.6%
Married	86.3%	13.7%	100.0%	15.4%
Total	80.3%	19.7%	100.0%	100%
Recommended for Drug Treatment				
	$X^2 = 2.00$, df = 1, Phi = .005, p = .157			
No	80.1%	19.9%	100%	47.1%
Yes	80.5%	19.5%	100%	52.9%
Total	80.3%	19.7%	100%	100%
Previously Received Treatment for Mental Illness				
	$X^2 = 35.8$, df = 1, Phi = .022, p < .001			
No	80.8%	19.2%	100%	75.7%
Yes	78.8%	21.2%	100%	24.3%
Total	80.3%	19.7%	100%	100%
Current Holding Offense Type				
	$X^2 = 1606.9$, df = 4, Cramer's V = .149, p < .001			
Person Crimes	71.7%	28.3%	100%	26.3%
Property Crimes	81.0%	19.0%	100%	31.8%
Drug Crimes	84.7%	15.3%	100%	34.5%
Sex Crimes	92.0%	8.0%	100%	5.6%
Other Crimes	73.5%	26.5%	100%	1.8%
Total	80.3%	19.7%	100%	100%
Current Holding Felony Class				
	$X^2 = 14.38$, df = 1, Phi = .014, p < .001			
Classes 3 or 4	79.8%	20.2%	100%	51.1%
Classes M, X, 1, or 2	80.9%	19.1%	100%	48.9%
Total	80.3%	19.7%	100%	100%
Last Prison Security Level Upon Release				
	$X^2 = 355.6$, df = 3, Cramer's V = .07, p < .001			
Minimum	82.1%	17.9%	100%	64.0%
Medium	78.1%	21.9%	100%	31.0%
Maximum	67.1%	32.9%	100%	1.5%
Pending/Other	73.7%	26.3%	100%	3.5%

Total	80.3%	19.7%	100%	100%
Prior Prison Sentence				
	X² = 1.22, df = 1, Phi = .004, p = .23			
No	80.2%	19.8%	100%	48.7%
Yes	80.5%	19.5%	100%	51.3%
Total	80.3%	19.7%	100%	100%
Active Gang Member				
	X² = 422.2, df = 1, Phi = .075, p < .001			
No	82.3%	17.7%	100%	69.9%
Yes	75.8%	24.2%	100%	30.1%
Total	80.3%	19.7%	100%	100%

Table 6. ANOVA Tests Between Rearrest for a Violent Crime and Variables

Covariate	No Recidivism	Recidivism	Total
Total Months Incarcerated	F = 2.61, Eta = .00003, p = .11		
Average	26.8	26.3	26.7
Release Age in Years	F = 2254.17, Eta = .0286, p < .001		
Average	35.1	30.4	34.2
Prior Non-Violent Arrests	F = 710.58, Eta = .009, p < .001		
Average	12.3	13.6	12.6
Prior Non-DV Violent Arrests	F = 1702.98, Eta = .0216, p < .001		
Average	1.6	2.6	1.8
Prior DV Arrests	F = 1491.23, Eta = .0189, p < .001		
Average	0.76	1.3	0.86
Days at Risk	F = 7.64, Eta = .0001, p = .002		
Average	1682.5	1657.9	1677.6

In order to prepare the data for analysis, several strategies were employed to account for missing data and selection bias. Because there is no objective evidence that the data are missing completely at random (MCAR), deleting cases with missing data risks subjecting the analysis to additional biases that may affect the results (Leite, 2016). The table below shows the proportion of missing cases for each covariate. Many variables had no missing cases and the highest percentage of missing cases for any single variable was 3.3 percent. Single imputation using

classification and regression tree methods was used to correct for these missing data (Groothuis-

Oudhsoorn & van Buuren, 2011; Leite, 2016; Stuart, 2010).

Table 7. Count and Percent of Missing Cases, by Variable

Covariate	Cases Missing	Percent Missing
Total Time Incarcerated	0	0.00%
Age	9	0.01%
Race	23	0.03%
Sex	0	0.00%
Education Level	801	1.11%
Region Released	1,064	1.46%
Marital Status	542	0.75%
Previously Recommended for Drug Treatment	2,382	3.28%
Mental Health Treatment	2,003	2.76%
Current Holding Offense Type	35	0.05%
Current Holding Felony Class	53	0.07%
Last Security Level	0	0.00%
Prior Non-Violent Arrests	0	0.00%
Prior Violent Arrests (Non-DV)	0	0.00%
Prior Violent Arrests (DV)	0	0.00%
Gang Membership	0	0.00%
Days at Risk	0	0.00%

Because this study was nonexperimental, and the data were observational data, the

absence of random sampling and assignment created a possibility for selection bias. Without any

sort of weighting procedure, the unconfoundedness assumption (i.e., that assignment to treatment

groups is not influenced by any confounding variables; Imbens, 2000) could not be met. In order

to correct for selection bias as it pertains to both the internal and external validity of this study,

the MMWS weighting procedure was used to improve pre-treatment covariate balance between

the treatment groups, or quartiles of time spent incarcerated (Hong, 2012; Rydberg & Clarke,

2016). Ensuring enhanced pre-treatment covariate balance between treatment groups helped to

increase confidence in the validity of the findings such that they may be more generalizable to broader populations.

The propensity scores ultimately used to create the sample weights were created using the Average Treatment Effect (ATE) estimand. The ATE is the effect of treatment for all individuals in each treatment group (Stuart, 2010) and is the estimand ultimately used in the MMWS method of weighting.

Hong (2012) describes the steps required to perform MMWS. After identifying the pre-treatment covariates, a proportional odds logistic regression model was estimated including the "treatment" variable (total months incarcerated) as the outcome variable and the pre-treatment covariates as the independent variables. The fitted values from the resulting regression model were extracted in the logit form to create the propensity scores. Next, common support between the treatment categories was analyzed based on standard deviations from propensity scores to identify cases which do not have counterparts. These cases were then excluded from analysis because they have no counterfactual or empirical basis for comparison with cases in other treatment groups (Hong, 2012). The remaining cases were sorted in ascending order based on the logit propensity score for each treatment group and split into ten equally-sized strata. Prior research (Cochran, 1968; Rosenbaum & Rubin, 1984) shows that splitting the cases into five strata removes about 90 percent of the selection bias, but due to the large sample size, ten strata were chosen to further improve reduction of bias (Hong, 2012). Finally, weights for each treatment group in each stratum were calculated. Essentially, the weights increase representation of treatment groups underrepresented in a stratum and decrease representation of treatment groups overrepresented in a stratum in order to better balance differences in covariates between treatment groups.

Covariate balance was assessed using balance tables generated by the *cobalt* package in *R* version 3.4.4 (Greifer, 2018). Stuart, Lee, and Leacy (2013) state that covariate balance can be reliably measured as the absolute standardized mean difference (ASMD) between covariates in each treatment group. Perfect balance in a variable between treatment pairs is considered to have an ASMD value of 0. Rubin (2001) states that an ASMD threshold of .25 standardized deviations is an adequate cutoff for determining whether or not a covariate is balanced between treatment groups, though more recent research suggests a stricter criterion of .1 standard deviations is more accurate (Austin, 2011). As such, ASMD standard deviations below .1 standard deviations will be used as the threshold in this study.

MMWS was performed for the overall sample as well as all other sub-samples. Table 8 contains a summary of covariate balance across all treatment pairs for the overall sample. For each categorical variable, the categories were assessed as dummy variables comparing each category to all other cases in that variable. Binary variables were already treated dichotomously and thus did not need to show balance statistics for both categories. The unstandardized mean differences are simply the mean differences for each covariate and category before weighting, while the standardized mean differences are the values observed after weighting. For the overall sample, age, person offenses, and the number of prior arrests for violent offenses (both domestic and non-domestic violence) are considered unbalanced by the .1 threshold. While there is some unbalance still observed after weighting, the table demonstrates that MMWS was successful in creating more covariate balance across treatment groups overall, and thus reduced selection bias. Most notably, the holding felony class variable was reduced from considerable unbalance (.76) to an ASMD value much closer to 0 (.05). Covariate balance tables for all sub-samples can be referenced in the appendix.

Table 8. Covariate Balance Between Treatment Groups, by Variable

Covariate	Unstandardized	Standardized	Max Threshold
Exit Age	0.2959	0.2716	> .1
Race			
Black	0.0567	0.0431	< .1
Hispanic	0.0373	0.0386	< .1
White	0.0833	0.0597	< .1
Sex			
Female	0.0809	0.0287	< .1
Education Level			
High School/GED Complete	0.0197	0.0436	< .1
Marital Status			
Not Married	0.0140	0.0197	< .1
Previous Mental Health Treatment			
No	0.0476	0.0787	< .1
Drug Treatment			
No	0.2192	0.0813	< .1
Current Offense Type			
Person	0.1994	0.1241	> .1
Property	0.1165	0.0689	< .1
Drug	0.1487	0.0413	< .1
Sex	0.0657	0.0451	< .1
Other	0.0218	0.0078	< .1
Current Holding Felony Class			
Classes M, X, 1, or 2	0.7611	0.0476	< .1
Prior Non-Violent Arrests	0.1292	0.1468	> .1
Prior Violent Arrests (Non-DV)	0.2245	0.0707	< .1
Prior Violent Arrests (DV)	0.1645	0.1189	> .1
Prior Prison			
No	0.1720	0.0963	< .1
Active Gang Member			
Not in Gang/Non-active Member	0.2311	0.0693	< .1

In order to observe the effects of total time incarcerated as a continuous variable on recidivism for the overall sample, IPTW was used to improve covariate balance (Leite, 2016;

Robin, Hernan, & Brumback, 2000). This method involves calculating a generalized propensity score (Hirano & Imbens, 2004) which is then used to create the final weights.

One obvious limitation to these weighting methods is that covariate balance between the treatment groups could only be achieved to the extent that they were balanced on the measured covariates, so any other relevant covariates not included in this study could still have confounded the effect of treatment assignment. Additionally, the observed reduction in selection bias and the resulting strength of the unconfoundedness assumption relied on the assumption that the covariates do not contain measurement error (Hong, 2012).

Once the weighting process was complete for each sub-sample, separate quasi-binomial logistic regression models using the weights were estimated for rearrest for any offense and rearrest for a violent offense as the dependent variable. Quasi-binomial logistic regression models, as opposed to binomial regression models, include an extra parameter in order to account for more variability caused by the inclusion of weights in the model (Williams, 1982). Time spent incarcerated is the independent variable of interest for each logistic regression model. For each model using the categorical form of time spent incarcerated as the variable of interest, the discrete categories were determined by the quartiles of the distribution rounded to more natural breaks, similar to previous relevant methodologies (Meade et al., 2013; Rydberg & Clarke, 2016). Finally, test statistics were computed to identify significantly different covariate effect sizes between models (Brame, Paternoster, Mazerolle, & Piquero, 1998). Covariate effect sizes were significantly different at the .05 confidence level when the absolute value of the test statistic was greater than 1.96.

For each sample, weighted logistic regression models with rearrest for any offense as the dependent variable and rearrest for a violent offense as the dependent variable will be described.

The results will begin with a description of these models for the overall sample. In addition, models containing the variable of interest (time served incarcerated) as a continuous variable will also be described for the overall sample. Following the overall sample analyses will be a description of the results for the sample of gang members and for non-gang members. Next, separate models for gang members and non-gang members will be described using only those sentenced for Class 3 or 4 felonies. The same will be done using a sub-sample of only those sentenced for Class M, X, 1, or 2 felonies.

CHAPTER FOUR

RESULTS

Below, tables 9 through 12 contain the results of the logistic regressions run for the overall sample with rearrest for any offense and for a violent offense, as well as for only gang members and non-gang members. A table including the z-test statistics calculated to compare effect sizes between the gang and non-gang member models can be found in the appendix, as well as tables for models containing only persons incarcerated for Class 3 or 4 and Class M, X, 1, or 2 felonies.

Overall Sample

For the general model containing all individuals in the sample, the quartiles of total time spent incarcerated are "Less than 10.5 Months," "10.5 through 17 Months," "18 through 29 Months," and "30 or More Months." Only the second quartile of total time incarcerated had a statistically significant impact on the odds of recidivism for any offense compared to the first quartile. In fact, those who were incarcerated in the second quartile were roughly 11 percent less likely than those in the first quartile to recidivate, significant at the 95 percent confidence level (Odds Ratio = .89, b = -0.11, Wald = -5.63, $p < .05$). This finding suggests that incarceration has a deterrent effect only up to a year and a half, beyond which any significant reduction in future recidivism ceases to occur.

In contrast to the model with any rearrest as the outcome variable, both the second and third quartiles were significantly related to lower odds of recidivism for a violent offense

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compared to the first quartile. Specifically, individuals in the second quartile were about 7 percent less likely to recidivate for a violent offense, while individuals in the third quartile were 13 percent less likely to recidivate, significant at the .05 confidence interval. When time spent incarcerated was coded as a continuous independent variable, it appeared to have a criminogenic effect in terms of recidivism for any offense, and a deterrent effect in terms of recidivism for a violent offense (any recidivism OR = 1.003, b = .003, Wald = 10.45, p < .001; violent recidivism OR = 1.00, b = -.003, Wald = -4.04, p < .001). Furthermore, the z-test statistic comparing the covariate effect sizes indicated that total time incarcerated had a significantly stronger effect on the odds of rearrest for any new offense than rearrest for a violent offense (z = 58.61, p < .05) specifically for the second quartile relative to the first.

In addition to these findings, the likelihood of recidivism for any offense for gang members was 1.23 times the odds of recidivism for non-gang members, significant at the .05 confidence level. Gang membership also had a similarly significant effect on recidivism for a violent offense, as the odds of recidivism for a violent offense were 1.14 times the odds of recidivism for non-gang members. Further, inmates sentenced for Class 3 or 4 felonies were 10 percent more likely to recidivate for any offense and 14 percent more likely to recidivate for a violent offense compared to those sentenced for more serious felony offenses.

In terms of demographic variables, male individuals were about 30 percent more likely than female individuals to recidivate for any offense, and about 57 percent more likely to recidivate for violent offenses. Furthermore, White individuals were about 17 percent less likely to recidivate than Black individuals, and each 1-year increase in age resulted in about a 6 percent

decrease in the odds of recidivism[1]. These effects were about the same for both recidivism for any offense and recidivism for violent offenses. Releasees returning to counties other than Cook County were *less* likely to recidivate for any offense, but *more* likely to recidivate for a violent offense, significant at the .05 confidence level.

For the holding offense type, only individuals convicted of property offenses had significantly higher odds of recidivism for any offense than those incarcerated for person (violent) offenses, while all holding offense types had lower odds of recidivism for a violent offense compared to person offenses. All three measures of prior arrests were related to recidivism for any offense, as an increase in the odds of recidivism was seen for each additional prior arrest. Comparatively, only prior arrests for non-violent offenses had no statistically significant effect on recidivism for a violent offense. Having a prior prison sentence coincided with about a 25 percent increase in the odds of recidivism for any offense, while the odds of recidivism for a violent offense were about 11 percent higher for those who served prior prison sentences compared to those in prison for their first time.

Table 9. Logistic Regression Results for Rearrest for Any Crime

Covariate	Estimate	Std. Error	Wald	Odds Ratio
Total Time Incarcerated (in Months)				
Less than 10.5 Months	Ref	Ref	Ref	Ref
10.5 thru 17 Months	-0.11	0.02	-5.63	0.89***
18 thru 29 Months	-0.03	0.02	-1.66	0.97
30 or More Months	-0.02	0.02	-1.09	0.98
Release Age				
---	-0.06	0.00	-53.78	0.94***
Race				

---

[1] An ANOVA test comparing the model with race categorized as Black versus all others with a model including race defined as Black, White, and Hispanic suggested that the more detailed model fit the data better ($X^2 = 423.33$, df = 2, $p < .001$), holding all other variables constant.

Black	Ref	Ref	Ref	Ref
White	-0.19	0.02	-7.70	0.83***
Hispanic	-0.89	0.03	-29.95	0.41***
Gender				
Female	Ref	Ref	Ref	Ref
Male	0.26	0.03	7.75	1.30***
Education Level				
High School/GED Complete	Ref	Ref	Ref	Ref
High School/GED Incomplete	0.02	0.02	0.78	1.02
Region Released[2]				
Cook County	Ref	Ref	Ref	Ref
Mostly Urban	-0.31	0.02	-13.85	0.74***
Mostly/Completely Rural	-0.67	0.04	-16.18	0.51***
Marital Status				
Single	Ref	Ref	Ref	Ref
Married	-0.16	0.03	-5.84	0.85***
Recommended for Drug Treatment				
No	Ref	Ref	Ref	Ref
Yes	0.02	0.02	0.98	1.02
Ever Received Treatment for Mental Health				
No	Ref	Ref	Ref	Ref
Yes	0.09	0.03	3.46	1.09***
Holding Offense Type				
Person	Ref	Ref	Ref	Ref
Property	0.23	0.03	8.56	1.25***
Drug	-0.09	0.03	-3.50	0.91***
Sex	-1.92	0.06	-29.51	0.15***
Other	-0.03	0.07	-0.36	0.97
Holding Crime Class				
Classes M, X, 1, or 2	Ref	Ref	Ref	Ref
Classes 3 or 4	0.10	0.02	4.88	1.10***
Last Security Level				
Minimum	Ref	Ref	Ref	Ref
Medium	-0.06	0.02	-0.27	0.94**

---

[2] The logistic regression model with the region of release defined as Cook, Urban, or Rural counties fit the data better than a model with region of release categorized dichotomously as Cook versus all other counties in Illinois (X^2 = 121.24, df = 1, p < .001).

Maximum	-0.08	0.08	-1.03	0.92
Pending/Other	-0.27	0.06	-4.81	0.76***
Number of Prior Non-Violent Arrests				
---	0.05	0.00	36.40	1.05***
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)				
---	0.04	0.00	8.32	1.04***
Number of Prior Domestic Violence Arrests				
---	0.02	0.06	3.67	1.02***
Prior Prison Sentences				
None	Ref	Ref	Ref	Ref
1 or More	0.22	0.02	9.70	1.25***
Gang Membership Status				
Not in Gang/Non-active Gang Member	Ref	Ref	Ref	Ref
Active Gang Member	0.21	0.02	8.77	1.23***
Number of Days at Risk				
---	0.00	0.00	-13.79	1.00***
*** = p < .001; ** = p < .01; * = p < .05				

Table 10. Logistic Regression Results for Rearrest for a Violent Crime

Covariate	Estimate	Std. Error	Wald	Odds Ratio
Total Time Incarcerated (in Months)				
Less than 10.5 Months	Ref	Ref	Ref	Ref
10.5 thru 17 Months	-0.08	0.02	-3.57	0.93***
18 thru 29 Months	-0.14	0.02	-7.17	0.87***
30 or More Months	0.01	0.02	0.60	1.01
Release Age				
---	-0.06	0.00	-42.80	0.94***
Race				
Black	Ref	Ref	Ref	Ref
White	-0.16	0.03	-6.04	0.85***
Hispanic	-0.36	0.03	-10.72	0.70***
Gender				
Female	Ref	Ref	Ref	Ref
Male	0.45	0.04	10.31	1.57***
Education Level				
High School/GED Complete	Ref	Ref	Ref	Ref

High School/GED Incomplete	0.02	0.02	1.17	1.02
Region Released				
Cook County	Ref	Ref	Ref	Ref
Mostly Urban	0.25	0.02	10.59	1.28***
Mostly/Completely Rural	0.14	0.05	3.00	1.15**
Marital Status				
Single	Ref	Ref	Ref	Ref
Married	-0.13	0.03	-3.94	0.88***
Recommended for Drug Treatment				
No	Ref	Ref	Ref	Ref
Yes	-0.08	0.02	-3.87	0.92***
Ever Received Treatment for Mental Health				
No	Ref	Ref	Ref	Ref
Yes	0.24	0.03	9.22	1.27***
Holding Offense Type				
Person	Ref	Ref	Ref	Ref
Property	-0.21	-0.03	-8.16	0.81***
Drug	-0.38	0.03	-14.40	0.68***
Sex	-1.13	0.07	-16.00	0.32***
Other	-0.22	0.07	-3.01	0.80**
Holding Crime Class				
Classes M, X, 1, or 2	Ref	Ref	Ref	Ref
Classes 3 or 4	0.13	0.02	5.88	1.14***
Last Security Level				
Minimum	Ref	Ref	Ref	Ref
Medium	0.18	0.02	7.73	1.19***
Maximum	0.51	0.07	7.27	1.67***
Pending/Other	0.14	0.06	2.42	1.14*
Number of Prior Non-Violent Arrests				
---	0.00	0.00	1.36	1.00
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)				
---	0.14	0.00	33.71	1.15***
Number of Prior Domestic Violence Arrests				
---	0.17	0.01	31.07	1.19***
Prior Prison Sentences				
None	Ref	Ref	Ref	Ref
1 or More	0.11	0.02	4.49	1.11***
Gang Membership Status				

Not in Gang/Non-active Gang Member	Ref	Ref	Ref	Ref
Active Gang Member	0.13	0.02	5.43	1.14***
Number of Days at Risk				
---	0.00	0.00	-2.81	1.00**
*** = p < .001; ** = p < .01; * = p < .05*				

Gang Members versus Non-Gang Members

For the separate models analyzing the effect of time spent incarcerated on recidivism for any new arrest among gang members versus non-gang members, the quartiles of time spent incarcerated were coded the same as the quartiles defined for the model including all cases.

For non-gang members, those in the second quartile had significantly lower odds of recidivism for any offense than those in the first quartile (OR = .80, b = -0.22, Wald = -8.45 p<.001), which is consistent with the results from the "any rearrest" model analyzed using the overall sample. Additionally, neither the individuals in the third nor the fourth quartiles were more or less likely than those in the first quartile of recidivating for any new arrest. On the other hand, for gang members, those in the second quartile of the distribution of total time incarcerated had *higher* odds of recidivism than those in the first quartile (OR = 1.21, b = 0.20, Wald = 5.48, p < .001). Thus, the effect of time served appears to have a different direction of influence on recidivism among gang versus non-gang members.

On the other hand, gang members in the third quartile were roughly 11 percent less likely to recidivate compared to those in the first quartile (OR = .89, b = -0.12, Wald = -3.33, p<.001). In terms of rearrest for a violent offense, non-gang members in the second and third quartiles of time spent incarcerated were about 14 percent *less likely* to recidivate than those in the first quartile (OR = .86, b = -0.16, Wald = -5.67, p <.001; OR = .86, b = -.15, Wald = -5.91, p < .001). For gang members, those in the second quartile were also *more likely* to recidivate for a violent

offense and those in the third quartile were *less likely* to recidivate for a violent offense, consistent with the direction of effect when recidivism for any offense was examined (OR = 1.12, *b* = 0.11, Wald = 2.84, p<.01; OR = .84, *b* = -.17, Wald = -4.81, p<.001). In addition, the test statistic comparing the effect sizes of covariates between models indicates that the difference in effects between non-gang members and gang members were significant in the second quartile.

Table 11. Logistic Regression Results: Non-Gang vs. Gang Members (Any Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 10.5 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
10.5 thru 17 Months	-0.22	0.03	-8.45	0.80***		0.20	0.04	5.48	1.21***
18 thru 29 Months	-0.04	0.02	-1.52	0.96		-0.12	0.03	-3.33	0.89***
30 or More Months	-0.02	0.02	-0.83	0.98		-0.04	0.03	-1.02	0.97
Release Age									
---	-0.06	0.00	-42.74	0.94***		-0.06	0.00	-28.06	0.94***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.27	0.03	-8.91	0.77***		-0.22	0.05	-4.00	0.80***
Hispanic	-1.08	0.04	-26.09	0.34***		-0.56	0.05	-11.90	0.57***
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.25	0.04	6.45	1.28***		0.08	0.13	0.62	1.08
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.05	0.02	1.86	1.05		-0.08	0.03	-2.40	0.92*
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	0.19	0.03	-6.72	0.83***		-0.55	0.04	-14.29	0.58***
Mostly/Completely Rural	-5.02	0.05	-10.03	0.61***		-1.64	0.09	-17.28	0.19***
Marital Status									

Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.20	0.04	-5.64	0.82***		0.00	0.05	0.02	1.00
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.04	0.02	1.58	1.04		0.04	0.03	1.31	1.05
Ever Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.07	0.03	2.36	1.08*		0.12	0.05	2.61	1.12**
Holding Offense Type									
Person	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Property	0.24	0.03	7.14	1.27***		0.24	0.05	5.08	1.27***
Drug	-0.12	0.03	-3.74	0.88***		0.08	0.04	1.73	1.08
Sex	-1.71	0.08	-21.52	0.18***		-2.39	0.13	-18.69	0.09***
Other	0.08	0.09	0.85	1.08		0.19	0.13	1.45	1.21
Holding Crime Class									
Classes M, X, 1, or 2	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Classes 3 or 4	0.04	0.03	1.44	1.04		0.24	0.04	6.46	1.27***
Last Security Level									
Minimum	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Medium	-0.03	0.03	-1.17	0.97		-0.05	0.04	-1.36	0.95
Maximum	0.08	0.11	0.79	1.09		-0.38	0.11	-3.32	0.69***
Pending/Other	-0.16	0.07	-2.16	0.86*		-0.45	0.10	-4.44	0.64***
Number of Prior Non-Violent Arrests									
---	0.06	0.00	30.93	1.06***		0.04	0.00	19.64	1.04***
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)									
---	0.04	0.01	6.48	1.04***		0.02	0.01	3.60	1.02***
Number of Prior Domestic Violence Arrests									
---	0.04	0.01	5.04	1.04***		0.00	0.01	0.07	1.00
Prior Prison Sentences									
None	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
1 or More	0.18	0.03	6.27	1.19***		0.08	0.05	1.81	1.09
Number of Days at Risk									
---	0.00	0.00	-9.23	1.00***		0.00	0.00	-10.30	1.00***
*** = p < .001; ** = p < .01; * = p < .05*									

Table 12. Logistic Regression Results: Non-Gang vs. Gang Members (Violent Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 10.5 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
10.5 thru 17 Months	-0.16	0.03	-5.67	0.86***		-0.11	0.04	2.84	1.12**
18 thru 29 Months	-0.15	0.03	-5.91	0.86***		-0.17	0.04	-4.81	.84***
30 or More Months	-8.82	0.02	-0.37	0.99		0.02	0.03	0.59	1.02
Release Age									
---	-0.05	0.00	-33.02	0.95***		-0.06	0.00	-24.94	0.94***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.20	0.03	-6.58	0.82***		0.04	0.06	0.74	0.90
Hispanic	-0.65	0.05	-13.29	0.52***		-0.11	0.05	-2.20	1.04*
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.43	0.05	9.59	1.55***		0.76	0.17	4.46	2.13***
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.01	0.03	0.41	1.01		0.03	0.04	0.88	1.03*
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	0.24	0.03	8.44	1.27***		0.23	0.04	5.67	1.25***
Mostly/Completely Rural	0.11	0.05	2.09	1.12*		0.21	0.10	2.16	1.24*
Marital Status									
Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.13	0.04	-3.28	0.88**		-0.83	0.05	-1.57	0.92
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.02	0.02	0.67	1.02		-0.13	0.03	-3.82	0.88***
Ever Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.26	0.03	8.26	1.29***		0.29	0.04	6.90	1.25***
Holding Offense Type									

Person	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Property	-0.21	0.03	-6.70	0.81***	-0.16	0.05	-3.55	0.85***
Drug	-0.39	0.03	-11.90	0.68***	-0.25	0.04	-5.78	0.78***
Sex	-1.18	0.09	-13.68	0.31***	-0.87	0.12	-7.43	0.42***
Other	-0.32	0.09	-3.64	0.72***	0.24	0.12	1.98	1.27*
Holding Crime Class								
Classes M, X, 1, or 2	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Classes 3 or 4	0.09	0.03	3.26	1.09**	0.14	0.04	3.90	1.16***
Last Security Level								
Minimum	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Medium	0.21	-0.29	7.35	1.23***	0.09	0.04	2.36	1.09*
Maximum	0.47	0.09	5.15	1.61***	0.34	0.11	3.21	1.41**
Pending/Other	0.29	0.07	4.41	1.33***	0.20	0.10	1.97	1.22*
Number of Prior Non-Violent Arrests								
---	0.00	0.00	0.52	1.00	0.00	0.00	3.35	1.00***
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)								
---	0.15	0.01	27.35	1.17***	0.10	0.01	17.34	1.11***
Number of Prior Domestic Violence Arrests								
---	0.15	0.01	28.87	1.21***	0.12	0.01	13.63	1.13***
Prior Prison Sentences								
None	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
1 or More	0.10	0.03	3.43	1.10***	-0.03	0.04	-0.56	0.98
Number of Days at Risk								
---	0.00	0.00	-2.49	1.00*	0.00	0.00	-1.53	1.00
*** = p < .001; ** = p < .01; * = p < .05*								

Other independent variables appear to have disparate effects on recidivism between gang members and non-gang members as well. For instance, male non-gang members were roughly 28 percent more likely to recidivate for any offense than female non-gang members, whereas gender appears to have no statistically significant effect on recidivism for any offense among gang members. In terms of recidivism for a violent offense, male non-gang members were 55 percent more likely to recidivate than female non-gang members, while male gang members were 113 percent more likely to recidivate than female gang members. Non-Black gang members were less

likely than Black gang members to recidivate for any offense, while Hispanic gang members were slightly more likely to recidivate for a violent offense than Black gang members. Gang members without a high school diploma or GED certificate were about 8 percent less likely to recidivate for a non-violent offense. In terms of recidivism for a violent offense, gang members without a high school diploma or GED certificate were 3 percent *more* likely to recidivate. Additionally, married non-gang members were less likely to recidivate for any offense or any violent offense, but there was no discernible effect among gang members, which was also true for recidivism for a violent offense.

In terms of case characteristics, non-gang members incarcerated on drug charges were less likely to recidivate for any offense compared to those incarcerated for person offenses, while gang members sentenced for drug charges were no more or less likely to recidivate for any offense compared to those incarcerated for a person offense. For recidivism defined as rearrest for a violent offense, both gang members and non-gang members incarcerated for drug offenses were less likely to recidivate than those incarcerated for person offenses. A test statistic comparing all holding offense groups found that the difference in covariate effect sizes between the "any rearrest" models was only significant for the effect size of drug offenders ($z = -7.26$, $p<.05$). Security level designations also had significant effects on recidivism for gang members and non-gang members. Gang members held in medium-level security facilities were roughly 30 percent less likely than gang members held in minimum-security facilities to recidivate for any offense. In terms of recidivism for a violent offense, both gang members and non-gang members were more likely to recidivate if they were held in security levels higher than the minimum-security level.

Finally, the odds of recidivism for any offense among gang members incarcerated for Class 3 or 4 felonies were about 27 percent higher than those incarcerated for more serious felony offenses, while this holding felony class dichotomization had no statistically significant effect on recidivism for non-gang members. However, non-gang members incarcerated for Class 3 or 4 were 9 percent more likely than those held for more serious felony offenses to recidivate for a violent offense. Gang members were about 16 percent more likely to recidivate for a violent offense if they were held for a Class 3 or 4 offense compared to a more serious felony offense.

Individuals Sentenced for Class 3 or 4 Felonies

To examine the relationship between time incarcerated and recidivism among another sub-set of cases, analyses were performed for those released from prison after serving a sentence for Class 3 or 4 felonies only, separately for non-gang and gang members. For subjects incarcerated for Class 3 or 4 felonies, the quartiles of time spent incarcerated were defined as "Less than 6.5 Months," "6.5 through 11 Months," "12 through 16 Months," and "17 or More Months."

For non-gang members, only the third quartile had a statistically significant effect on recidivism for any offense relative to the first quartile. Specifically, non-gang members in the third quartile were about 6 percent less likely to recidivate than those in the first quartile (OR = .94, b = -.06, Wald = -1.99, p < .05), while the second and fourth quartiles had no statistically significant effect. Gang members in the fourth quartile of time spent incarcerated had odds 13 percent greater than those in the first quartile of recidivating (OR = 1.13, b = 0.12, Wald, 2.22, p<.05). Similar to the model including all felony classes, neither the second or third quartiles had any statistically significant effect on recidivism for any offense at the .05 confidence level. For recidivism defined as rearrest for any violent offense, time spent incarcerated had no statistically

significant effect on recidivism for either gang members or non-gang members, compared to those in the first quartile.

Non-gang members returning to mostly urban counties compared to those returning to Cook County were roughly 20 percent less likely to recidivate, whereas gang members returning to mostly urban counties had odds of recidivism 39 percent lower than those returning to Cook County. The test statistic comparing the effect sizes of this covariate category indicate that it is significantly stronger for gang members ($z = 2.74$, $p < .05$). Additionally, non-gang members held in medium security level facilities prior to release were about 10 percent less likely to recidivate for any offense than those non-gang members held in minimum security, and security level had no discernible effect on the likelihood of recidivism for gang members. For recidivism for a violent offense, all gang members and non-gang members not held in minimum security levels were significantly more likely to recidivate.

Males were more likely than females to recidivate for a violent offense, while males were no more or less likely to recidivate for any offense, both for gang members and non-gang members. Marital status only had a statistically significant effect on non-gang members, both for recidivism defined as an arrest for any offense and for violent offenses (this difference was not significant for recidivism defined as any rearrest and significant for violent rearrest; $z = -0.86$ and -4.14, respectively). Prior treatment for mental health was related to an increase in the odds of recidivism (any offense and for a violent offense) for both gang members and non-gang members.

Individuals Sentenced for Class M, X, 1, or 2 Felonies

The last set of analyses examined the relationship between time incarcerated and recidivism for the sub-set of cases that served time in prison for felony classes more serious than

Class 3 and 4 offenses. The quartiles of time spent incarcerated for felony Classes M, X, 1, or 2 were defined as "Less than 20 Months," "20 through 26 Months," "27 through 44 Months," and "45 or More Months."

For non-gang members, time spent incarcerated had no effect on the odds of recidivism for any offense among individuals sentenced for felony classes M, X, 1, or 2. Gang members in the second quartile, however, were about 10 percent more likely to recidivate for any new offense than those in the first quartile (OR = 1.10, b = .10, Wald = 2.19, p < .05). No other quartiles had a significant effect on the odds of recidivism. For recidivism defined as rearrest for a violent offense, non-gang members in the second quartile were about 20 percent less likely than those in the first quartile to recidivate (OR = .80, b = -.23, Wald = -5.82, p < .001). Time served had no statistically significant effect on recidivism for a violent offense for gang members compared to the first quartile.

Non-gang members without a high school diploma or GED certificate were more likely to recidivate for any offense, while this variable had no effect on recidivism among gang members. The odds of recidivism for a violent offense among male gang members were 2.34 times greater than those of female gang members, and gang members without a high school diploma or GED were 1.11 times more likely to recidivate for a violent offense. Only White gang members were more likely to recidivate for a violent offense than Black gang members, as White or Hispanic gang and non-gang members were less likely than Black subjects to recidivate for any offense, and White and Hispanic non-gang members were less likely to recidivate for a violent offense.

Additionally, non-gang members held for drug offenses were about 24 percent less likely to recidivate for any offense than those incarcerated for person offenses, while there was no

statistically significant difference between these two categories for gang members. Non-gang and gang members held for property, drug, and sex offenses were less likely to recidivate for a violent offense than those incarcerated for a person offense. Gang and non-gang members with prior prison sentences were 26 and 24 percent more likely to recidivate for any offense, respectively, while only non-gang members with prior prison sentences were more likely to recidivate for a violent offense.

CHAPTER FIVE

DISCUSSION

The current study has contributed to the literature on the effect of length of incarceration on recidivism in several ways. Methodologically, the weighting procedure (MMWS) helped the data better approximate random assignment between the treatment groups (or, quartiles of the distribution of length of incarceration) based on relevant covariates, making the findings more reliable. It has also contributed to the literature conceptually, comparing sub-sets of data on two levels of relevant case characteristics. By comparing the effect of length of incarceration on recidivism (any arrest or arrest for a violent offense) not only by gang affiliation but also by holding felony class, the current study has progressed the degree to which this effect is scrutinized.

Overall, the findings from the current study reveal a similar pattern to previous findings: the relationship between time incarcerated and recidivism is inconsistent, with results differing depending on how recidivism was measured between gang members and non-gang members, and by felony class. Table 13 summarizes the direction and prevalence of significant effect sizes for each model. The differences in effects between gang members and non-gang members overall are slightly different than the effects observed when split up into separate analyses by felony class. Seeing as the holding felony class has a notably high level of association with length of incarceration (Cramer's V = .587, p < .001), the majority of persons in the first two quartiles of the length of incarceration variable of the gang and non-gang member samples are

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held for Class 3 or 4 felonies and those in the third and fourth quartiles are mostly Class M, X, 1, or 2 felonies. This association might explain how for non-gang members recidivating for any offense, the effect of length of incarceration resembles the effects observed when discriminating by felony class, whereby a deterrent effect is observed in the third quartile of the Class 3 or 4 felony distribution and no effect is observed for more serious felony classes. However, this consistency across sub-samples was not observed for gang members. Most notably, the deterrent effect observed among gang members in the third quartile of the overall distribution of length of incarceration was not observed in any quartile when split up by felony class.

Table 13. Length of Incarceration Effect Directions, by Model and Quartile

Model	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Overall (any rearrest)	Ref	-	NS	NS
Overall (violent rearrest)	Ref	-	-	NS
Non-gang (any rearrest)	Ref	-	NS	NS
Non-gang (violent rearrest)	Ref	-	-	NS
Gang (any rearrest)	Ref	+	-	NS
Gang (violent rearrest)	Ref	+	-	NS
Non-gang, Class 3 or 4 (any rearrest)	Ref	NS	-	NS
Non-gang, Class 3 or 4 (violent rearrest)	Ref	NS	NS	NS
Gang, Class 3 or 4 (any rearrest)	Ref	NS	NS	+
Gang, Class 3 or 4 (violent rearrest)	Ref	NS	NS	NS
Non-gang, Classes M, X, 1,	Ref	NS	NS	NS

or 2 (any rearrest)				
Non-gang, Classes M, X, 1, or 2 (violent rearrest)	Ref	-	NS	NS
Gang, Classes M, X, 1, or 2 (any rearrest)	Ref	+	NS	NS
Gang, Classes M, X, 1, or 2 (violent rearrest)	Ref	NS	NS	NS

"NS" indicates "Not Significant", "+" indicates a positive direction, and "-" indicates a negative direction.

In terms of recidivism for a violent offense, the results are even more inconsistent. While non-gang members in the second and third quartiles were less likely to recidivate, no effect whatsoever was observed for non-gang members held for Class 3 or 4 felony offenses, and a deterrent effect was observed only for those in the second quartile of the distribution for those held for more serious felony offenses. Additionally, the effects observed for gang members overall did not hold up across the sub-samples based on felony class, and, as with recidivism for any offense, the deterrent effect observed among all gang members was not observed in the sub-samples.

There are several possible explanations for these inconsistencies across case characteristics. First, despite a general improvement in covariate balance due to the applied weighting technique, perfect balance across the pre-treatment covariates was not achieved. Certain sub-samples were better weighted than others, which could thus explain the observed discrepancies (see the appendix for more covariate balance tables). Second, because the quartiles of length of incarceration were determined based on the unique distributions for each sample and sub-sample, the quartile definitions are not the same for each model. Finally, these

inconsistencies could simply be a product of differences in case characteristics that are illuminated only after the sub-samples based on these characteristics are analyzed.

The findings suggest that deterrence theory, as proposed by the Classical school of criminology (Beccaria, 1764/1973) may not be an adequate framework for explaining criminal behavior in terms of recidivism as an effect of time spent incarcerated. While relatively longer lengths of incarceration may have a statistically significant deterrent effect among non-gang members, the fact that a criminogenic effect of longer incarceration lengths exists among gang members demonstrates that any rationale behind subsequent criminal behavior differs from person to person, potentially to a more nuanced extent than a simple dichotomization of gang membership or felony class.

Based on these findings, social learning theory appears to be a more appropriate framework when discussing the effect that longer incarceration lengths may have on recidivism. Social learning theory (Akers, 1997), as previously discussed, posits that the values and beliefs of a person - facilitated by peer group association - determine how that person reacts to the consensual norms of society. Gang members, whose values and norms tend to contradict those of the law-abiding general public and prioritize the pursuits of their respective gangs (Esbensen, 2009; Matsuda et al., 2013), are then theoretically less persuaded by the deterrent effect of incarceration that other non-gang members might be. The findings in the current study lend some support to this theory. After separating the samples based on gang membership and felony class, the logistic regression models demonstrated that a deterrent effect was only observed among the non-gang member samples, while no deterrent effect (and at times a *criminogenic* effect) was observed among gang members. As such, these findings suggest that gang members, through

their necessary deference to delinquent peer groups (i.e., gangs), are indeed less persuaded by any potential deterrent effect of longer incarceration lengths.

In addition, the findings do not support the original hypotheses that there would be a criminogenic effect observed for non-gang members in the third or fourth quartiles, as indicated by the "Inverted-U" proposal stated by Orsagh and Chen (1988). This finding also diminishes support for the Classical theory of deterrence predicated on free will in decision-making. Specifically, the lack of an observed criminogenic effect of longer incarceration lengths on recidivism among non-gang members is contrary to the deterrence theory proposal that extensive punishment could actually increase criminal behavior (Beccaria, 1764/1962). The hypotheses were also not supported in that the effects observed for the overall sample were not observed among non-gang members in either felony class grouping. However, the hypothesis that a deterrent effect would be less or non-existent among gang members was supported once the samples were split up by the felony class dichotomization.

The effect of longer lengths of incarceration on the likelihood of recidivism for a violent offense also did not entirely support the original hypotheses. As found with recidivism defined as rearrest for any offense, no "U-Shaped" trend in the likelihood of recidivism was found with the overall sample or among non-gang members. Additionally, this effect was not observed among non-gang members when the sample was again split up by holding felony class. Evidence of a criminogenic effect among gang members but not for non-gang members, as well as a deterrent effect only observed among non-gang members after analyzing samples based on felony class again supports the social learning explanation of the effect of longer lengths of incarceration on recidivism for a violent offense.

Support for the potential heterogenic nature of the effect of length of incarceration on recidivism is evidenced here by the differences in effect sizes and direction by gang membership, felony class, and operationalization of recidivism, and provides insight as to why previous research has been largely inconclusive. Perhaps the most notable example of this is the finding that a deterrent effect was observed among gang members until they were separated by felony class, at which point only criminogenic effects remained. Additionally, longer lengths of incarceration compared to the first quartile had no significant effect on recidivism for any arrest among non-gang members incarcerated for Class M, X, 1, or 2 felonies, while there was a deterrent effect for recidivism for arrest for a violent offense. This heterogeneity suggests that the effect might change dramatically across other relevant characteristics, further muddling the prospect that there might be one general effect trend.

In terms of policy implications, the findings from the current study indicate that the effect of length of incarceration on recidivism is too heterogeneous to reliably be used to inform the amount of time someone may be incarcerated. This study specifically demonstrates how gang members are not deterred by longer lengths of incarceration while non-gang members appear more deferent to the deterrent effects of longer incarceration once felony class is specified. Considering the disparate effects observed between gang members and non-gang members suggest that social learning theory is an accurate model for explaining why extended incarceration had no observable deterrent effect on gang members, addressing differential values and beliefs of gang members might create a deterrent effect. The assumption that increasing incarceration lengths will linearly increase the deterrent effect of incarceration and decrease the likelihood of recidivism is certainly unsupported by these findings. Instead, reducing the odds of

recidivism may be best optimized by less punitive measures such as increasing access and length of appropriate treatment.

Prior research evaluating the efficacy of treatment for gang members in an effort to promote crime desistance and dissociation from gangs found positive results for programs based on the Risk-Need-Responsivity (RNR) model of treatment (Andrews & Bonta, 2010; Di Placido et al., 2006). This treatment model, based on cognitive-behavioral therapy and influenced by social learning theory, targets higher-risk inmates, their specific criminogenic needs, and is provided in a manner that is responsive to the personalities and learning styles of the participants. One study found that this treatment had a more pronounced effect on reducing recidivism among gang members as it did for non-gang members, especially for violent recidivism (Di Placido, 2006). By prioritizing gang members as high-risk recipients of this sort of treatment, prisons could effectively incarcerate gang members and non-gang members for equal lengths of incarceration and expect the same or a greater deterrent effect on recidivism. If prisons provide specialized RNR treatment to gang members, the optimal length of incarceration for gang members could approach that of non-gang members. In more general terms, identifying and targeting other high-risk and antisocially-inclined individuals in prison by substituting longer incarceration lengths with more personalized therapy could effectively reduce recidivism and alleviate the financial strain of incarceration (Cohen, 1998).

CHAPTER SIX

CONCLUSION

In general, the observance of a criminogenic effect of longer lengths of incarceration was found to be exclusive to gang members, while a slight deterrent effect was only observed for some groups of non-gang members (across felony classes and recidivism operationalization). With gang membership serving as a proxy measure for differential association and adherence to non-conforming values and attitudes, the results support social learning theory assertions that non-conforming values mediate the propensity for engaging in criminal activities, including recidivism. The findings did not support the hypothesis that longer lengths of incarceration would have first a deterrent effect followed by a criminogenic effect, as suggested by the "U-Shaped" hypothesis (Orsagh & Chen, 1988). Furthermore, this effect was not more robust among non-gang members though incarceration length did not have a deterrent effect on recidivism among gang members, both for any offense and for violent offenses. Overall, the findings were largely dependent on the sub-sample, differing between gang members and non-gang members, felony classes, and operationalization of recidivism.

Despite the lack of support for the hypotheses, the findings still fit within the social learning theory of criminal behavior. Though the specifics of the effect of length of incarceration on recidivism differed from sample to sample, the criminogenic effects were exclusive to gang members and the deterrent effects were exclusive to non-gang members once each group was further divided by felony class. The social learning framework would explain this disparate

effect as a product of differential association and peer groups inherent among gang members that promote and mitigate participation in criminal activity that might increase the likelihood of recidivism. Although length of incarceration did appear to have a deterrent effect on recidivism for any offense and recidivism for a violent offense among gang members, the fact that this effect disappeared after analyzing the sub-samples based on felony class indicates how unreliable this variable may be as a factor on which to base sentencing policy. As such, none of the findings here support a linear relationship between length of incarceration and recidivism such that longer lengths equate to reduced likelihoods of recidivism.

This study is, however, not without its limitations. The data used in this study were observational and involved secondary analysis. As such, concerns of selection bias hinder the confidence of the findings. MMWS (Hong, 2012) was utilized to address these concerns, improving overall balance between treatment groups based on pre-treatment covariates. Still, perfect balance was not achieved, and some covariates were still unbalanced after weighting. Additionally, not all relevant pre-treatment covariates could be accounted for, and the treatment groups could still have been unbalanced based on unmeasured variables. These concerns primarily limit the internal validity of the study. In terms of external validity, this study only involved individuals held in IDOC facilities. Thus, the findings may not be generalizable to other jurisdictions, states, or countries.

Limitations exist among the measures used as well. The dependent variable, recidivism as defined by arrest for any offense and arrest for a violent offense, naturally did not measure every instance of criminal offending and only those in which the subject was caught, and the police officer had probable cause to make an arrest, not whether the subject actually did commit the crime. The recidivism measures also could not measure rearrests outside of Illinois, which may

have artificially reduced the likelihood of recidivism in the findings. The measures of prior criminal history are also based on arrest records and had the same limitations. Measures such as drug abuse and mental health were proxy measures and were thus less reliable than objectively determined measures. Additionally, some potentially relevant variables were unable to be measured with the available data. For example, the amount and severity of misconduct incidents during incarceration were not measured, which may be important for predicting the likelihood of recidivism (Di Placido, 2006). Additionally, whether or not the subjects received behavioral therapy during their incarceration was also unable to be measured, which could also affect the outcomes of the findings (Bonta & Andrews, 2010). Some measures had missing cases, which could impact the findings of the study, though imputation was used to help correct for any artificial biases and the amount of missing cases was relatively low. Finally, gang membership was determined by self-reported answers and thus may be less accurate than an objectively determined measure.

Future research should seek to identify other relevant offender characteristics that might experience disparate effects of longer incarceration lengths on recidivism. By identifying these characteristics and further understanding the nuanced differences in this effect, treatment or other non-punitive evidence-based initiatives can be applied with greater efficiency. The dichotomies between gang members and non-gang members and felony classes are only two of a potentially vast number of relevant characteristics to consider. Research should be conducted with a focus on other potentially high-risk groups to explore who would benefit most from incorporating treatment into prison programming, instead of simply lengthening their sentences in the expectation that a deterrent effect will eventually appear. Obvious ethical issues arise with using research on the effect of length of incarceration on the likelihood of recidivism to determine who

should be given longer prison sentences based on demographic or non-criminal case characteristics.

Instead, future research should focus on determining who could benefit most from supplemental programming to decrease the optimal length of incarceration. Based on whether inmates with certain characteristics experience a delay or no deterrent effect at all from longer incarceration lengths, a hierarchy of need compatible with the RNR model can be established. In sum, the findings from the current study suggest that uncovering a universal understanding of the effect of length of incarceration on recidivism may never be realistically achieved considering the degree to which it alters based on the sample being analyzed. Instead, providing treatment rather than longer lengths of incarceration to reduce recidivism rates seems to be a more worthwhile endeavor.

APPENDIX

TABLES

Covariate Balance: Gang Members

Covariate	Unstandardized	Standardized	Max Threshold
Exit Age	0.2446	0.0857	< .1
Race			
Black	0.0303	0.0578	< .1
Hispanic	0.0550	0.0509	< .1
White	0.0283	0.0330	< .1
Sex			
Female	0.0173	0.0091	< .1
Education Level			
High School/GED Complete	0.0231	0.0740	< .1
Marital Status			
Not Married	0.0142	0.0395	< .1
Previously Received Mental Health Treatment			
No	0.0331	0.0928	< .1
Drug Treatment			
No	0.1756	0.0317	< .1
Current Offense Type			
Person	0.2931	0.0695	< .1
Property	0.0955	0.0740	< .1
Drug	0.2330	0.1083	> .1
Sex	0.0366	0.0503	< .1
Other	0.0242	0.0101	< .1
Current Holding Felony Class			
Classes M, X, 1, or 2	0.8124	0.0473	< .1
Prior Non-Violent Arrests	0.3831	0.1802	> .1
Prior Violent Arrests (Non-DV)	0.0072	0.1193	> .1
Prior Violent Arrests (DV)	0.2000	0.1654	> .1
Prior Prison			
No	0.0398	0.0936	< .1

Covariate Balance: Non-Gang Members

Covariate	Unstandardized	Standardized	Max Threshold
Exit Age	0.3763	0.2408	> .1
Race			
Black	0.0193	0.0319	< .1
Hispanic	0.0373	0.0343	< .1
White	0.0560	0.0404	< .1
Sex			
Female	0.0753	0.0339	< .1
Education Level			
High School/GED Complete	0.0243	0.0207	< .1
Marital Status			
Not Married	0.0285	0.0103	< .1
Previously Received Mental Health Treatment			
No	0.0482	0.0633	< .1
Drug Treatment			
No	0.2333	0.0621	< .1
Current Offense Type			
Person	0.1495	0.1162	> .1
Property	0.1270	0.0636	< .1
Drug	0.1227	0.0359	< .1
Sex	0.0961	0.0408	< .1
Other	0.0214	0.0092	< .1
Current Holding Class			
Classes M, X, 1, or 2	0.7482	0.0576	< .1
Prior Non-Violent Arrests	0.1751	0.1362	> .1
Prior Violent Arrests (Non-DV)	0.1804	0.0827	< .1
Prior Violent Arrests (DV)	0.1679	0.0948	< .1
Prior Prison			
No	0.1544	0.0657	< .1

Covariate Balance: Gang Members, Class 3 or 4 Felonies

Covariate	Unstandardized	Standardized	Max Threshold
Exit Age	0.2759	0.1539	> .1
Race			
Black	0.0427	0.0107	< .1
Hispanic	0.0948	0.0152	< .1
White	0.0543	0.0229	< .1
Sex			
Female	0.0108	0.0054	< .1
Education Level			
High School/GED Complete	0.0365	0.0358	< .1
Marital Status			
Not Married	0.0091	0.0117	< .1
Previously Received Mental Health Treatment			
No	0.0672	0.0325	< .1
Drug Treatment			
No	0.1682	0.0246	< .1
Current Offense Type			
Person	0.0856	0.0362	< .1
Property	0.0250	0.0077	< .1
Drug	0.1439	0.0738	< .1
Sex	0.0310	0.0326	< .1
Other	0.0212	0.0093	< .1
Prior Non-Violent Arrests	0.0478	0.0601	< .1
Prior Violent Arrests (Non-DV)	0.0402	0.0193	< .1
Prior Violent Arrests (DV)	0.0326	0.0094	< .1
Prior Prison			
No	0.1689	0.0400	< .1

Covariate Balance: Non-Gang Members, Class 3 or 4 Felonies

Covariate	Unstandardized	Standardized	Max Threshold
Exit Age	0.2773	0.1629	> .1
Race			
Black	0.0764	0.0734	< .1
Hispanic	0.1235	0.0156	< .1
White	0.1692	0.0787	< .1
Sex			
Female	0.0343	0.0327	< .1
Education Level			
High School/GED Complete	0.0731	0.0382	< .1
Marital Status			
Not Married	0.0182	0.0199	< .1
Previously Received Mental Health Treatment			
No	0.0878	0.0325	< .1
Drug Treatment			
No	0.2492	0.0484	< .1
Current Offense Type			
Person	0.0755	0.0282	< .1
Property	0.0952	0.0237	< .1
Drug	0.2002	0.0405	< .1
Sex	0.0281	0.0201	< .1
Other	0.0138	0.0076	< .1
Prior Non-Violent Arrests	0.1601	0.1432	> .1
Prior Violent Arrests (Non-DV)	0.1933	0.1035	> .1
Prior Violent Arrests (DV)	0.1643	0.0253	< .1
Prior Prison			
No	0.3836	0.0840	< .1

Covariate Balance: Gang Members, Class M, X, 1, or 2 Felonies

Covariate	Unstandardized	Standardized	Max Threshold
Exit Age	0.9578	0.2312	> .1
Race			
Black	0.0769	0.0504	< .1
Hispanic	0.0713	0.0495	< .1
White	0.0074	0.0106	< .1
Sex			
Female	0.0113	0.0013	< .1
Education Level			
High School/GED Complete	0.0825	0.0236	< .1
Marital Status			
Not Married	0.0444	0.0156	< .1
Previously Received Mental Health Treatment			
No	0.0786	0.0557	< .1
Drug Treatment			
No	0.1168	0.0830	< .1
Current Offense Type			
Person	0.2949	0.1922	> .1
Property	0.1521	0.1338	> .1
Drug	0.1709	0.0989	> .1
Sex	0.0287	0.0356	< .1
Other	0.0009	0.0009	< .1
Prior Non-Violent Arrests	0.5449	0.3507	> .1
Prior Violent Arrests (Non-DV)	0.1211	0.0945	> .1
Prior Violent Arrests (DV)	0.2143	0.0884	< .1
Prior Prison			
No	0.3318	0.1840	> .1

Covariate Balance: Non-Gang Members, Class M, X, 1, or 2 Felonies

Covariate	Unstandardized	Standardized	Max Threshold
Exit Age	0.7796	0.0680	< .1
Race			
Black	0.0326	0.0356	< .1
Hispanic	0.0410	0.0248	< .1
White	0.0380	0.0236	< .1
Sex			
Female	0.0383	0.0271	< .1
Education Level			
High School/GED Complete	0.0481	0.0275	< .1
Marital Status			
Not Married	0.0708	0.0086	< .1
Previously Received Mental Health Treatment			
No	0.0590	0.0473	< .1
Drug Treatment			
No	0.1138	0.0633	< .1
Current Offense Type			
Person	0.2218	0.1004	> .1
Property	0.2086	0.0965	< .1
Drug	0.1573	0.0520	< .1
Sex	0.1394	0.0359	< .1
Other	0.0037	0.0029	< .1
Prior Non-Violent Arrests	0.3715	0.2297	> .1
Prior Violent Arrests (Non-DV)	0.2468	0.0497	< .1
Prior Violent Arrests (DV)	0.0905	0.0352	< .1
Prior Prison			
No	0.2802	0.1658	> .1

Logistic Regression Results: Non-Gang vs. Gang Members (Any Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 10.5 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
10.5 thru 17 Months	-0.22	0.03	-8.45	0.80***		0.20	0.04	5.48	1.21***
18 thru 29 Months	-0.04	0.02	-1.52	0.96		-0.12	0.03	-3.33	0.89***
30 or More Months	-0.02	0.02	-0.83	0.98		-0.04	0.03	-1.02	0.97
Release Age									
---	-0.06	0.00	-42.74	0.94***		-0.06	0.00	-28.06	0.94***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.27	0.03	-8.91	0.77***		-0.22	0.05	-4.00	0.80***
Hispanic	-1.08	0.04	-26.09	0.34***		-0.56	0.05	-11.90	0.57***
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.25	0.04	6.45	1.28***		0.08	0.13	0.62	1.08
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.05	0.02	1.86	1.05		-0.08	0.03	-2.40	0.92*
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	0.19	0.03	-6.72	0.83***		-0.55	0.04	-14.29	0.58***
Mostly/Completely Rural	-5.02	0.05	-10.03	0.61***		-1.64	0.09	-17.28	0.19***
Marital Status									
Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.20	0.04	-5.64	0.82***		0.00	0.05	0.02	1.00
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.04	0.02	1.58	1.04		0.04	0.03	1.31	1.05

Continued: Logistic Regression Results: Non-Gang vs. Gang Members (Any Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Previously Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.07	0.03	2.36	1.08*		0.12	0.05	2.61	1.12**
Current Holding Offense Type									
Person	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Property	0.24	0.03	7.14	1.27***		0.24	0.05	5.08	1.27***
Drug	-0.12	0.03	-3.74	0.88***		0.08	0.04	1.73	1.08
Sex	-1.71	0.08	-21.52	0.18***		-2.39	0.13	-18.69	0.09***
Other	0.08	0.09	0.85	1.08		0.19	0.13	1.45	1.21
Current Holding Crime Class									
Classes 1, 2, M, & X	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Classes 3 & 4	0.04	0.03	1.44	1.04		0.24	0.04	6.46	1.27***
Last Security Level									
Minimum	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Medium	-0.03	0.03	-1.17	0.97		-0.05	0.04	-1.36	0.95
Maximum	0.08	0.11	0.79	1.09		-0.38	0.11	-3.32	0.69***
Pending/Other	-0.16	0.07	-2.16	0.86*		-0.45	0.10	-4.44	0.64***
Number of Prior Non-Violent Arrests									
---	0.06	0.00	30.93	1.06***		0.04	0.00	19.64	1.04***
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)									
---	0.04	0.01	6.48	1.04***		0.02	0.01	3.60	1.02***
Number of Prior Domestic Violence Arrests									
---	0.04	0.01	5.04	1.04***		0.00	0.01	0.07	1.00
Prior Prison Sentences									
None	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
1 or More	0.18	0.03	6.27	1.19***		0.08	0.05	1.81	1.09
Number of Days at Risk									
---	0.00	0.00	-9.23	1.00***		0.00	0.00	-10.30	1.00***
*** = p < .001; ** = p < .01; * = p < .05*									

Logistic Regression Results: Non-Gang vs. Gang Members (Violent Rearrest)

Covariate	**Non-Gang Members**					**Gang Members**			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 10.5 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
10.5 thru 17 Months	-0.16	0.03	-5.67	0.86***		-0.11	0.04	2.84	1.12**
18 thru 29 Months	-0.15	0.03	-5.91	0.86***		-0.17	0.04	-4.81	.84***
30 or More Months	-8.82	0.02	-0.37	0.99		0.02	0.03	0.59	1.02
Release Age									
---	-0.05	0.00	-33.02	0.95***		-0.06	0.00	-24.94	0.94***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.20	0.03	-6.58	0.82***		0.04	0.06	0.74	0.90
Hispanic	-0.65	0.05	-13.29	0.52***		-0.11	0.05	-2.20	1.04*
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.43	0.05	9.59	1.55***		0.76	0.17	4.46	2.13***
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.01	0.03	0.41	1.01		0.03	0.04	0.88	1.03*
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	0.24	0.03	8.44	1.27***		0.23	0.04	5.67	1.25***
Mostly/Completely Rural	0.11	0.05	2.09	1.12*		0.21	0.10	2.16	1.24*
Marital Status									
Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.13	0.04	-3.28	0.88**		-0.83	0.05	-1.57	0.92
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.02	0.02	0.67	1.02		-0.13	0.03	-3.82	0.88***

Continued: Logistic Regression Results: Non-Gang vs. Gang Members (Violent Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		b	SE	Wald	Odds ratio
Previously Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.26	0.03	8.26	1.29***		0.29	0.04	6.90	1.25***
Current Holding Offense Type									
Person	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Property	-0.21	0.03	-6.70	0.81***		-0.16	0.05	-3.55	0.85***
Drug	-0.39	0.03	-11.90	0.68***		-0.25	0.04	-5.78	0.78***
Sex	-1.18	0.09	-13.68	0.31***		-0.87	0.12	-7.43	0.42***
Other	-0.32	0.09	-3.64	0.72***		0.24	0.12	1.98	1.27*
Current Holding Crime Class									
Classes 1, 2, M, & X	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Classes 3 & 4	0.09	0.03	3.26	1.09**		0.14	0.04	3.90	1.16***
Last Security Level									
Minimum	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Medium	0.21	-0.29	7.35	1.23***		0.09	0.04	2.36	1.09*
Maximum	0.47	0.09	5.15	1.61***		0.34	0.11	3.21	1.41**
Pending/Other	0.29	0.07	4.41	1.33***		0.20	0.10	1.97	1.22*
Number of Prior Non-Violent Arrests									
---	0.00	0.00	0.52	1.00		0.00	0.00	3.35	1.00***
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)									
---	0.15	0.01	27.35	1.17***		0.10	0.01	17.34	1.11***
Number of Prior Domestic Violence Arrests									
---	0.15	0.01	28.87	1.21***		0.12	0.01	13.63	1.13***
Prior Prison Sentences									
None	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
1 or More	0.10	0.03	3.43	1.10***		-0.03	0.04	-0.56	0.98
Number of Days at Risk									
---	0.00	0.00	-2.49	1.00*		0.00	0.00	-1.53	1.00
*** = p < .001; ** = p < .01; * = p < .05									

Logistic Regression Results: Non-Gang vs. Gang Members, Class 3 or 4 Felonies (Any Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 6.5 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
6.5 thru 11 Months	-0.04	0.03	-1.41	0.96		0.04	0.05	0.67	1.05
12 thru 16 Months	-0.06	0.03	-1.99	0.94*		0.01	0.05	0.27	1.00
17 or More Months	-0.02	0.00	-0.75	0.98		0.13	0.06	2.35	1.13*
Release Age									
---	-0.05	0.00	-35.52	0.95***		-0.06	0.00	-16.64	0.95***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.26	0.03	-7.36	0.77***		-0.20	0.08	-2.48	0.82*
Hispanic	-0.96	0.05	-20.07	0.38***		-0.54	0.07	-7.31	0.59***
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.03	0.04	0.82	1.04		-0.06	0.17	-0.35	0.94
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.02	0.03	0.52	1.02		-0.01	0.05	-0.25	1.00
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	-0.22	0.03	-6.54	0.80***		-0.50	0.06	-8.43	0.61***
Mostly/Completely Rural	-0.56	0.06	-9.47	0.57***		-1.90	0.14	-14.02	0.15***
Marital Status									
Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.15	0.04	-3.94	0.86***		-0.10	0.07	-1.54	0.89
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.00	0.03	0.09	1.00		0.08	0.05	1.60	1.08

Continued: Logistic Regression Results: Non-Gang vs. Gang Members, Class 3 or 4 Felonies

(Any Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		b	SE	Wald	Odds ratio
Previously Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.15	0.03	4.30	1.16***		0.21	0.06	3.35	1.19***
Current Holding Offense Type									
Person	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Property	0.28	0.04	6.68	1.33***		0.25	0.08	3.29	1.30**
Drug	0.14	0.04	3.36	1.15***		0.24	0.07	3.22	1.27**
Sex	-1.42	0.09	-15.78	0.24***		-2.37	0.20	-11.95	0.09***
Other	0.20	0.09	2.29	1.22*		0.04	0.15	0.25	1.03
Last Security Level									
Minimum	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Medium	-0.11	0.03	-3.30	0.90***		-0.05	0.05	-0.87	0.97
Maximum	0.12	0.15	0.79	1.12		0.04	0.13	0.19	1.02
Pending/Other	-0.11	0.06	-1.72	0.90		-0.10	0.13	-0.77	0.90
Number of Prior Non-Violent Arrests									
---	0.05	0.00	27.55	1.05***		0.04	0.00	13.42	1.03***
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)									
---	0.05	0.01	7.14	1.05***		0.04	0.01	0.40	1.03***
Number of Prior Domestic Violence Arrests									
---	0.05	0.01	5.91	1.05***		0.01	0.01	0.74	1.01
Prior Prison Sentences									
None	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
1 or More	0.10	0.03	3.03	1.10**		0.10	0.09	1.13	1.14
Number of Days at Risk									
---	0.00	0.00	-5.65	1.00***		0.00	0.00	-3.99	1.00***
*** = p < .001; ** = p < .01; * = p < .05									

Logistic Regression Results: Non-Gang vs. Gang Members, Class 3 or 4 Felonies (Violent

Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 6.5 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
6.5 thru 11 Months	0.04	0.03	1.16	1.04		-0.06	0.05	-1.14	0.94
12 thru 16 Months	0.00	0.03	-0.05	1.00		0.04	0.05	0.69	1.04
17 or More Months	0.02	0.04	0.58	1.02		0.01	0.05	0.16	1.01
Release Age									
---	-0.05	0.00	-27.15	0.95***		-0.07	0.00	-19.08	0.93***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.17	0.04	-4.09	0.85***		-0.16	0.08	-1.98	0.85*
Hispanic	-0.60	0.06	-9.31	0.55***		-0.14	0.08	-1.87	0.87
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.48	0.06	8.56	1.61***		0.65	0.02	3.26	1.92**
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.01	0.03	0.37	1.01		0.09	0.05	1.77	1.09
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	0.18	0.04	4.62	1.20***		0.24	0.06	4.00	1.27***
Mostly/Completely Rural	0.08	0.07	1.08	1.08		-0.02	0.14	-0.17	0.98
Marital Status									
Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.15	0.05	-2.91	0.86**		-0.01	0.07	-0.15	0.99
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	-0.02	0.03	-0.53	0.98		0.00	0.05	0.07	1.00

Continued: Logistic Regression Results: Non-Gang vs. Gang Members, Class 3 or 4 Felonies

(Violent Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Previously Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.29	0.39	7.30	1.33***		0.38	0.06	6.36	1.46***
Current Holding Offense Type									
Person	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Property	-0.14	0.05	-3.12	0.87**		-0.11	0.07	-1.57	0.89
Drug	-0.31	0.04	-7.04	0.73***		-0.30	0.07	-4.28	0.74***
Sex	-0.75	0.11	-7.03	0.47***		-0.44	0.17	-2.65	0.64**
Other	-0.02	0.09	-0.26	0.98		-0.02	0.14	-0.17	0.98
Last Security Level									
Minimum	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Medium	0.10	0.04	2.73	1.11**		0.14	0.05	2.56	1.15*
Maximum	0.51	0.14	3.54	1.66***		0.45	0.20	2.18	1.56*
Pending/Other	0.25	0.07	3.67	1.28***		0.24	0.12	2.00	1.27*
Number of Prior Non-Violent Arrests									
---	0.00	0.00	3.06	1.00**		0.00	0.00	1.85	1.00
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)									
---	0.14	0.01	20.31	1.15***		0.11	0.01	13.07	1.11***
Number of Prior Domestic Violence Arrests									
---	0.18	0.01	22.60	1.20***		0.14	0.01	11.92	1.15***
Prior Prison Sentences									
None	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
1 or More	0.01	0.04	0.19	1.01		0.01	0.08	0.09	1.01
Number of Days at Risk									
---	0.00	0.00	0.54	1.00		0.00	0.00	-0.01	1.00
*** = p < .001; ** = p < .01; * = p < .05									

Logistic Regression Results: Non-Gang vs. Gang Members, Class M, X, 1, or 2 Felonies (Any

Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		*b*	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 20 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
20 through 26 Months	-0.03	0.03	-1.02	0.97		0.10	0.04	2.19	1.10*
27 through 44 Months	0.00	0.03	1.11	1.04		0.02	0.05	0.43	1.02
45 or More Months	0.06	0.04	1.57	1.06		0.04	0.05	0.82	1.04
Release Age									
---	-0.06	0.00	-34.47	0.94***		-0.06	0.00	-20.56	0.95***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.26	0.04	6.56	0.77***		-0.23	0.07	-3.11	0.79**
Hispanic	-1.09	0.06	-19.66	0.34***		-0.53	0.06	-9.06	0.59***
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.40	0.06	7.07	1.49***		0.28	0.19	1.45	1.32
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.11	0.03	3.39	1.12***		0.07	0.04	1.54	1.07
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	-0.04	0.04	-1.06	0.96		-0.42	0.05	-8.49	0.66***
Mostly/Completely Rural	-0.21	0.07	-3.18	0.81**		-1.55	0.13	-11.93	0.21***
Marital Status									
Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.18	0.05	-3.73	0.83***		-0.17	0.06	-2.75	0.84**
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.00	0.03	0.03	1.00		0.04	0.05	0.80	1.04

Continued: Logistic Regression Results: Non-Gang vs. Gang Members, Class M, X, 1, or 2

Felonies (Any Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		b	SE	Wald	Odds ratio
Previously Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.02	0.04	0.41	1.02		0.06	0.06	1.01	1.06
Current Holding Offense Type									
Person	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Property	0.20	0.05	4.50	1.23***		0.19	0.06	3.10	1.20**
Drug	-0.27	0.04	-6.27	0.76***		0.04	0.06	0.76	1.04
Sex	-2.08	0.09	-22.57	0.12***		-2.12	0.14	-15.49	0.12***
Other	-0.02	0.23	-0.11	0.98		-0.56	0.33	-1.68	0.57
Last Security Level									
Minimum	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Medium	-0.11	0.04	-3.07	0.89**		0.04	0.05	0.83	1.04
Maximum	-0.35	0.13	-2.81	0.70**		-0.52	0.12	-4.32	0.60***
Pending/Other	-0.24	0.14	-1.70	0.78		-0.15	0.18	-0.82	0.86
Number of Prior Non-Violent Arrests									
---	0.06	0.00	22.89	1.06***		0.04	0.00	13.31	1.04***
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)									
---	0.03	0.01	3.83	1.03***		0.03	0.01	2.97	1.03**
Number of Prior Domestic Violence Arrests									
---	0.03	0.01	2.91	1.03**		-0.01	0.01	-0.54	0.99
Prior Prison Sentences									
None	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
1 or More	0.02	0.04	5.88	1.26***		0.22	0.06	3.88	1.24***
Number of Days at Risk									
---	0.00	0.00	-8.10	1.00***		0.00	0.00	-7.27	1.00***
*** = $p < .001$; ** = $p < .01$; * = $p < .05$									

Logistic Regression Results: Non-Gang vs. Gang Members, Class M, X, 1, or 2 Felonies

(Violent Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		b	SE	Wald	Odds ratio
Total Time Incarcerated (in Months)									
Less than 20 Months	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
20 through 26 Months	-0.23	0.04	-5.82	0.80***		0.05	0.05	1.08	1.05
27 through 44 Months	-0.05	0.04	-1.23	0.95		-0.05	0.05	-1.01	0.95
45 or More Months	0.03	0.04	0.72	1.04		0.06	0.05	1.25	1.07
Release Age									
---	-0.06	0.00	-23.10	0.94***		-0.06	0.00	-17.12	0.94***
Race									
Black	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
White	-0.17	0.05	-3.64	0.85***		0.18	0.08	2.33	1.20*
Hispanic	-0.69	0.08	-8.96	0.51***		-0.09	0.06	-1.38	0.92
Gender									
Female	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Male	0.58	0.08	7.09	1.83***		0.85	0.28	3.02	2.34**
Education Level									
High School/GED Complete	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
High School/GED Incomplete	0.11	0.04	2.95	1.11**		0.10	0.05	2.12	1.11*
Region Released									
Cook County	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Mostly Urban	0.31	0.04	7.09	1.36***		0.10	0.05	1.83	1.11
Mostly/Completely Rural	0.22	0.08	2.68	1.27**		-0.17	0.15	-1.17	0.84
Marital Status									
Single	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Married	-0.14	0.07	-2.06	0.87*		-0.16	0.08	-2.15	0.85*
Recommended for Drug Treatment									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.00	0.04	0.11	1.00		-0.09	0.05	-1.88	0.91

Continued: Logistic Regression Results: Non-Gang vs. Gang Members, Class M, X, 1, or 2

Felonies (Violent Rearrest)

Covariate	Non-Gang Members					Gang Members			
	b	SE	Wald	Odds ratio		b	SE	Wald	Odds ratio
Previously Received Treatment for Mental Health									
No	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Yes	0.21	0.05	4.40	1.26***		0.19	0.06	3.21	1.21**
Current Holding Offense Type									
Person	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Property	-0.12	0.05	-2.46	0.88*		-0.28	0.06	-4.62	0.75***
Drug	-0.43	0.05	-8.52	0.65***		-0.33	0.06	-5.49	0.72***
Sex	-1.58	0.12	-13.46	0.20***		-0.91	0.14	-6.18	0.40***
Other	0.00	0.25	0.01	1.02		0.22	0.35	0.63	1.25
Last Security Level									
Minimum	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
Medium	0.18	0.04	4.27	1.19***		0.11	0.05	2.17	1.11*
Maximum	0.44	0.13	3.47	1.64***		0.54	0.12	4.63	1.71***
Pending/Other	0.25	0.14	1.77	1.33		0.29	0.17	1.68	1.33
Number of Prior Non-Violent Arrests									
---	0.01	0.00	3.33	1.01***		0.00	0.00	1.18	1.00
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)									
---	0.14	0.01	15.30	1.15***		0.09	0.01	11.00	1.10***
Number of Prior Domestic Violence Arrests									
---	0.18	0.01	15.42	1.20***		0.13	0.01	9.79	1.14***
Prior Prison Sentences									
None	Ref	Ref	Ref	Ref		Ref	Ref	Ref	Ref
1 or More	0.19	0.04	4.22	1.22***		0.04	0.06	0.67	1.04
Number of Days at Risk									
---	0.00	0.00	-5.78	1.00***		0.00	0.00	-2.04	1.00*
*** = p < .001; ** = p < .01; * = p < .05									

Z-Test Statistics Comparing Logistic Regression Model Effect Sizes, by Covariate and

Model

Covariate	Non-Gang vs. Gang (Any Rearrest)	Non-Gang vs. Gang (Violent Rearrest)	Non-Gang vs. Gang, Class 3 or 4 (Any Rearrest)	Non-Gang vs. Gang, Class 3 or 4 (Violent Rearrest)	Non-Gang vs. Gang, Class M, X, 1, or 2 (Any Rearrest)	Non-Gang vs. Gang, Class M, X, 1, or 2 (Violent Rearrest)
Total Time Incarcerated (Months						
Quartile 1	Ref	Ref	Ref	Ref	Ref	Ref
Quartile 2	-8.13*	-7.89*	-7.13*	6.44*	-6.19*	-5.98
Quartile 3	3.50*	0.52	-6.80*	-4.58*	-3.69*	0.03
Quartile 4	2.12*	-6.44*	-4.95*	2.74*	1.09	-2.23
Release Age						
---	1.33	3.13*	0.61	3.34*	-1.28	0.16
Race						
Black	Ref	Ref	Ref	Ref	Ref	Ref
White	-0.69	-6.65*	-0.78	-0.12*	-0.39	-5.58*
Hispanic	-2.09*	-3.73*	-1.62	-2.93*	-1.94	-3.13*
Gender						
Female	Ref	Ref	Ref	Ref	Ref	Ref
Male	3.01*	-1.00	3.74*	-1.19	0.75	-0.57
Education Level						
High School/GED	Ref	Ref	Ref	Ref	Ref	Ref
High School/GED Incomplete	7.62*	-3.43*	7.19*	-3.79*	1.73	0.32
Region Released						
Cook County	Ref	Ref	Ref	Ref	Ref	Ref
Mostly Urban	6.62*	0.29	2.15*	-0.82	4.04*	3.05*
Mostly Rural	-2.74*	-1.40	1.88	4.49*	2.39*	4.31*
Marital Status						
Single	Ref	Ref	Ref	Ref	Ref	Ref
Married	-5.37*	3.61*	-1.26	-4.09*	-0.18	0.45
Recommended for Drug Treatment						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes	-0.57	6.05*	-4.31*	-6.34*	-4.55*	4.81*
Previously Recommended for Mental Health Treatment						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes	-1.61	-.043	-1.04	-0.45	-2.82*	0.29

Continued: Z-Test Statistics Comparing Logistic Regression Model Effect Sizes, by

Covariate and Model

Covariate	Gang vs. Non-Gang (Any Rearrest)	Gang vs. Non-Gang (Violent Rearrest)	Gang vs. Non-Gang, Class 3 or 4 (Any Rearrest)	Gang vs. Non-Gang, Class 3 or 4 (Violent Rearrest)	Gang vs. Non-Gang, Class M, X, 1, or 2 (Any Rearrest)	Gang vs. Non-Gang, Class M, X, 1, or 2 (Violent Rearrest)
Holding Offense Type						
Person	Ref	Ref	Ref	Ref	Ref	Ref
Property	0.06	-1.00	0.35	-0.66	0.29	2.22*
Drug	-7.26*	-1.07	-1.42	-0.15	-5.45*	-0.83
Sex	0.70	-0.68	0.84	-1.01	0.04	-1.05
Other	-1.55	-4.43*	2.71	-0.03	1.65	-1.66
Current Holding Felony Class						
Classes M, X, 1, or 2	Ref	Ref	Ref	Ref	Ref	Ref
Classes 3 or 4	-4.38*	-1.91	---	---	---	---
Last Security Level						
Minimum	Ref	Ref	Ref	Ref	Ref	Ref
Medium	1.49*	3.15*	-2.70*	-0.93	-6.54*	1.68
Maximum	3.55*	0.72	1.55	0.22	0.74	-0.42
Pending/Other	1.97*	0.94	-0.25*	0.07	-0.83	-0.24
Number of Prior Non-Violent Arrests						
---	5.87*	-22.45*	5.75*	4.60*	6.76*	12.19*
Number of Prior Violent Arrests (Excluding Domestic Violence Arrests)						
---	4.97*	3.59*	2.71*	2.30*	1.92	3.00*
Number of Prior Domestic Violence Arrests						
---	11.24*	1.82	8.71*	1.70	11.11*	1.91
Prior Prison Sentences						
None	Ref	Ref	Ref	Ref	Ref	Ref
1 or More	2.70*	7.09*	0.10	0.26	-3.76*	3.66*
Number of Days at Risk						
---	52.00*	-12.52*	26.41*	159.65*	21.43*	-71.13
* = p < .05						

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VITA

H. Douglas Otto was born and raised in Dayton, Ohio. He attended Loyola University Chicago where he enrolled in the Criminal Justice department's 5-year combined Bachelor's and Master's track, earning a Bachelor of Science in Criminal Justice and Criminology, with Great Distinction, in 2017.

During his time at Loyola, Otto also completed an internship with the Drug Enforcement Administration Chicago Field Office and became a member of the National Criminal Justice Honor Society, Beta Omicron chapter. He worked for Loyola's Campus Safety Police Department and as a research assistant for Loyola's Center for Criminal Justice Research, Policy, and Practice. In August 2017, Otto was awarded a graduate research assistantship for the 2017-2018 academic year.