Does Parole Make a Difference?

The Effect of Community Supervision on Post-Discharge Recidivism

By

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This dissertation examines post-discharge outcomes among ex-prisoners in Nebraska. Specifically, it assesses whether a lower proportion of people who finished their sentence while on parole were re-incarcerated, relative to inmates who discharged from prison. It also considers whether the total amount of time inmates spend in the community during their sentences impacts their chances of future re-incarceration. Although a number of scholars have studied the relationship between parole and recidivism rates, this study is one of the first to examine this relationship by using propensity score matching. Findings indicate that a lower proportion of men who discharged from the community were returned to prison, relative to men who finished their sentences behind bars. Furthermore, men who served six months or more on parole had lower odds of re-incarceration than men who served less, or no, time on parole. With regard to females, however, neither discharging from parole, nor the total amount of time spent in the community, affected re-incarceration outcomes.

Keywords: Corrections, Community Supervision, Incarceration, Mandatory Discharge, Nebraska, Parole, Prison, Recidivism, Re-Incarceration

This dissertation is dedicated to Sandra S. Vandenberg: my mother, my inspiration, and my best friend.

September 14, 1955 – May 3, 2012

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Chapter 1:

Introduction

Statement of the Problem

Correctional populations in the United States have increased over the past few decades. For example, the Nebraska Department of Correctional Services [NDCS] had an average daily inmate population of approximately 1,750 in 1982, and operated at 142 percent of its design capacity.[1] Since that time, its population has increased nearly 170 percent, and NDCS now manages an average of 4,750 incarcerated inmates each day. Despite the addition of new institutions and housing units across the department, it still operates at 150 percent of its design capacity. Nationally, state and federal prison populations rose by 16 percent between 2000 and 2009, alone (Guerino, Harrison, & Sabol, 2011, p. 2). With imprisonment rates at nearly 500 people per 100,000 nationwide (Guerino et al., 2011), a number of scholars and practitioners have focused their attention on the economic costs of incarceration (see, for example, Goetting & Howsen, 1986; Schmitt, Warner, & Gupta, 2010), as well as the interpersonal and legal ramifications of crowded prisons (see, for example, Camp, Gaes, Langan, & Saylor, 2003; Steiner & Wooldredge, 2008). Many have advocated for an increased use of parole and other forms of community supervision in order to address these concerns (see, for example, Petersilia, 2003, 2011; Turner, 2011; Wright & Rosky, 2011).

Parole is important for two reasons. First, it is an alternative form of correctional commitment that helps manage institutional populations. Contrary to most conceptualizations, parole is *not* early release[2] from a sentence; although parolees are in

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[1] I calculated these figures as part of a larger project during my internship at NDCS.

[2] For purposes of this dissertation, "release" indicates that an inmate has been let out of a correctional institution and is currently living in the community, but remains under the custody and care of a correctional agency. People who have simply been released may be returned to prison at any time prior to the end of their current sentence. "Discharge," on the other hand, means that an inmate has completed the terms of his or her sentence and is no longer subject to correctional oversight. People who have discharged

the community, they remain under correctional supervision until they fulfill the remainder of their obligated sentence. The population challenges faced by the Nebraska Department of Correctional Services, as described above, would be much worse without the availability of parole. During fiscal year 2011, there were approximately 900 people on parole in Nebraska on any given day; during fiscal year 2012, this figure increased by over one-third, with an average of more than 1,200 people serving out the remainder of their sentences in the community each day. Although the number of people released to the community has grown substantially, it should be noted that revocation rates have remained constant. This indicates that parole plays a crucial role with regard to inmate management. Not only are parole officers able to properly supervise their clients in ways that promote public safety and order, but without this alternative, NDCS could easily face crowding levels of 190 percent or higher.

The second reason parole is important is because it provides a more re-integrative alternative to incarceration. Early release from incarceration, coupled with supervision in the community, helps inmates gradually adjust to mainstream life (McCarthy, McCarthy, & Leone, 2001; Petersilia, 2003). A slow transition from confinement to the community is important because prisons operate as "total institutions" (Goffman, 1961), which: incapacitate and isolate inmates from the outside world, constrain their activities through strict schedules and organizational rules, and function in such a way that all events take place in the immediate company of other prisoners (Craig, 2004; Karmel, 1969; Sykes, 1958). To the degree that inmates adapt to this lifestyle, they may become dependent on the institution and its routines in order to function. This dependency may eventually

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may only be re-incarcerated if they are convicted of a new crime and sentenced to a new prison term. For a visual overview of criminal justice processing, see Appendix A.

diminish their capacity to be self-sufficient, thereby increasing the likelihood that they will be re-incarcerated after their release. Because of this, periods of community supervision are important for those who present a high risk of returning to their criminal habits because the support, skills, and levels of personal accountability they develop while on parole should increase their chances of remaining law-abiding citizens once their period of correctional oversight expires (Maconochie, 1846, 1848; McWilliams & Pease, 1990; Petersilia, 2003; Rotman, 1986).

This transformation, however, is not a simple task. Inmates transitioning back to society may find it difficult to obtain stable housing and/or employment (Huebner & Berg, 2011; Lin, Grattet, & Petersilia, 2010), reestablish relationships with family members (Bales & Mears, 2008; Huebner & Berg, 2011), and avoid old criminal habits or associates (Birzer & Cromwell, 2010; Cobbina, Huebner, & Berg, 2012). Furthermore, some may have difficulty attending required treatment programs due to a lack of reliable transportation (Hipp, Jannetta, Shah, & Turner, 2011; Sung, Mahoney, & Mellow, 2010). If parolees do not receive assistance in addressing these needs, or if they do not receive adequate levels of supervision and treatments relative to their needs, it is likely that they will violate the law again (Gunnison & Helfgott, 2011; Guy, 2009). Recidivism not only threatens public safety, but it may also result in parole revocation and re-incarceration, which further contribute to high correctional costs and populations (Goetting & Howsen, 1986; Steiner, Makarios, Travis III, & Meade, 2012).

Research Questions and Overview of Current Study

Although many scholars have examined the relationship between parole and recidivism, their studies face notable limitations. First, the vast majority of researchers

compare current parolees to inmates who have fulfilled their correctional obligation and have been discharged from the system (see, for example, Huebner & Berg, 2011; Schlager & Robbins, 2008; Solomon, 2005; Williamson, 2009; Yahner, Visher, & Solomon, 2008). It is difficult to draw meaningful comparisons between these groups because one is still subject to correctional oversight and the other is not. This is especially true when examining the relationship between recidivism and the amount of time ex-prisoners spend in the community (see, for example, Berg & Huebner, 2011; Huebner & Berg, 2011; Schlager & Robbins, 2008; Steen & Opsal, 2007).

In addition, most studies define the total amount of time inmates spend in the community as the period between their release from prison and the time at which they either experience a failure event (e.g., revocation, re-arrest, re-incarceration) or reach the end of the study's follow-up period, whichever occurs first. This means that if a parolee successfully discharges from his or her sentence, but recidivates before the follow-up period is over, the time-to-failure recorded for that person will include the days they spent under parole supervision and those they spent unsupervised. This is problematic because it reveals little about the degree to which parole produces a lasting, positive impact on offender behavior after their sentence is over. Finally, this issue is compounded by the fact that many researchers fail to use sophisticated statistical techniques to answer their research questions. The majority of scholars use regression models to examine the relative contribution of parole to future re-incarceration rates in concert with other contributing factors. Furthermore, many models include parole as a dependent variable and fail to focus on the unique role it could play as an independent

variable. These limitations make it difficult to disentangle the unique contribution of parole to the likelihood of future incarcerations.

As a result, this dissertation was designed to serve two functions. First and foremost, it answers substantive questions about the relationship between parole supervision and the likelihood of re-incarceration for a new offense after discharge. [3] Through the process of answering these questions, however, this dissertation also contributes methodological improvements to the existing body of literature through the application of propensity score matching. With regard to the primary purpose of this dissertation, the overarching research question is:

1. *What proportion of people who were supervised in the community at the time of their discharge from the Nebraska Department of Correctional Services [NDCS] are re-incarcerated within three years, relative to inmates who discharged directly from prison?*
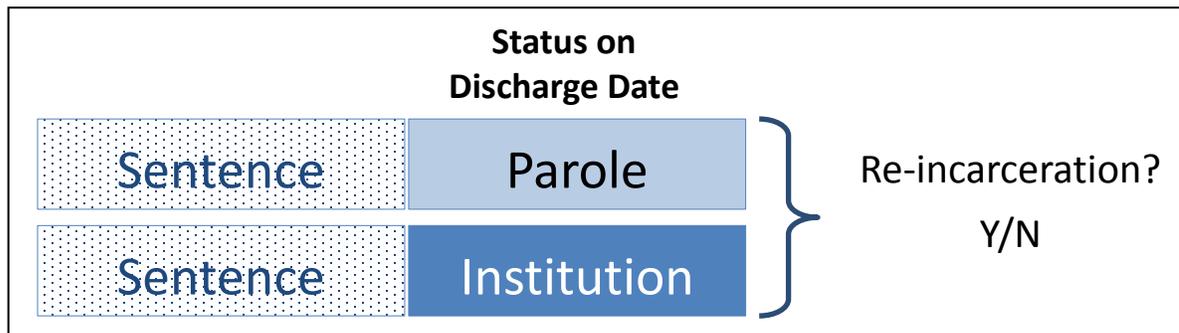
Figure 1.1. Illustration of Research Question 1: Proximity of Parole to Discharge

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[3] In this dissertation, time spent "under community supervision" will include periods spent on parole and periods spent on the release furlough program [RFP]. RFP may be granted to inmates who appear to be good candidates for community supervision but have not yet reached their parole eligibility dates. In these instances, inmates are reviewed by parole board members and may be granted discretionary release if deemed appropriate. If they are released to the community, they are supervised by a parole officer and, for all intents and purposes, look identical to parolees. They do not, however, accumulate any sentence credits while in the community until they have reached their parole eligibility date, undergo another review by the parole board, and are officially placed on parole status.

This question focuses solely the proximity of parole to the time of an inmate's discharge. The answer to this holds important implications for public safety and institutional crowding because it may guide parole release and supervision decisions. Findings that indicate lower rates of recidivism among inmates who discharge from parole may suggest that greater consideration should be given to an inmate's sentence structure when parole release decisions are made. This would allow correctional case workers to prioritize inmate placement into institutional programs according to their parole eligibility and tentative release dates. Such preparation would ensure that inmates who are closer to discharge than others, and/or those who are approaching parole board hearings, have a greater chance of being released. Furthermore, this finding may indicate that certain instabilities related to the transition from prison to the community exist, and that these issues can be better managed while the inmate is still under formal correctional supervision.

On the other hand, findings that indicate lower levels of recidivism among those who discharge directly from prison may suggest that the parole process is not sufficiently resourced to provide a lasting, positive effect on individuals' behaviors after they discharge. Rather, a finding such as this may lead to the conclusion that there is something going on within the institutional environment that produces in inmates an aversion to serious criminal behavior after complete their sentence. In either situation, the answer to this question has important practical implications. It may help parole officers identify critical factors related to reintegration so they can manage their caseloads more efficiently, or it may shed light on the therapeutic benefits of incarceration.

While it is possible that recidivism may be influenced by the proximity of parole to discharge, it may also depend on the dosage an inmate receives (i.e., the total amount of time spent in the community prior to discharge). In order to explore such a possibility, this dissertation will also answer:

2. *To what degree does the total amount of time inmates spend under community supervision during one sentence influence their likelihood of returning to prison within three years of their discharge?*

This question considers the total number of days each inmate spent in the community during his or her sentence. Such an examination is important for two reasons.

First, as noted previously, most researchers who study the total amount of time inmates spend in the community are interested in the average time-to-failure (see, for example, Berg & Huebner, 2011; Huebner & Berg, 2011; Yahner et al., 2008). In other words, these scholars want to know how long it takes someone to come into contact with the criminal justice system after leaving prison. While this may provide a good indication of the degree to which parole stabilizes inmates in the community prior to the completion of their sentence, it does not adequately address the lasting impact of parole supervision after their final discharge from the system.

The second reason this question is important is because it, too, holds practical implications related to parole release and administration decisions. Based on findings from the extant literature, periods of supervised release reduce the likelihood of future offending to the degree that they stabilize inmates in their communities prior to discharge (see, for example, McWilliams & Pease, 1990; Petersilia, 2003; Rotman, 1986). If my results indicate that inmates who spend more time in the community have a lower risk of

recidivism, then one could logically argue that parole should be more widely utilized (to the extent that public safety concerns can be appropriately managed). This would not only decrease the number of inmates cycling through the prison system, but it would also lower levels of prison crowding and serve as a cheaper alternative to incarceration.

Although the findings from this study are relevant to any state that uses a system of parole, offenders in Nebraska are especially well-suited for an examination of reoffending. First, Nebraska has retained the use of indeterminate sentencing. Because parole in this state is based on the informed decisions of parole board members, it remains a discretionary process. This allows outcome comparisons to be made between parolees and those who were eligible for parole but mandatorily discharged from a Nebraska prison. Approximately 85 percent of all currently incarcerated inmates in Nebraska will be eligible for parole after serving a portion of their term, and nearly 80 percent of all prisoners are discharged within three years of their admission date. The variability that exists within the state's correctional population will allow for a sizeable control group of inmates who were eligible for parole but discharged directly from prison.

Second, the State of Nebraska has dramatically increased its use of parole in recent years. Within the past five years, the average daily parole population has increased by nearly 62 percent, rising from 753 inmates per day in 2008 to 1,218 in 2012. Such remarkable growth not only places additional strain on the state resources necessary to properly supervise parolees, but it also raises concerns about potential threats to public safety and the adequacy and availability of various treatment and vocational resources located in the community.

In a larger context, Nebraska closely resembles the majority of states in the Midwest in terms of population density and geographical dispersion. Although Nebraska has a few major metropolitan areas, the majority of communities in the state are located in rural settings. This distribution not only mimics the composition of other Midwestern states (i.e., small, dense population clusters that are widely separated by rural areas), but it also holds important implications for access to community resources. Parolees are more likely to recidivate when their treatment needs are not met (Gunnison & Helfgott, 2011; Guy, 2009; Petersilia, 2003). Inmates who return to rural communities have a higher risk of failure than those who return to metropolitan regions because they have access to fewer services and treatment resources. Therefore, geography may play an important role in the success or failure of parolees due to the differential allocation of community resources throughout the state. While the findings of this study will be contextualized within Nebraska, they will be generalizable to the surrounding states with similar population distributions.

In order to fully understand the intricacies of these findings, however, one must be familiar with the general nature of parole, public safety, and recidivism. For that reason, the remainder of this chapter will discuss the historical development of parole, the nature and structure of parole supervision, and the ways in which community supervision addresses factors related to criminal behavior. It will then examine how parole successes and failures may be explained by various criminological theories and conclude with an overview of the remaining chapters.

History of Parole

The history of modern parole can be traced back to the Reformatory Era of criminal justice. During the mid-19th century, correctional philosophy began to shift away from the idea that offenders were incorrigible people who needed to be isolated from society and punished for their actions. The emerging school of thought was grounded in the notion that crimes resulted from individual inadequacies that could be corrected through various rehabilitation and treatment efforts (Clear, Cole, & Reisig, 2009; Crofton, 1868; Maconochie, 1946, 1948). Based on this ideology, graduated systems of release were implemented. These programs slowly reintegrated inmates into their communities and helped them learn how to become productive members of society. The precursors to modern parole practices can be traced primarily to Captain Alexander Maconochie in Australia and Sir Walter Crofton in Ireland.

Captain Alexander Maconochie was a Scottish penal reformer and an administrator for the British penal colony at Norfolk Island in Australia between 1840 and 1843 (Clear et al., 2009). Maconochie's development of the "mark system" was influenced by his belief that prisons should instill in inmates the social and vocational skills necessary to rejoin society as productive citizens after their release (Maconochie, 1848). This system allowed inmates to earn "marks," or points that were awarded for good behavior, hard work, and academic achievements within the prison (Clear et al., 2009). As inmates accumulated marks, they progressed through Maconochie's five stages of graduated release: (1) incarceration in solitary confinement, (2) daily labor on chain gangs, (3) temporary release from the prison for short periods of time, (4) release from prison with the condition that inmates would be re-incarcerated if they got into

trouble while in the community before their sentences expired, and (5) complete freedom (Maconochie, 1839; Clear et al., 2009; Hirschel, Wakefield, & Sasse, 2008). This program showed tremendous success, and fewer than three percent of all participants were re-incarcerated within 16 months of their discharge (Maconochie, 1846).

Although the mark system demonstrated positive results, Maconochie's ideas were not popular among the English, and he was relieved of his post on Norfolk Island after only four years. His works did not go unnoticed, however, and Sir Walter Crofton created a similar system in 1854, which was used with Irish convicts (Clear et al., 2009). Crofton also believed that inmates should pass through three unique phases of release, each with a distinct purpose, before being allowed a "ticket-of-leave" (i.e., conditional release). Similar to the mark system, the first stage of Crofton's "Irish system" used solitary isolation "to punish [inmates], for the sake of deterring [the individual offender], and deterring others" (Crofton, 1868, p. 11).

The goal of the second stage of this system was "to amend" inmates (Crofton, 1868, p. 11) by involving them in congregate labor with other prisoners in the institution. Here, they learned to cooperate with others, and they acquired job skills that would likely help them secure employment upon release. These skills were further refined during stage three, or the "intermediate stage," when inmates were allowed to leave the institution to work at jobs within the community. Crofton (1868, p. 11) stated that transitional employment was necessary "to train [the inmate] naturally before liberation, or the public would not value the voucher for his conduct, and therefore would not employ him" (Crofton, 1868, p. 11). If prisoners were able to successfully pass through all stages, they were granted a ticket-of-leave, which allowed them to live in the

community with oversight from a "special civilian inspector [who] helped releasees find jobs, visited them periodically, and supervised their activities" (Clear et al., 2009, p. 381). Crofton's system of graduated release most closely resembles the system of modern parole in the United States (Clear et al., 2009; Hirschel et al., 2008).

Current Parole Practices and Effectiveness

Although modern parole practices are similar to those developed by Maconochie and Crofton, their purpose has evolved over time. Parole still serves as a pathway to community reintegration, but its modern popularity grew largely out the fact that it provides a cheaper alternative to incarceration (Gies et al., 2012; McCarthy et al., 2001; Schmitt, Warner, & Gupta, 2010) and it allows for more efficient management of growing prison populations (Petersilia, 2011; Spencer, 2012; Steadman, 2011). When inmates are granted parole, they are released into their communities under the supervision of designated parole officers. In general, parole officers are tasked with the responsibilities of monitoring their clients, making sure they abide by both the general conditions (i.e., the rules and requirements that are standard for every parolee within a given jurisdiction) and the specific conditions (i.e., requirements that are based on a parolee's individual needs) of their release, and assisting in the acquisition of appropriate treatment and rehabilitation services.

Variations exist in the methods by which prisoners are released from incarceration, however. About one-third of all inmates in the United States are unconditionally discharged. These inmates leave prison at the completion of their sentence and are allowed to return to the community with no supervision or other restrictions on their liberties (Solomon et al., 2005). The remaining two-thirds, however,

are released via one of two different parole mechanisms. Discretionary parole, as exists in Nebraska, occurs when parole boards or other governing authorities determine that inmates are ready to be released from an institution prior to the end of their sentence and transition to their communities with oversight from a parole officer. This decision is based on a careful review of inmates' criminal histories, institutional records related to behavior and program participation, and post-release employment and housing plans (Solomon et al., 2005). The use of discretionary parole has decreased in recent decades, accounting for only 24 percent of all prisoner releases in 2000 (Solomon et al., 2005). While the use of discretionary parole has declined dramatically, the use of mandatory parole has increased substantially. Mandatory parole is used when inmates are automatically released from incarceration after serving a specified period of time and complete the remainder of their sentence under supervision in the community; this type of parole accounts for nearly 40 percent of all inmate releases, nationally (Solomon et al., 2005).

In general, a number of studies support the idea that recidivism rates are lowest among discretionary parolees and highest among ex-prisoners who are discharged with no post-release supervision requirements (see, for example, Ostermann, 2011a, 2012; Schlager & Robbins, 2008; Solomon, 2005; Williamson, 2009). For example, research conducted by Solomon and her colleagues (2005) showed that the re-arrest rates among mandatory parolees were similar to those for prisoners who discharged directly from an institution (slightly more than 60 percent of both groups were rearrested); the re-arrest rates for both of these groups, however, were higher than the re-arrest rates for inmates released on discretionary parole (54%) (Solomon et al., 2005, p. 8). Similarly,

Ostermann (2011a, p. 17) found that the likelihood of re-arrest for inmates who received unconditional release was the same as that for individuals on mandatory parole, but was over 30 percent higher than the likelihood of re-arrest among discretionary parolees.

Interestingly, however, some studies report lower rates of re-arrest among discretionary parolees, but *higher* rates of re-incarceration (Huebner & Berg, 2011; Langan & Levin, 2002; Kurlychek, Wheeler, Tinik, & Kempinen, 2011; Ostermann, 2011a; Yahner et al., 2008). For example, Yahner, Vishner, & Solomon (2008) found that parolees were not statistically more or less likely to commit a new crime or be re-arrested within eight months of release (Yahner et al., p. 5), but while only nine percent of unsupervised ex-prisoners were re-incarcerated within one year, 23 percent of people on parole were returned to prison (Yahner et al., p. 5). Re-incarceration rates for discretionary parolees in other studies range between 20 and 60 percent (Huebner & Berg, 2011; Ostermann, 2011a). These findings may seem contradictory, but they can be attributed to the inclusion of technical violations as measures of recidivism.

Technical violations occur when parolees fail to obey one of the state-mandated conditions of their release. These actions are not crimes, in and of themselves; rather, they are dependent on the person's legal status. Analyses that use technical violations to assess recidivism, then, are problematic. First, technical violations reflect administrative regulations, applicable only to persons who are under the immediate custody and supervision of the correctional system. As such, these actions pose little to no direct threat to public safety. The re-incarceration of individuals for such infractions not only results in unnecessary consumption of limited correctional resources, but it also disrupts the employment statuses, housing situations, and social relationships parolees have

cultivated during their release. Such destabilization will likely complicate any future attempts by the inmate to transition to life in the community without supervision.

More importantly, individuals who have been released to the community on parole have not yet completed their sentence. Therefore, the use of technical violations to assess the behavior of parolees is a better indicator of the degree to which community supervision is able to stabilize someone *during* a period of correctional commitment. This is why scholars are able to assess differences in rates of technical violations between mandatory and discretionary parolees, but not between parolees and inmates discharged directly from an institution: technical violations, by definition, are only measurable for persons under correctional custody. Therefore, findings based on the analysis of technical violations do little to advance our current understanding of the lasting, positive effects of parole that continue after inmates discharge.

Because of these complications, this dissertation defines parole as an alternative condition of confinement, rather than an alternative condition of release. In other words, this perspective considers people currently under parole supervision as being more similar to people who are still incarcerated, relative to people who are under no correctional oversight, because individuals in both groups are in the process of completing their sentence. Therefore, in this study, recidivism is measured as any law violations that are incurred after someone has completely discharged from a prison sentence. When operationalized in this way, studies generally show that parole is an effective means of reducing future criminal activity (see, for example, Ostermann, 2011a). In order to understand why certain individuals may be more or less likely to successfully complete parole, it is necessary to examine different criminological theories.

The next section will examine three distinct, yet related, theoretical perspectives that are most relevant to the prediction of post-release recidivism: social strain theory, social control theory, and subcultural theory.[4]

Theoretical Perspectives

Social Strain Theories

Generally, social strain theories suggest that crime occurs when individuals cannot reach cultural goals (e.g., monetary wealth, middle-class status) through socially accepted means (e.g., legitimate employment) (Agnew, 1992; Cloward & Ohlin, 1960; Cohen, 1955; Durkheim, 1951 [1897]; Merton, 1968; Messner & Rosenfeld, 2001). When these situations arise, people resort to other means of achieving the same culturally valued ends. In his 1897 study of suicides in Europe, Durkheim put forth the concept of "anomie," or a sense of normlessness that individuals experience when their self-perceived social status continuously fails to reach their expected, or ideal, social status. Durkheim (1951 [1897]) noted that anomie was most noticeable in times of rapid social change. When this occurs, the moral rules of a society are reconstructed and individuals must learn to adapt quickly to the new environment. If they are not able to unite their ideal and perceived senses of self in the context of the new social order, they will experience heightened levels of strain, which increases the likelihood that they will engage in deviant behavior, including crime and suicide (1957 [1897]).

Other scholars have approached the issue of social strain in different ways. Robert Merton (1968), for example, argued that it was not rapid social change in

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[4] To be clear, the goal of this dissertation is not to test any of these theories. Rather, these perspectives are included to guide the development of a predictive model that is grounded in logic, theory, and empirical evidence. Furthermore, these potential explanations of criminal behavior will aid in the interpretation of the findings presented in Chapter Four.

American society that increased strain and crime rates, but the country's basic social structure. Merton noted that American culture is based on the flawed notion that everyone has an equal chance to achieve wealth and a high social status. Moreover, everyone is expected to work toward these goals, even when they have little to no chance of actually achieving them (Merton, 1968; Bernard et al., 2010). Merton posited that crime is likely to occur when individuals either believe that the cultural goals are more important than the means by which they are reached or when they renounce the dominant social goals. For example, people may attempt to resolve their strain by: engaging in illegal activities, such as robbery or theft, to achieve valued cultural goals; rejecting both the goals of society and the means of achieving them by withdrawing from the larger culture altogether (e.g., through the use of drugs or alcohol or by repeatedly committing offenses in order to remain incarcerated); or rejecting societal goals and means and replacing them with their own sets of objectives and tactics for reaching them, as occurs with terrorist and other extremist groups (Merton, 1968). Most recently, Robert Agnew (1992) proposed the idea of "general strain." This theory also supports the notion that strain occurs when a person is unable to achieve a culturally valued goal. It expands this idea, however, and posits that strain may also occur when someone experiences the removal of a positively valued stimulus (e.g., the end of a relationship or loss of a job), or when something "noxious" or unwanted (e.g., physical or sexual abuse, domestic violence) is imposed on the person (Agnew, 1992; Bernard et al., 2010). In this context, crime occurs as a response to negative emotional states brought on by unsupportive interpersonal relationships (e.g., frustration, anger).

In recent years, scholars have found support for strain theories as explanations of crime among both adults (Agnew, Piquero, & Cullen, 2009; Botchkovar & Broidy, 2010; Eitle, 2010; Rebellon, Piquero, Piquero, & Thaxton, 2009) and juveniles (Baron, 2009; Hollist, Hughes, & Schiable, 2009). For example, Agnew, Piquero, and Cullen (2009) found that strains created by the inability to reach economic and/or status goals were relevant factors in explaining the commission of white-collar offenses, such as embezzlement and corporate fraud. Rebellon and his colleagues (2009) subjected their study participants to a variety of hypothetical situations. Similar to Agnew and his colleagues, these researchers found that participants who experienced dissonance between their expectations and the actual outcomes reported higher levels of anger. In turn, these higher levels of anger were significantly related to higher self-reported levels of employee theft.

In addition to explaining first-time offenses, empirical findings also show that strain theory may be a valid explanation of repeated criminality among parolees. Recent research indicates that the key to addressing strain among parolees may begin in the institutional environment. Listwan and her colleagues (2011, p. 12) examined various deprivations associated with imprisonment, and found that inmates with higher levels of anticipated strain (i.e., inmates' perceptions that they "will have difficulty paying their bills…or finding housing…in the community" after their release) are more likely to be arrested and re-incarcerated. Such anxieties, however, may be alleviated through increased positive contact with non-incarcerated others. Bales and Mears (2008, p. 313) note that "social ties may well constitute a critical vehicle through which to reduce or manage the strains associated with the unique circumstances of reentry." Indeed, their

examination of inmate visitation revealed that the odds of reconviction for a felony offense within two years of release were nearly 31 percent lower for prisoners who received visits from family members or friends, relative to inmates who did not. These findings indicate that social strain theories provide a framework within which the correlates of re-offending among ex-prisoners can be situated. Specifically, the aforementioned studies suggest that interpersonal relationships may insulate parolees from criminal behavior after their return to the community.

Social Control Theories

In contrast to most criminological theories, which attempt to explain why crime occurs, social control theories are based on the assumption that criminal behavior is innate. Consequently, these perspectives examine the various mechanisms that constrain behavior and inhibit criminal impulses. Although many variations of social control theory exist (see, for example, Gottfredson & Hirschi, 1990; Nye, 1958; Reiss, 1951; Shaw & McKay, 1969), Hirschi's social bond theory (1969) is perhaps the most well-known. Hirschi (1969) posits that people will refrain from crime when they have strong bonds to their society in the form of attachment (the emotional connections to others that facilitate the internalization of social norms), commitment (the freely-made choice to conform to societal standards), involvement (participation in conventional activities), and/or belief (a personal investment in the overall values of a society). Each type of bond strengthens the degree to which people feel connected to society. As a result, crime is inhibited in those who adopt societal norms because any transgression will damage their relationships and connections with the community and those to whom they are bonded (Hirschi, 1969).

Sampson and Laub (1993) expanded on this theory by examining not just the presence of these social bonds, but also their strength and the ways in which they may change throughout the life course. For example, bonds to parents and school may be extremely important for children but hold less importance for adults, relative to spousal and career-related bonds (Cullen & Agnew, 2006; Sampson & Laub, 1993). Sampson and Laub (1993) also noted the importance of social capital, or the instrumental and emotional resources that are gained from connections with others. Because social capital strengthens social bonds, it serves as another effective means of informal social control; if social bonds are weakened or removed, individuals will lose the social capital they have gained as a result of their relationships with others. In order to avoid such a loss and further decrease their propensity for criminal behavior, people must cultivate and maintain their bonds with important others.

Lanier and Henry (2004, p. 203) noted that social control theory "has the highest level of [empirical] support of all theories of crime causation," and recent studies lend further support to this notion. Schroeder and his colleagues (2010) examined the influence of parenting on children's criminality throughout the life course. They found that parent-child bonds have a greater level of permanence, relative to bonds with peers and intimate partners. Furthermore, because "parents also continue to mature and interact with their children in numerous roles throughout the life course," they play an important role in "sustained criminal desistance" throughout one's life (Schroeder, Giordano, & Cernkovich, 2010, p. 562, 568). While this study focused primarily on the importance of parental attachment, Salvatore and Taniguchi (2012) considered the impact of all four of Hirschi's social bonds. These scholars reported that in addition to attachment to one's

own parents, marriage, religious participation, job satisfaction, and having children were all significantly related to decreases in criminal behavior (Salvatore & Taniguchi, 2012, p. 752).

With respect to repeated criminality, empirical findings indicate that aspects of social control theory play a key role in the reintegration process for ex-prisoners and parolees. Maruna and Toch (2005) found that inmates who received social support from family members and friends both during and after their incarceration were significantly more likely to desist from future criminal offending. Bales and Mears (2008) reported similar findings. They noted that prison visitation was related to both reduced and delayed onset of future offending among releasees, and that visitations occurring closer to the time of release had a stronger negative effect on recidivism, than to visits that occurred earlier in an inmate's sentence (Bales & Mears, 2008). Mills and Codd's (2008) review of the extant literature also supported the idea that prisoners' families serve as an important source of social capital after release. This was particularly true with respect to obtaining employment, encouraging inmates to develop positive interactions with their probation officers, and participating in drug treatment programs. These findings support the contentions of Laub and Sampson (2001), who noted that social capital may not only provide the motivation individuals need for desistance but may also "[maintain] the continued state of nonoffending" (p. 11). Social control theories are relevant to this study's examination of parolees because the likelihood of re-incarceration should be influenced by the level of social and other forms of instrumental support these individuals receive while in the community.

Subcultural Theories

The final theoretical perspective relevant to explanations of recidivism consists of subcultural theories. Subcultures are groups of individuals who exist within the dominant societal culture, but distinguish themselves through the adoption of unique norms and values (Gelder, 2007; Hebdige, 1979). In criminological studies, subcultural explanations posit that crimes occur when individuals adopt cultural ideologies that stand in contrast to the primary values and beliefs of the dominant culture, and when groups of like-minded individuals have anti-social interactions with others. One of the earliest subcultural studies was discussed in Albert Cohen's (1955) examination of juvenile gang members. Cohen noted that the majority of people in society have legitimate employment that provides them with the financial resources they need to access food, shelter, and participation in conventional activities, but such opportunities are not equally distributed among all social classes (Cohen, 1955). As a result, people in the lower class experience greater levels of strain. According to Cohen (1955), subcultures develop when groups of individuals experience similar social strains and attempt to collectively solve their problems through alternate means. Cohen (1955) also focused on the frustrations of people in the lower classes due to their inability to attain conventional middle-class status. Therefore, a key component to subcultures is the establishment of a new social hierarchy so that its members can achieve a respectable social status, as defined by the norms and values adopted within their group (Cohen, 1955).

While Cohen (1955) focused on the development of subcultures, Sutherland and Cressey (1960) and Burgess and Akers (1966) examined how such groups continued and

were maintained.[5] Sutherland and Cressey (1960) initially put forth the theory of differential association, which argues that individuals learn the physical and mental techniques necessary to engage in criminal activity as part of their regular interactions with others in their personal groups. Furthermore, this learning occurs through the same mechanisms as those through which any other behavior is learned. The authors note that individuals only become criminal, however, when they develop an abundance of definitions favorable to violations of the law, relative to definitions unfavorable to violations of the law (Sutherland & Cressey, 1960). Therefore, it is not enough to merely learn criminal techniques; one must come to internalize a preference for criminal behavior over adherence to the law. Burgess and Akers (1966) expanded this theory by explaining that individuals may also learn to commit crime by imitating the actions of others or through a process of differential reinforcement.[6]

In 1981, Wolfgang and Ferracuti introduced the subculture of violence theory. According to this perspective, certain subcultures (particularly those that consist of young, lower-class males) maintain that violence is an appropriate manner of conflict resolution. Furthermore, failure to use violence in situations that warrant it may result in the alienation and/or expulsion of members from the group (Wolfgang & Ferracuti, 1981). The authors did not offer any explanations for the conditions that required the development of such subcultures, but instead emphasized the learned aspect of the behavior. In essence, they argue that while the circumstances that required violent responses have long since diminished, the values and beliefs that support such reactions

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[5] Although these theories are typically classified as learning theories, they are considered here because it is likely that the majority of parolees' learning occurs within the subcultures of prisons.

[6] With differential reinforcement, the likelihood that an individual will continue to commit crimes is based on the rewards or punishments he or she receives as a result of the initial criminal behavior.

are continually transmitted to future generations through routine interactions and reinforcements (Bernard et al., 2010; Wolfgang & Ferracuti, 1981).

Anderson (1999) proposed that a subculture of violence existed among African-Americans within inner-city areas, based on the "code of the street." This perspective expands Wolfgang and Ferracuti's (1981) theory by introducing the concepts of "street" and "decent" people (Anderson, 1999). Anderson argues that the "decent" people abide by a code of conduct that "includes many of the middle-class values of the larger society" (Bernard et al., 2010, p. 187). This code has no credibility to "street" people whose own code mandates that, in every situation, they communicate in both subtle and overt ways that they are fearless and willing to use violence in order to settle any situation that may arise (Anderson, 1999; Bernard et al., 2010). According to this theory, "street" and "decent" people are further separated by the fact that "decent" people are able to switch between their civil code and the code of the street when demanded by the situation, but "street" people are unable to do so. As a result, they follow the code of the streets in all situations, thereby increasing the likelihood of violence (Anderson, 1999). Subcultural theories, overall, would suggest that examinations of recidivism should take into account the potential influence of race/ethnicity, the communities to which inmates are released, and/or association with criminal groups.

While studies provide empirical support for a wide array of subcultural theories, most recent scholars focus primarily on the subculture of violence and the code of the streets. Stewart and Simons (2010) found that violence is more likely to occur in neighborhoods that have a subculture that strongly adheres to the code of the streets than in those that do not. Moreover, the violence they describe occurs at the individual level.

This reinforces the idea that individual ideology and behavior are strongly shaped by the subcultural groups to which a person belongs. McGloin and her colleagues (2011, p. 784), however, noted that while adherence to the subculture of violence predicted higher levels of criminal activity, overall, it was not a stable predictor of violent versus non-violent crime.

When subcultural theories are applied to parolees and ex-prisoners, one would expect to find higher levels of recidivism among those who socialize with others who have pro-criminal attitudes or who live in within a cultural environment that promotes such an ideology. Indeed, Ezell and Tanner-Smith (2009) found that "those immersed in a subculture of violence are…more likely to use violence to solve problems,…a legitimate form of expression within the subculture" (Ezell & Tanner-Smith, 2009, p. 145). Guy (2009), however, noted that community reentry and successful rehabilitation may be enhanced when supervision officers model pro-social behaviors and provide positive reinforcement when their clients imitate these actions. Therefore, while adherence to the subculture of violence and code of the streets may increase the likelihood of recidivism, such odds may be decreased through more specialized forms of supervision and the development of pro-social relationships with others outside of the subculture.

Organization of Dissertation

The majority of the information presented in this chapter has provided context for the primary research questions, and a framework within which the rest of this dissertation can be situated. Chapter Two contains a more focused discussion of factors related to the likelihood of recidivism. Specifically, it reviews findings from the extant literature and

outlines key variables that have been empirically and/or theoretically linked to post-release offending. Chapter Three describes the dataset used in this study, with an emphasis on the sampling parameters and variable definitions. It also presents an overview of the data through descriptive statistics and details the different analytical techniques that were used to answer the research questions. Chapter Four presents the statistical results of all models, while Chapter Five discusses their broader implications. The last chapter also suggests avenues of future research and offers recommendations for other investigations of parole supervision, mandatory discharge, and recidivism. With this overview in mind, the focus of this paper will now shift to an examination of the factors related to risk, recidivism, and the prediction of parole outcomes.

Chapter 2:

Literature Review

Predictors Associated with Re-Offending

Criminal justice research is grounded in the assumption that deviant behavior can be predicted (Anderson, 1999; Cohen, 1955; Hirschi, 1969; Lemert, 1972; Messner & Rosenfeld, 2001; Sheldon, 1942; Sherman, 2007; Sutherland & Cressey, 1960; Wolfgang & Ferracuti, 1981). Both theoretical and empirical studies enhance our understanding of when, where, and by whom crime is most likely to be perpetrated through the identification of certain risk factors, or characteristics that increase the likelihood of criminal behavior. This information can help criminal justice officials develop and implement proactive crime prevention measures in an effort to enhance public safety (Borum, Fein, Vossekuil, & Berglund, 1999; Gendreau, Little, & Goggin, 1996; Sherman, 2007). As stated in Chapter One, the overarching goal of this study is to examine the degree to which parole supervision affects re-incarceration rates among ex-prisoners after the completion of their original sentence. In order to uncover the impact of parole, however, other potentially influential factors must be controlled. Furthermore, the controlled measures must be guided by logic (the variables have face validity), theory (relevant theoretical perspectives suggest that the variable would be linked to recidivism), and empirical evidence (findings in existing research studies support their inclusion). The remainder of this chapter will explore various risk factors that are of empirical and/or theoretical importance to post-incarceration offending.

Post-Incarceration Supervision

Supervision Type

As discussed in the previous chapter, most studies find that discretionary parolees have lower recidivism rates than both mandatory parolees and those who serve the

entirety of their sentence behind bars ("max out") (Beck & Shipley, 1989; Lipsey & Cullen, 2007; Ostermann, 2011a, 2012; Petersilia, 2000b; Schlager & Robbins, 2008; Solomon et al., 2005; Williamson, 2009). However, the extent to which rates of re-arrest, reconviction, and/or re-incarceration differ among these groups appears to be minimal. For example, Ostermann (2011a) found only a four percentage point difference in the likelihood of re-arrest between discretionary parolees and those who max out (55% versus 59%, respectively), and only a seven percentage point difference in the likelihood of re-conviction (52% versus 59%, respectively). Solomon and her colleagues (2005) found that 54 percent of discretionary parolees in their sample were re-arrested, compared to 60 percent of people who were mandatorily discharged, and Beck and Shipley (1989) reported a difference of less than two percentage points among ex-prisoners in their study (62.3% of parolees were re-arrested, relative to 64.8% of those discharged from an institution). The above findings lend support to meta-analyses on the topic, which typically report that parole appears to reduce rates of recidivism, but not by large magnitudes (generally, between two to eight percent; see, for example, Lipsey and Cullen, 2007; Lowenkamp, Latessa, & Holsinger, 2006).

This conclusion raises questions as to whether the apparent reductions in offending are due to community supervision, itself, or to the discretionary process by which parolees are selected. Inmates selected for discretionary parole are discernibly different from other inmates because the parole granting authorities believed these inmates posed a low level of threat to public safety. Such inmates typically have few criminogenic risk and needs factors, have committed less serious crimes, have shorter criminal histories, and have demonstrated their ability to follow institutional rules by

accumulating few misconduct reports (Ostermann, 2011a, 2012; Schlager & Robbins, 2008; Solomon et al., 2005; Steen & Opsal, 2007). Because these individuals have a low likelihood of reoffending, in general, one would expect them to have fewer arrests for new crimes regardless of their supervision status when they leave prison.

The significant difference in re-offense rates between discretionary parolees and those who max out their sentence may also be explained by prior parole revocations. Inmates released to community supervision, especially those released multiple times, have more opportunities than those who are never paroled to develop and strengthen positive ties with their communities, and to cultivate relationships with non-criminal others. Each time inmates are allowed to serve portions of their sentence outside of prison, they can continue to work toward stabilizing the conditions to which they will discharge (e.g., housing and employment plans; pro-social relationships with family and friends), thereby decreasing their odds of returning to prison (Petersilia, 2003; Rotman, 1986). In short, differences between the groups may be statistically significant because of differential exposure to opportunities for self-improvement.

While selection bias may account for the fact that discretionary parolees typically have lower rates of recidivism than those who discharge directly from prisons, it does not explain why there is only a two to eight percentage point reduction in the likelihood of future offending; one would expect to see a much greater difference between the two groups. One potential explanation is that while parolees have a lower risk of re-offending, they have relatively comparable likelihoods of re-arrest and/or re-incarceration because they are subjected to higher levels of surveillance (Hanley, 2004; Marciniak, 2000; Petersilia & Turner, 1990; Paparozzi & Gendreau, 2005). When individuals are

under community supervision, their actions are scrutinized more frequently and to a greater degree. As a result, parole officers have more opportunities to observe their clients engaging in criminal activities; this is exacerbated as the unbroken period of time a person spends on parole increases.[7]

Length of Parole Supervision

Another explanation for the small magnitude of difference, however, may result from the fact that revocations necessarily interrupt the formative processes described above. Every time inmates are removed from the community, their stabilization plans are disrupted and, often, degraded. These inmates suffer a disadvantage when they re-parole because the first thing they must do is repair any damage done by their re-incarceration; only when this is complete can they make any further headway in their stabilization plans. Therefore, recidivism rates for discretionary parolees may be similar to rates for people who have discharged from prison because parolees must spend time addressing their setbacks. At this point, the challenges they encounter may be similar to those faced by inmates who max out their time behind bars.

Unfortunately, most researchers do not examine how post-discharge recidivism rates are impacted by the total amount of time inmates spend in the community during their sentences. Recall from the previous chapter that when researchers do consider this, it is typically done within the context of survival analyses. These examinations measure

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[7] From a methodological standpoint, similarities in re-offense rates may be due to the follow-up periods employed by researchers. Researchers generally concur that "the risk for recidivism is not evenly distributed over the release period, but rather peaks in the first months following release and declines with time" (Huebner & Berg, 2011, p. 147-148). While short follow-up periods are useful to examine the speed with which offenders are likely to recidivate (Kingree, Phan, & Thompson, 2003; McGrath & Thompson, 2012; Schlager & Robbins, 2008), periods that are too short will likely over-represent failure rates or high-risk parolees, not the average offender. Similarly, lengthy follow-up periods (more than three years) will likely over-represent re-offense rates for all offenders, due to the differential opportunity for observing maladaptive behavior.

the length of time between an inmate's release from prison and the first time he or she is re-arrested, reconvicted, and/or re-incarcerated. Once inmates have such contact, they have fulfilled their purpose in the study and no further consideration is given to their future movement within the criminal justice system. Only rarely do researchers account for interrupted periods of parole. When this occurs, however, it is usually done to account for sanctions imposed as a result of technical violations. For example, Ostermann (2012) subtracted the time parolees spent incarcerated for a technical violation from their overall time at risk. Once subjects experienced sanctions for new law violations, however, they were deemed a recidivist and were given no further consideration in his study.

Not only do the majority of existing studies consider only the first period of time an offender stays on parole, but they also largely fail to examine the effect parole may have on post-discharge rates of recidivism. Therefore, it remains unclear whether differences in rates of reoffending between parolees and inmates who max out are due to the sample bias inherent in the parole process, to differential supervision and monitoring practices, or to methodological complications in existing research models. It is likely that combinations of these three factors are present and operate at the same time, making it difficult to sort out their distinct effects. This dissertation will use propensity score matching (discussed in greater detail in Chapters Three and Four) to address these issues and to provide a more accurate assessment of the impact parole supervision has on re-incarceration after one's sentence is complete. In order to conduct such an examination, however, known sources of potential bias must be controlled. The remainder of this chapter will discuss variables that may have an impact on one's risk of recidivism.

Demographic Predictors

Age

One of the most consistent findings in criminological research is that age is negatively related to offending: as age increases, the likelihood of criminal behavior decreases (Sampson & Laub, 1992; Sampson & Lauritsen, 1994). Theoretically, this finding is expected because as people age, they become more integrated into social institutions that can restrain or help control behavior (Cullen & Agnew, 2006; Sampson & Laub, 1992; Schroeder et al., 2010). The majority of researchers report that younger offenders are at an increased risk of failing parole (Beck & Shipley, 1989; Berk, Sherman, Barnes, Kurtz, & Ahlman, 2009; Cobbina et al., 2012; Grattet, Petersilia, & Lin, 2008; Huebner & Berg, 2011; Langan & Levin, 2002; Listwan et al., 2011; Monahan, 2006; Ostermann, 2011a; Steen & Opsal, 2007; Yahner et al., 2008). Sampson and Lauritsen (1994, p. 1) noted that "arrests for violent crime peak around age 18 and decline gradually thereafter." This trend holds true with relation to reoffending while on parole. Researchers have found that between 72 percent (Beck & Shipley, 1989) and 80 percent (Langan & Levin, 2002) of offenders 18 years of age or younger were re-arrested after their release from incarceration. In fact, scholars estimate that each year increase in age increases the likelihood of parole success between three percent (Listwan et al., 2011) and 13 percent (Bahr, Harris, Fisher, & Armstrong, 2010). It should also be noted that some scholars suggest younger offenders benefit more from parole supervision than older offenders (Yahner et al., 2008). This "implies that parole officers have a better chance of influencing parolees with less [extensive] criminal histories" (Yahner et al., 2008, p. 6).

Along this same line, Lin, Grattet, and Petersilia (2010, p. 777) report that the oldest parolees in their sample (45 years of age or older) were the most likely to be re-incarcerated for law violations. They further explain, however, that this may be a function of the decisions made by parole board members, who may see older offenders as "more blameworthy," less "worthy of additional chances to reintegrate after committing criminal violations," and "believe that older offenders 'should know better'" (Lin et al., 2010, p. 777). As a result, older offenders may be at a greater risk of parole revocations and re-incarceration. In a different study, Grattet, Lin, and Petersilia (2008, p. 13) found that offenders who were older at the time of their original commitment to the California Department of Corrections and Rehabilitation were at a higher risk of committing technical violations and less serious offenses. They note, however, that "this…group was probably largely composed of drug offenders that had substance dependence driving their offending, and as a result of drug use, were prone to [technical violations and low-level offenses,] but were less likely to be involved in more serious criminal behavior (Grattet et al., 2008, p. 13).

In summary, it appears that older inmates are less likely than younger inmates to commit new offenses, or to commit more serious offenses, but have higher rates of re-incarceration. Such conflicting findings may be attributable to technical violations and the fact that paroling authorities are more likely to revoke parole for older offenders. However, with regard to the commission of new law violations, younger people have higher rates of criminal justice system involvement subsequent to their discharge from prison.

Sex

Although crime rates among females have increased in recent years (Baglivio, 2009; Monahan, 2006; McIvor, 2013), research still finds that women offend at much lower rates than their male counterparts. In terms of parole supervision, most scholars find that male ex-prisoners are more likely to recidivate than females, in general (Baglivio, 2009; Bahr et al., 2010; Beck & Shipley, 1989; Cobbina et al., 2012; Langan & Levin, 2002; Jalbert & Rhodes, 2012). When specific types of recidivism are examined, however, results indicate that men are more likely to commit new crimes while under community supervision, while women have higher likelihoods of committing technical violations (Grattet et al., 2008; Lin et al., 2010; Ostermann, 2011a; Steen & Opsal, 2007). This is likely due to the fact that the offenses women commit tend to be of a much less serious nature than those crimes committed by males (Monahan, 2006).

The reasons for differences in re-offending rates among men and women are still widely debated, however, with explanations ranging from differential treatment by criminal justice agents (Daly & Tonry, 1997; Nagel & Hagan, 1983); to early childhood socialization practices, in which tolerance for, and reactions to, deviant and criminal behaviors vary by gender (Hagan, Gillis, & Simpson, 1985); to patriarchal social structures, which view misbehavior by women as driven by illness rather than criminal intent (Brennan & Vandenberg, 2009; Berrington & Honkatukia, 2002; Chesney-Lind,1999; Vandenberg, Brennan, & Chesney-Lind, 2013). Nevertheless, theoretical perspectives (e.g., social control, social strain) and empirical evidence suggest that rates of initial offending, and reoffending, vary across the sexes.

Race/Ethnicity

Some scholars have noted that racial/ethnic minorities have higher risks of serious and violent criminal law violations than whites (Grattet et al., 2008; Lin et al., 2010; Steen and Opsal, 2007), but the relationship between race/ethnicity and the risk of reoffending is still unclear. Ostermann (2011a), for example, reported that whites were more likely to experience technical violations than minorities (see also Grattet et al., 2008; Lin et al., 2010). On the other hand, Steen and Opsal (2007, p. 356) found that black parolees were 50 percent more likely than their white counterparts to have their parole revoked for a technical violation. Further discrepancies exist when race/ethnicity is not a dichotomous measure: some find that blacks are more likely to recidivate than Hispanics (Beck & Shipley, 1989; McGovern, Demuth, & Jacoby, 2009), while other studies report that Hispanics have higher odds of recidivating than other racial/ethnic groups (Lin et al., 2010).

The effect of race/ethnicity on recidivism is further confounded by its potential interaction with a number of variables, including sex (Cobbina et al., 2012; Steen & Opsal, 2007), age (Steen & Opsal, 2007), education level (Huebner, DeJong, & Cobbina, 2010), community racial heterogeneity (Reisig, Bales, Hay, & Wang, 2007), time spent on parole (Steen & Opsal, 2007), offense type (Steen & Opsal, 2007), and prior felony incarceration (Steen & Opsal, 2007). As a result, it is unclear what role race/ethnicity plays in the likelihood of re-incarceration.

As with discussions of gender and crime, there are several theoretical explanations for why minorities may have higher rates of reoffending than whites (Gabbidon, 2010). At the individual level, some suggest that biology plays a role in the

likelihood of offending among minorities (Wilson and Hernnstein, 1985), whereas others posit that differential treatment by criminal justice agents produces higher rates of apparent offending among minorities relative to whites (Crawford, Chiricos, & Kleck, 1998; Kennedy, 1997) On a macro level, others suggest that Blacks and Hispanics have higher rates of reoffending than whites due to the neighborhood context in which they live (Nielsen, Lee, & Martinez, 2005; Sampson, Raudenbush, & Earls, 1997), or to the larger structural and cultural organization of the broader society (Austin, 1987; Quinney, 1977). Despite the varied explanations and ever-evolving debate over why minorities may have higher rates of reoffending than whites, there are reasons to believe that recidivism varies across racial and ethnic groups, even if the relationship has not been consistently defined.

Legal Predictors

Information relating to an offender's criminal history and current offense is often used as the basis for criminal sentencing decisions, prison classifications, and institutional release decisions (Monahan, 2006; Williamson, 2009). Research has demonstrated that offenders' criminal history records influence their treatment within the criminal justice system because they form a basis for perceptions of "*both* … the offender's deserts *and* … the likelihood of recidivism" (Monahan, 2006, p. 398). Grattet and her colleagues (2008, p. 20) found support for this notion, stating that "parolees with longer, and more serious, histories of criminal behavior were likely to be considered public safety risks by court and board decision-makers, and their cases were treated accordingly." Beyond the use of these factors for criminal justice processing decisions, it

is simply logical to assume that past and present behavior are useful predictors of future behavior.

Prior Arrests, Convictions, and Incarcerations

One of the most widely acknowledged predictors of recidivism is the length of one's prior criminal record (Beck & Shipley, 1989; Berg & Huebner, 2011; Monahan, 2006; Solomon et al., 2005). The criminal justice system operates as a funnel: not all crimes that are committed will come to the attention of police, and only a portion of the offenders believed, or known, to have committed those crimes will be formally arrested. Furthermore, not all of those arrested will be convicted, and not all of the people who are convicted will be incarcerated. While it is reasonable to conclude that prior arrests, convictions, and incarcerations are, to some degree, artifacts of the functioning of law enforcement agencies and the courts, these factors do provide a rough indication of the way people have behaved in the past.

The range of prior arrests for offenders likely varies across sex, age, race, and ethnic groups, for reasons discussed above, but Berg and Huebner (2011) reported that offenders in their sample averaged 9.14 prior arrests, and Beck and Shipley (1989) reported that more than 25 percent of all prisoners released in 1983 had more than 10 prior arrests. In general, individuals with higher numbers of prior arrests and/or convictions are more likely to recidivate than offenders with fewer priors (Beck et al., 2007; Beck & Shipley, 1989; Huebner & Berg, 2011; Listwan et al., 2011; Solomon et al., 2005). In Beck and Shipley's 1989 study, only 38 percent of offenders with one prior arrest were rearrested within three years, but over three-quarters of offenders with more than 10 prior arrests were rearrested in that same time period. Beck and Shipley (1989)

found that about 19 percent of prisoners with one prior arrest were rearrested for a new offense within one year of their release, whereas nearly four times as many offenders with more than 10 prior arrests were rearrested within the first year.

With regard to prior convictions, Berk and his colleagues (2007) found that the odds of an offender with 10 prior violent convictions being charged with a homicide or attempted homicide were twice as high as the odds for offenders with no prior violent convictions. Similarly, others have reported that the odds of parole failure increased by 10 percent for each additional prior felony conviction (Listwan et al., 2011), and that people with more extensive records tend to recidivate more quickly than those with less extensive records (Beck & Shipley, 1989; Berg & Huebner, 2011).

Finally, with respect to prior incarcerations, Grattet and her colleagues (2008) reported that offenders who served multiple prison sentences in California had a much higher risk of parole violations than offenders finishing their first sentence. Specifically, relative to those released from prison for the first time, parolees who had served one prior sentence were 20 percent more likely to recidivate, parolees who served two prior sentences had a 39 percent higher chance of violating their parole, and parolees who served eight prior sentences had a 124 percent higher risk of violation (Grattet et al., 2008, p. 13). Interestingly, however, there is little evidence to suggest that the amount of time served in prison influences rates of recidivism. In one of the most comprehensive and widely cited pieces of research concerning the effect of discretionary parole and mandatory discharge on rates of offender recidivism, Langan and Levin (2002, p. 11) found no evidence to support the notion that increases in the length of time served increased rates of recidivism. Furthermore, while they reported that offenders who

served over five years in prison had the lowest rates of re-arrest (54.2%), there were no statistically significant differences in re-arrest rates for those who served six months or less (66.0%), seven to 12 months (64.8%), 13 to 18 months (64.2%), 19 to 24 months (65.4%), or 25 to 30 months (68.3%) (Langan & Levin, 2008, p. 11).

Studies also report that institutional misconduct (i.e., breaking prison rules) is a significant predictor of recidivism upon release. In particular, individuals with higher levels of misconduct are likely to recidivate more quickly (Huebner & Berg, 2011; Huebner et al., 2010). This is likely because "institutional misconduct may be indicative of enduring antisocial behaviors in prison, while lower levels of problem behavior are likely associated with common normative adaptations to the institutional environment (Huebner et al., 2007)" (Huebner et al., 2010).

It should be noted that criminal history records have also been linked to parole revocation decisions and, thus, re-incarceration (see, for example, Grattet et al., 2008). Those with more extensive criminal histories are more likely to have their parole revoked by parole boards than those with less extensive histories. Furthermore, parole boards are more likely to revoke cases involving persons who have violated the conditions of release during previous terms in the community (Lin et al., 2010).

Offense Severity

The type of crimes for which offenders were incarcerated also predicts who will re-offend after being released from prison. Contrary to popular belief, violent crime is a relatively rare event (Antunes & Hurley, 1977; Buckler & Travis, 2005; Naylor, 2001), and most offenders are incarcerated for non-violent offenses. Berg and Huebner (2011) reported that slightly fewer than half (46%) of the offenders in their sample were serving

time for a property-related crime and only 14 percent were incarcerated for violent offenses. Similarly, Huebner and Berg (2011) found that nearly two-thirds of the men in their sample (61%) were serving time for property or drug crimes. Because property offenders typically receive shorter sentences than violent offenders, they do not have as much time to participate in programming while incarcerated or while under community supervision. Furthermore, property and other non-violent offenders are subjected to much lower levels of monitoring after their release. As a result, these individuals spend more unsupervised time in the community and experience greater opportunities to commit crime.

With these things in mind, it makes sense that offenders with the highest rates of recidivism are those who were incarcerated for property-related offenses, while those who committed violent crimes (including murder/manslaughter and sex offenses) are the least likely to reoffend or have their parole revoked for a technical violation (Beck & Shipley, 1989; Steen & Opsal, 2007). With this said, however, when violations come to the attention of parole boards, offenders who are labeled as "serious or violent offenders," "registered sex offenders," or those who have committed violent crimes are more likely to have their freedoms revoked (Grattet et al., 2008; Lin et al., 2010).

Furthermore, when violent prisoners are released, they have the highest likelihood of committing the same offense for which they were originally incarcerated. For example, Beck and Shipley (1989) found that offenders initially incarcerated for rape were 10.5 times more likely to be rearrested for rape than offenders who were initially incarcerated for other offenses. Similarly, other sex offenders were 7.5 times more likely

to be arrested for a repeated sexual assault, and murderers were 5 times more likely than other offenders to be arrested for another homicide.

<div align="center">**Social Predictors**</div>

Education/Employment

As discussed previously, certain factors in one's social life impose informal social controls on behavior (Hirschi, 1969; Lanier & Henry, 2004; Schroeder et al., 2010). Education levels indicate people's willingness to embrace cultural norms and the legitimate means for achieving life goals, as does lawful employment (Agnew, 1992; Merton, 1968). Scholars have often found that offenders' levels of educational attainment and employment statuses (both pre- and post-incarceration) may predict their propensity to violate the law after release from prison (see, for example, Belenko, 2006; Laub & Sampson, 2001; Platt, 2005; Travis et al., 2001). From a theoretical standpoint, both education and employment provide environments that are suitable for developing, maintaining, and strengthening social bonds with others; and are strong sources of social capital (see, for example, Hagan & McCarthy, 1997; Halpern, 2005; Mills & Codd, 2008; Sampson & Laub, 1993). As a practical matter, both of these environments provide constructive outlets that keep individuals occupied for extended periods of time, thereby decreasing opportunities to engage in misbehavior. The influence of education and post-release employment on recidivism has been studied by many, but there are conflicting findings.

With regard to education, Makarios and his colleagues (2010) noted that slightly more than half (55%) of the parolees in their sample had either a high school diploma or GED. This is important because most scholars note that offenders who have at least this

level of education have lower rates of re-arrest, reconviction, and/or re-incarceration than those with lower levels of educational attainment (Berg & Huebner, 2011; Huebner & Berg, 2011; Huebner et al., 2010; Visher, LaVigne, & Travis, 2004). These findings may be related to education levels, alone, but they may also be a function of how education impacts one's future: Petersilia (2011, p. 29) notes that "offenders who earn a high school equivalency diploma while behind bars are more likely to get jobs after release. Those who receive vocational training are more likely to get jobs and higher wages after release." Therefore, the effect of education may be moderated by its influence on post-release employment.

Recall from earlier discussions that periods of incarceration necessarily disrupt offenders' employment outside of prison. Once they are released, it is highly unlikely that their original jobs will be waiting for them, and "the stigma of a criminal record means that many ex-prisoners will be automatically rejected by prospective employers" (Mills & Codd, 2008, p. 12). Although employment may be difficult to initially obtain, research generally shows that those who obtain employment following release are less likely to fail on parole (Bahr et al., 2010; Berg & Huebner, 2011; Huebner & Berg, 2011; Makarios et al., 2010; Petersilia, 2000b). Specifically, Berg and Huebner (2011) reported that about twice as many employed parolees made it through the 600-day follow-up period in their study without being re-arrested, compared to unemployed parolees. Furthermore, Listwan and her colleagues (2011) found that the odds of re-incarceration were 45% lower for offenders who obtained a job after release relative to those who were unemployed.

In some cases, however, it can be shown that it is not merely the presence or absence of stable employment that is linked to lower rates of recidivism, but the number of hours an offender works per week. For example, Bahr and colleagues (2010) reported that each hour worked per week increased the likelihood of successful parole completion by 14 percent for the individuals in their sample (p. 679). In fact, by the end of their three-year follow-up period, 63 percent of parolees who were employed full-time were successfully discharged from supervision, whereas only 10 percent of those who worked fewer than 40 hours per week were discharged (Bahr et al., 2010, p. 679-680). This may provide further support for the arguments that: (1) work provides a source of financial income, which may alleviate stress and strain; (2) work allows for interactions with, and the development of, relationships with others, which may shift offenders away from their deviant lifestyles; and (3) work provides offenders with a constructive time-consuming activity, thereby decreasing opportunities to engage in crime (Bahr et al., 2010).

Mental Illness/Substance Abuse

A number of scholars have examined the effect of mental health and the use of illicit substances on reoffending (Bahr et al., 2010; Cobbina et al., 2012; Dahle, 2006; Grattet et al., 2008; Huebner & Berg, 2011; Huebner et al., 2010; Jalbert & Rhodes, 2012; Monahan, 2006; Ngo, Paternoster, Curran, & Mackenzie, 2011; Yahner et al., 2008). With respect to mental health, the consensus is that not only do offenders with diagnosed mental illnesses have higher rates of reoffending, in general (see, for example, Belenko, 2006; Grattet et al., 2008; Ngo et al., 2011), but they also have a greater likelihood of committing violent crimes (Dahle, 2006; Grattet et al., 2008; Monahan, 2006). In terms of specific diagnoses, Abracen and his colleagues (2013) found that

recidivism rates were significantly higher among offenders diagnosed with borderline personality disorder and attention deficit hyperactivity disorder.

With regard to substance abuse, Monahan (2006) reported that around 37 percent of offenders in jails in the United States were under the influence of alcohol and/or an illicit substance during the commission of their crimes. Eighty-two percent of parolees in the sample analyzed by Bahr and his colleagues (2010) reported that drug and/or alcohol contributed to their imprisonment. Huebner and Berg (2011) found that about 20 percent of the individuals in their sample were drug-dependent after their release from incarceration, and others found that about one-third of female recidivists were identified as drug dependent at the time of their release (Huebner et al., 2010). Furthermore, post-release drug use has been positively linked to increased odds of recidivism: Huebner and Berg (2011, p 158) noted that men who recidivated within six months were nearly twice as likely to be drug-dependent than men who successfully completed their parole.

A number of scholars acknowledge that substance use among parolees is greatly influenced by peer behavior (see, for example, Bahr et al., 2010; Belenko, 2006; Doyle, 2012; Wills & Cleary, 1999). For example, Bahr and his colleagues noted that "most [parolees] began using again while associating with friends who used drugs" (Bahr et al., 2010, p. 680). Doyle (2012, p. 56) specifically reported that parolees were at a higher risk of recidivating when their social network included three or more drug users. Indeed, nearly two-thirds of offenders who believed it would be difficult for them to stay away from drugs and alcohol after being released from prison were re-incarcerated within three years (Bahr et al., 2010). Not only is there a social aspect to substance abuse, but there may also be a link to mental health.

A study submitted to the National Research Council Panel on the Understanding and Control of Violent Behavior noted that alcohol and illegal stimulants increase aggression and violent tendencies (Monahan, 2006, p. 422-423). Furthermore, it is possible that individuals who use illicit substances to self-medicate may actually exacerbate their mental illnesses. To the degree that drug use is the result of a mental illness, or simply exacerbates an existing mental condition, it appears that these two factors, either alone or in combination, are likely to impact ex-prisoners' chances of re-offending.

Social Relationships

Relationships with family members are of special theoretical importance in terms of developing social capital and maintaining social bonds that will decrease the likelihood of re-offense (Bales & Mears, 2008; Berg & Huebner, 2011; Listwan et al., 2011; Mills & Codd, 2008). Indeed, the informal relationships that people develop (e.g., with family, peers, or other attachments to their communities) have a stronger, and more direct, impact on individual behavior and the likelihood of criminal offending than formal social controls (e.g., law enforcement) (Taxman, 2002, p. 19; see also Sampson & Laub, 1992). Mills and Codd (2008, p. 12) explain, "families may encourage [ex-prisoners] to avoid circumstances that are likely to lead to reoffending, or dissuade them from having contact with certain acquaintances who are likely to involve them in deviant activities."

However, incarceration likely has a significant impact on the quality and availability of social relationships due to both the physical and emotional distances it creates. Mills and Codd (2008, p. 15) note that "Separation is likely to strain family relationships and weaken bonds because contact is infrequent and subject to constant

surveillance." Because of the theoretical importance of maintaining relationships, visitation is a central component of most correctional facilities (Bales & Mears, 2008).

Empirical findings that relate recidivism rates to continued familial relationships during incarceration, however, are mixed. Mills and Codd (2008) note that the risk of re-offense is between two and six times higher for ex-prisoners who do not have active family support during their imprisonment, relative to those who remain in contact with family members while they are incarcerated (see also Reisig et al., 2007). Bales and Mears (2008, p. 305) found that each visit an inmate received reduced the odds of post-release recidivism by nearly four percent. Even when recidivism does occur, increased visitation is linked to a delayed onset of reoffending (Bales & Mears, 2008).

Mears and his colleagues (2011), however, note that the impact of visitation on recidivism depends on the nature of the visitor's relationship with the inmate. For example, visits from a spouse or intimate partner reduced recidivism by nine percentage points and visits from friends produced an eight percentage point reduction in recidivism, but visits from other family members did not significantly impact the likelihood of recidivism, overall (Mears, Cochran, Siennick, & Bales, 2011). Furthermore, they found that reductions in recidivism taper off after the third visit an inmate receives, thus contradicting the finding by Bales and Mears (2008) that visitation has a constant, negative effect on the probability of recidivating (Mears et al., 2011).

There also appear to be gender differences with regard to the effect of intimate partner relationships. Laub and Sampson (2001) found that men with strong attachments to their spouses were significantly less likely to engage in criminal behavior than those who reported weak attachments. Huebner and Berg (2011) support this finding and

report that men who were able to maintain their marital status while incarcerated were

2.61 times more likely to desist from crime, and they had longer times-to-failure when

they did recidivate (Huebner & Berg, 2011). These findings held for Cobbina and her

colleagues (2012) with respect to women, but not for men. In particular, they found that

good-quality intimate partner relationships lowered the risk of recidivism among women,

regardless of their criminal histories, but only decreased the likelihood of re-offending for

men with below-average levels of arrests (Cobbina et al., 2012, p. 344, 347). This

indicates that significant others may not serve the same protective function for women as

they do for men. Still other studies find that intimate partner relationships do not

significantly[8] influence the likelihood of recidivism for either sex (see Tripodi, 2010 for a

discussion of males and Huebner et al., 2010 for a discussion of females). The mixed

findings that exist in the extant literature illustrate the need for further examination of this

topic.

Though not many have considered relationships with children, Huebner, DeJong,

and Cobbina (2010) report that there is a possibility they may serve as a protective factor

and decrease the likelihood of parole failure. Bales and Mears (2008), however, reported

that visitation by children may increase the risk of recidivism. Overall, this body of

research is limited and further investigation into this area of inquiry is warranted.

It is important to qualify these findings by noting that "…not all families are a

positive influence in the lives of prisoners. They may themselves engage in criminal

activity or be the cause of the initial offending and in such cases are unlikely to promote a

reduction in reoffending" (Mills & Codd, 2008, p. 10). Similar conclusions can be drawn

for the importance of peer friendship networks. Peer behavior plays a significant role

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[8] No statistically significant differences at $p \leq .05$.

with respect to the initiation into, and maintenance of, criminal lifestyles and deviant behaviors. If individuals associate with delinquent peers, they are more likely to engage in delinquent activities. On the other hand, pro-social associations with others may provide insulation from crime, and protect offenders from subsequent relapse and recidivism (Belenko, 2006). Again, however, the empirical research paints mixed findings regarding the impact of friendships on parolee recidivism.

Bahr, Harris, Fisher, and Armstrong (2010) report that parolees who spend more time per week engaging in "enjoyable activities" with friends are less likely to be re-incarcerated than those who do not. Although the authors do not define "enjoyable activities," they do note that a majority of parolees stated that they made new friends upon release and made conscious decisions to avoid associating with old friends (Bahr et al., 2010, p. 682). Indeed, 90 percent of offenders from their sample who were re-incarcerated stated that it was difficult for them to break ties and disassociate from their former social networks (Bahr et al., 2010, p. 681). Cobbina, Huebner, and Berg (2012) provide some support for this, noting that men with ties to delinquent peers were more likely to fail on parole. This pattern was not consistent for female offenders, however, noting that the effect of delinquent peers seems to differ by gender (Cobbina et al., 2012, p. 347).

Community of Release

It has long been suggested that the structure and culture of a neighborhood or local community can influence the behavior of its residents (Bursik & Grasmick, 1993; Shaw and McKay, 1942). With specific regard to parolees, "Communities with greater financial resources may be able to fund more rehabilitation and work programs, which

can provide parolees with pathways out of criminal lifestyles. Communities with more progressive political views may have more tolerance for minor rule violations" (Grattet et al., 2008, p. 16). Moreover, neighborhoods that provide more educational and employment opportunities afford time-consuming legal activities to residents, leaving less time for criminal behavior.

Although some scholars report few, if any, regional differences in parole outcomes (Grattet et al., 2008; Ostermann, 2011a), this may be due to a lack of control for the neighborhoods to which parolees return. Recall from Chapter One that parolees may not be distributed evenly across a state. Most parolees who are released from prison return to the neighborhoods from which they originally came. If neighborhood characteristics are related to crime, one would expect to find higher rates of crime in areas with higher concentrations of parolees.

This theoretical expectation has found empirical support in California. Grattet and her colleagues (2008, p. 55) found that the one percent of census tracts in Los Angeles County with the most parolees in them contained slightly less than 10 percent of all parolees in the state. Moreover, the top five percent of census tracts contained nearly one quarter of the state's parolees, while the top 10 percent contained almost 37 percent of individuals returning from prison (Grattet et al., 2008, p. 55). This finding that most parolees return to a small number of census tracks within large urban areas is not unique to California (Clear 2007). Across all states, the few areas with large concentrations of parolees often have levels of disadvantage that are similar to the levels present in the communities in which parolees lived prior to their incarceration (Leverentz, 2010; Travis 2006; Wehrman, 2010). Studies typically find that individuals who live in disadvantaged

neighborhoods, as characterized by high levels of residential instability and poverty, have higher rates of recidivism than those who do not (Eck & Eck, 2012; Huebner & Berg, 2011; Huebner et al., 2010).

Summary of Literature Findings

The previous sections provide a mere sample of the ways in which researchers have long tried to predict the risk of recidivism among former prisoners and parolees. Scholars have consistently identified several demographic, legal, and social factors related to future criminal justice system involvement among those released with and without parole supervision. With regard to demographic characteristics, scholars typically find that recidivism is more likely among ex-prisoners who are younger and male. Findings are mixed, however, regarding the degree to which a person's race/ethnicity influences reoffending. From the existing research, it is unclear whether people from racial/ethnic minority groups are more likely than whites to commit new crimes; whether specific racial/ethnic minority groups are more likely to reoffend than others; whether racial/ethnic differences exist with regard to the commission of technical violations; and the degree to which race may interact with a number of other demographic, legal, and social characteristics to influence rates of reoffense.

Concerning legal predictors, findings in the extant literature reveal that individuals with lengthier criminal histories (rearrests, reconvictions, and/or re-incarcerations) and higher levels of institutional misconduct are more likely to have future contact with the criminal justice system. Ex-prisoners who have committed non-violent offenses are more likely to have contact for any new crime, while violent offenders are more likely to commit the same crime for which they were originally

incarcerated. Members of this group are also more likely to have their parole revoked due to technical violations.

Social factors indicate that recidivism is more likely to occur among individuals who do not have a high school diploma, GED, or stable employment; who have a diagnosed mental illness; who abuse alcohol or illicit substances; who do not have strong social support networks; and who return to disadvantaged communities. It should be noted, however, that all of these findings must be interpreted with caution for three reasons.

First, most studies compare failure rates of those who have completed their sentence in prison to those who are currently finishing the remainder of their sentence in the community. This approach treats parolees and those who have been mandatorily discharged as a homogenous group, based on the simple fact that these individuals are no longer incarcerated. As explained previously, however, this dissertation considers parole to be an alternate form of correctional commitment. Although parolees have been released from an institution, they have not yet completed their sentence. As such, parolees are qualitatively different from ex-inmates who have completed their sentences. A significant gap exists in the extant literature due to the fact that few scholars have compared *post-discharge* recidivism rates for inmates who completed their sentences in prison to those who completed their sentences while on parole.

Second, researchers have not adequately determined the lasting effects of parole supervision. The extent to which the total amount of time spent on parole during one sentence affects the likelihood of post-discharge re-incarceration is still unknown. Many studies that consider the amount of time parolees spend in the community focus on time-

to-failure. In this context, most researchers are concerned only with the length of time between one's release from prison and his or her first time-to-failure (or, if no criminal justice contacts occur, the end of the follow-up period). When scholars do account for multiple parole releases, they typically do so to control for sanctions that result from technical violations. Furthermore, when parolees both discharge from their sentence and recidivate during a study's follow-up period, researchers often fail to distinguish between the length of time inmates spent under supervision and the amount of time spent unsupervised. More research must be conducted in order to determine whether, and to what degree, the amount of time spent on parole during one sentence serves as a protective factor against future incarcerations.

Finally, the majority of studies suffer from methodological limitations. In addition to the issues described above, most studies calculate the impact of parole on reoffending by simply controlling for its presence or absence in statistical models that regress the individual characteristics of inmates on re-arrest or re-incarceration (see, for example, Berg & Huebner, 2011; Huebner & Berg, 2011; Ngo et al., 2011; Lin et al., 2010; Schlager & Robbins, 2008; Steen & Opsal, 2007). Moreover, most examinations are conducted using a form of logistic regression; only occasionally are more sophisticated methods, such as hierarchical linear modeling (HLM) employed (see, for example, Lin et al., 2010). To date, only two studies have used propensity score matching to examine the effect of parole on recidivism (Ostermann, 2012; Wright & Rosky, 2011), but neither considered the research questions posed in this dissertation and both suffer from the aforementioned measurement and group comparison issues.

In an attempt to address these limitations and to fill gaps in the extant literature, this study uses propensity score matching to answer the research questions posed in Chapter One. By controlling for a number of known factors related to reoffending, this technique allows for a more robust measure of the degree to which parole impacts recidivism rates with regard to both the proximity of supervision to an inmate's final discharge and the total length of time a person spends on parole. The next chapter provides a more in-depth discussion of this technique and its application to the primary research questions. Specifically, it describes the data that were collected and used in this study; presents descriptive statistics related to the distribution of variables among the sample; explains how the correlates of offending were operationalized; and discusses each of the statistical models that were used to answer the proposed research questions.

Chapter 3:

Methodology

Research Questions and Hypotheses

As discussed previously, the purpose of this dissertation was to discern the impact of parole supervision on the likelihood of re-incarceration for inmates who have discharged from correctional custody. Therefore, two overarching research questions form the basis for this study. First,

What proportion of people who were supervised in the community at the time of their discharge from the Nebraska Department of Correctional Services [NDCS] are re-incarcerated within three years, relative to inmates who discharged directly from prison?

One would expect to find that, because of the discretionary nature of the parole process, inmates who are granted parole are qualitatively different from inmates who are not. Consequently, I expect to find:

H1: People who were on parole when they discharged from their sentence will have a lower likelihood of being re-incarcerated within three years, relative to ex-inmates who discharged from prison.

My second research question asks,

To what degree does the total amount of time inmates spend under community supervision during one sentence influence their likelihood of returning to prison within three years of their discharge?

To the extent that parole is an alternative form of correctional commitment that helps stabilize inmates in the community prior to their discharge, any time spent under supervised release should decrease the odds of recidivism. For this reason, I expect my results to show that:

H2: As the amount of time spent under community supervision increases, the

likelihood of post-discharge re-incarceration will decrease.

As mentioned in the previous chapters, one of the major contributions of this

dissertation is its methodological improvements to the extant literature. In addition to

comparing people who are currently on parole to ex-prisoners who have already

discharged, many researchers fail to use statistical techniques that adequately control for

selection bias within their samples. In order to overcome this limitation, the current study

uses propensity score matching as its primary analytic technique.

Overview of Propensity Score Matching

Random selection of study participants, and random assignment of participants to

treatment or control groups, are considered to be the "gold standard" in terms of research

designs. When subjects are randomly selected for participation, the sample more closely

resembles the composition of the larger population. Therefore, results obtained from

analyses with randomly selected participants have a higher degree of generalizability.

When subjects are randomly assigned to an outcome condition, each individual has the

same likelihood of receiving the proposed treatment. As a result, the treatment and

control groups should be more similar to each other than they are different, and any

outcome findings should be attributable to the influence of the independent variable

rather than to selection bias. In criminological research, however, it is often not practical,

nor safe, to randomly assign participants to a given outcome. Therefore, other statistical

techniques must be employed.

Propensity score matching is a quasi-experimental design that addresses the

practical feasibility of randomly assigning participants to treatment groups and control

groups by artificially simulating it: researchers identify inmates with similar characteristics, then assign each to a different outcome condition (Guo & Frasier, 2010). In traditional matching strategies, researchers match subjects in their samples on a number of mutually shared characteristics (e.g., race, total length of sentence, most serious offense). This method becomes problematic as the number of covariates in the study increases, however, because it becomes more difficult to find inmates who are alike on every variable. As a result, these studies may suffer from significant amounts of subject attrition.

Propensity score matching adjusts for this issue by assigning each subject a single score. This score is a composite measure that reflects an individual's probability of assignment into the treatment group, given a specific set of covariates (Guo & Fraser, 2010; Morgan & Winship, 2007; Ostermann, 2012). By matching subjects on this single score, researchers can include a larger number of covariates in their model and still ensure that the composition of the treatment group (in this study, people who discharge from parole) is similar to that of the control group (people who max out). As a result, researchers are able to appropriately identify which subjects are likely to experience similar outcomes, even if they are not identical to one another on their values for all covariates.

Because subjects must still be matched on the value of their propensity scores, however, not all cases will have a suitable counterpart. Therefore, only those whose propensity scores fall on the area of common support (i.e., who can be appropriately matched to another subject) will be included in the final analysis. Once as many subjects as possible have been matched, the researcher must ensure that the groups are balanced

(i.e., there are no significant differences in the compositions of the treatment and control groups). If the researcher can demonstrate statistical equivalency between the groups, he or she can conclude that the matching process has eliminated any potential selection bias (Guo & Fraser, 2010). Once balance has been achieved, researchers can simply examine the degree of difference between the two groups in order to determine treatment effects, or they may run more complex multivariate analyses using the matched sample. Any statistically significant differences that emerge from these investigations can be attributed to the dependent variable, as the influence of other potentially relevant factors has been controlled for by the propensity score. This proposed methodology will allow this dissertation to move scholarship regarding parole outcomes from simply controlling for supervision in regression models, to providing a much more accurate estimation of its true effect (Guo & Fraser, 2010; Morgan & Winship, 2007). This also adds to our existing understanding of the relationship between parole and re-incarceration by treating parole as an independent variable, rather than a dependent variable, as is common in many other studies.

<div align="center">**Data Description**</div>

Data Management and Extraction

The data I used to answer my research questions were collected from the Nebraska Department of Correctional Services. NDCS has maintained the electronic storage and retention of basic inmate information (e.g., demographic characteristics, criminal history, sentence length, parole eligibility criteria, and inmate movement records) since November of 1977.[9] While only a limited amount of inmate information

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[9] Although electronic record storage began in November of 1977, detailed historical information (e.g., records for each change in an inmate's institutional location) did not appear consistently until the mid-

was originally collected in a digital format, electronic record retention has expanded over

the years, and NDCS currently manages a number of relational databases that store a

wide variety of information related to an individual's term of commitment (e.g., time in

segregation, institutional program recommendations and participation, institutional

employment, parole board review and hearing details, and visitor records).

Electronically-stored information is entered by NDCS staff members into either the

Correctional Tracking System [CTS] or the Nebraska Inmate Case Management System

[NICaMS]. Each night, the majority of data fields that have been created or updated are

downloaded to the department's SQL server.[10] This server allows end-users to access

various data tables through Oracle Business Intelligence Enterprise Edition [OBIEE],

Version 11g.

OBIEE is a proprietary software application that provides client-based access to

NDCS data. Within the program, data are divided into 16 different subject areas,

according to information type (e.g., inmate accounting and payroll, physical and mental

health records, security and intelligence data). Users are able to run pre-programmed

reports, as well as ad hoc queries and analyses, within each subject area, as well as

extract raw data files. Due to the inherent sensitivity of the information contained within

the databases, however, access is controlled through user-specific log-in credentials. The

data used in this dissertation were collected from the "Corrections Web" subject area,

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1980s. The missing historical information, as well as records for inmates who discharged prior to the development of the electronic database, is stored on individual microfiche sheets. Due to the nature of this study, however, I only considered information that was easily retrievable in a digital format. This did not have a measurable impact on my analyses, as the vast majority of cases in my sample were admitted after 1977. Furthermore, given the low rates of recidivism among the NDCS population, it is unlikely that my analyses would have been affected by missing criminal history records for inmates who discharged prior to 1977.

[10] Data fields that are entered in CTS or NICaMS, but not passed down to the SQL server, may be manually retrieved by staff in the Office of the Chief Information Officer, if needed.

which contains general sentence information for all inmates who were committed to

NDCS since November of 1977. Raw data were extracted using OBIEE, then exported

into Microsoft Excel. Because of the relational nature of the data collected, the Excel

files were then imported into Microsoft Access to compile a dataset suitable for analysis

in Stata version 12.

Data Limitations

The primary limitation of the NDCS data is that records are structured around each

unique term of commitment. Upon intake, inmates are assigned a five-digit identification

number, which they retain until the completion of their sentence. Should an individual be

committed to another prison term after discharge, he or she will be assigned a new five-

digit identification number. A number of problems are created by the fact that inmate

numbers are based on unique sentences rather than personal identity. The issue most

relevant to this dissertation relates to tracking post-discharge recidivism.[11]

Because inmates do not receive the same identification number each time they are

incarcerated, NDCS staff must rely on the self-reported name, date of birth [DOB], Social

Security number [SSN], state identification number [SID] and Federal Bureau of

Identification fingerprint identification number [FID] each person was committed under

in order to track multiple terms of incarceration. Any intentional misrepresentation of

this information by the inmate at the time of intake, or any typographical errors made by

clerical staff, increases the difficulty in tracking the same person across multiple terms of

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[11] Other issues relate to alias management and tracking state services utilization (e.g., Department of Health and Human Services, Department of Motor Vehicles) over time. Intelligence efforts suffer because there is no database that tracks the various combinations of name, DOB, SSN, SID, and FID inmates use over time. Furthermore, without collecting information for each unique person in a uniform way, it is difficult to determine the extent to which prisoners have had previous criminal justice system involvement (e.g., previous commitments to jail or probation terms).

incarceration. Although each sentence record in the database contains a "Previous ID" field, this data field is manually entered by NDCS staff. Therefore, it is dependent upon staff's ability to reconcile the five data points listed above (i.e., name, DOB, SSN, SID, and FID), and correctly enter the inmates' most recent NDCS identification number.[12]

For the purposes of this study, however, the alias management issue was addressed through an extensive manual analysis of all electronically-available inmate sentence records by NDCS staff (*N*=53,709). This process involved four separate series of analyses to create a single "Subject ID" variable for each individual. It is likely that undetected errors may still exist in the recoded data, due to the manual nature of the manipulations. Though the extent to which such inaccuracies may exist is unknown, the adjusted data are more accurate than the original records and allowed for more meaningful examinations of my research questions.

A second limitation of the NDCS data was one that is common in most other types of official and/or secondary data sources: not all data of interest were available. In this study, some data were unavailable because they were not stored electronically, while others were not included because they constituted protected personal information (e.g., security threat group information; educational, medical and mental health records) and I lacked the proper clearance to access them. In order to combat this issue, however, I collected as many pieces of information as possible and developed the best proxy measures I could.

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[12] This is problematic, as some records staff only consider the identification number for an inmate's most recent sentence directly to NDCS, whereas others include special status identification numbers (i.e., serials for WEC probationers, Hastings detainees, interstate parolees, lifetime sex offenders, and county and federal safekeepers) in the "Previous ID" field. The lack of consistency in what constitutes a previous identification number further complicates efforts to track individuals over time.

State Context

      The State of Nebraska has a population of approximately 1.86 million people, with an average distribution of 23.8 people per square mile (United States Census Bureau [USCB], 2010, 2013). These statistics place Nebraska as the 38th most populous state in the nation, and 43rd in population density. Over half of the state's population reside in three counties: Douglas (27.9%), Lancaster (15.4%), and Sarpy (8.6%) (USCB, 2012). In relation to other states, Nebraska has relatively low crime rates. According to data from the Uniform Crime Reports [UCR], Nebraska is ranked 32nd in the nation for rates of violent crime (279.5 victims per 100,000 residents) and 29th in the nation for rates of property crime (2,673.2 victims per 100,000 residents); overall, Nebraska's crime rate is 30th in the nation (United States Department of Justice, Federal Bureau of Investigation [FBI], 2011). Consequently, Nebraska has a lower population of offenders under formal supervision, relative to other states, as well. The Nebraska Department of Correctional Services manages an average daily population [ADP] of 1,357 people under community supervision and 4,768 people incarcerated in one of the State's 10 correctional facilities. According to national figures, only seven states have fewer prisoners per capita (Carson & Sabol, 2012), and only nine states have fewer parolees per capita (Maruschak & Parks, 2012).

      As shown in Table 3.1, the majority of Nebraska's penal institutions are concentrated in the eastern portion of the State, with 70 percent located in Omaha (Douglas County) and Lincoln (Lancaster County). It should come as no surprise that NDCS resources are clustered in ways that reflect the general population density of the state and correspond to the larger allocation of treatment resources and other

rehabilitative services. Figure 3.1 further illustrates that the majority of inmates committed to prison during fiscal year 2013 were from Douglas County and Lancaster County.[13] Similarly, when inmates were released on parole during the 2013 fiscal year, nearly 60 percent were supervised in one of these two counties (see Figure 3.2),[14] which serve as the primary locations for about 73 percent of the State's parole officers (see Table 3.2).

Table 3.1 also shows that most of the prisons in Nebraska are designed to house adult male inmates, but there are also two coed facilities, one institution specifically for juvenile males, and one prison designated for females.[15] Nearly all, however, currently operate in excess of their design capacity.[16] Despite the fact that 43 states have more prisoners per capita, and 38 re-incarcerate higher proportions of their parole violators, only six states report higher levels of crowding (Carson & Sabol, 2012; Glaze & Bonczar, 2011).

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[13] Fiscal year 2013 was used to develop these maps in order to illustrate current trends in prison admissions and the geographical distribution of inmates across Nebraska. These trends have remained stable over time, and accurately reflect the general patterns seen in the admission cohorts for fiscal years 2007, 2008, and 2009. See Appendix B for the specific number of inmates admitted from each county during fiscal year 2013.

[14] Appendix C provides information regarding the actual number of parolees released to each county during fiscal year 2013. If an inmate paroled multiple times or changed living location during that time period, only the county to which he or she was first released was counted. Again, the distribution patterns of inmates across the state has remained stable over time and accurately reflects the regions to which inmates paroled during fiscal years 2007, 2008, and 2009.

[15] Males and females are housed in separate units in mixed sex facilities.

[16] NCYF and NCCW are under their official design capacity because of the specialized nature of their populations. TSCI is under its design capacity because, unlike other facilities, it was originally designed to house multiple inmates per cell and cannot accommodate additional double-bunking, nor the addition of dorm-style housing units. As a result, this institution's design capacity also reflects its maximum operating capacity.

TABLE 3.1. NDCS PRISON FACILITIES

Facility	Year Opened	City	County	Custody Level[a]	Sex	Age	ADP	Design Capacity
Community Corrections Center - Lincoln (CCC-L)	1993	Lincoln	Lancaster	Community	Mixed	Adults	382	200
Community Corrections Center - Omaha (CCC-O)	1985	Omaha	Douglas	Community	Mixed	Adults	161	90
Diagnostic and Evaluation Center (DEC)*	1979	Lincoln	Lancaster	Maximum	Male	Adults	472	160
Lincoln Correctional Center (LCC)	1979	Lincoln	Lancaster	Medium, Maximum	Male	Adults	498	308
Nebraska Correctional Center for Women (NCCW)*	1920	York	York	Minimum, Medium, Maximum	Female	Adults & Juveniles	250	275
Nebraska Correctional Youth Facility (NCYF)*	1998	Omaha	Douglas	Minimum, Medium, Maximum	Male	Juveniles	67	68
Nebraska State Penitentiary (NSP)	1869	Lincoln	Lancaster	Minimum, Medium, Maximum	Male	Adults	1,269	718
Omaha Correctional Center (OCC)	1984	Omaha	Douglas	Minimum, Medium	Male	Adults	589	396
Tecumseh State Correctional Institution (TSCI)	2001	Tecumseh	Johnson	Medium, Maximum	Male	Adults	959	960
Work Ethic Camp (WEC)	2001	McCook	Red Willow	Minimum	Male	Adults	123	100

[a] Custody level reflects the type of beds that the institution was designed to house.

* Indicates intake facility.
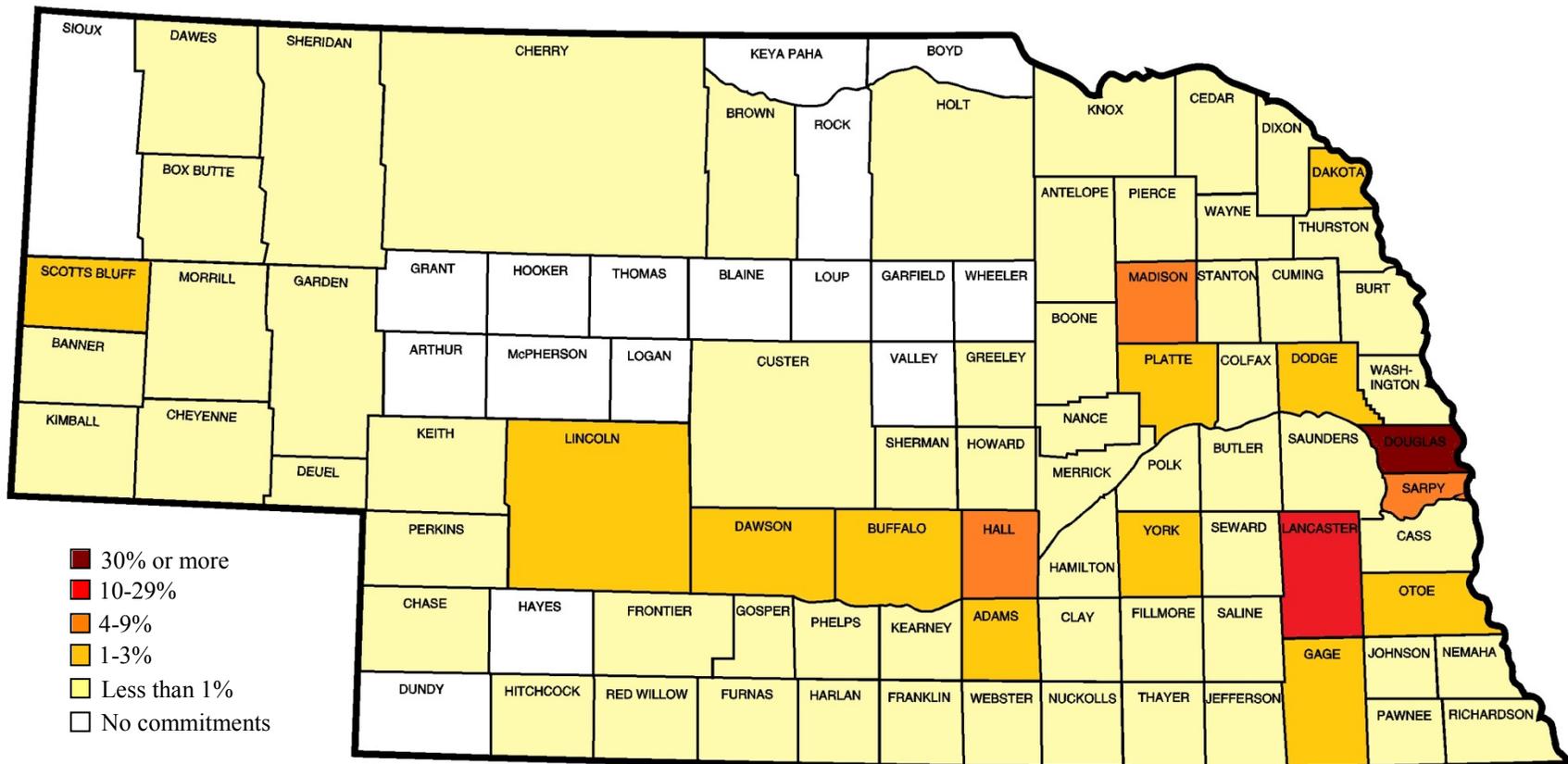
Figure 3.1. Counties of Commitment for Newly Admitted Inmates in FY 2013

Figure 3.2. Counties to which Inmates Paroled in FY 2013

TABLE 3.2. NDCS ADULT PAROLE OFFICES

Office	City	County	Number of Officers	Average Caseload
Omaha District Parole Office	Omaha	Douglas	14	37
Adult Parole Central Office	Lincoln	Lancaster	1	3
Lincoln District Parole Office	Lincoln	Lancaster	13	33
Lifetime Sex Offender Unit	Lincoln	Lancaster	2	22
Norfolk Regional Parole Office	Norfolk	Madison	3	34
Grand Island Regional Parole Office	Grand Island	Hall	3	35
Kearney Regional Parole Office	Kearney	Buffalo	1	35
North Platte Regional Parole Office	North Platte	Lincoln	2	26
Scottsbluff Regional Parole Office	Scottsbluff	Scotts Bluff	2	21

Sample Description

The sampling parameters used study included all adult, parole-eligible, sentenced inmates who discharged from NDCS custody between fiscal years 2007 and 2009 (i.e., between July 1, 2006 and June 30, 2009). "Adults" are defined as persons who were 19 years of age or older at the time of their discharge from NDCS.[22] Although Nebraska operates under a discretionary parole system, not all inmates have a sentence structure that allows for this type of release (e.g., flat sentences, life or death sentences). Therefore, my sample included only inmates who had a defined tentative release date and a parole eligibility date earlier than the tentative release date. This allowed me to examine differences between those who were released to community supervision, and those who were eligible for release but served the majority of their sentence behind bars.

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[22] Nineteen is the legal age of majority in the State of Nebraska. It is possible for persons 18 years of age and under to be tried as an adult, convicted, and sentenced to a period of confinement within NDCS. When this occurs, NDCS must ensure sight and sound separation between these inmates and those over the age of majority. To accommodate this, male youth are housed in the Nebraska Youth Correctional Facility until they discharge or are old enough to transfer to one of the state's adult facilities. Females are housed in a segregated area of NCCW until they are old enough to move into general population or until they discharge. Although they are seen as adults in the eyes of the criminal justice system, juvenile felons are qualitatively different from persons over the legal age of majority. Because of this, this study considers only those who are 19 years of age or older when they discharge from their sentence.

Inmates serving life or death sentences, as well as those who had statutorily-mandated lifetime sex offender registration requirements were excluded from my sample because they have no opportunity for a standard discharge from NDCS custody; they will remain under correctional supervision until their sentence is vacated or dismissed, or when they die.

Finally, because NDCS houses and provides supervision, monitoring, and control for a variety of inmate populations, my sample included only inmates who were sentenced directly to the custody and care of NDCS. Thus, I excluded the following groups of inmates: (1) *interstate parolees* – these inmates do not serve the entirety of their sentence within NDCS; rather, they are released from correctional facilities in other states and are allowed to serve the remainder of their parole term under the supervision of Nebraska's Adult Parole Administration; (2) *county and federal safe-keepers and detainees* – NDCS provides supervision for these inmates on a contractual basis and is not obligated to accept all requests for transfers into their system; (3) *Work Ethic Camp (WEC) probationers* – although these offenders are housed in a facility run by NDCS, they are not serving prison sentences and are under the care and responsibility of the Nebraska Office of Probation Administration.

Within the context of this study, "discharge" means that inmates have completed all obligated terms of their NDCS sentence and are no longer subject to correctional oversight. Specifically, inmates were considered "discharged" if their institutional release code indicated: "mandatory discharge," "expiration of sentence," "discharge to Immigration and Naturalization Service custody," "sentence vacated," or "sentence

amended." In order to account for potential recidivism, inmates were not included if they were discharged due to death.

The discharge cohorts were chosen because these years will allow me to conduct three-year follow-up analyses using the most recent data available from NDCS (Bahr et al., 2010; Huebner & Berg, 2011; Langan & Levin, 2002; Mears et al., 2011). In addition, I chose to structure the discharge cohorts around fiscal year, rather than calendar year, in order to conform to the operational standards of the Nebraska Department of Correctional Services. In total, there were 5,529 inmates in my full sample.

Dependent Variable

In this study, recidivism was defined as re-incarceration for a law violation within three years of discharge from NDCS. Inmates were grouped according to the fiscal year during which they discharged and tracked for three years from the date of their release. Re-incarceration was selected, rather than re-arrest or re-conviction, because this sanction places a direct burden on correctional resources. In addition, re-incarceration signifies that offenders pose such a direct and significant threat to public safety, that their isolation from the community was deemed warranted. Because my sample only included inmates who had completely discharged from their sentences, re-incarcerations were the end result of new law violations, only. Table 3.3 describes how each variable in my study was coded and distributed among the sample. Of the inmates included in this study, approximately 11 percent were re-incarcerated for a new law violation within three years of their final release.

Independent Variables

Because I tested two different research questions, I analyzed two separate independent variables. It should be noted that the treatment of parole as the key independent variable is of particular importance because it moves scholarship beyond our understanding of parole as a dependent variable. In my first research question, I examined differences in recidivism based on an inmate's parole status at the time of his or her discharge. As shown in Table 3.3, about 40 percent of inmates in my sample discharged while on discretionary parole, and about 60 percent were mandatorily discharged from an institution. My second research question considered the extent to which re-incarceration was influenced by the total amount of time ex-prisoners spent in the community during their sentences. I chose my dosage categories based on the distribution of this variable. Approximately half of the inmates in my study were not released on parole at any time; of those who served time in the community, about half were returned to prison within six months (23.49%), while the other half were on parole for six months or more (26.53%).

Control Variables

Parole in Nebraska is a truly discretionary process that is heavily influenced by inmates' individual characteristics. In order to estimate each subject's conditional probability, or propensity, for post-discharge incarceration, I considered 14 covariates in my analyses. These variables reflect a variety of demographic, legal, and social characteristics that are linked to an increased likelihood of re-incarceration through logic, theory, or empirical evidence.

Demographic Controls

The demographic traits most often empirically associated with reoffending include age, sex, and race/ethnicity (see Chapter Two for a review). With regard to demographic characteristics, the average age of ex-prisoners in my study at the time of discharge is 34.7 years. Men are significantly over-represented in the prison population (84.97%), relative to their proportion in the larger society (around 50%), while females are appreciably under-represented (15.03%). Similar disparities can be found in the distribution of inmates across different racial/ethnic groups: white inmates account for 59 percent of the sample, while non-white inmates account for 40 percent.[23]

Legal Controls

As explained in Chapter Two, a variety of legal factors are also associated with recidivism. The first legal factor considered is length of stay. One would expect that inmates with longer terms of commitment would be at greater risk of recidivating because incarceration necessarily disrupts their employment, housing arrangements, and social networks (Grattet et al., 2008; Sampson & Laub, 1993). Overall, inmates served about 27 months under NDCS custdy, though their lengths of stay ranged between zero days[24] and 38 years.

I considered length of stay instead of the judge-issued sentence length because of the way good time credits are awarded in Nebraska. At the time of admission, each inmate's tentative release date is calculated in accordance with Nebraska Revised Statute 83-1,107

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[23] Non-white inmates include inmates who self-identified as black (21%), Hispanic (13%), Native American (5%), Asian (0.7%), and "other" (0.2%).

[24] Inmates who served zero days were processed through NDCS after sentencing, but were released on the same day. These cases typically result when the credits inmates received for time served in jail before, during, or after trial were greater than, or equal to, the prison sentence handed down by the judge.

§2a.[25] This statute reduces inmates' terms of commitment by six months for each year of their sentence; credits are pro-rated for any portion of their sentence that is less than one year. Although inmates can forfeit these credits by failing to follow prison rules, this statute effectively reduces terms of institutional commitment in half. By controlling for length of stay, rather than original sentence length, I am better able to control for the amount of correctional intervention inmates actually received.[26]

I used a dichotomous measure of criminal history that reflected whether an inmate has served a prior prison term with the Nebraska Department of Correctional Services (i.e., as a sentenced inmate, not as a county or federal safekeeper, interstate parolee, lifetime sex offender, Hastings detainee, and/or WEC probationer).[27] More than one-quarter of the inmates in my study served at least one prior term of commitment with NDCS since 1982.

One of the most commonly considered legal factors is offense type. Inmates were categorized according to the most serious offense for which they were incarcerated.

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[25] It is important to note that inmates currently incarcerated within NDCS are subject to one of seven distinct laws governing the awarding and application of good time credits. In my study, ninety-seven percent of inmates were sentenced under these provisions, which allow for the greatest reduction in time under NDCS custody.

[26] There are two other ways in which inmates may have their sentence reduced. First N.R.S. 83-1,107 §2b also allows inmates who have served twelve months without receiving a Class I or Class II misconduct report, or who have received no more than two Class III misconduct reports, to earn three days of sentence credit per month. Second, if parolees abide by their conditions of their release, their sentence may be reduced by ten days per month, in accordance with N.R.S. 83-1,108, §1. Originally, I wanted to control for the length of time inmates actually served within NDCS, relative to their expected length of stay at the time of admission. I was unable to do so, however, because the application or retraction of these credits automatically update and overwrite inmates' tentative release dates. As a result, the original expected discharge dates are not retained. In order to reconstruct this date, I would have needed access to the inmates' original commitment orders, which are not available electronically. I would have also required information related to when, and how many, sentence credits were awarded and/or taken away during an inmate's sentence. In most instances, this information is contained within the judgments for individual misconduct reports, which would have required IRB approval and inmate consent to review. Future researchers may wish to control for the impact of sentence credits in their analyses of recidivism.

[27] I originally intended for this variable to be a continuous measure that reflected the total number of days inmates have served during all prior NDCS sentences. However, the skewed nature of the data prevented this from being a useful measure.

TABLE 3.3. VARIABLE CODING and DESCRIPTIVE STATISTICS (*N*=5,529)

Variable Category	Variable Name	Coding Description	n	%	Min	Max	*M*	*SD*
Dependent Variable								
Recidivism	dvrecid	0 = not re-incarcerated for a law violation within 3 years of discharge	4,935	89.26	0	1	0.11	0.31
		1 = re-incarcerated for a law violation within 3 years of discharge	594	10.74				
Independent Variables								
Discharge Cohort	dcgroup	0 = mandatorily discharged from a prison facility	3,359	60.75	0	1	0.39	0.49
		1 = discharged from parole	2,170	39.25				
Total Time on Parole	IV2cmty	0 = no time on parole	2,763	49.97	0	2	0.77	0.84
		1 = fewer than 6 months on parole	1,299	23.49				
		2 = 6 months or more on parole	1,467	26.53				
Demographic Control Variables								
Age at Discharge	r_dcage	0 = 19-25	1,336	24.20	0	3	1.49	1.11
		1 = 26-33	1,524	27.60				
		2 = 34-42	1,274	23.00				
		3 = 43 or older	1,395	25.20				
Sex	sex	0 = male	4,698	84.97	0	1	0.15	0.36
		1 = female	831	15.03				
Race/Ethnicity	white	0 = non-white	2,240	40.51	0	1	0.59	0.49
		1 = white	3,289	59.49				
Legal Control Variables								
Length of Stay	rr_lostay	0 = less than 12 months	1,751	31.64	0	2	1.05	0.83
		1 = between 12 and 24 months	1,738	31.43				
		2 = more than 24 months	2,040	36.93				
Previous NDCS Sentences	d_ndcshx	0 = no prior NDCS sentences	3,938	71.22	0	1	0.29	0.45
		1 = one or more prior NDCS sentences	1,591	28.78				

TABLE 3.3. VARIABLE CODING and DESCRIPTIVE STATISTICS (cont.) (*N*=5,529)

Variable Category	Variable Name	Coding Description	n	%	Min	Max	*M*	*SD*
Legal Control Variables (cont.)								
Current Committed Offense[a]	violent	0 = non-violent	3,630	65.65	0	1	0.34	0.47
		1 = violent	1,899	34.35				
Initial Custody Classification	custody	0 = community	673	12.17	0	3	1.39	0.80
		1 = minimum	2,420	43.77				
		2 = medium	2,021	36.55				
		3 = maximum	415	7.51				
% Sentence Spent in Segregation[b]	d_pctseg	0 = no time spent in segregation	3,527	63.80	0	2	0.36	0.48
		1 = served time in segregation	2,002	36.21				
Parole Interrupted	prolbrk	0 = no parole term interrupted	4,823	87.23	0	1	0.13	0.33
		1 = one or more parole terms interrupted	706	12.77				
Fiscal Year Discharge Cohort	dcfy	0 = discharged between July 1, 2006 and June 30, 2007	1,905	34.45	0	2	0.97	0.81
		1 = discharged between July 1, 2007 and June 30, 2008	1,865	33.73				
		2 = discharged between July 1, 2008 and June 30, 2009	1,759	31.81				

[a] "Current Committed Offense" refers to the most serious offense for which the inmate was incarcerated. "Violent" offenses are those that can be classified as homicide, sex offense, assault, weapons, robbery, or restraint. See Appendix D for a complete list of the crimes that constitute these categories.

[b] Segregation includes administrative confinement, death row, disciplinary segregation, intensive management, immediate segregation, initial segregation, medical lay-in (WEC), protective custody, and transitional confinement. Inmates may be placed on multiple segregation statuses at the same time.

TABLE 3.3. VARIABLE CODING and DESCRIPTIVE STATISTICS (cont.) (*N*=5,529)

Variable Category	Variable Name	Coding Description	n	%	Min	Max	*M*	*SD*
Social Control Variables								
Marital Status	marital	0 = single	3,247	58.73	0	2	0.64	0.83
		1 = divorced, widowed, separated	984	17.45				
		2 = married (includes common law)	1,262	22.83				
Number of Approved Visitors	r_visitors	0 = no approved visitors	1,934	35.00	0	2	0.94	0.80
		1 = 1-4 visitors	1,970	35.60				
		2 = 5 or more visitors	1,625	29.40				
Self-Betterment Clubs[c]	betterment	0 = has not participated in any self-betterment clubs	3,414	61.75	0	1	0.38	0.49
		1 = has participated in one or more self-betterment clubs	2,115	38.25				

[c] Self-betterment clubs include a variety of peer-support groups (e.g., Alcoholics and Narcotics Anonymous), hobby groups (e.g., art, stamp collecting), religious/fellowship organizations (e.g., Islamic, Christian), and ethnic/cultural awareness groups (e.g., La Raza, Nasca), among others.

[d] Inmate visitation logs were not captured electronically prior to October of 2008. Therefore, I use the number of approved visitors on an inmate's visitor list as a proxy for the amount of social support inmates received from family and/or friends. Clergy, religious counselors, and attorneys were included in this count, as they are also important sources of guidance, support, and social capital for inmates during their incarceration.

Offenses were categorized into one of thirteen different crime types: homicide, sex offense, assault, weapons, restraint, arson, robbery, motor vehicle, drugs, burglary, theft, fraud, morals, and "other."[34] These measures were collapsed into a dichotomous variable that reflects whether the offense was violent or non-violent.[35] Table 3.3 shows that the majority of inmates in my dataset (65.65%) were incarcerated for non-violent offenses; slightly more than one-third had committed a violent crime.

In order to control for inmate placement within the correctional system, and as a proxy measure of the degree to which offenders were deemed to be dangerous or in need of higher levels of monitoring at admission, I included a control for inmates' post-intake custody classification level.[36] The majority of inmates in my dataset were classified into either minimum (44%) or medium (37%) custody. Community custody inmates accounted for about 12 percent of my sample, while only eight percent of inmates were classified as maximum custody.

Because this dissertation aims to examine the degree to which ex-prisoners are able to reintegrate and become productive members of society after a period of correctional custody, it is important to include measures regarding the extent to which inmates are able to integrate into the general prison population. Therefore, I will control

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[34] See Appendix D for a list of the specific crimes that comprised each of these offense category.

[35] "Violent offenses" consist of crimes classified as an assault (17.16%), sex offense (7.81%), weapons (4.03%), robbery (3.96%), homicide (1.12%), or restraint (0.25%). "Non-violent" offenses are crimes related to drugs (26.98%), motor vehicles (11.52%), theft (11.0%), burglary (7.85%), fraud (4.58%), arson (0.51%), morals (0.80%), and otherwise unclassified offenses (2.42%).

[36] All inmates are classified as maximum custody at intake. Inmates remain at this level until intake staff have completed a thorough assessment of the their risks and needs. At that point, inmates should receive a custody classification level in accordance with these scores. The use of inmate classification as a proxy for dangerousness or predatory risk should be done with caution. Due to the nature of current level of crowding within NDCS, inmates are often classified according to the type of beds that are available to house them. This does not mean that inmates are housed in inappropriate locations within the system, but they may not be housed at the minimum custody level for which they could be approved.

for whether inmates spent time in segregation.[37] For purposes of this study, all types of segregation were considered, regardless of their nature. This decision was based on the fact that any form of voluntary or involuntary separation from the general inmate population indicates an inmate's inability to function within the standard prison environment. If inmates have difficulties conforming to the social standards that exist within prison, it is likely that they will also have problems relating to non-criminal others after their release. Nearly one-third of the inmates in my study spent some time in segregation during their sentence.

I also examined the degree to which inmates were able to reintegrate into the community while under supervision by considering whether they had any parole interruptions. It can be assumed that inmates who experienced a period of incarceration following any length of supervised release in the community were returned to prison because they had difficulty abiding by either the administrative or legal restrictions that were imposed on them. Approximately 13 percent of all inmates experienced an interrupted term of parole.[38]

The final control I included, primarily for matching purposes, was the fiscal year in which the inmates discharged. Inmates were evenly distributed between 2007 (34%), 2008 (34%), and 2009 (32%).

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[37] While I would have liked to have controlled for (a) the number of misconduct reports an inmate received, (b) the type of charges that were filed, and (c) the percent of misconduct charges for which an inmate was found guilty, I was unable to obtain these data because the misconduct records contained personally identifiable information. Future scholars should consider obtaining IRB approval in order to control for these measures in their studies. This information would be especially important in relation to data concerning inmate segregation.

[38] Recall from earlier that approximately half of the inmates in the sample did not experience any time on parole. Therefore, about 34% of inmates who were released were re-incarcerated prior to the expiration of their sentence.

Social Controls

Social predictors of recidivism were theoretically and empirically derived from information presented in Chapters One and Two. Unfortunately, the majority of the data that would have been collected under ideal circumstances were unavailable for examination in this study. Without IRB approval and inmate consent, I was unable to collect information regarding education (protected by the Family Educational Rights and Privacy Act (FERPA)) and mental health/substance abuse treatment records (protected by the Health Insurance Portability and Accountability Act (HIPAA)). Furthermore, not all information contained in inmate records is shared with the inmate. As a result, inmates do not have the authority to consent to the dissemination of information in their records to which they are not privy. Although these are important measures, and should be considered in future investigations of recidivism, I was able to control for levels of social support and interaction.

With regard to marital status, about 59 percent of inmates classified themselves as single (never married) and 23 percent reported that they were married; the remainder were divorced, separated, or widowed. Because attachments to others play a major role in reducing ex-prisoners' proclivity to reoffend (Bales & Mears, 2008; Berg & Huebner, 2011; Listwan et al., 2011; Mills & Codd, 2008; Taxman, 2002), I also controlled for the number of people on each inmate's approved visitor list.[39] Inmates averaged about 3.4 approved visitors ($SD = 5.14$).

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[39] Originally, I intended to use records of actual visitations to determine the level of social support inmates received from others while incarcerated. During the data collection process, however, I discovered that electronic visitor records were not implemented until October of 2008. All records for visitations that occurred prior to that point in time exist only on paper records stored within inmate files at each of the ten facilities. Because this information was unavailable through electronic means for the majority of inmates in my sample, I chose to use the number of people on an inmate's approved visitor list as a proxy for social support. Visitors must file paperwork with NDCS that indicates their consent to be included on the

My final social control variable measures the degree to which inmates participated in self-betterment clubs while incarcerated. These clubs are voluntary groups that bring inmates together around common themes or activities, such as peer support groups (e.g., Alcoholics/Narcotics Anonymous), hobby groups (e.g., art clubs, stamp collecting, Toastmasters), religious/fellowship organizations, and ethnic/cultural awareness groups (e.g., La Raza, Nasca). These groups give inmates the opportunity to socialize with one another and provide an outlet for participation in conventional activities. Social bond theory and social control theory would both suggest that higher levels of involvement in these groups would produce lower levels of post-release re-incarceration (Bales & Mears, 2008; Hirschi, 1969). Approximately one-third of the inmates in my dataset voluntarily participated in one or more self-betterment club during their sentence.

While these factors are important predictors of recidivism, my research questions aimed to isolate the effect of parole supervision on re-incarceration when these known covariates are held constant. In light of this, I now turn to a discussion of my methodology and detailed descriptions of my analytic techniques.

Analytic Techniques

T-Tests

The first step in my analysis was to discern the degree to which differences existed in the characteristics of inmates who discharged from parole, relative to those who discharged from an institution. I used t-tests to conduct gender-specific analyses, as previous research has found that the rates and causes of reoffending may differ according

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inmate's list. Therefore, this is an appropriate approximation of social support, as it indicates some degree of the visitor's willingness to maintain a relationship with the inmate while he or she is incarcerated.

to sex (Baglivio, 2009; Bahr et al., 2010; Beck & Shipley, 1989; Cobbina et al., 2012; Grattet et al., 2008; Jalbert & Rhodes, 2012; Langan & Levin, 2002; Lin et al., 2010; Monahan, 2006; Ostermann, 2011a; Steen & Opsal, 2007). Certain selection criteria, as discussed previously, made some inmates ineligible for inclusion in this study. Therefore, although my study does not represent the true population of all inmates discharged from the Nebraska Department of Correctional Services between fiscal years 2007 and 2009, it does include the population of all sentenced, adult, parole-eligible inmates, who were discharged during that timeframe in a manner other than death. Because of this, any statistically significant differences that emerge in the t-test results can be attributed to the selection bias inherent in the parole process.

Lipsey and Cullen (2007, p. 4) note, "The only scientifically credible method for assessing intervention effects is with a research design that compares recidivism rates for offenders exposed to the intervention with those for a substantially similar control group not exposed to it." While t-test comparisons provide useful introductory information, they do not provide enough information to answer this study's research questions. In order to determine whether differences in recidivism rates are due to the effect of parole supervision, itself, and not the influence of other factors, I control for potential selection effects with propensity-score matching (Guo & Frasier, 2010; Lipsey & Cullem, 2007; Mears et al., 2011; Morgan & Winship, 2007; Ostermann, 2012; Orrick & Morris, 2012; Wright & Rosky, 2011).

Propensity Score Matching

It is often not feasible, nor ethical, to randomly assign study participants to outcome conditions. Because subjects only experience one treatment outcome, quasi-

experimental designs like propensity score matching (PSM) can be used to simulate the random assignment of study participants to different outcomes and examine counterfactual situations. PSM will be used in this study to answer the questions, "What would the re-incarceration rate be for people who discharged from a facility, had they actually discharged from parole?" and "How would the re-incarceration rate changed for people had they received more or less time in the community during their sentence?" The *psmatch2* function within Stata version 12 (Leuven & Sianesi, 2003) was used to estimate a propensity score for each subject (i.e., the predicted probability of discharging from parole, given a specific set of covariates). Once this step was complete, analyses were conducted using appropriately matched subjects to control for selection bias on the observed variables and examine any statistically significant differences in recidivism rates (Guo & Fraser, 2010). As with the t-tests, all PSM analyses used sex-specific models.

PSM for Research Question 1. Recall from Chapter One that the secondary purpose of this dissertation is to contribute methodological improvements to the existing body of parole literature through the use and evaluation of propensity score matching. Although this technique offers vast improvements over traditional matching strategies with regard to subject retention, treatment cases may still drop out of the analysis when they do not have a corresponding match in the control group (and vice versa). Because of this, researchers must decide whether it is more beneficial to conduct their propensity score matching analyses using incomplete matching strategies or inexact matching strategies (Guo, Barth, & Gibbons, 2005).

Incomplete matching strives to minimize the level of variance between matched pairs at the cost of reducing the size of the sample. Researchers can have high levels of confidence in the accuracy of their results using this strategy, but they may not be able to generalize their findings as widely. Inexact matching aims to maintain as many cases as possible by sacrificing confidence in the similarity of matched pairs. These results are typically more generalizable, but have higher levels of variance and potential inaccuracy. This dissertation tests both inexact and incomplete strategies using three of the most common techniques: nearest neighbor matching, radius matching, and Mahalanobis distance matching. The results of these analyses will demonstrate that differential outcomes may be produced from the same sample depending on the analytic strategy that is employed. Table 3.4 lists the strategies that will be tested with regard to Research Question 1: *What proportion of people who were supervised in the community at the time of their discharge from NDCS are re-incarcerated within three years, relative to inmates who discharged directly from prison?*

The first matching technique used in this dissertation was nearest neighbor matching. This method is the most commonly used propensity score matching

TABLE 3.4. MATCHING STRATEGIES

	Matching Strategy	*Caliper*	*Replacement*
1.	Nearest Neighbor 1:1		
2.	Nearest Neighbor 1:1	x	
3.	Nearest Neighbor 1:1		x
4.	Nearest Neighbor 1:1	x	x
5.	Nearest Neighbor 2:1		x
6.	Nearest Neighbor 2:1	x	x
7.	Nearest Neighbor 3:1		x
8.	Nearest Neighbor 3:1	x	x
9.	Radius Matching	x	x
10.	Mahalanobis Distance Matching		x

technique because it is the most straightforward (see, for example, Austin, 2011;

Caliendo & Kopeinig, 2008; Rubin, 1973; Stuart, 2010). In nearest neighbor matching, a

subject from the treatment group (i_1) is matched to the control subject (j_k) whose

propensity score has the smallest absolute distance from that of subject i_1. Once these

cases have been matched, i_1 is removed from the sample, and the strategy is repeated

using the next treatment subject (i_2). This process continues until all treatment cases on

the area of common support have been exhausted. It should be noted, however, that

although this strategy is the most convenient, the sequential nature of matching treatment

and control cases may be problematic. Specifically, cases that are matched toward the

end of the sample may have relatively large distances between their propensity scores,

thus increasing their bias (Guo & Fraser, 2010; Stuart & Rubin, 2008). Furthermore, it is

possible that multiple control cases may have the same propensity score value as the

treated case. In order to compensate for both of these issues, the sample should be sorted

according to a user-generated variable with random values prior to matching (Guo &

Fraser, 2010; Imbens, 2004; Morgan & Winship, 2007). As illustrated in Table 3.4, I will

test four variants of nearest neighbor matching: 1:1 matching without replacement, 1:1

matching with replacement, 2:1 matching, and 3:1 matching. Additionally, I will

examine the extent to which the addition of caliper constraints impact the results

produced by each model.

In 1:1 matching without replacement, each treatment case is matched to only one

control case. Once this match has been made, both cases are removed from the sample

and neither is used in any subsequent matching. In 1:1 matching *with* replacement,

treatment cases are still matched to only one control case, but the control subject is not

removed from the sample (Guo & Fraser, 2010; Morgan &Winship, 2007). Rather, the subject is retained and may be matched to subsequent treatment cases that fall on the area of common support. The 2:1 and 3:1 nearest neighbor matching schema operate under similar mechanisms, except each treatment case is matched to multiple (i.e., 2 and 3, respectively) control subjects.

The replacement technique is useful when there are more treatment than control cases on the area of common support because it helps protect against sample attrition. There is some disagreement about the amount of bias that may be produced with this method, however. For example, Morgan and Winship (2007, p. 108) note that matching with replacement increases the likelihood that poor matches may be made, thereby increasing levels of bias in the model. Others posit that matching the same control cases to multiple treatment subjects may actually decrease bias because the process helps ensure that the best matches are made (see, for example, Dehejia & Wahba, 2002; Mocan & Tekin, 2006). Because of these possibilities, variance estimators must be examined for each model in order to account for potential hidden bias (Austin, 2011; Rosenbaum, 2002).

As noted previously, each variant of nearest neighbor matching was also tested using caliper restraints. A caliper specifies the maximum amount of allowable deviation between the propensity scores of a matched treatment and control case. Typically, this distance is defined as .25 times the standard deviation of the propensity score (Guo & Fraser, 2010; Rosenbaum & Rubin, 1985). When calipers are used with nearest neighbor matching, treatment cases are only matched to control cases where the difference in their propensity scores falls within the specified range. This addition helps minimize the

extent of poor matches that are made, as well as reduce the level of bias within each covariate (Stuart & Rubin, 2008). Because limits are placed on the amount of difference that may exist between treatment and control subjects, treatment cases without suitable matches and unmatched control cases will be excluded from the analysis.

In addition to nearest neighbor matching techniques, I will also examine results produced by radius matching and Mahalanobis distance matching. Radius matching is similar to matching within calipers because users still define a specified maximum acceptable distance between propensity scores for treatment and control cases. In contrast to the nearest neighbor within caliper matching strategies discussed above, however, treatment subjects are matched to *all* control subjects that fall within the defined radius (Dehejia & Wahba, 2002). The primary benefit of this strategy is that it simultaneously minimizes the number of poor matches that are made (i.e., fewer cases are used when good matches are not available within the defined radius), while maximizing the number of good matches (i.e., all available cases are used when good matches can be made between treatment and control cases) (see, for example, Caliendo & Kopeinig, 2008; Dehejia &Wahba, 2002).

The final technique used in this study is Mahalanobis distance matching. The strategy of matching treatment and control cases based on their Mahalanobis distances can be viewed as a predecessor to propensity score matching. The premise behind this method is to match similar treatment and control cases based on their values within a given set of covariates (Guo & Fraser, 2010; Rosenbaum & Rubin, 2010; Stuart & Rubin, 2008). However, unlike the unidimensional propensity score, in which a single value is calculated for each subject based on a given set of covariates, the Mahalanobis distance

attempts to match subjects by balancing on *all potential covariate interactions* (Stuart & Rubin, 2008). When few covariates are considered (typically fewer than five; see, for example, Stuart & Rubin, 2008), this metric often produces matches similar to those produced by propensity scores. When a larger number of covariates are included in the model, however, poorer matches may be produced due to the need to control for all potential covariate interactions. Because of this, scholars often advocate for Mahalanobis matching techniques that include the propensity score as an additional covariate (Guo & Fraser, 2010; Morgan & Winship, 2007; Rosenbaum & Rubin, 1985; Stuart 2010). This variant of Mahalanobis matching is the final method I used to answer Research Question 1.

PSM for Research Question 2. After I used the above-described techniques to answer my first research question, I turn to an examination of my second research question: *To what degree does the total amount of time inmates spend under community supervision during one sentence influence their likelihood of returning to prison within three years of their discharge?* I cannot use the methods described in the previous section to find the answer because this question requires the examination of varying levels of treatment and, thus, a reconceptualization of how propensity scores are calculated. In this type of analysis, the propensity score no longer represents the conditional probability of receiving treatment, but the probability of receiving a particular *dose* of treatment. Therefore, subjects are assigned multiple propensity scores, each of which corresponds to a different dosage (Imbens, 2000). Matches must be made between subjects who are similar with respect to the specified set of covariates, but who differ significantly on the level of treatment they received (Guo & Fraser, 2010, p. 164).

In this dissertation, I followed Imbens's (2000) strategy for modeling doses of treatment through propensity score matching. This technique is a widely used, straightforward method of modeling binary treatment outcomes (see, for example, Foster, 2003; Guo & Fraser, 2010; Imbens, 2000; Stuart, 2010). I first ran a multinomial logistic regression, which allowed me to derive three predicted probability scores for all inmates, based on the total amount of time they spent on parole during their sentences. The first score ($p1$) represents the generalized propensity of not experiencing parole during one's sentence, the second ($p2$) estimates the generalized propensity of spending less than six months on parole, and the final measure ($p3$) indicates the generalized propensity of spending six months or more on parole.

Once these values were calculated, I then creates a new variable that was used to weight cases in subsequent analyses. For each inmate, this variable was equal to the inverse of the generalized propensity score that corresponded to the level of treatment actually received. Therefore, inmates who spent no time on parole during their sentence were weighted by ($1/p1$), inmates who spent less than six months on parole were weighted by ($1/p2$), and inmates who spent six months or more on parole were weighted by ($1/p3$). When this was done, I will run two final logistic regression models: one that controlled for selection through the inclusion of inverse p-weights, and one that did not. The results of these two models were compared to one another to assess the degree to which the likelihood of re-incarceration is affected by each level of exposure to parole, and whether this impact was statistically significant.

Study Benefits and Limitations

There are three primary ways in which this dissertation reinforces, and/or improves upon, the findings and methodologies of existing research regarding the impact of parole supervision on rates of re-incarceration. First, the data allowed me to track inmates for three years after their discharge from NDCS. Based on the findings of previous studies, this appears to be the optimal length for a follow-up period: it is long enough that it will not under-represent failure rates for typical offenders relative to high-risk ones, yet is short enough so that it will not inflate recidivism rates as an artifact of an extended observation period (Bahr et al., 2010; Huebner & Berg, 2011; Kingree, Phan, & Thompson, 2003; Langan & Levin, 2002; Mears et al., 2011; McGrath & Thompson, 2012; Schlager & Robbins, 2008).

Second, my sample is drawn from a Midwestern state. Many recidivism studies use national samples or states with exceptionally large correctional populations, such as California or Texas, which are not representative of most other states. The results of my study are likely to be more comparable to states with largely rural environments and relatively few metropolitan areas. Finally, while the majority of studies have examined recidivism through logistic or multinomial regression models (Berg & Huebner, 2011; Huebner & Berg, 2011; Ngo et al., 2011; Lin et al., 2010; Schlager & Robbins, 2008; Steen & Opsal, 2007), very few have used propensity score matching techniques (Mears et al., 2011; Ostermann, 2012). This method provides less biased results than standard regression models and, as such, provides a more accurate estimation of whether and how parole supervision influences the likelihood of re-incarceration.

Although this dissertation adds to the existing body of literature, and improves upon these studies through the use of a stronger analytic technique, it is not without its own limitations. First, it focuses only on inmates released from the Nebraska Department of Correctional Services. Nebraska does not have the same volume of inmates as other states. Therefore, it is likely that the day-to-day operations and procedures within NDCS differ from those in other states, as they are guided by different practical concerns and population assumptions. As a result, the findings from this study may not be generalizable to states that differ greatly in their rates of incarceration. Furthermore, they do not provide an accurate representation of the overall picture of recidivism in the nation, as a whole. Prior studies would suggest, however, that this level of generalization should be viewed with caution due to the influence that geography may have on crime (see, for example, Gunnison & Helfgott, 2011;Guy, 2009; Petersilia, 2003).

Second, my analyses are based on data collected from official agency records. Official data are inherently plagued with numerous problems including inaccurate records, incomplete records, and missing data (Williams, 1998). Because I used an existing dataset that maintained inmate confidentiality, the information I was provided contained no personally identifiable information. Therefore, there were two types of record issues that were easily identifiable in my dataset: missing data due to a lack of electronic record keeping and missing data due to inmate confidentiality restrictions.

One example of data that were missing because of electronic record retention was the lack of inmate visiting logs prior to October of 2008. Prior to that time, all records related to inmate visitation (e.g., date of the visit, relationship of the visitor to the inmate, duration of the visit) were kept on paper logs within each individual facility. This meant

that I only had detailed visitation information for fewer than one-third of the inmates in my dataset. In order to compensate for this, I used the next best proxy measure I had available for all inmates: the number of visitors on each inmate's approved visitor list. In order to appear on an inmate's list, each visitor must first file an authorized visiting form with the facility at which the inmate is housed, then receive approval by the institution's Warden or his or her designee. It is possible that individuals may be approved but never actually visit the inmate while he or she is incarcerated. I believe this measure is an appropriate substitute for individual visitation logs, however, because it represents the potential maximum level external social support each inmate may receive while incarcerated.

Issues concerning data that were missing due to inmate confidentiality restrictions arose primarily with regard to inmate educational and mental health records. This information is protected by FERPA and HIPAA. Without obtaining inmate consent and IRB approval to interview inmates or review paper medical files, I could not control for these issues in my dissertation. It should also be noted that there may be clinical notes or other information contained in the records that education, medical, and mental health treatment staff have not shared with the inmate. Therefore, even if I did receive permission from inmates to collect this information, they could not consent to the release of information over which they have no knowledge. In this case, I had no good proxy measures available and had to exclude these variables from consideration in my study. Future scholars should invest in IRB approval and inmate consent for the collection of such protected information, as there are a multitude of mental health factors that influence one's likelihood of criminal involvement and subsequent re-incarceration (see,

for example, Huebner & Berg, 2011; Lemon, 2010; Makarios et al., 2010; Monahan, 2006; Petersilia, 2011; Wagoner, 2010).

The dataset used in this dissertation was constructed in a way that maintained inmate confidentiality, so there is virtually no cross-referencing I can do to attempt to uncover any potential inaccurate or incomplete information in the inmate records. Therefore, I conducted my analyses under the assumption that all records were accurate as provided, with the understanding that the findings should be interpreted with caution. The use of official data also limits my ability to get a complete picture of inmate recidivism. Specifically, the records in this dataset only enable me to consider re-incarcerations that occurred within the State of Nebraska. Any inmate who discharged from NDCS and was re-incarcerated in another state would, in this study, appear to have remained out of prison during his or her three-year follow-up period.[40] Moreover, it is possible that an apparent lack of recidivism may be the result of inmates who have died within three years of their discharge. Without knowing this information, I do not know the extent to which these scenarios may influence my data.

The third limitation of this study is that, because Nebraska is a largely rural state with only a few dense population clusters, the manner in which parole supervision is administered varies across the state. For example, treatment providers may be scarce in more rural areas of the state. If parolees are unable to have their underlying issues addressed while they are in the community, parole officers may attempt to compensate for this deficiency by subjecting their clients to a greater level of monitoring. Higher levels of surveillance may result in higher rates of revocation, simply because the parole

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[40] NDCS does not collect information on the geographical regions to which inmates return after they are discharged. It is worth noting, however, that 7.6 percent of parolees are supervised in other states. It seems likely that these people will remain out of state once they discharge.

officer had more opportunities to detect law violations (Hanley, 2004; Marciniak, 2000; Petersilia & Turner, 1990; Paparozzi & Gendreau, 2005). Furthermore, supervision varies among officers, due to differences in individual beliefs, attitudes, and practices regarding proper monitoring (Payne & DeMichele, 2010; Seiter, 2002; West & Seiter, 2004). Both of these scenarios have implications for successful completion of, and discharge from, parole. While controlling for these officer-level characteristics would be helpful in isolating parole effects, that information was unavailable in my dataset and not directly relevant to my immediate research questions. Future investigations should control for the effects of specific parole officers and supervision practices.

Despite these limitations, however, my dissertation research still provides a meaningful representation of the effect of parole supervision on rates of re-incarceration among inmates in Nebraska. Chapter Four discusses the technical details of each analysis, as well as the results they produced.

Chapter 4:

Findings

T-Tests for Differences between Prison and Parole Discharge Groups

        The first stage of my data analysis was to use t-tests to determine if there were any statistically significant differences in the composition of the treatment group (i.e., those who discharged from parole) and the control group (i.e., those who discharged from prison). This step was used to identify potential sources of selection bias between the samples and indicate the degree to which the groups were unbalanced. Recall from previous chapters that discretionary processes drive the mechanisms by which inmates are initially selected as parole candidates, as well as the mechanisms by which their parole is revoked. Because of this, one would expect to find a high degree of dissimilarity between inmates who finish their sentences on parole and those who finish them while incarcerated. In order to conduct these analyses, I ran t-tests for independent samples with unequal variances. Table 4.1 provides the mean values, standard deviations, and confidence intervals for each covariate among the male sample and indicates which variables were not evenly distributed among the treatment and control groups; Table 4.2 provides the same information for the female sample.

        With regard to the male sample, the only variable on which males who discharged from parole did not differ from those who finished their sentence in prison was participation in self-betterment clubs, which is interesting given the large sample size of males in these analyses. Given this sample size, I anticipated a significant difference between samples for all variables. Slightly more than one-third of the men in both groups were involved with one or more such clubs. The other covariates indicate that, relative to members of the treatment group, significantly higher proportions of men who discharge

TABLE 4.1. T-TEST DIFFERENCES between MALE TREATMENT GROUPS (*N*=4,698)

Variable	Treatment (Discharge) Group	Min	Max	*M*	*SD*	99.99% C.I. Lower Bound	99.99% C.I. Upper Bound	t	Degrees of Freedom Satterthwaite	Welch
Recidivism	Parole	0	1	0.08	0.26	0.05	0.10	7.33****	4508.59	4510.81
	Prison	0	1	0.14	0.35	0.12	0.17			
Age at Discharge	Parole	0	3	1.57	1.09	1.47	1.67	-4.92****	3945.94	3947.97
	Prison	0	1	1.41	1.14	1.33	1.49			
Race/Ethnicity	Parole	0	1	0.61	0.49	0.57	0.66	-3.68***	3859.30	3861.27
	Prison	0	1	0.56	0.50	0.52	0.60			
Length of Stay	Parole	0	2	1.23	0.75	1.16	1.30	-9.77****	4181.31	4183.45
	Prison	0	2	0.99	0.86	0.93	1.06			
Previous NDCS Sentences	Parole	0	1	0.27	0.45	0.23	0.32	3.27**	3928.68	3930.70
	Prison	0	1	0.32	0.47	0.29	0.35			
Current Offense	Parole	0	1	0.26	0.44	0.22	0.30	13.90****	4168.39	4170.53
	Prison	0	1	0.45	0.50	0.41	0.49			
Initial Custody Classification	Parole	0	3	1.20	0.76	1.13	1.27	13.01****	4126.79	4128.91
	Prison	0	3	1.51	0.85	1.45	1.57			
Percent of Sentence in Segregation	Parole	0	3	0.25	0.46	0.20	0.27	13.01****	4126.79	4128.91
	Prison	0	2	0.53	0.62	0.43	0.50			
Parole Interrupted	Parole	0	1	0.06	0.23	0.03	0.08	13.70****	4690.83	4692.76
	Prison	0	1	0.18	0.38	0.15	0.20			
Fiscal Year Discharge Cohort	Parole	0	2	1.02	0.81	0.95	1.10	-3.32***	3818.52	3820.46
	Prison	0	2	0.94	0.82	0.88	1.00			
Marital Status	Parole	0	2	0.69	0.85	0.62	0.77	-5.12****	3667.38	3669.22
	Prison	0	2	0.57	0.81	0.51	0.63			
Number of Approved Visitors	Parole	0	2	1.04	0.77	0.97	1.11	-7.27****	3879.94	3881.92
	Prison	0	2	0.87	0.79	0.81	0.93			
Self-Betterment Clubs	Parole	0	1	0.36	0.48	0.31	0.40	0.48	3814.98	3816.92
	Prison	0	1	0.36	0.48	0.33	0.40			

*$p \leq .05$, **$p < .01$, ***$p < .001$, ****$p < .0001$

TABLE 4.2. T-TEST DIFFERENCES between FEMALE TREATMENT GROUPS (*N*=831)

Variable	Treatment Group	Min	Max	*M*	*SD*	99.99% C.I. Lower Bound	99.99% C.I. Upper Bound	t	Degrees of Freedom Satterthwaite	Welch
Recidivism	Parole	0	1	0.05	0.22	0.01	0.10	1.04	825.47	827.50
	Prison	0	1	0.07	0.25	0.02	0.11			
Age at Discharge	Parole	0	3	1.72	1.04	1.72	2.30	-2.77**	788.63	790.61
	Prison	0	1	1.52	1.05	1.49	1.99			
Race/Ethnicity	Parole	0	1	0.72	0.45	0.62	0.41	-2.33*	813.31	815.35
	Prison	0	1	0.64	0.48	0.55	0.73			
Length of Stay	Parole	0	2	1.02	0.76	0.87	1.18	-4.99****	808.96	810.99
	Prison	0	2	0.75	0.79	0.61	0.90			
Previous NDCS Sentences	Parole	0	1	0.18	0.38	0.10	0.25	1.99*	820.91	822.95
	Prison	0	1	0.23	0.42	0.15	0.31			
Current Offense	Parole	0	1	0.12	0.33	0.06	0.19	2.61**	828.40	830.42
	Prison	0	1	0.19	0.39	0.12	0.26			
Initial Custody Classification	Parole	0	3	1.33	0.52	1.22	1.43	2.70**	828.47	830.46
	Prison	0	3	1.44	0.62	1.32	1.55			
Percent of Sentence in Segregation	Parole	0	3	0.20	0.40	0.12	0.28	5.38****	828.78	830.79
	Prison	0	2	0.38	0.51	0.28	0.45			
Parole Interrupted	Parole	0	1	0.06	0.23	0.01	0.10	4.8721****	782.03	783.63
	Prison	0	1	0.16	0.36	0.09	0.22			
Fiscal Year Discharge Cohort	Parole	0	2	0.99	0.80	0.83	1.15	-0.16	802.45	804.46
	Prison	0	2	0.98	0.82	0.83	1.13			
Marital Status	Parole	0	2	0.87	0.84	0.69	1.04	-2.86**	760.26	762.22
	Prison	0	2	0.70	0.81	0.55	0.85			
Number of Approved Visitors	Parole	0	2	1.07	0.87	0.90	1.25	-2.68**	783.11	785.07
	Prison	0	2	0.91	0.84	0.76	1.07			
Self-Betterment Clubs	Parole	0	1	0.49	0.50	0.39	0.59	0.71	796.68	798.67
	Prison	0	1	0.51	0.50	0.42	0.61			

*p ≤ .05, **p < .01, ***p < .001, ****p < .0001

from prison are re-incarcerated within three years, are younger, and are non-white. Furthermore, a greater number of them served shorter periods of time in prison than their paroled counterparts, had served prior sentences within NDCS, had higher initial custody classifications after intake, spent more time in segregation, served one or more unsuccessful parole terms, and were discharged prior to 2009. Finally, more men who discharged from prison were single and had fewer people on their approved visitor list than parolees.

Similar, though not identical, trends were discovered with regard to the female sample. The data in Table 4.2 reveal that a higher percentage of women who discharge from prison are younger, non-white, and have served shorter sentences than their paroled counterparts. In addition, more of them had served prior prison terms in Nebraska and were incarcerated for violent offenses, relative to women who finished their sentences in the community. Finally, more of these discharged women were single and had fewer visitors. There were no differences between the treatment and control groups in terms of discharge cohort or participation in self-betterment clubs. Perhaps the most interesting observation, however, is the fact that a woman's status at the time of her discharge from NDCS custody was not significantly related to re-incarceration within three years. In other words, there was no statistically significant difference in rates of recidivism between women who discharged from parole and women who discharged from prison.

While these findings are interesting, their utility is limited with regard to treatment effects. The primary benefit of this analysis is to provide a cursory description of male and female samples in this study and highlight differences in the composition of

the treatment and control groups.[41] We now know that people who finish their sentences in the community appear to be qualitatively different from those who finish their sentences behind bars, but these t-tests do not allow us to isolate these differences in recidivism to solely the participation in parole. They simply suggest that the people who make parole are substantively different than those who do not. More importantly, these tests do not indicate whether, or the degree to which, rates of recidivism are influenced by the given covariates. In order to better understand the influence that parole has on rates of future re-incarceration, it is necessary to use inferential statistical models.

Propensity Score Matching for Research Question 1

In order to fully determine whether people who were on parole at the time of their discharge from NDCS are more or less likely than inmates who discharged directly from prison to be re-incarcerated within three years, I used ten different propensity score matching strategies (see Table 3.4 in the previous chapter). Recall from Chapter Three that propensity score matching minimizes between-group differences by matching inmates from the treatment group to the control group after controlling for a set of given covariates. All models in this study were analyzed through the *psmatch2* function in Stata version 12 (Leuven & Sianesi, 2003).

Prior to matching, I generated a variable with a uniform distribution (*x*). By sorting on this variable, I was able to ensure that cases were randomly ordered. Prior to sorting on *x*, however, I used the set seed option. This ensured that cases were randomly

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[41] It should be noted that it is possible for t-tests to return results that appear to indicate statistically significant differences, but are actually artifacts of large samples. In these situations, it is important for researchers to examine the effect sizes of the apparent differences in order to confirm or refute the significance of the finding. Because of the size of my sample, I used the effect sizes produced to confirm or refute the t-test results.

ordered, but that the analyses could be replicated. Furthermore, it ensured that treatment cases would be matched in the same order for each analysis. Once cases were sorted, I used the *psmatch2* function to estimate the average treatment effect for the treated. This value represents the average degree to which individuals benefit from receiving treatment (in this case, discharging from parole). I then used the *pstest* option to obtain the mean values for each control variable, as well as the degree to which each model reduced levels of bias among the covariates in the matched sample, relative to the unmatched sample. In the sections that follow, I first justify that this method is a valid analytic technique that significantly reduces the levels of selection bias that exist between two samples. Once the validity of these methods has been established, I present the substantive outcomes of each model in order to answer Research Question 1.

Diagnostic Procedures and Model Performance Indicators

Region of common support. Recall from Chapter Three that matching techniques take one of two forms: incomplete matching and inexact matching (Guo et al., 2005). Incomplete matching occurs when sample sizes are minimized in order to produce matched pairs that have the smallest possible absolute distances between propensity scores. These analyses produce findings with high degrees of accuracy at the expense of discarding a greater number of treatment and control cases, thus reducing the model's region of common support. Inexact matching, on the other hand, strives to retain the greatest number of cases as possible. In the process, however, the quality of the matches is sacrificed. The number of treatment and control cases that were retained on the area of common support in each of the models is presented in Table 4.3.

In the original, unmatched samples, 1,796 men and 374 women discharged from parole, while 2,902 men and 457 women discharged from prison. Among all of the models tested, Models 1 and 2 produced the smallest regions of common support. This was to be expected, however, as these techniques used nearest neighbor 1:1 matching without replacement. In Model 1, each treatment case is matched to the first available control case with the smallest distance between propensity scores. Therefore the number of potential control cases available for matching is equal to the number of treatment cases. Although 99 percent of the male treatment cases and 95 percent of the female treatment cases were able to be used in this model, only 61 percent of the male control cases and approximately 78 percent of the female control cases were utilized.

TABLE 4.3. n on AREA of COMMON SUPPORT				
Matching Strategy	**Males (N=4,698)**		**Females (N=831)**	
	Parole	*Prison*	*Parole*	*Prison*
Unmatched Sample	**1,796**	**2,902**	**374**	**457**
1.	1,780	1,780	356	356
2.	1,245	1,349	286	261
3.	1,780	2,899	356	451
4.	1,780	2,899	356	451
5.	1,780	2,899	356	451
6.	1,780	2,899	356	451
7.	1,780	2,899	356	451
8.	1,780	2,899	356	451
9.	1,780	2,899	356	451
10.	1,780	2,899	356	451

Model 2 used nearest neighbor 1:1 matching without replacement, but within calipers. This meant that treatment and control cases could not be matched unless the distance between their propensity scores fell within a specified range (in this case, .05 for males and .06 for females). Because of this restriction, Model 2 had the smallest region of common support and used the fewest number of available treatment and control cases.

In the male-only models, 69 percent of the treatment cases (n = 1,245)and 46 percent (n = 1,349) of the control cases fell within the region of common support. With regard to the female sample, 74 percent of treatment cases (n = 286)and 57 percent (n = 261) of the control cases were used. All other models produced regions of common support that were the same size; among the males, this region contained 99 percent of treatment cases (n = 1,780) and 99.9 percent of the control cases (n = 2,899) for the male sample, and 95.2 percent of treatment cases (n = 356) and 98.7 (n = 451) of the control cases for females. Although there is considerable variation in the size of the common support area for Models 1 and 2, both relative to each other and to all other models, the potential benefits or limitations of this cannot be determined until other factors, such as bias reduction and statistical balance, have been assessed.

Bias reduction and statistical balance. Statistical balance is typically assessed through t-test comparisons of means, standardized levels of bias, and levels of bias reduction. The first section in this chapter used t-test comparisons and, while they revealed which covariates appeared to be unbalanced between the treatment and control groups, they did not provide information on the cause of these imbalances, nor did they offer mechanisms for reducing levels of bias between the groups. Propensity score matching, however, allows users to examine the levels of bias that exist between the samples prior to matching and the degree to which this bias is reduced after cases have been matched. Scholars tend to agree that models can be considered statistically balanced on a given covariate when the absolute value of the post-matching bias level is lower than 20 percent (Caliendo & Kopeinig, 2005; Guo & Fraser, 2008; Rosenbaum &

Rubin, 1985). Table 4.4 presents the mean values for each covariate in the unmatched sample and their associated levels of bias.

In the unmatched male sample, only six of the 21variables have absolute levels of bias that exceed 20 percent. Specifically, these covariates were related to: (1) a length of stay between 12 and 24 months in NDCS custody, (2) incarceration for a violent offense, (3) inmates initially classified into maximum custody, (4, 5) inmates who served any time in segregation (less than 50% of sentence or 50% or more of sentence), and (6) inmates who had one or more interrupted parole term. The mean bias of the overall unmatched sample is 16.4, while the median bias is 11.0. This would tend to indicate that, overall, the model appears to be unbiased, these levels are sufficiently large enough to suggest that it is in need of improvement.

TABLE 4.4. BIAS LEVELS in UNMATCHED SAMPLE

Variables	Variable Values	Males			Females		
		Parole	Prison	% Bias	Parole	Prison	% Bias
Age at Discharge	26-33	.29	.26	7.3	.25	.31	-12.1
	34-42	.24	.21	7.2	.31	.28	6.3
	43+	.27	.24	5.4	.29	.22	.28
Race/Ethnicity	White	.61	.56	11.0	.72	.65	14.7
Length of Stay	12-24 months	.38	.26	26.5*	.43	.31	23.6*
	24 or more months	.42	.37	11.4	.30	0.22	17.3
Prior NDCS Sentence	One or More	.27	.32	-9.8	.18	.23	-14.4
Committed Offense	Violent	.26	.45	-41.1*	.12	.18	-16.3
Custody Level	Minimum	.45	.37	15.6	.66	.62	10.0
	Medium	.35	.39	-9.7	.31	.32	-1.2
	Maximum	.02	.12	-38.9*	.01	.06	-24.9*
Time in Segregation	less than 50%	.22	.39	-37.1*	.20	.36	-35.7*
	50% or more	.01	.07	-29.8*	-	-	-
Parole Interruptions	One or More	.06	.18	-38.8*	.06	.16	-33.7*
Discharge Fiscal Year	2008	.34	.33	2.2	.36	.33	5.1
	2009	.34	.30	7.6	.31	.32	-1.1
Marital Status	Divorced, Widowed, Separated	.18	.15	8.8	.26	.25	2.8
	Married (incl. Common Law)	.25	.21	11.5	.29	.22	16.6
Visitors	1-4 Visitors	.40	.35	9.8	.24	.30	-13.2
	5+ Visitors	.32	.56	13.6	.42	.31	22.0*
Betterment Clubs	Participated in One or More	.36	.36	-1.5	.49	.52	-6.1
Overall Model Statistics	Mean Bias	16.4			14.6		
	Median Bias	11.0			14.2		

* |bias| ≥ 20%

Table 4.4 shows that the unmatched female sample is also unbalanced, though not to the same extent as the male model. Similar to the male sample, absolute levels of bias exceeded 20 percent for women who: were committed to NDCS for a period of one to two years, were initially placed into a maximum custody bed, spent less than half of their sentence in segregation, and who had one or more parole term interrupted. Sample and control cases for the women also differed, however, when they had five or more people on their approved visitor list.[42] Overall, the unmatched female sample had a mean bias value of 14.6 with a median bias of 14.2.

In sum, there is a great deal of covariate imbalance between the treatment and control groups in both the male and female samples. In an attempt to correct for this, and to determine which propensity score matching method provides the greatest degree of correction, I tested ten different matching strategies. Table 4.5 shows the overall mean and median bias levels for each of the ten models.

***Nearest neighbor 1:1 matching without replacement.*[43]** With respect to the male sample, each propensity score matching technique significantly reduced the mean and median levels of bias in the matched samples. As shown in Tables 4.5, the matched sample produced by Model 1, where treatment cases are matched to the first appropriate control subject, has significantly less bias than the unmatched sample. At the same time, however, it still has the largest mean bias value of all post-matched samples, at 5.6, and the highest median bias of 3.5. An examination of the individual covariates for this

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[42] It should be noted that only five women in the sample spent more than half of their sentence in segregation, and none of these women discharged from parole. Because there were no treatment cases with similar propensity scores on the area of common support in any of the models, Stata excluded these five cases in all analyses.

[43] For detailed covariate information with regard to Models 1 and 2, see Appendix Table F.1 for males and Appendix Table F.2 for females.

TABLE 4.5. OVERALL MODEL BIAS

	Male Sample					Female Sample				
Model	Pseudo R^2	LR χ^2	$P > \chi^2$	Mean Bias	Median Bias	Pseudo R^2	LR χ^2	$P > \chi^2$	Mean Bias	Median Bias
Unmatched Sample	.185	1154.05	.000***	16.4	11.0	.120	136.67	.000***	14.6	14.4
1	.041	194.08	.000***	5.6	3.5	.029	27.61	.119	5.8	5.2
2	.073	217.69	.000***	4.0	3.1	.065	40.58	.004**	4.8	4.4
3	.189	1176.17	.000***	2.7	2.2	.136	150.86	.000***	4.7	4.2
4	.189	1176.17	.000***	2.7	2.2	.136	150.86	.000***	4.7	4.2
5	.186	1158.52	.000***	2.6	1.7	.112	123.99	.000***	2.8	1.9
6	.186	1158.52	.000***	2.6	1.7	.112	124.52	.000***	2.8	1.9
7	.186	1157.08	.000***	2.5	2.1	.109	120.80	.000***	3.2	2.2
8	.186	1157.08	.000***	2.5	2.1	.110	121.58	.000***	3.2	2.2
9	.173	1073.70	.000***	2.0	1.4	.097	107.28	.000***	2.5	2.4
10	.101	625.75	.000***	2.3	2.0	.039	43.19	.002*	4.9	3.8

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$,

model[44] revealed that this technique was unable to reduce the level of bias in the covariate indicating whether inmates spent less than half of their sentences in segregation below 20 percent. Furthermore, this model actually increased the amount of bias in the variable reflecting participation in self-betterment clubs, although its absolute value remained well below 20 percent.

In contrast to the male sample, none of the Model 1 covariates from the female sample had bias levels in excess of 20 percent. At the same time, however, the indicator for women who were divorced, widowed, or separated had a higher level of bias in the post-matched sample. Although it is not ideal for models to introduce additional levels of bias into the covariates, the value of this indicator did not exceed 20 percent, indicating that the post-matched samples were balanced. However, while Model 1 was able to reduce the mean and median bias levels from 14.6 to 5.8 and 14.4 to 5.2, respectively, this reduction was not statistically significant.

Model 2 produces matches in a fashion similar to Model 1, but cases are only paired if the distance between the propensity scores of treatment and control cases fall within a certain caliper. In this model (and all other models with caliper-restricted matches), calipers were calculated by multiplying .25 by the standard deviation of the propensity score (Guo & Fraser, 2010; Rosenbaum & Rubin, 1985). This resulted in a caliper size of .05 for models with male subjects and .06 for models with females. Therefore, treatment and control cases were only matched to one another when the difference between their propensity scores did not exceed these limits.

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[44] Detailed output related to post-matching bias reduction (i.e., mean values for each covariate in the treatment and control groups, percent of post-matching bias in each covariate, and the percent bias reduction in each covariate relative to the unmatched sample) for each of the ten male and female models is provided in Appendix F.

For males and females, the matched samples produced by Model 2 significantly lowered the mean and median bias levels relative to both the unmatched sample and the results of Model 1. No covariates among the male sample had inflated levels of bias after matching, though the model inflated the bias level for two variables among women who were classified into medium custody or who were divorced, widowed, or separated. Despite this, however, all of the covariates in both samples had bias levels below 20 percent, producing mean biases of 4.0 in the male sample (median = 3.1) and 4.8 in the female sample (median = 4.4). These outcomes indicate that no statistically significant differences exist between members of the treatment (parole discharge) and control (prison discharge) groups. Because both groups were balanced on the observed covariates, any differences in post-discharge re-incarceration can be attributed solely to the presence or absence of parole at the time of discharge.

Nearest neighbor k:1 matching with replacement. Models 3 through 8 use nearest neighbor k:1 matching *with* replacement. This strategy also matches treatment subjects to the control cases that have the smallest absolute difference between the propensity scores. Similar to the strategy used in Models 1 and 2, treatment cases are still removed from the pool of subjects once they have been matched, but in k:1 matching, the control cases are returned to the pool and may be paired with other treatment cases. I tested three variants of this technique: Models 3 and 4[45] used 1:1 replacement matching without and with calipers, Models 5 and 6[46] used 2:1 replacement matching (Model 5 did not have a caliper restriction, while Model 6 did), and Models 7 and 8[47] used 3:1

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[45] See Appendix Tables F.3 and F.4 for specific information related to the levels of bias and bias reduction among individual covariates in the male and female samples, respectively.
[46] For detailed model information, see Appendix Tables F.5 and F.6.
[47] Covariate distribution information for these models is provided in Appendix Tables F.7 and F.8.

replacement matching (Model 8 matches subjects within calipers). Due to the similar trends revealed in each of these three matching strategies, all k:1 models will be discussed together in order to avoid redundancy.

Perhaps the most interesting finding with regard to these models was that the addition of caliper restrictions did not change the means, bias levels, and levels of bias reduction among the covariates (i.e., Model 4 produced the same results as Model 3, Model 6 produced the same results as Model 5, and Model 8 produced the same results as Model 7). Furthermore, all models produced inflated levels of bias in the post-matched sample. Among males, bias was increased in the covariate indicating participation in self-betterment clubs. Among females, increased bias was found in the covariates related to placement in medium custody immediately following intake and having been divorced, widowed, or separated. In Models 3 and 4, bias levels also increased in the indicators for fiscal discharge years 2008 and 2009, and 2009 was increased in Models 7 and 8, as well. Models 5 and 6, however, were able to completely eliminate bias from the covariates related to being aged 34-42 at time of discharge and having served one or more prior prison sentence within NDCS.

Importantly, none of these models for either males or females had covariate with bias levels above 20 percent, which means that the samples were still statistically balanced. Among males, overall mean bias levels in the male sample significantly improved as the number of matched control cases increased (2.7 in Models 3 and 4, 2.6 in Models 5 and 6, and 2.5 in Models 7 and 8). In terms of median bias levels, the 1:1 models were more similar to the 3:1 models (2.2 and 2.1, respectively) than to the 2:1 models (1.7). Furthermore, all of the k:1 matching with replacement models offer

improvements over 1:1 matching without replacement (both with and without calipers) and the original unmatched sample. With respect to women, Models 3 and 4 did not offer much improvement to the mean and median bias levels than Model 2 (mean of 4.7 relative to 4.8, and median of 4.2 relative to 4.4). Models 7 and 8 did somewhat better (mean of 3.2 and median of 2.2), while Models 5 and 6 appeared to provide the greatest degrees of bias reduction (2.8 mean bias and 1.9 median bias). Although the reductions may seem small, however, they are still significant reductions in bias when compared to the unmatched sample

Radius matching. The final model I tested, in which matching is based purely on propensity score values, is radius matching. This method is similar to the k:1 nearest neighbor strategies discussed above, except that I did not specify the number of control cases to which each treatment case should be matched in this method. Instead, I specified the maximum allowable difference between propensity score values (similar to a caliper), and treatment cases are matched to *all* control cases that fell within the defined limit (Dehejia & Wahba, 2002). In this study, the radius was also defined as .25 times the standard deviation of the propensity score (.05 for males, .06 for females). Recall from earlier that the primary benefit of this technique is that when the difference between the propensity scores of treatment and control cases falls within this radius, the number of good matches is maximized, while the number of poor matches is minimized. Therefore, the results produced by this model should demonstrate improvements over the results of previous techniques.

This matching method produced the lowest overall levels of bias among both the male and female samples.[48] Specifically, the mean level of bias produced after matching men was 2.0, relative to 16.4 in the unmatched sample, and the median bias level was 1.4, relative to 11.0 in the unmatched sample. Similarly, females had a mean post-matching bias value of 2.5 (relative to 14.6) and a median bias of 2.4 (relative to 14.4).Bias levels increased for women with respect to the 2009 fiscal discharge, but 99 percent of the bias was eliminated with respect to prior NDCS prison sentences; no covariate in the post-matching male or female sample had bias levels above 20 percent. Therefore, this model achieved statistical balance among the treatment and control groups for both males and females, and it produced the most dramatic reduction in overall model bias of all techniques employed so far.

Mahalanobis distance matching. The final model in my study was not propensity score matching in the strictest sense as the other models were. Rather, this method attempts to achieve statistical balance among treatment and control groups by matching cases on their Mahalanobis distance, after controlling for a given a set of covariates which includes the propensity score (Guo & Fraser, 2010; Rosenbaum & Rubin, 2010; Stuart & Rubin, 2008). Recall from Chapter Three that the Mahalanobis distance is similar to the propensity score, but instead of a unidimensional value that reflects probability of treatment, given a set of covariates, this value is based on all potential interactions within a given set of covariates. Because of this, it is likely to be inaccurate when more than a few covariates are examined and researchers advocate for including the propensity score as a covariate when conducting this type of analysis.

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[48] See Appendix Tables F.9 and F.10 for detailed information about levels of covariate bias and bias reductions in the male and female samples, respectively.

This strategy increased bias in two variables for men (betterment clubs and FY2008 discharge) and in three variables for women (medium custody, 2009 fiscal discharge year, and participation in self-betterment clubs). At the same time, however, it produced a 100 percent reduction in bias for three variables in the male sample (parole interrupted, 50% or more of sentence spent in segregation, classified as maximum custody) and in two variables for the females (maximum custody and interrupted parole periods). As with all previous discussion, the important findings from Model 10 are that this technique also reduced bias levels to below 20 percent for all covariates, and that the overall mean and median bias levels are significantly lower than in the original, unmatched sample (2.3 and 2.0, respectively, for men, and 4.9 and 3.8 for women).

Diagnostic findings summary. Before an examination of the direct effects of parole on future offending, as measured by re-incarceration, could occur, several diagnostic procedures must be conducted to determine and attempt to eliminate sampling and matching biases. Through my examinations of covariate means, bias percentages, and levels of post-matching bias reduction, I obtained important information about three factors that impact the reliability and validity of the substantive outcome results these models produced. First, Models 1 and 2 represent incomplete matching strategies. Although Model 1 was able to retain nearly 99 percent of the treatment cases among men and about 95 percent of the treatment cases among women, only 61 percent of male control cases and 78 percent of female control cases were utilized. Similarly, Model 2 used 69 percent of treatment cases and 46 percent of control cases from the male sample, and 74 percent of treatment cases and 57 percent of control cases from the female sample. All other models (3-10) were able to retain nearly all treatment and control cases among

both men (99.12% and 99.90%, respectively) and women (95.20% and 98.70%, respectively).

Despite the high degree of subject attrition in Models 1 and 2, I expected these strategies to produce the best matches between treatment and control cases. Once I ran the analyses, however, I discovered that these models had the highest levels of post-matching bias among both men and women (Model 10 also produced high levels of bias for the female sample). In the end, radius matching created the most statistically balanced samples for both males and females. The fact that models utilizing replacement produced lower levels of bias in nearly all other models suggests that not all of the control cases were well-suited matches for the treatment subjects. In the end, however, all of the strategies tested on the male sample, and nine of the ten strategies tested on the female sample, produced matched treatment and control samples that had significantly lower levels of covariate bias than the unmatched sample, yet were statistically balanced with one another. With these things in mind, I now turn to a discussion of my substantive research findings with the knowledge that any difference in outcomes result from one's supervision status at the time of discharge and are not produced by methodological artifacts or biases.

Substantive Research Findings

Research Question 1 asks: *What proportion of people who were supervised in the community at the time of their discharge from the Nebraska Department of Correctional Services [NDCS] are re-incarcerated within three years, relative to inmates who discharged directly from prison?* Table 4.6 shows the estimated average treatment effects produced by each of the ten matching strategies. The unmatched samples for both

males and females indicated that fewer people who discharged from parole (treatment cases) were re-incarcerated in NDCS within three years than people who discharged from one of the NDCS prison facilities (control cases).

Recall from the t-test analysis presented at the beginning of this chapter, that, taken at face value, these results should be expected: it would not be safe, nor ethical, to randomly select inmates for supervised release in the community. Rather, parole is a discretionary process, and we would expect selection bias to play a role in the decisions

TABLE 4.6. AVERAGE TREATMENT EFFECT ESTIMATES

Model	MALES				FEMALES			
	Treated	Controls	Difference	Std. Err.	Treated	Controls	Difference	Std. Err.
Unmatched Sample	.0752	.1409	-.0658	.0096	.0508	.0686	-.0178	.0167
1	.0785	.1185	-.0423***	.0096	.0534	.0674	-.0140	.0175
2	.0767	.1249	-.0482***	.0104	.0559	.0629	-.0070	.0183
3	.0758	.1135	-.0376*	.0169	.0534	.0449	.0084	.0265
4	.0758	.1135	-.0376*	.0169	.0534	.0449	.0084	.0265
5	.0758	.1093	-.0334*	.0142	.0534	.0492	.0042	.0229
6	.0758	.1093	-.0334*	.0142	.0534	.0492	.0042	.0229
7	.0758	.1174	-.0416**	.0137	.0534	.0693	-.0159	.0218
8	.0758	.1174	-.0416**	.0137	.0534	.0693	-.0159	.0218
9	.0758	.1121	-.0362**	.0362	.0534	.0603	-.0069	.0196
10	.0758	.0944	-.0185*	.0140	.0534	.0449	.0084	.0222
Averages	.0760	.1131	-.0370	.0160	.0537	.0562	.0026	.0220

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

that are made (e.g., people should have a higher likelihood of being paroled if they have fewer, and less severe, educational, vocational, residential, and/or treatment needs). In this dissertation, I used propensity score matching to assess the degree to which discharging from parole, in and of itself, influenced rates of future re-incarceration, relative to discharging from a state prison facility after a set of known covariates was held constant.

The results of each propensity score matching model showed that a lower percentage of men who finished their sentences in the community were re-incarcerated within three years of their discharge from NDCS, relative to men who finished their sentences behind bars. Though the estimated treatment effect ranged from 1.85 percent (Model 10 – Mahalanobis distance matching) to 4.82 (Model 2 – nearest neighbor 1:1 matching without replacement, but within calipers), the average effect across all models was 3.70 percent. This indicates that parole supervision at the time of discharge, by itself, reduces the number of people who return to NDCS custody on future prison sentences by four percent. The substantive results are markedly different for the female sample, however. Specifically, all of the models revealed that women who experienced parole supervision immediately prior to their discharge were no more or less likely than women who discharged directly from prison to recidivate. According to these analyses, approximately six percent of women in both groups will be re incarcerated in Nebraska within three years.

Because the model diagnostics described in previous sections indicated that the post-matched treatment and control groups were not significantly different in terms of their covariate balance, we can be confident that the substantive results are due to the presence or absence of parole at the end of one's sentence, alone. To reiterate, nearly four percent fewer men who discharge from parole are re-incarcerated when compared to men who discharge from prison, but the same proportion of women who discharge from parole are re-incarcerated relative to their institutional counterparts. Although these findings may reaffirm those from prior studies, which suggest that parole supervision can influence post-incarceration behavior, the methods by which these findings were derived

varies vastly from those in previous studies. Rather than traditional examinations in which parole is entered as a variable in a regression model predicting reoffending, or t-tests are conducted to determine differences in reoffending across groups, the methods discussed above allow me to better isolate the direct effects of parole on re-incarceration by controlling for sampling biases that are often uncontrolled in regression and t-test models. What remains unanswered, however, is whether and how the extent to which an inmate spends supervised time in the community during his or her sentence may impact recidivism.

Propensity Score Matching for Research Question 2

My second research question asks: *To what degree does the total amount of time inmates spend under community supervision during one sentence influence their likelihood of returning to prison within three years of their discharge?* This question considers the impact of exposure to supervised life in the community on post-discharge re-incarceration, regardless of its timing relative to discharge and regardless of whether any parole time was interrupted by periods of re-incarceration.

Based on criminological theory and empirical findings in the extant literature, I predicted that people who experienced a greater amount of out-of-prison time during their sentences would be less likely to come back to prison within three years of their discharge. In order to test this, I used Imbens's (2000) strategy for using propensity score matching to estimate the average treatment effect of various treatment doses. The distribution of the three doses used in this study is shown in Table 4.7.

TABLE 4.7. DISTRIBUTION of DOSE CATEGORIES.

Cumulative Time on Parole during Sentence	Males (N = 4,698)		Females (N = 831)	
	n	%	n	%
0 = No time on parole	2,380	50.66	383	46.09
1 = Fewer than 6 months	1,086	23.12	213	25.63
2 = 6 months or more	1,232	26.22	235	28.28

As illustrated, about half of all males (50.66%) and slightly fewer than half of all females (46.09%) were not supervised in the community during any portion of their prison sentence. Furthermore, a slightly lower proportion of males and females spent six months or fewer in the community (23.12% and 25.63%, respectively) relative to those who were on parole for a total of six months or more (26.22% of males and 28.28% of females).

The first step in preparing the data for matching was to calculate three propensity scores for each subject in the sample. These scores reflect the generalized propensity of each subject having no exposure to community supervision ($p1$), spending a cumulative total of fewer than six months on parole ($p2$), and spending a cumulative total of six months or more on parole ($p3$). These scores were then used to calculate sampling weights. Each subject was weighted by the inverse of the generalized probability score that predicted his or her *actual* dose of community supervision (i.e., $1/p1$ for persons who spent no time on parole, $1/p2$ for persons who were on parole for fewer than six months, and $1/p3$ for persons who were in the community for six months or more). Once these variables were defined, I ran two logistic regression models to obtain the dosage effects presented in Table 4.8. The first model contained no weighting adjustments, while the second controlled for selection effects through the use of the inverse probability weights. Both models controlled for the same covariates that were controlled for in Research

TABLE 4.8. REGRESSION ANALYSIS of TREATMENT DOSAGE on RECIDIVISM

Variable	Variable Values	Males Unadjusted Odds Ratio	Males Unadjusted Robust S.E.	Males Adjusted Odds Ratio	Males Adjusted Robust S.E.	Females Unadjusted Odds Ratio	Females Unadjusted Robust S.E.	Females Adjusted Odds Ratio	Females Adjusted Robust S.E.
Treatment Dosage (Ref = None)	Fewer than 6 Months	.77	.10	.70	.13	.62	.26	.59	.28
	6 Months or More	.53***	.08	.53**	.12	1.01	.47	.91	.42

Question 1. In addition, these models controlled for within-subject clustering (i.e., cases in which the same person appeared in two different fiscal year cohorts).

The odds ratios reported in the table above reveal the degree to which periods of community supervision throughout the course of one's sentence influence rates of post-discharge recidivism. The likelihood of re-incarceration for males who experienced fewer than six months of community supervision during their sentence was not significantly different than the likelihood for men who were not paroled during their sentence. However, men who spent six months or more on parole were significantly different from those who were incarcerated for their entire sentence, as well as for those who spent less time in the community. Specifically, the odds that these men would be re-incarcerated within three years were 47 percent lower than for males who were not paroled during their sentence, and 17 percent lower than the odds for men who were on parole for fewer than six months. In line with findings from the previous research question, however, no statistically significant differences emerged among the dosage groups within the female sample. As a result, women who are not granted parole at any time during their sentence are just as likely as women who spent any time in the community to return to prison after their discharge.

Chapter Summary

This chapter presented answers to my two overarching research questions. The t-test analysis indicated that there appeared to be statistically significant differences in the distribution of covariates among people who discharged from prison and people who discharged from parole. Specifically, higher proportions of men in the control (prison discharge) were younger and non-white; had served prior NDCS sentences, had higher security classification levels after intake, spent more time in segregation, and had served at least one unsuccessful parole term during their sentence; and were single and had fewer people on their approved visitor lists. These findings make intuitive sense, based on the existing theoretical and empirical research findings presented in Chapter Two. However, because the t-tests could not confirm whether, or the degree to which, these imbalances influenced differential rates of recidivism between the treatment and control groups, I used propensity score matching to control for the given set of known covariates and isolate the true impact of discharge location on future re-incarceration.

In order to offer methodological advancements to the existing body of recidivism research, and to validate the reliability of my results, I tested ten different matching techniques: nearest neighbor 1:1 matching without replacement (both with and without caliper restrictions); nearest neighbor 1:1, 2:1, and 3:1 matching *with* replacement (all with and without caliper restrictions), radius matching, and Mahalanobis distance matching. With regard to the technical assessment, my first important finding was that eight of the ten models maintained a vast majority of treatment and control cases on the area of common support. These models allowed better matches to be made between treatment and control cases. This was confirmed by my second finding: all ten methods

were reduced the overall level of bias among the covariates, thereby creating statistical balance between the treatment (i.e., parole discharge) and control (i.e., prison discharge) groups. The only instance in which this was not true was when nearest-neighbor 1:1 matching without replacement was used with the female sample. In all other circumstances, however, these methods effectively eliminated selection bias from the groups based on a set of known covariates.

With regard to substantive outcomes, each PSM model indicated that, relative to men who finished their sentence behind bars, a lower proportion of men who discharged from parole were re-incarcerated in a Nebraska prison within three years of discharge (3.70%). In contrast, parole supervision status at the time of discharge appeared to have no effect for women: approximately six percent of all women who are discharged from NDCS sentences will come back. Because statistical balance was achieved within each model, it should be assumed that these findings are true reflections of the impact of parole supervision and are not due to methodological artifacts.

I then turned my attention to another aspect of parole supervision: the impact that the total amount of time inmates spend under supervision during the entirety of their sentence has on recidivism. An examination of varying "doses" of parole supervision revealed that the odds of returning to prison within three years of discharge were no different for men who served the entirety of their sentence behind bars and those men who spent a cumulative total of fewer than six months in the community during their sentence. However, relative to prison discharges, men who discharged from parole had much lower odds (47%) of subsequent re-incarceration. When the same models were used with the female sample, they revealed that the total amount of parole supervision

experienced throughout the course of one's sentence had no statistically significant

impact on recidivism rates. This further supports the notion that parole in Nebraska prior

to 2009 did not serve the same benefits for women as it did for men. The next and final

chapter will conclude the dissertation and will reiterate the highlights of this study,

discuss the implications of the findings presented in this chapter, and outline suggestions

for future research.

Chapter 5:

Discussion and Conclusion

Summary of Findings and Study Benefits

This dissertation was written to serve two purposes. First, it aimed to answer substantive questions regarding whether and how much parole supervision time influenced rates of re-incarceration among inmates discharged from the Nebraska Department of Correctional Services between fiscal years 2007 and 2009. The conventional practice in research related to parole effectiveness and recidivism is to compare outcomes of current parolees to people who have completely discharged from their sentence. Such an approach is premised on the notion that, by virtue of their release from incarceration, parolees are more similar to members of the general society than they are to people who are still incarcerated.

In reality, however, the opposite is true: parolees have been released from a correctional facility and live and work in the community, but they are subjected to, and must abide by, a number of conditions that are placed on their liberty. Although these individuals are no longer incarcerated, they are still, to a degree, incapacitated through supervision by a parole officer. Therefore, I treated parole as an alternate form of correctional commitment in this dissertation, and defined recidivism as any period of re-incarceration that occurred *subsequent* to an inmate's discharge from his or her original sentence. By thinking of parole in this manner, I was better able to assess whether, and the degree to which, community supervision prevented individuals from returning to prison after they discharged.[49] In also treated parole as the key independent variables in

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[49] Future researchers may want to test the validity of this assessment by comparing parolees to inmates in one of the two NDCS Community Correction Centers. Because inmates in the Community Correction Centers are able to leave the institution during the day, Routine Activities Theory would suggest that these people have virtually the same opportunity to commit crime as parolees. Scholars may wish to assess the degree to which recidivism rates differ between Community Correction Center inmates and parolees both

my analyses. This provides another major contribution to the existing literature, given that many prior examinations of parole treat it as a dependent variable.

The first key substantive finding from this study is that when parole terms coincide with discharge dates, lower rates of recidivism are produced among males but not among females. After the treatment and control groups were statistically balanced on a given set of known covariates, approximately seven percent of men who finished their sentences in the community returned to NDCS within three years, relative to over 11 percent of men who remained incarcerated until their discharge. In contrast, slightly more than five percent of women in both the treatment and control groups were re-incarcerated in Nebraska within three years of exiting the system.

Similar findings were reached with regard to my second substantive finding: parole supervision appears to have a therapeutic dosage effect with respect to the male sample, but not females. The dosage effect on men, however, did not manifest in the linear manner I expected. I anticipated that people who spent fewer than six months in the community would have a lower likelihood of recidivism than those who were never paroled, and that people who were under community supervision for six months or more would have lower odds of recidivism than both of the other groups. In reality, only the last prediction was substantiated (for males, parole supervision is only beneficial when it occurs for six months or more), and there were no significant differences in recidivism among males in the first two groups. My prediction was further refuted by the female sample; no statistically significant differences in the odds of re-incarceration were found among any of the three dosage groups (i.e., no parole supervision, supervision for fewer

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while they are active in their current status (i.e., on parole or incarcerated at community custody level) and after their final discharge from NDCS.

than six months, and supervision for six months or more). Taken together, the substantive findings of this dissertation contribute to our current understanding of parole and post-discharge recidivism, by indicating that parole in Nebraska matters for inmates who discharged between fiscal years 2007 and 2009, albeit in seemingly specific ways.

The secondary purpose of my dissertation was to answer my research questions by using progressive statistical techniques. This process was included to offer methodological advances to the existing body of recidivism literature. T-test analyses indicated that inmates who discharged from prison were qualitatively different from those who discharged from parole. These tests, however, could not offer insight into why such differences existed. Therefore, propensity score matching techniques were used to examine these issues while simultaneously controlling for selection bias.

Although ten different matching strategies were used, nearly all models significantly reduced the level of covariate imbalance between the treatment and control groups. In fact, the degree to which these imbalances were minimized made the groups statistically identical to one another, with the exception of the inmates' parole supervision status of the inmates at the time of their discharge from NDCS. This allowed me to conclude that any substantive outcome results could be attributed solely to the presence or absence of parole at the time of discharge. Furthermore, while there was some variation in the findings produced by each model, these variations were slight and there was more similarity in the outcomes than there was difference. This revealed that some techniques may produce more robust estimations than others, but all of the matching models used in this dissertation were well-suited to the data and produced findings that were valid and reliable. In short, this study validated the idea that propensity score

matching is an effective, appropriate method of reducing levels between-sample bias, and it showed that this method is suitable for use in answering questions related to correctional outcomes. The diagnostic measures used in this study highlight ways in which sample bias may be addressed prior to running predictive models to ensure that the coefficients that are reported accurately measure the effect of a specific treatment on behavior. In the future, similar studies should incorporate survival analyses; this would allow for examinations of whether parole delays the onset of offending for former parolees who are re-incarcerated after discharge.

Study Limitations

While the answers to my research questions are interesting, in and of themselves, they inevitably lead to more questions and need to be interpreted within the proper context. At this point, it bears repeating that the data used in this study are historical in nature. As such, they only reflect the inmates and practices of the Nebraska Department of Correctional Services prior to the end of fiscal year 2009. Like any other organization, NDCS has undergone many changes between that time and the time this dissertation was written, so any conclusions drawn and presented herein may not accurately reflect current policies, practices, or procedures, and are intended to apply to the historical population only.

Furthermore, although the models I tested produced valid, reliable results for the data I used, their construction was based on a de-identified dataset provided by NDCS. Because the dataset did not contain any personally identifiable information, I was unable to analyze information protected by FERPA (i.e., education records) or HIPAA (i.e., medical and mental health treatment information), nor was I able to collect other

information that would have required me to obtain consent from the former inmate. I also had to construct proxy measures for ideas or concepts that were not directly observable or for which a better form of data did not exist. For example, detailed electronic visiting logs did not exist prior to October of 2008, so I used information related to marital status and the number of people on an inmate's approved visitor list as a proxy measure of social support. Also noteworthy is that my sample consisted only of inmates who were eligible for parole at some point during their sentence. Any inmate serving a flat sentence or who was otherwise ineligible for early release from incarceration was not included in this study. Similarly, I was unable to control for inmates who may have opted not to participate in parole, preferring to do their entire sentence behind bars. It is possible that the effect sizes produced in my models may have been smaller if additional variables were considered or if a wider range of inmates had been included in my models. However, all researchers face similar limitations and issues related to proper model specification. Because all of the variables included in my model were driven by logic, theory, and/or empirical evidence, it seems unlikely that the results of more comprehensive or re-specified models would invalidate the findings of this study.

One potentially limiting factor, however, is that this study only considers inmates who were re-incarcerated in Nebraska within three years of their discharge. Therefore, the degree to which inmates discharge from NDCS and are re-incarcerated in another state is unknown. This could be important because Omaha, the largest population center in the state, is located on the Eastern border of Nebraska, near Council Bluffs, Iowa. While it is important to consider the possibility that not all inmate recidivism has been

captured, it is unlikely that the inclusion of out-of-state commitments would have a significant impact on my results as only 0.2 percent of inmates are admitted from other states, and 7.6 of all people released on parole are supervised in other states (see Appendices B and C). Moreover, these findings only apply to those who committed a subsequent crime deemed serious enough for re-incarceration. The degree to which parole influences less serious behaviors, warranting jail or probation terms, is unknown.

A final limitation of this study, and perhaps the most important, is that I was largely unable to control for the socio-political environment in which the Nebraska Department of Correctional Services was situated at the time the inmates in my sample discharged. In future studies, investigators could potentially address this topic through the addition of qualitative data. Such information would likely reflect the overall administrative culture and the institutional practices that are carried out in each facility and would be useful for examinations of the way sentences are administered across a given correctional system. Researchers could also incorporate data related to the larger political climate of the region through examinations of news story content and information related to the ideology of the governor, director of corrections, and other important decision makers. Although research findings may provide a basis for recommending changes to certain policies and/or practices, these suggestions must oftentimes navigate sensitive political waters. Adding in a control for the philosophy and politics that underlie correctional practices may provide context for one's results and offer important insight on how best to present suggested changes.

Despite the aforementioned limitations, however, my research still provides a meaningful representation of the state of parole and recidivism in Nebraska for inmates

discharged between fiscal years 2007 and 2009. Therefore, I will now turn to the final section of my dissertation and discuss the practical implications of these findings and offer suggestions for future avenues of inquiry.

Practical Implications and Suggestions for Future Research

Sex Differences

One of the most striking differences in the performance of the models tested in Chapter Four was the lack of consistency in findings between the male and female samples. The analysis of both research questions indicate that parole produces a greater degree of desistance for men than it does for women. However, the presence of an insignificant finding is actually rather significant in this instance. Although approximately six percent of women in both the treatment and control groups were re-incarcerated within three years of their discharge, the general finding to be drawn from this sample is that 94 percent of female inmates in Nebraska *do not* come back to prison. Indeed, during the entire three-year follow-up period, only 50 women were returned to NDCS custody.

From the perspective of cost-savings and institutional management, this finding would suggest that parole should be more widely used with female inmates, despite its ineffectual appearance on post-sentence behavior. Parole provides a cheaper correctional alternative to incarceration, and while it may not significantly reduce rates of post-discharge recidivism, it does not appear likely to increase these rates, either. Furthermore, reducing the number of incarcerated women would not only ease levels of crowding within the system as a whole, but it may reveal potential tactics for further decreasing levels of crowding in the male population. For example, if the number of

incarcerated women can be significantly reduced, it may be possible to house them in a smaller facility and repurpose NCCW as a male-only institution. In terms of new prison construction, building facilities for females is more politically palatable than building new spaces for male inmates, and it would likely be less expensive than a male facility, due to the small nature of the female inmate population. Therefore, the construction of a smaller, and less expensive, prison for women could effectively allow NDCS to simultaneously gain housing space for approximately 500 males (assuming cells are renovated to accommodate double-bunking). Furthermore, the relocation of the women's facility from York to one of the counties from which the majority of women were committed (i.e., Douglas, Lancaster, and Sarpy Counties) would allow for increased contact with children, family members and other sources social support.

Further lines of inquiry should be investigated, however, in order to determine whether an increased use of parole among women is a viable option. For instance, this study did not take into account the types of offenses for which women were re-incarcerated, nor did it track their new expected lengths of stay. Therefore, this study cannot determine the degree to which the new offenses committed by women who discharged from prison are more or less severe than the offenses committed by women who finished their sentences while on parole. Because of the important public safety implications this poses, future researchers should consider the influence of parole on the nature of the crimes for which males and females are re-incarcerated.

With regard to the blatant differences between the male and female populations in terms of recidivism rates, researchers would also do well to conduct an examination of the culture and environment of the Nebraska Correctional Center for Women (NCCW).

While there is theoretical and empirical evidence to suggest that men and women commit, and respond to, crime in qualitatively different ways, there may be certain programs or administration strategies that work to produce a more therapeutic environment in the women's prison. If this is true, consideration should be given to whether the implementation of similar practices in the male facilities would further reduce rates of recidivism among men.

Parole Supervision Strategies

At the same time, however, additional considerations should be given to the nature of the parole supervision that women receive. Because males comprise the vast majority of the prison and parole populations, it is possible that parole supervision strategies were developed to be most effective when administered to men. If gender differences do, indeed, exist with respect to recidivism (see, for example, Bahr, 2010; Cobbina et al., 2012; Langan & Levin, 2002; Monahan, 2006; Osterman, 2011a; Steen & Opsal, 2007) and responses to criminal behavior (see, for example, Chesney-Lind, 1999; Daly & Tonry, 1997; Nagel & Hagan, 1983; Hagan et al., 1985), the use of a "one-size fits all" approach to the administration of supervised release is unlikely to benefit males and females equally.

Unfortunately, examinations of the scope and nature of parole supervision strategies fell outside the scope of this dissertation. However, this is an important topic and should be investigated in future studies, both in gender-specific and in gender-neutral examinations. Such researchers would also do well to take into account the geographical regions to which inmates return when they are released on parole and when they are discharged, the supervision style of individual parole officers (e.g., proactive versus

reactive), and the administrative conditions of parole, among other potentially influential factors. Given the largely rural nature of Nebraska, researchers would do well to control for the distribution and availability of treatment resources in the communities to which ex-inmates return, and specifically those available to men and women distinctly.

Desistance and Incapacitation

The findings uncovered in this dissertation indicate that parole supervision, as it was administered in NDCS prior to the end of fiscal year 2009, increased rates of post-discharge desistance among males. The three-year follow-up period should have been sufficiently long enough for a majority of ex-inmates' cases to be processed through the criminal justice system (i.e., most inmates should complete the process of stages of arrest, conviction, sentencing, and physical re-admission to NDCS within a three year period). In future studies, however, scholars should investigate the degree to which parole supervision delays the onset of offending for those inmates who are re-incarcerated.

The findings to my second research question, revealed that rates of recidivism were reduced only when males spent six months or more under community supervision. This suggests that when parole is used as a form of incapacitation, it does little to reduce the likelihood of post-discharge recidivism unless it occurs over extended periods. Therefore, it is likely that re-incarceration rates are influenced by the philosophical approaches that underpin parole supervision tactics. For example, one would expect parole officers to achieve better outcomes if they shift from a law-enforcement orientation (i.e., strict focus on compliance with conditions of release) to one that is proactive and centered on parolee stabilization, as may be the case with terms of interaction that are longer than three to four months. This is not an easy, nor a quick,

process, so to the degree that parole officers are able to compensate for the deficiencies of their clients (e.g., with regard to providing adequate levels of treatment, helping obtain employment and a place to live, and limiting interactions with former criminal associate), post-discharge rates of recidivism should be reduced. Aside from the question of supervision models, there is also the practical question of what constitutes an appropriate "dose" of parole exposure? Future scholars should conduct analyses to determine the practical thresholds for effective dosage levels (i.e., the point at which maximum recidivism reduction is achieved) versus thresholds for treatment overdoses (i.e., the point at which recidivism rates no longer improve or even worsen).

So, overall, does parole make a difference? In short: yes. Parole appears to have a suppressive effect on future criminality for men who are supervised in the community for six months, as well as for men who are on parole at the time they discharge from their NDCS sentence. While parole does not appear to provide significant reductions in the rates of re-incarceration for women, only six percent of all female inmates will be re-admitted to NDCS custody on a future sentence. Therefore, the focus for this population should not be on how to further reduce their rates of recidivism, but on how parole can be utilized with this population to provide a cheaper alternative to incarceration.

Despite the fact that parole in Nebraska is a truly discretionary process, these findings suggest that certain changes should be made to the ways in which parole decisions are made.[50] First, because it is important for men to finish their sentences while in the community, parole board members should make an effort to parole a greater

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[50] It should be noted once more that these recommendations are based off of analyses of historical data. It is possible that the analysis of more recent data would indicate that the practices of NDCS and the parole board have altered to align with the prospective changes presented here. Therefore, my suggestions should be taken into consideration only to the degree that they accurately reflect current policies and practices.

number of inmates. Within the system, there are a number of non-violent inmates who will finish their sentences in prison because of their relatively lengthy criminal history records. Although these inmates may initially appear to be risky parole candidates, they will have better post-discharge outcomes if they experience a gradual, supervised return to their communities prior to completing their sentence. While providing parole opportunities to a greater number of individuals would help decrease recidivism rates, it cannot be done in isolation. Therefore, parole board members should take into account the total length of time inmates will spend in the community under supervision.

In Nebraska, inmates are released to community supervision an average of 10 months prior to the end of their sentence. However, because inmates can earn time off of their sentence for good behavior and compliance with parole regulations, parolees tend to discharge from their sentence after only eight months. The findings presented earlier indicate that parole only produces a reduction in recidivism rates when people are supervised for six months or more. This suggests that parole board members should adjust the parole process to allow for longer parole terms. This could occur through setting parole hearings prior to an inmate's parole eligibility date, or as close to it as possible in the case of inmate with longer sentences, as well as through the increased use of RFP.

As it stands, Nebraska has one of the lowest parole rates in the nation. It is possible that we could increase the parole population, while retaining a constant rate of re-incarceration, if current practices were adjusted to provide supervision to more inmates for a longer period of time. Existing research suggests that parolees need to make changes to their pre-incarceration lifestyle in order to succeed. Without changes,

parolees may return to old criminal habits, which decreases public safety and undermines any short-term therapeutic effects that individuals gained during their periods of supervised release. Future studies of this population should incorporate examinations into the nature of parole supervision to help further explain the findings presented in this dissertation and to explore the degree to which parole stabilizes inmates prior to discharge. This methodology should also be replicated in states with higher rates of parole and reoffending to see if similar results are produced.

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Flowchart: Overview of Criminal Justice Processing

Entry into Criminal Justice System
- Arrest

Prosecution and Pretrial Services
- Arraignment
- Charges dropped
- Diversion, Waiver, Fine

Adjudication and Sentencing
- Guilty Plea, Trial and Conviction
- Fine, Time Served
- Charges Dismissed
- Acquittal

Corrections
- Probation
- Prison
- Parole
- Revocation
- Revocation

Discharge
- Out of System

Legend:
- Active point in criminal processing
- Terminal point in criminal processing
- Potential pathway in processing

County of Commitment	Number of Inmates	Percent of Inmates	County of Commitment	Number of Inmates	Percent of Inmates
DOUGLAS	874	33.9%	CHERRY	6	0.2%
LANCASTER	457	17.7%	KEITH	6	0.2%
SARPY	164	6.4%	NANCE	6	0.2%
HALL	119	4.6%	PIERCE	6	0.2%
MADISON	108	4.2%	STANTON	6	0.2%
DODGE	72	2.8%	NEMAHA	5	0.2%
DAKOTA	56	2.2%	NUCKOLLS	5	0.2%
BUFFALO	55	2.1%	OUT OF STATE	5	0.2%
SCOTTS BLUFF	53	2.1%	POLK	5	0.2%
ADAMS	47	1.8%	THURSTON	5	0.2%
GAGE	37	1.4%	WAYNE	5	0.2%
LINCOLN	37	1.4%	DAWES	4	0.2%
PLATTE	31	1.2%	KEARNEY	4	0.2%
DAWSON	30	1.2%	BROWN	3	0.1%
YORK	27	1.0%	CUSTER	3	0.1%
OTOE	26	1.0%	FRANKLIN	3	0.1%
SAUNDERS	22	0.9%	GARDEN	3	0.1%
SEWARD	21	0.8%	HOWARD	3	0.1%
WASHINGTON	19	0.7%	JOHNSON	3	0.1%
CASS	15	0.6%	THAYER	3	0.1%
COLFAX	15	0.6%	CEDAR	2	0.1%
HAMILTON	15	0.6%	CLAY	2	0.1%
JEFFERSON	15	0.6%	DEUEL	2	0.1%
MERRICK	15	0.6%	DIXON	2	0.1%
ANTELOPE	13	0.5%	FILLMORE	2	0.1%
SALINE	12	0.5%	PAWNEE	2	0.1%
BURT	11	0.4%	SHERMAN	2	0.1%
KNOX	10	0.4%	BANNER	1	0.0%
PHELPS	10	0.4%	BOONE	1	0.0%
RED WILLOW	10	0.4%	CHASE	1	0.0%
CHEYENNE	9	0.3%	FRONTIER	1	0.0%
CUMING	9	0.3%	FURNAS	1	0.0%
BOX BUTTE	8	0.3%	GOSPER	1	0.0%
HOLT	8	0.3%	GREELEY	1	0.0%
SHERIDAN	8	0.3%	HARLAN	1	0.0%
BUTLER	7	0.3%	HITCHCOCK	1	0.0%
KIMBALL	7	0.3%	MORRILL	1	0.0%
RICHARDSON	7	0.3%	PERKINS	1	0.0%
			WEBSTER	1	0.0%

County	Number of Parolees	Percent of Parolees	County	Number of Parolees	Percent of Parolees
Douglas	526	33.0%	Burt	3	0.2%
Lancaster	384	24.1%	Cheyenne	3	0.2%
Out of State	121	7.6%	Harlan	3	0.2%
Hall	73	4.6%	Holt	3	0.2%
Madison	47	2.9%	Howard	3	0.2%
Sarpy	44	2.8%	Perkins	3	0.2%
Dodge	43	2.7%	Sherman	3	0.2%
Lincoln	40	2.5%	Thurston	3	0.2%
Adams	39	2.4%	Wayne	3	0.2%
Scotts Bluff	30	1.9%	Custer	2	0.1%
Buffalo	22	1.4%	Dawes	2	0.1%
Platte	20	1.3%	Dixon	2	0.1%
Dawson	16	1.0%	Furnas	2	0.1%
Gage	13	0.8%	Greeley	2	0.1%
Cass	12	0.8%	Hamilton	2	0.1%
Jefferson	10	0.6%	Kearney	2	0.1%
Otoe	9	0.6%	Knox	2	0.1%
Saline	8	0.5%	Nemaha	2	0.1%
Saunders	8	0.5%	Sheridan	2	0.1%
Colfax	7	0.4%	Antelope	1	0.1%
Dakota	7	0.4%	Boone	1	0.1%
York	7	0.4%	Box Butte	1	0.1%
Keith	6	0.4%	Cedar	1	0.1%
Washington	6	0.4%	Cherry	1	0.1%
Clay	5	0.3%	Cuming	1	0.1%
Merrick	5	0.3%	Johnson	1	0.1%
Phelps	5	0.3%	Kimball	1	0.1%
Pierce	5	0.3%	Morrill	1	0.1%
Red Willow	5	0.3%	Nance	1	0.1%
Butler	4	0.3%	Nuckolls	1	0.1%
Seward	4	0.3%	Pawnee	1	0.1%
Thayer	4	0.3%	Polk	1	0.1%

Note: There were 143 cases for which information regarding the county to

which individuals paroled was unavailable. These cases were excluded.

The "Most Serious Offense" categories, as defined by the Nebraska Department of Correctional Services, include the following offenses:

Homicide: 1st and 2nd degree murder; and manslaughter.

Sex offense: 1st, 2nd, and 3rd degree sexual assault; 1st, 2nd, and 3rd degree sexual assault of a child; sexual abuse of an inmate/parolee; sexual sociopath; sodomy; sex offender registration act violations; criminal child enticement (with or without the use of a computer); and violations of sex offender community supervision.

Assault: shooting with the intent to kill, wound, or maim; strangulation; 1st, 2nd, or 3rd degree assault; terroristic threats; stalking; domestic abuse; child abuse; abuse of a vulnerable adult; assaulting an officer using a motor vehicle; 1st, 2nd, or 3rd degree assault on a peace officer/NDCS employee; and assault by a confined person.

Weapons: carrying/possession of a concealed weapon; use of a firearm, explosives, or deadly weapon to commit a felony, possession of a firearm or deadly weapon by a fugitive or felon; possession of a defaced firearm; defacing a firearm; unlawful discharge of a firearm; possession or receiving a stolen firearm; transportation or possession of a machine gun or short gun; 1st degree possession of explosives; obtaining a weapons permit by false representation; possession or threat with a destructive device; use of explosives to damage or destroy property; and use of explosives to kill or injure another person.

Arson: 1st, 2nd, and 3rd degree arson; and burning to defraud an insurer.

Robbery: Larceny from a person; and robbery.

Motor Vehicle: Motor vehicle homicide; operating a motor vehicle to avoid arrest; general motor vehicle violation; willful reckless driving; leaving the scene of an injury accident; driving while intoxicated; driving under the influence, resulting in an injury; driving under a revoked license.

Drugs: Administering narcotics to addicts; administering medicine unlawfully; dealing narcotics or controlled substances; possession of a controlled substance, except marijuana; possession of over one pound of marijuana; possession of one ounce to one pound of marijuana; possession of under one ounce of marijuana; possession of anhydrous ammonia; possession of ephedrine; manufacturing, distributing, delivering, dispensing, or possessing drugs with the intent to deliver; being under the influence of a controlled substance; creating or distributing counterfeit substances; manufacturing, distributing, delivering, or dispensing drug to a minor; manufacturing, distributing, delivering, or dispensing drug using a minor; possession of firearm during a controlled substance violation; possession of money during a controlled substance violation; intentional violation by a registered person; manufacturing, delivering, or possessing drug paraphernalia; delivering drug paraphernalia to a minor; advertising drug paraphernalia; acquiring controlled substances by fraud; and intentional violation of a narcotics drug law.

Burglary: Burglary; possession of burglary tools; and breaking and entering.

Theft: Grand larceny; theft; petty larceny; theft by unlawful taking or disposing, shoplifting, receiving stolen property, deception, or extortion; theft of

lost or mislaid property; theft of services; and unauthorized use of a propelled vehicle.

Fraud: 1st and 2nd degree forgery; possession of a forged instrument valued $75 or less, between $75 and $300, or $30 or more; possession of a forgery device; violation of a financial transaction device; criminal simulation; sale of unregistered securities; fraudulent insurance acts; making, using, or uttering slugs; criminal impersonation; issuing a no account check or a bad check for less than $75, between $75 and $300, between $300 and $1000, or $1000 or more; issuing multiple bad checks; embezzlement; welfare fraud; false book entries; sale or transaction of personal property without consent; commercial bribery or breach of duty; altering an identification number; receiving an altered article; blackmail; and using a bogus pickle card.

Restraint: Kidnapping, and 1st and 2nd degree false imprisonment.

Morals: Enticement using an electronic communication device; bigamy; incest; abandoning dependents; criminal non-support; failure to pay child support; contributing to the delinquency of a minor; pandering; prostitution; debauching a minor; visual depictions of sexually explicit acts or conduct; admitting a minor to an obscene show; and public indecency.

Other: Criminal attempt; conspiracy; accessory to a felony; aiding in the consummation of a felony; aiding and abetting; assisting suicide; violation of custody agreement; violation of a protection order; violation of the bureau of vital statistics; criminal mischief; criminal trespassing; disturbing the peace; obstructing government operations; refusing to aid a peace officer; obstructing a

peace officer; resisting arrest (with or without a weapon); false reporting; interfering with a fireman on duty; falsifying public utility records; escape; possessing implements for escape or other contraband; failure to appear; perjury or subordination as perjury; bribery; tampering; voting violations; tax violations; criminal contempt; possession of a gambling device; removing, concealing, or abandoning a dead human body; concealing the death of another person; livestock violations; cruelty to animals; telecommunication violations; grain warehouse violations; Class I, II, or III Misdemeanors; leaving the state while on parole; minor in possession of alcohol; sale of alcohol to a minor; habitual criminal; county safekeeper; and sex offender safekeeper.

TABLE E.1. DISTRIBUTION of MALES by TREATMENT GROUP MEMBERSHIP (*N*=4,698)		Treatment Group (Parole)		Control Group (Prison)	
Variable Category	**Coding Description**	**n**	**%**	**n**	**%**
Recidivism	0 = not re-incarcerated within 3 years of discharge	1,661	92.48	2,493	85.91
	1 = re-incarcerated within 3 years of discharge	135	7.52	409	14.09
Age at Discharge	0 = 19-25	358	19.93	829	28.57
	1 = 26-33	530	29.51	761	26.22
	2 = 34-42	428	23.83	605	20.85
	3 = 43 or older	480	26.73	707	24.36
Race/Ethnicity	0 = non-white	693	38.59	1,277	44
	1 = white	1,103	61.41	1,625	56
Length of Stay	0 = less than 12 months	351	19.54	1,084	37.35
	1 = between 12 and 24 months	685	38.14	751	25.88
	2 = more than 24 months	760	42.32	1,067	36.77
Previous NDCS Sentences	0 = no prior NDCS sentences	1,303	72.55	1,976	68.09
	1 = one or more prior NDCS sentences	493	27.45	923	31.91
Current Offense	0 = non-violent	1,334	74.28	1,597	55.03
	1 = violent	462	25.72	1,305	44.97
Initial Custody Classification	0 = community	330	18.37	336	11.58
	1 = minimum	808	44.99	1,084	37.35
	2 = medium	620	34.52	1,138	39.21
	3 = maximum	38	2.12	344	11.85
% Sentence Spent in Segregation	0 = no time spent in segregation	1,374	76.5	1,564	53.89
	1 = less than 50%	402	22.38	1,138	39.21
	2 = 50% or more	20	1.11	200	6.89
Parole Interrupted	0 = no parole term interrupted	1,697	94.49	2,388	82.29
	1 = one or more parole terms interrupted	99	5.51	514	17.71
Fiscal Year Discharge	0 = discharged between July 1, 2006 and June 30, 2007	571	31.79	1,055	36.35
	1 = discharged between July 1, 2007 and June 30, 2008	615	34.24	964	33.22
	2 = discharged between July 1, 2008 and June 30, 2009	610	33.96	883	30.43
Marital Status	0 = single	1,004	56.00	1,852	64.06
	1 = divorced, widowed, separated	332	18.52	441	15.25
	2 = married (includes common law)	457	25.49	598	20.68
Number of Approved Visitors	0 = no approved visitors	500	27.84	1,124	38.73
	1 = 1-4 visitors	720	40.09	1,026	35.35
	2 = 5 or more visitors	576	32.07	752	25.91
Self-Betterment Clubs	0 = no participation	1,155	64.31	1,846	63.61
	1 = participated in one or more	641	35.69	1,056	36.39

TABLE E.2. DISTRIBUTION of FEMALES by TREATMENT GROUP MEMBERSHIP (*N*=831)					
Variable Category	**Coding Description**	**Treatment Group (Parole)**		**Control Group (Prison)**	
		n	**%**	**n**	**%**
Recidivism	0 = not re-incarcerated within 3 years of discharge	355	94.92	426	93.22
	1 = re-incarcerated within 3 years of discharge	19	5.08	31	6.78
Age at Discharge	0 = 19-25	58	15.51	91	19.91
	1 = 26-33	94	25.13	139	30.42
	2 = 34-42	115	30.75	126	27.57
	3 = 43 or older	107	28.61	101	22.1
Race/Ethnicity	0 = non-white	106	28.34	164	35.89
	1 = white	268	71.66	293	64.11
Length of Stay	0 = less than 12 months	103	27.54	213	46.61
	1 = between 12 and 24 months	159	42.51	143	31.29
	2 = more than 24 months	112	29.95	101	22.1
Previous NDCS Sentences	0 = no prior NDCS sentences	308	82.35	351	76.81
	1 = one or more prior NDCS sentences	66	17.65	106	23.19
Current Offense	0 = non-violent	328	87.7	371	81.18
	1 = violent	46	12.3	86	18.82
Initial Custody Classification	0 = community	4	1.07	3	0.66
	1 = minimum	248	66.31	280	61.27
	2 = medium	117	31.28	143	31.95
	3 = maximum	5	1.34	28	6.13
% Sentence Spent in Segregation	0 = no time spent in segregation	299	79.95	290	63.46
	1 = less than 50%	75	20.05	162	35.45
	2 = 50% or more	-	-	5	1.09
Parole Interrupted	0 = no parole term interrupted	353	94.39	385	84.25
	1 = one or more parole terms interrupted	21	5.61	72	15.75
Fiscal Year Discharge Cohort	0 = discharged between July 1, 2006 and June 30, 2007	122	32.62	157	34.35
	1 = discharged between July 1, 2007 and June 30, 2008	134	35.83	152	33.26
	2 = discharged between July 1, 2008 and June 30, 2009	118	31.55	148	32.39
Marital Status	0 = single	157	43.25	234	52.47
	1 = divorced, widowed, separated	98	27.00	113	25.34
	2 = married (includes common law)	108	29.75	99	22.20
Number of Approved Visitors	0 = no approved visitors	129	34.49	181	39.61
	1 = 1-4 visitors	89	23.8	135	29.54
	2 = 5 or more visitors	156	41.71	141	30.85
Self-Betterment Clubs	0 = no participation	191	51.07	222	48.58
	1 = participated in one or more	183	48.93	235	51.42

TABLE F.1. NEAREST NEIGHBOR 1:1 MATCHING without REPLACEMENT (MALES)

| | | Unmatched Sample | | | Matched Samples | | | | | | | |
| | | | | | Model 1 | | | | Model 2 | | | |
Variables	Variable Values	Parole	Prison	% Bias	Parole	Prison	% Bias	% Bias Reduct.	Parole	Prison	% Bias	% Bias Reduct.
Age at Discharge (Ref = 19-25)	26-33	.29	.26	7.3	.29	.27	4.9	32.6	.30	.29	1.9	74.6
	34-42	.24	.21	7.2	.24	.23	2.7	62.1	.23	.25	-3.1	56.1
	43+	.27	.24	5.4	.27	.27	-1.1	80.3	.26	.26	-0.8	85.5
Race/ Ethnicity	White	.61	.56	11.0	.62	.61	2.1	80.8	.60	.61	-4.2	61.6
Length of Stay (Ref = < 12 months)	12-24 months	.38	.26	26.5	.38	.32	14.8	44.1	.32	.39	-13.6	48.6
	24 or more months	.42	.37	11.4	.42	.40	3.5	69.1	.42	.40	3.9	66.0
Prior NDCS Sentence	One or More	.27	.32	-9.8	.28	.29	-2.6	73.2	.28	.27	4.0	58.9
Committed Offense	Violent	.26	.45	-41.1	.26	.34	-17.7	56.9	.33	.29	10.2	75.2
Custody Level (Ref = Community)	Minimum	.45	.37	15.6	.45	.43	3.4	78.4	.43	.44	-2.0	87.1
	Medium	.35	.39	-9.7	.35	.39	-9.5	2.6	.38	.37	1.8	81.7
	Maximum	.02	.12	-38.9	.02	.01	4.9	87.4	.03	.01	8.0	79.5
Time in Segregation (Ref = none)	less than 50%	.22	.39	-37.1	.23	.33	-23.3	37.2	.29	.27	4.7	87.4
	50% or more	.01	.07	-29.8	.01	.01	2.0	93.2	.01	.00	5.5	81.5
Parole Interruptions	One or More	.06	.18	-38.8	.06	.08	-6.7	82.8	.07	.05	6.9	82.2
Discharge Fiscal Year (Ref = 2007)	2008	.34	.33	2.2	.34	.34	0.5	74.8	.34	.34	1.2	46.9
	2009	.34	.30	7.6	.34	.32	2.5	66.7	.34	.34	-0.9	87.8
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.18	.15	8.8	.19	.18	1.8	80.1	.17	.18	-2.7	69.0
	Married/ Common Law	.25	.21	11.5	.25	.23	4.9	57.4	.25	.25	-0.1	99.1
Visitors (Ref = none)	1-4 Visitors	.40	.35	9.8	.40	.40	0.7	93.3	.38	.41	-4.9	49.8
	5+ Visitors	.32	.56	13.6	.32	.30	3.5	74.3	.32	.33	-2.1	84.7
Betterment Clubs	Participated in One or More	.36	.36	-1.5	.36	.38	-5.1	-253.6	.39	.38	1.0	28.9
Overall Model Statistics	Mean Bias:	16.4			5.6				4.0			
	Median Bias:	11.0			3.5				3.1			

TABLE F.2. NEAREST NEIGHBOR 1:1 MATCHING without REPLACEMENT (FEMALES)

					Matched Samples							
FEMALES		**Unmatched Sample**			**Model 1**				**Model 2**			
Variables	**Variable Values**	Parole	Prison	% Bias	Parole	Prison	% Bias	*% Bias Reduct.*	Parole	Prison	% Bias	*% Bias Reduct.*
Age at Discharge (Ref = 19-25)	26-33	.25	.31	*-12.1*	.26	.29	*-6.3*	47.9	.28	.24	*8.6*	28.7
	34-42	.31	.28	6.3	.30	.28	3.2	49.1	.30	.32	-4.5	29.1
	43+	.29	.22	.28	.28	.25	5.8	60.0	.26	.26	-0.2	98.5
Race/Ethnicity	White	.72	.65	14.7	.71	.70	3.2	78.2	.70	.68	4.0	72.8
Length of Stay (Ref = < 12 months)	12-24 months	.43	.31	23.6	.42	.34	18.1	23.5	.37	.37	1.2	95.0
	24 or more months	.30	.22	17.3	.28	.25	7.0	59.6	.28	.30	-5.2	69.9
Prior NDCS Sentence	One or More	.18	.23	-14.4	.19	.22	-7.8	45.8	.19	.16	7.4	48.3
Committed Offense	Violent	.12	.18	-16.3	.13	.15	-6.8	58.2	.14	.11	9.4	42.3
Custody Level (Ref = Community)	Minimum	.66	.62	10.0	.67	.68	-2.5	74.6	.67	.69	-4.3	56.8
	Medium	.31	.32	-1.2	.31	.31	0.4	69.4	.31	.30	2.0	-64.3
	Maximum	.01	.06	-24.9	.01	.01	4.3	82.7	.02	.00	7.0	71.8
Time in Segregation (Ref = none)	less than 50%	.20	.36	-35.7	.21	.27	-13.7	61.7	.25	.27	-5.4	85.0
	50% or more	-	-	-	-	-	-	-	-	-	-	-
Parole Interruptions	One or More	.06	.16	-33.7	.06	.07	-4.3	87.1	.07	.04	11.1	67.1
Discharge Fiscal Year (Ref = 2007)	2008	.36	.33	5.1	.36	.34	4.6	9.2	.35	.36	-1.4	73.2
	2009	.31	.32	-1.1	.31	.31	0.9	17.4	.35	.34	2.6	125.6
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.26	.25	2.8	.28	.26	3.0	-10.0	.26	.25	2.8	-1.7
	Married (incl. Common Law)	.29	.22	16.6	.25	.22	7.6	54.2	.23	.26	-5.7	65.9
Visitors (Ref = none)	1-4 Visitors	.24	.30	-13.2	.25	.28	-6.1	53.7	.26	.25	2.0	85.1
	5+ Visitors	.42	.31	22.0	.40	.36	9.0	59.1	.37	.40	-6.7	69.6
Betterment Clubs	Participated in One or More	.49	.52	-6.1	.50	.50	-1.2	81.0	.50	.52	-3.7	39.8
Overall Model Statistics	**Mean Bias:**	**14.6**			**5.8**				**4.8**			
	Median Bias:	**14.2**			**5.2**				**4.4**			

TABLE F.3. NEAREST NEIGHBOR 1:1 MATCHING with REPLACEMENT (MALES)

						Matched Samples					
MALES		**Unmatched Sample**			**Model 3**				**Model 4**			
Variables	**Variable Values**	Parole	Prison	% Bias	Parole	Prison	% Bias	*% Bias Reduct.*	Parole	Prison	% Bias	*% Bias Reduct.*
Age at Discharge (Ref = 19-25)	26-33	.29	.26	*7.3*	.29	.28	2.6	64.1	.29	.28	2.6	64.1
	34-42	.24	.21	7.2	.24	.25	-2.3	68.0	.24	.25	-2.3	68.0
	43+	.27	.24	5.4	.27	.28	-1.9	64.3	.27	.28	-1.9	64.3
Race/ Ethnicity	White	.61	.56	11.0	.62	.65	-6.4	41.9	.62	.65	-6.4	41.9
Length of Stay (Ref = < 12 months)	12-24 months	.38	.26	26.5	.38	.37	2.8	89.5	.38	.37	2.8	89.5
	24 or more months	.42	.37	11.4	.42	.41	0.8	92.9	.42	.41	0.8	92.9
Prior NDCS Sentence	One or More	.27	.32	-9.8	.28	.30	-4.7	52.1	.28	.30	-4.7	52.1
Committed Offense	Violent	.26	.45	-41.1	.26	.26	0.7	98.2	.26	.26	0.7	98.2
Custody Level (Ref = Community)	Minimum	.45	.37	15.6	.45	.45	-0.3	97.8	.45	.45	-0.3	97.8
	Medium	.35	.39	-9.7	.35	.34	1.3	86.8	.35	.34	1.3	86.8
	Maximum	.02	.12	-38.9	.02	.03	-1.6	96.0	.02	.03	-1.6	96.0
Time in Segregation (Ref = none)	less than 50%	.22	.39	-37.1	.23	.20	6.7	82.0	.23	.20	-6.7	82.0
	50% or more	.01	.07	-29.8	.01	.01	-0.6	98.1	.01	.01	-0.6	98.1
Parole Interruptions	One or More	.06	.18	-38.8	.06	.06	-1.3	96.8	.06	.06	-1.3	96.8
Discharge Fiscal Year (Ref = 2007)	2008	.34	.33	2.2	.34	.37	-5.1	-135.8	.34	.37	-5.1	-135.8
	2009	.34	.30	7.6	.34	.34	-0.2	96.8	.34	.34	-0.2	96.8
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.18	.15	8.8	.19	.21	-6.2	30.0	.19	.21	-6.2	30.0
	Married/ Common Law	.25	.21	11.5	.25	.25	-0.7	94.2	.25	.25	-0.7	94.2
Visitors (Ref = none)	1-4 Visitors	.40	.35	9.8	.40	.41	-2.2	77.5	.40	.41	-2.2	77.5
	5+ Visitors	.32	.56	13.6	.32	.33	-2.2	83.6	.32	.33	-2.2	83.6
Betterment Clubs	Participated in One or More	.36	.36	-1.5	.36	.39	-6.0	-310.3	.36	.39	-6.0	-310.3
Overall Model Statistics	**Mean Bias:**	**16.4**			**5.6**				**4.0**			
	Median Bias:	**11.0**			**3.5**				**3.1**			

TABLE F.4. NEAREST NEIGHBOR 1:1 MATCHING with REPLACEMENT (FEMALES)

		Unmatched Sample			Matched Samples							
					Model 3				Model 4			
Variables	**Variable Values**	Parole	Prison	% Bias	Parole	Prison	% Bias	*% Bias Reduct.*	Parole	Prison	% Bias	*% Bias Reduct.*
Age at Discharge *(Ref = 19-25)*	26-33	.25	.31	*-12.1*	.26	.25	2.5	79.2	.26	.25	2.5	79.2
	34-42	.31	.28	6.3	.30	.31	-1.8	70.7	.30	.31	-1.8	70.7
	43+	.29	.22	.28	.28	.30	-5.2	64.1	.48	.30	-5.2	64.1
Race/Ethnicity	White	.72	.65	14.7	.71	.68	6.6	54.8	.71	.68	6.6	54.8
Length of Stay *(Ref = < 12 months)*	12-24 months	.43	.31	23.6	.43	.43	-0.6	97.5	.43	.43	-0.6	97.5
	24 or more months	.30	.22	17.3	.28	.30	-3.8	77.8	.28	.30	-3.8	77.8
Prior NDCS Sentence	One or More	.18	.23	-14.4	.19	.18	2.1	85.5	.19	.18	2.1	85.5
Committed Offense	Violent	.12	.18	-16.3	.13	.10	7.1	56.7	.13	.10	7.1	56.7
Custody Level *(Ref = Community)*	Minimum	.66	.62	10.0	.67	.66	2.3	76.6	.67	.66	2.3	76.6
	Medium	.31	.32	-1.2	.31	.30	2.4	-95.4	.31	.30	2.4	-95.4
	Maximum	.01	.06	-24.9	.01	.03	-6.0	75.8	.01	.03	-6.0	75.8
Time in Segregation *(Ref = none)*	less than 50%	.20	.36	-35.7	.21	.27	-14.0	60.9	.21	.27	-14.0	60.9
	50% or more	-	-	-	-	-	-	-	-	-	-	-
Parole Interruptions	One or More	.06	.16	-33.7	.06	.04	4.6	86.4	.06	.04	4.6	86.4
Discharge Fiscal Year *(Ref = 2007)*	2008	.36	.33	5.1	.36	.41	-9.4	-85.6	.36	.41	-9.4	-85.6
	2009	.31	.32	-1.1	.31	.31	1.8	-59.3	.31	.31	1.8	-59.3
Marital Status *(Ref = Single)*	Divorced, Widowed, Separated	.26	.25	2.8	.28	.22	11.6	-320.2	.28	.22	11.6	-320.2
	Married (incl. Common Law)	.29	.22	16.6	.25	.26	-0.6	96.1	.25	.26	-0.6	96.1
Visitors *(Ref = none)*	1-4 Visitors	.24	.30	-13.2	.25	.28	-5.7	56.8	.25	.28	-5.7	56.8
	5+ Visitors	.42	.31	22.0	.50	.38	5.3	76.0	.40	.38	5.3	76.0
Betterment Clubs	Participated in One or More	.49	.52	-6.1	.50	.49	1.1	81.6	.50	.49	1.1	81.6
Overall Model Statistics	Mean Bias:	14.6			4.7				4.7			
	Median Bias:	14.2			4.2				4.2			

TABLE F.5. NEAREST NEIGHBOR 2:1 MATCHING (MALES)

		Unmatched Sample			Matched Samples							
					Model 5				Model 6			
Variables	Variable Values	Parole	Prison	% Bias	Parole	Prison	% Bias	*% Bias Reduct.*	Parole	Prison	% Bias	*% Bias Reduct.*
Age at Discharge (Ref = 19-25)	26-33	.29	.26	*7.3*	.29	.27	5.2	29.1	.29	.27	5.2	29.1
	34-42	.24	.21	7.2	.24	.25	-2.4	66.1	.24	.25	-2.4	66.1
	43+	.27	.24	5.4	.27	.29	-4.6	14.4	.27	.29	-4.6	14.4
Race/ Ethnicity	White	.61	.56	11.0	.62	.63	-3.7	66.8	.62	.63	-3.7	66.8
Length of Stay (Ref = < 12 months)	12-24 months	.38	.26	26.5	.38	.38	1.7	93.6	.38	.38	1.7	93.6
	24 or more months	.42	.37	11.4	.42	.42	-0.5	95.9	.42	.42	-0.5	95.9
Prior NDCS Sentence	One or More	.27	.32	-9.8	.28	.30	-4.0	59.1	.28	.30	-4.0	59.1
Committed Offense	Violent	.26	.45	-41.1	.26	.26	-0.5	98.7	.26	.26	-0.5	98.7
Custody Level (Ref = Community)	Minimum	.45	.37	15.6	.45	.44	1.0	93.7	.45	.44	1.0	93.7
	Medium	.35	.39	-9.7	.35	.35	-0.1	99.4	.35	.35	-0.1	99.4
	Maximum	.02	.12	-38.9	.02	.02	-1.1	97.1	.02	.02	-1.1	97.1
Time in Segregation (Ref = none)	less than 50%	.22	.39	-37.1	.23	.21	4.5	88.0	.23	.21	4.5	88.0
	50% or more	.01	.07	-29.8	.01	.01	-1.0	96.6	.01	.01	-1.0	96.6
Parole Interruptions	One or More	.06	.18	-38.8	.06	.06	-1.2	97.0	.06	.06	-1.2	97.0
Discharge Fiscal Year (Ref = 2007)	2008	.34	.33	2.2	.34	.35	-1.5	31.4	.34	.35	-1.5	31.4
	2009	.34	.30	7.6	.34	.34	-0.8	88.9	.34	.34	-0.8	88.9
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.18	.15	8.8	.19	.20	-4.7	46.2	.19	.20	-4.7	46.2
	Married/ Common Law	.25	.21	11.5	.25	.25	-0.9	92.5	.25	.25	-0.9	92.5
Visitors (Ref = none)	1-4 Visitors	.40	.35	9.8	.40	.39	1.7	82.2	.40	.39	1.7	82.2
	5+ Visitors	.32	.56	13.6	.32	.35	-7.9	41.6	.32	.35	-7.9	41.6
Betterment Clubs	Participated in One or More	.36	.36	-1.5	.36	.39	-6.5	-346.5	.36	.39	-6.5	-346.5
Overall Model Statistics	Mean Bias:	16.4			2.6				2.6			
	Median Bias:	11.0			1.7				1.7			

TABLE F.6. NEAREST NEIGHBOR 2:1 MATCHING (FEMALES)

					Matched Samples						
	FEMALES	**Unmatched Sample**			**Model 5**				**Model 6**		
Variables	**Variable Values**	**Parole**	**Prison**	**% Bias**	**Parole**	**Prison**	**% Bias**	**% Bias Reduct.**	**Parole**	**Prison**	**% Bias**	**% Bias Reduct.**
Age at Discharge (Ref = 19-25)	26-33	.25	.31	-12.1	.26	.26	1.9	84.4	.26	.26	1.9	84.4
	34-42	.31	.28	6.3	.30	.30	0.0	100.0	.30	.30	0.0	100.0
	43+	.29	.22	.28	.28	.29	-1.9	86.5	.28	.29	-1.9	86.5
Race/Ethnicity	White	.72	.65	14.7	.71	.67	8.2	44.5	.71	.67	8.2	44.5
Length of Stay (Ref = < 12 months)	12-24 months	.43	.31	23.6	.43	.40	6.1	73.9	.43	.40	6.1	73.9
	24 or more months	.30	.22	17.3	.28	.30	-3.8	77.8	.28	.30	-3.8	77.8
Prior NDCS Sentence	One or More	.18	.23	-14.4	.19	.19	0.0	100.0	.19	.19	0.0	100.0
Committed Offense	Violent	.12	.18	-16.3	.13	.10	7.4	54.3	.13	.10	7.4	54.3
Custody Level (Ref = Community)	Minimum	.66	.62	10.0	.67	.67	0.6	94.2	.67	.67	0.6	94.2
	Medium	.31	.32	-1.2	.31	.30	1.5	-22.1	.31	.30	1.5	-22.1
	Maximum	.01	.06	-24.9	.01	.02	-2.3	90.9	.01	.02	-2.3	90.9
Time in Segregation (Ref = none)	less than 50%	.20	.36	-35.7	.21	.23	-5.1	85.8	.21	.23	-5.1	85.8
	50% or more	-	-	-	-	-	-	-	-	-	-	-
Parole Interruptions	One or More	.06	.16	-33.7	.06	.05	3.2	90.5	.06	.05	3.2	90.5
Discharge Fiscal Year (Ref = 2007)	2008	.36	.33	5.1	.36	.36	1.2	76.8	.36	.36	1.2	76.8
	2009	.31	.32	-1.1	.31	.31	1.8	-59.3	.31	.31	1.8	-59.3
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.26	.25	2.8	.28	.25	6.1	-121.8	.28	.25	6.1	-121.8
	Married (incl. Common Law)	.29	.22	16.6	.25	.25	0.3	98.0	.25	.25	0.3	98.0
Visitors (Ref = none)	1-4 Visitors	.24	.30	-13.2	.25	.24	2.2	83.2	.25	.24	2.2	83.2
	5+ Visitors	.42	.31	22.0	.40	.40	0.3	98.7	.40	.40	0.3	98.7
Betterment Clubs	Participated in One or More	.49	.52	-6.1	.50	.49	1.1	81.6	.50	.49	1.1	81.6
Overall Model Statistics	**Mean Bias:**	**14.6**			**2.8**				**2.8**			
	Median Bias:	**14.2**			**1.9**				**1.9**			

TABLE F.7. NEAREST NEIGHBOR 3:1 MATCHING (MALES)

					Matched Samples							
MALES		Unmatched Sample			Model 7				Model 8			
Variables	Variable Values	Parole	Prison	% Bias	Parole	Prison	% Bias	*% Bias Reduct.*	Parole	Prison	% Bias	*% Bias Reduct.*
Age at Discharge (Ref = 19-25)	26-33	.29	.26	*7.3*	.29	.29	1.3	82.9	.29	.29	1.3	82.9
	34-42	.24	.21	7.2	.24	.25	-3.1	57.3	.24	.25	-3.1	57.3
	43+	.27	.24	5.4	.27	.27	-1.0	81.8	.27	.27	-1.0	81.8
Race/ Ethnicity	White	.61	.56	11.0	.62	.63	-3.1	71.7	.62	.63	-3.1	71.7
Length of Stay (Ref = < 12 months)	12-24 months	.38	.26	26.5	.38	.38	1.0	96.2	.38	.38	1.0	96.22
	24 or more months	.42	.37	11.4	.42	.42	-0.6	94.6	.42	.42	-0.6	94.6
Prior NDCS Sentence	One or More	.27	.32	-9.8	.28	.29	-3.8	61.4	.28	.29	-3.8	61.4
Committed Offense	Violent	.26	.45	-41.1	.26	.27	-1.4	96.7	.26	.27	-1.4	96.7
Custody Level (Ref = Community)	Minimum	.45	.37	15.6	.45	.43	3.0	80.6	.45	.43	3.0	80.6
	Medium	.35	.39	-9.7	.35	.35	-0.5	94.8	.35	.35	-0.5	94.8
	Maximum	.02	.12	-38.9	.02	.02	-1.1	97.1	.02	.02	-1.1	97.1
Time in Segregation (Ref = none)	less than 50%	.22	.39	-37.1	.23	.21	4.0	89.3	.23	.21	4.0	89.3
	50% or more	.01	.07	-29.8	.01	.01	-1.4	95.1	.01	.01	-1.4	95.1
Parole Interruptions	One or More	.06	.18	-38.8	.06	.06	-1.6	95.9	.06	.06	-1.6	95.9
Discharge Fiscal Year (Ref = 2007)	2008	.34	.33	2.2	.34	.34	0.3	90.9	.34	.34	0.2	90.9
	2009	.34	.30	7.6	.34	.35	-2.1	72.5	.34	.35	-2.1	72.5
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.18	.15	8.8	.19	.20	-4.8	45.3	.19	.20	-4.8	45.3
	Married/ Common Law	.25	.21	11.5	.25	.24	2.4	79.1	.25	.24	-2.4	79.1
Visitors (Ref = none)	1-4 Visitors	.40	.35	9.8	.40	.39	2.6	73.5	.40	.39	2.6	73.5
	5+ Visitors	.32	.56	13.6	.32	.35	-7.7	43.7	.32	.35	-7.7	43.7
Betterment Clubs	Participated in One or More	.36	.36	-1.5	.36	.38	-5.1	-251.3	.36	.38	-5.1	-251.3
Overall Model Statistics	Mean Bias:	16.4			2.5				2.5			
	Median Bias:	11.0			2.1				2.1			

TABLE F.8. NEAREST NEIGHBOR 3:1 MATCHING (FEMALES)

					Matched Samples						
	FEMALES	**Unmatched Sample**			**Model 7**				**Model 8**		
Variables	**Variable Values**	Parole	Prison	% Bias	Parole	Prison	% Bias	*% Bias Reduct.*	Parole	Prison	% Bias	*% Bias Reduct.*
Age at Discharge (Ref = 19-25)	26-33	.25	.31	*-12.1*	.26	.24	5.2	56.6	.26	.24	5.2	56.6
	34-42	.31	.28	6.3	.30	.29	1.0	83.7	.30	.29	1.0	83.7
	43+	.29	.22	.28	.28	.31	-8.4	41.7	.28	.31	-8.4	41.7
Race/Ethnicity	White	.72	.65	14.7	.71	.68	6.6	54.8	.71	.68	6.6	54.8
Length of Stay (Ref = < 12 months)	12-24 months	.43	.31	23.6	.43	.40	5.3	77.7	.43	.40	5.3	77.7
	24 or more months	.30	.22	17.3	.28	.31	-5.3	69.2	.28	.31	-5.3	69.2
Prior NDCS Sentence	One or More	.18	.23	-14.4	.19	.18	0.2	98.4	.19	.18	0.2	98.4
Committed Offense	Violent	.12	.18	-16.3	.13	.10	7.1	56.7	.13	.10	7.1	56.7
Custody Level (Ref = Community)	Minimum	.66	.62	10.0	.67	.67	-1.2	88.3	.67	.67	-1.2	88.3
	Medium	.31	.32	-1.2	.31	.30	2.0	-62.8	.31	.30	2.0	-62.8
	Maximum	.01	.06	-24.9	.01	.02	-1.5	93.9	.01	.02	-1.5	93.9
Time in Segregation (Ref = none)	less than 50%	.20	.36	-35.7	.21	.24	-5.7	84.0	.21	.24	-5.7	84.0
	50% or more	-	-	-	-	-	-	-	-	-	-	-
Parole Interruptions	One or More	.06	.16	-33.7	.06	.06	-0.3	99.1	.06	.06	-0.3	99.1
Discharge Fiscal Year (Ref = 2007)	2008	.36	.33	5.1	.36	.36	0.2	96.1	.36	.36	0.2	96.1
	2009	.31	.32	-1.1	.31	.31	1.0	11.5	.31	.31	1.0	11.5
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.26	.25	2.8	.28	.25	4.7	-71.2	.28	.25	4.7	-71.2
	Married (incl. Common Law)	.29	.22	16.6	.25	.26	-2.4	85.7	.25	.25	-2.4	85.7
Visitors (Ref = none)	1-4 Visitors	.24	.30	-13.2	.25	.24	1.3	90.4	.25	.24	1.3	90.4
	5+ Visitors	.42	.31	22.0	.40	.42	-3.3	84.9	.40	.42	-3.3	84.9
Betterment Clubs	Participated in One or More	.49	.52	-6.1	.50	.50	-0.6	90.8	.50	.50	-0.6	90.8
Overall Model Statistics	**Mean Bias:**	**14.6**			**3.2**				**3.2**			
	Median Bias:	**14.2**			**2.2**				**2.2**			

TABLE F.9. RADIUS and MAHALANOBIS DISTANCE MATCHING (MALES)

					Matched Samples						
MALES		**Unmatched Sample**			**Model 9**				**Model 10**		
Variables	**Variable Values**	Parole	Prison	% Bias	Parole	Prison	% Bias	*% Bias Reduct.*	Parole	Prison	% Bias	*% Bias Reduct.*
Age at Discharge (Ref = 19-25)	26-33	.29	.26	*7.3*	.29	.28	1.4	80.6	.29	.29	-0.5	93.2
	34-42	.24	.21	7.2	.24	.24	0.3	96.5	.24	.24	0.4	94.4
	43+	.27	.24	5.4	.27	.28	-3.2	40.6	.27	.27	0.4	92.9
Race/ Ethnicity	White	.61	.56	11.0	.62	.63	-2.8	74.9	.62	.66	-7.5	31.6
Length of Stay (Ref = < 12 months)	12-24 months	.38	.26	26.5	.38	.40	-3.3	87.5	.38	.37	2.4	90.8
	24 or more months	.42	.37	11.4	.42	.41	2.5	78.4	.42	.41	2.0	82.8
Prior NDCS Sentence	One or More	.27	.32	-9.8	.28	.30	-5.4	44.9	.28	.27	0.9	91.2
Committed Offense	Violent	.26	.45	-41.1	.26	.26	-0.3	99.2	.26	.31	-10.2	75.2
Custody Level (Ref = Community)	Minimum	.45	.37	15.6	.45	.43	3.2	79.6	.45	.44	0.8	94.8
	Medium	.35	.39	-9.7	.35	.34	0.4	95.6	.35	.36	-2.1	78.5
	Maximum	.02	.12	-38.9	.02	.02	-1.2	96.9	.02	.02	0.0	100.0
Time in Segregation (Ref = none)	less than 50%	.22	.39	-37.1	.23	.22	0.7	98.2	.23	.25	-4.6	87.7
	50% or more	.01	.07	-29.8	.01	.01	-1.4	95.2	.01	.01	0.0	100.0
Parole Interruptions	One or More	.06	.18	-38.8	.06	.06	-1.7	95.7	.06	.06	0.0	100.0
Discharge Fiscal Year (Ref = 2007)	2008	.34	.33	2.2	.34	.34	0.0	98.5	.34	.36	-2.6	-20.7
	2009	.34	.30	7.6	.34	.34	-1.1	85.9	.34	.33	2.2	71.4
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.18	.15	8.8	.19	.20	-5.0	43.0	.19	.18	2.1	76.1
	Married/ Common Law	.25	.21	11.5	.25	.24	2.2	81.1	.25	.23	5.1	55.9
Visitors (Ref = none)	1-4 Visitors	.40	.35	9.8	.40	.41	-1.3	86.2	.40	.41	-0.7	92.9
	5+ Visitors	.32	.56	13.6	.32	.32	-0.9	93.7	.32	.31	2.1	84.5
Betterment Clubs	Participated in One or More	.36	.36	-1.5	.36	.37	-3.4	-134.5	.36	.35	1.9	-28.7
Overall Model Statistics	Mean Bias:	16.4			2.0				2.3			
	Median Bias:	11.0			1.4				2.0			

TABLE F.10. RADIUS and MAHALANOBIS DISTANCE MATCHING (FEMALES)

FEMALES		Unmatched Sample			Matched Samples							
					Model 9				Model 10			
Variables	Variable Values	Parole	Prison	% Bias	Parole	Prison	% Bias	% Bias Reduct.	Parole	Prison	% Bias	% Bias Reduct.
Age at Discharge (Ref = 19-25)	26-33	.25	.31	-12.1	.26	.25	4.0	66.9	.26	.29	-3.8	68.8
	34-42	.31	.28	6.3	.30	.31	-2.7	57.9	.30	.29	2.5	60.9
	43+	.29	.22	.28	.28	.30	-4.2	71.0	.28	.27	1.3	91.0
Race/Ethnicity	White	.72	.65	14.7	.71	.70	1.9	87.0	.71	.73	-4.2	71.2
Length of Stay (Ref = < 12 months)	12-24 months	.43	.31	23.6	.43	.40	4.8	79.6	.43	.41	2.9	87.6
	24 or more months	.30	.22	17.3	.28	.31	-5.9	65.8	.28	.24	9.6	44.6
Prior NDCS Sentence	One or More	.18	.23	-14.4	.19	.19	-0.1	99.0	.19	.14	10.4	27.4
Committed Offense	Violent	.12	.18	-16.3	.13	.12	3.3	80.0	.13	.08	12.5	23.1
Custody Level (Ref = Community)	Minimum	.66	.62	10.0	.67	.66	2.7	72.9	.67	.71	-8.8	12.3
	Medium	.31	.32	-1.2	.31	.32	-1.9	-50.1	.31	.27	9.1	-632.8
	Maximum	.01	.06	-24.9	.01	.02	-0.6	97.6	.01	.01	0.0	100.0
Time in Segregation (Ref = none)	less than 50%	.20	.36	-35.7	.21	.23	-5.3	85.2	.21	.22	-2.5	92.9
	50% or more	-	-	-	-	-	-	-	-	-	-	-
Parole Interruptions	One or More	.06	.16	-33.7	.06	.07	-3.3	90.2	.06	.06	0.0	100.0
Discharge Fiscal Year (Ref = 2007)	2008	.36	.33	5.1	.36	.36	1.4	73.2	.36	.37	-2.4	53.6
	2009	.31	.32	-1.1	.31	.32	-2.1	-82.3	.31	.33	-3.6	-218.7
Marital Status (Ref = Single)	Divorced, Widowed, Separated	.26	.25	2.8	.28	.28	-1.4	48.4	.28	.25	5.1	-86.8
	Married (incl. Common Law)	.29	.22	16.6	.25	.25	0.1	99.6	.25	.23	5.2	68.8
Visitors (Ref = none)	1-4 Visitors	.24	.30	-13.2	.25	.25	0.2	98.3	.25	.23	3.8	71.2
	5+ Visitors	.42	.31	22.0	.40	.42	-4.2	80.9	.40	.40	-0.6	97.3
Betterment Clubs	Participated in One or More	.49	.52	-6.1	.50	.49	0.7	89.4	.50	.45	9.0	-46.8
Overall Model Statistics	Mean Bias:	14.6			2.5				4.9			
	Median Bias:	14.2			2.4				3.8			