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# Analysis of the propensity of employment on recidivism among parolees in Iowa

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**Analysis of the propensity of employment on recidivism among parolees in Iowa**

by

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## ABSTRACT

The parole population continues to increase in the United States. This trend creates a need for an analysis of the effect of employment on the likelihood of parolee recidivism. The goal of the current research was to determine the propensity of employment on recidivism when the problem that employment was not randomly distributed among parolees was corrected. The effect of employment was examined among 1,270 parolees released from prison in Iowa in 2010 and its effect on recidivism, including re-arrest and re-incarceration, during a two-year follow up period. Employment was examined in two ways to assess economic factors and characteristics of employment, such as structure. These factors were analyzed using propensity score methods to adjust for employment among parolees. Propensity scores randomly distribute the condition of employment as a variable in empirical research. Findings suggested that results are stable across methods for conditioning employment propensity. The structural effects of employment evidenced the most significant impact on recidivism, while the economic benefits revealed a marginal impact on recidivism. Additionally, parolees that were employed had a lower hazard rate when compared to parolees that were unemployed.

# CHAPTER I

## INTRODUCTION

Recidivism occurs when a person who has been released on parole commits another offense which results in their re-arrest or re-incarceration. The current study adds to our understanding of the factors that contribute to recidivism by analyzing the effect of employment on recidivism in a manner that mimics the random assignment of that variable, which prior research has been unable to facilitate. Further, this approach to analysis corrects for previous weaknesses found in experimental research when employment was provided to parolees, a condition which does not reflect the skills of the parolees and is ultimately uninformative about the actual likelihood of recidivism.

In the current research, propensity methods are also used to reduce or eliminate bias due to confounding effects, which allows for a more accurate measure of the effects of employment on recidivism. By utilizing propensity methods that mimic random assignment for parolees, we can obtain outcomes that are not an artifact of which parolees are likely to receive employment. This methodology will ultimately be more useful in understanding the true role of employment in preventing or delaying recidivism.

Since propensity scores have the ability to reduce or eliminate confounding effects, their use has increased in empirical research, albeit still less frequently utilized in criminal justice research (Austin, 2011). Researchers have historically relied on "the use of regression adjustment to account for differences in measured baseline characteristics between treated and untreated objects" (Austin, 2011, p. 400).

Additionally, there is limited research on the effects of employment on recidivism among adult parolees when employment is the focus of the analysis. This study extends the exiting literature by providing analytical results of propensity methods for the effects of employment on recidivism among adult parolees.

Robert Martinson (1974) articulates "what works" for rehabilitating offenders during the prison reform. Martinson examined 231 studies that were conducted between 1945 and 1967. Two main theories were developed based on the analysis of those studies. The first theory articulates treatment programs as 'crime as a disease,' something abnormal in the offender that is curable. However, this theory denies the normality of crime in society and that offenders respond to the conditions of society. On the contrary, the other theory is as 'crime as a social phenomenon' which suggests that treatment programs maybe offensive and ineffective and focuses on offenders response to society. Additionally, Martinson argued that there were flaws in the research design of the studies that were examined and results are mis-leading due to non-random experimental design as well as poorly designed comparison groups in experimental studies.

This study attempts to address these research flaws by utilizing propensity scores to mimic randomization, a technique which eliminates selection bias. Additionally, in the current analysis, employment is measured by assessing both the economic factors and structural factors employment has on parolees. By analyzing employment in this way a parolee's bond with society is assessed as described by social control theory.

# CHAPTER 2

# LITERATURE REVIEW

## Statistical Corrections

Predicting recidivism in experimental research without the ability to randomly assign subjects to a particular category can cause threats to internal validity in the forms of selection bias, faulty conclusions, and compensatory behavior. As a variable of study, employment is not usually randomly assigned as it is a condition obtained based on the particular parolee's skills and not given to a parolee when released from prison to help them transition back into society. Existing literature on the relationship between employment and recidivism lacks research that manipulates data to achieve quasi-randomization. Random assignment, matching, or quasi-random assignment methods can instead be used to accurately measure the effects of employment in which data modifications or models with propensity scores are used to correct for threats to internal validity.

To effectively examine the impact of employment, systematic variation needs to be corrected to obtain outcomes that are not simply a product of parolees who are likely to receive employment. Statistical corrections to analyze the propensity of employment allow for a more accurate analysis of the overall effectiveness of employment on recidivism. Methods using a quasi-random assignment can be used to accurately measure the effects of employment by modifying data through the use of propensity scores, which correct for threats to internal validity.

By utilizing propensity scores in criminal justice research, the impact of selection bias can be removed to more accurately assess employment's effect on recidivism. For example, covariate adjustment models and inverse probability of treatment weighting models are propensity score methods used to correct and improve the effectiveness of understanding the impact of employment on recidivism. The effectiveness is improved as the methods correct for selection and mimic randomization. A Cox regression model measures the amount of time it takes a parolee to recidivate. Additionally, this model can be measured while correcting for the probability of a parolee receiving the treatment.

Utilizing an unadjusted Cox regression model, Tripodi, Kim, and Bender (2010) studied male parolees in Texas to analyze the influence of employment on recidivism. The Cox regression model accounted for the amount of time since the parolee had been released from prison. Findings showed that starting at approximately one year post-prison-release, parolees who were unemployed were more likely to recidivate by being reincarcerated than employed parolees.

Unlike the Cox regression model which predicts the amount of time that passes before recidivism, the covariate adjustment model is a propensity method used to reduce or eliminate the effects of confounding variables, factors that have an effect on the dependent and independent variables which threaten internal validity, and is less commonly found in criminological research. Uggen (2000) used the covariate adjustment to clarify the effects of explanatory variables as doing so "improves the precision of estimators and helps overcome the effects of incomplete randomization or

selective attrition" (p. 534). By focusing on employment as an important factor in a released offender's criminal career, Uggen (2000) compared released offenders who were provided minimal employment opportunities to released offenders who were not given employment opportunities. Results showed that released offenders who had marginal employment opportunities were less likely to recidivate.

## Employment

Previous literature has focused on the effects of being employed versus being unemployed on recidivism. Lockwood, Nally, Ho, and Knutson (2012) conducted a five-year follow up study of 6,561 released offenders from the Indiana Department of Corrections in 2005 to analyze predictors of recidivism. During the study period, 37.6% of released offenders were unemployed, while 62.4% were employed. Recidivists had a higher unemployment rate at 42%, than non-recidivists at 33%. Unemployed released offenders were 1.5 times more likely to recidivate than employed released offenders.

Verbruggen, Blokland, and van der Geest (2012) analyzed 540 juvenile offenders who had been institutionalized in a judicial treatment institution in the Netherlands during a longitudinal study in an effort to determine the effects of employment on recidivism. The longitudinal data consisted of boys who were released between 1989 and 1996 (n = 270) and girls who were released between 1990 and 1999 (n = 270). Study participants were observed from 18 to 32 years of age. Findings showed that when estimating the effect of employment on recidivism while controlling for the effects of stable background characteristics, marriage, and parenthood, employment,

operationalized as being employed for 90 days per year, decreased the number of recidivism events.

To assess whether employment was related to an increase in the amount of time it took a parolee to recidivate, Tripodi et al. (2010) analyzed 250 male parolees in Texas between 2001 and 2005. In this sample, employment did not decrease the likelihood of recidivism, but was related to an increased time until recidivism. These results suggested that employed parolees spend more time crime-free than unemployed parolees, with the periods of nonoffending being twice as long for employed parolees than unemployed parolees.

**Type of Employment**

The type of employment, consisting of full-time, part-time, or temporary employment, has previously been analyzed to assess the effects of employment on recidivism. Presenting a strong association between employment and recidivism, van der Geest, Bijleveld, and Blokland (2011) studied the effect of regular versus temporary employment on crime rates. A longitudinal research design containing 270 high-risk males was utilized, including chronic released offenders as well as those who had committed serious and violent offenses. For purposes of this study, being registered on the payroll of an employer was classified as regular employment, while employment through a temporary employment agency, often seasonal or project based, was classified as temporary employment. The males were discharged between January 1989 and June 1996 from a Netherland judicial treatment institution for juveniles and were followed up to the age of 32. Prior to admission into the treatment institution, 62% had

been convicted of at least one serious offense and 22% had been convicted of a violent offense. The mean length of time for regular employment was 1.35 years and temporary employment was .16 years. Findings suggested that regular employment had a stronger overall effect (*d* = -1.14) than temporary employment (*d* = -.90) on a released offender's likelihood of recidivism. Findings also indicated a 64% decrease in recidivism for released offenders who were employed with either regular or temporary work for 365 days when compared to released offenders who were unemployed for 365 days. Additionally, having regular employment for an entire year decreased recidivism rates by 68%, whereas temporary employment for an entire year decreased the recidivism rates by 59%.

To further understand the effects of employment on released offenders, previous literature by Wadsworth (2006) analyzed how released offender's transition into the labor market. Using data from the *National Longitudinal Study of Youth*, being male, white, and single, along with educational achievement and being from a higher income household were factors associated with an increase in a released offender's probability of being employed on a full-time basis. This study analyzed the independent variables at the status in 1979 and the recidivism variable, characterized as participating in criminal activity, in 1980. Results showed that there was not a direct impact on full-time employment as an adult if a juvenile had trouble in school or was charged with an offense while a juvenile.

To clarify the mechanisms through which employment works as a protective factor against recidivism, Bahr, Harris, Fisher, and Armstrong (2010) interviewed 51

parolees from two major metropolitan areas within an intermountain state in the United States to assess the effects of full-time employment between successful and unsuccessful parolees three years following entry into parole. Parolees with full-time employment of at least 40 hours a week had a higher likelihood of successful parole completion. The researchers suggested that employment provided routines which reduced time to interact with deviant peers, thereby reducing opportunities to participant in criminal activity that results in recidivism.

**Employment Characteristics**

The literature suggests that simply being employed is not the only determinative factor in recidivism, but that recidivism is impacted by the characteristics of that employment. Characteristics of employment can include, but are not limited to, the total wages paid to the employee and the method used to seek employment. In studying specific employment characteristics related to recidivism, Visher, Debus, and Yahner (2008) examined 740 recently released males who served a minimum of one year in state prison. Results showed that released offenders who earned more than minimum wage were less likely to recidivate eight to 12 months post incarceration. Released offenders' most successful method for finding long-term employment was returning to a previous employer, even though most released offenders looked towards family and friends for income.

## Level of Service Inventory (LSI)

One tool that assists in evaluating recidivism risk for potential parolees is the Level of Service Inventory-Revised (LSI-R) risk assessment measure. The LSI-R is

administered to evaluate an inmate's risk of reoffending if released on parole. The risk assessment measure is also re-administered throughout the parole period to measure any changes in the parolee's risk for reoffending. The LSI-R consists of 54 equally weighted items that are divided into subscales measuring static and dynamic factors before and after incarceration. These subscales assess: criminal history, education and employment, attitudes, financial status, family and marital relationships, living accommodations, leisure and recreation patterns, criminal companions, alcohol and drug problems, and emotional and personal problems.

Research has shown that the LSI is a valid predictor of recidivism (Holsinger, Lowenkamp, & Latessa, 2006; Vose, Cullen, & Smith, 2008). Vose, Cullen, and Smith (2008) conducted a meta-analysis of 47 studies that utilized the LSI between 1982 and 2008 to determine its validity as a risk assessment tool. The studies included adults, juveniles, males, and females from the United States, Canada, and Europe. The majority of the studies analyzed determined that the LSI was a valid predictor of recidivism.

However, other research has found that the LSI-R is not the most predictive tool to measure recidivism. Manchak, Skeem, and Douglas (2008) used the LSI-R to assess the risk for recidivism among 1,144 males who were released between 1999 and 2005 in Washington. Of the 1,144 males, 555 had served ten or more years in prison. The recidivism offense was categorized into general recidivism, consisting of any offense including violent offenses, and violent felony recidivism, consisting of violent crimes towards people. Findings showed that the LSI-R moderately predicted general recidivism but it did not predict violent recidivism. The predictive utility of the LSI-R was

not moderated by the released offender's long-term prison status and was primarily based on dynamic risk factors.

## Type of Crime

When analyzing recidivism, the type of crime is a criminal history variable often used to describe the type of offense that resulted in a prison sentence. Crime type is a way to describe an offense based on its most salient characteristics. Most commonly, crime types are categorized as being violent, crimes against property, drug related, or as a type of sex offense. Long-term recidivism patterns have been analyzed by Huebner, DeJong, and Cobbina (2010) among 506 women released from prison in 1998 to assess the relationship between type of crime and recidivism. Among the women sampled, 52% were incarcerated for a property offense, 28% for a drug offense, and 15% for a violent offense. The findings did not show a significant difference in recidivism at follow up based on the type of offense the women were incarcerated for prior to release. Instead, the results showed that the number of prior convictions was a significant predictor of future recidivism, with each prior conviction increasing the odds of recidivism by almost double.

Berg and Huebner (2011) found similar findings when studying 401 male parolees in 2000 from a Midwestern state to analyze the effects between employment, social ties, and recidivism. Forty six percent of the parolees were serving time for property offenses, while 14% were serving time for violent offenses. Again, the analysis showed that the nature of the current offense was not a statistically significant factor in predicting the time to recidivism.

## Amount of Time Served

Along with the type of crime, the amount of time a parolee was incarcerated for is a common control variable used to analyze recidivism. An analysis of 506 women released from prison in 1998 was conducted to examine long-term recidivism patterns (Huebner, DeJong, & Cobbina, 2010). In this sample, the average woman served 16 months in prison. In this research, the amount of time served was not statistically significant in the logistic model but a positive relationship emerged between time served and timing of recidivism in the survival model. This suggests that the amount of time served in prison prior to release may delay recidivism.

Additionally, how the amount of time predicts violent and nonviolent recidivism was measured by Collins (2010) in a meta-analysis utilizing 57 studies. In the sample of violent recidivists versus non-recidivists, the average sentence length being served prior to initial release for males was 3.81 years and 3.85 years for females while in the sample of violent recidivists versus non-violent recidivists, the average sentence length for males was 5.51 years and 1.96 years for females. Sentence length in men had a significant negative difference between the violent recidivists and non-recidivists, meaning that males who had served longer sentences were less likely to violently recidivate. Conversely, though, females were at a greater risk to violently recidivate if they had been paroled after serving longer sentences.

## Participation in Prison Programs

Participation in prison programs aimed at improving a parolee's ability to function in society upon release is a factor that is often utilized to analyze recidivism.

Research has showed mixed results in the relationship between participation in prison programs and recidivism. Previous literature has suggested that if released offenders participate in programs while incarcerated they are more likely to find employment upon release from prison (Visher, Debus, & Yahner, 2008). However, Huebner et al. (2010) did not find a relationship between recidivism and participation in programs while in prison.

Using data from the *Returning Home Project,* Visher et al. (2008) analyzed the employment experiences of 740 males. While in prison, 65% of the males participated in an employment program designed to teach new skills, 32% participated in education/GED classes, 30% participated in a life skills program, 35% participated in an employment readiness program, and 21% participated in a trade/job training program. Among the males sampled, 53% worked while incarcerated. Results showed an increase in the likelihood that the males who participated in these programs while incarcerated would find employment after their release from prison. Employed offenders who were earning higher wages were less likely to recidivate a year after release.

To analyze the job sectors providing employment to released offenders Nally, Lockwood, and Ho (2011) analyzed 6,561 released offenders from the Indiana Department of Corrections in 2005. Findings showed higher employment rates and lower recidivism rates for released offenders who obtained formal education or skill-oriented job training while incarcerated. Some of the jobs obtained upon release included construction and manufacturing positions. These jobs require special skills or certifications that released offenders were able to obtain while incarcerated during skill-

oriented trainings. The trainings provided them the necessary skills to obtain employment after release; therefore, employment is not randomly distributed among released offenders.

Long-term recidivism patterns were analyzed among 506 women who were released from prison in 1998 with follow up data collected through May 2006 (Huebner et al., 2010). Among the women in the study, 40% completed a program while in prison, consisting of a substance abuse or training program. Findings suggested that completing a prison program was not statistically significant.

## Age

Parolee characteristics, including age, are additional control variables frequently used to analyze recidivism. Generally, younger released offenders are more likely to recidivate than older released offenders (Huebner et al., 2010; Lockwood, Nally, Ho, & Knutson, 2012; Uggen, 2000; Verbruggen, Blokland, & van der Geest, 2012). However, among employed parolees, age was not associated with successful completion net of the number of hours the parolee worked per week (Bahr, Harris, Fisher, & Armstrong., 2010).

In research conducted by Bahr et al. (2010), findings suggested that as a parolee's age increased the likelihood of recidivating decreased. With age, the chances of successful parole increased by approximately 13% each year. Among the 51 parolees in the analysis, 26 were employed. Among the subsample, age was not a significant factor in whether or not the parolee ultimately recidivated, regardless of how many hours the parolee worked per week.

To determine if employment is a turning point for a released offender's criminal career, Uggen (2000) studied 3,000 released offenders. The study used data from the *National Supported Work Demonstration Project* which is a large-scale experimental employment program. Results indicated that released offenders over 26 years old were less likely to recidivate if provided with even marginal employment opportunities than released offenders who were not provided employment opportunities.

Long-term recidivism patterns were examined by Huebner et al. (2010) among 506 women released from prison in 1998. The average age of the women at intake to prison was 34 years old. Again, findings showed younger women to be more likely to recidivate. Additionally, findings suggested age to be significantly related to the timing of recidivism.

As previous research has shown, employment bonds parolees to society in a protective way. Employment does this by providing structure to a parolee's routines and decreases the amount of time available to spend with other parolees. Recidivism is then most likely to occur when unemployment disrupts a parolee's bond with society.

# CHAPTER 3

# THEORY

Social control theory came to the forefront of criminology and criminal justice research in Hirschi's (1969) book, *Causes of Delinquency.* Since then, the theory has become a benchmark framework for understanding the etiology of criminal behavior. According to the theory, individuals become delinquent when their bond with society, characterized by levels of attachment, commitment, involvement, and belief, becomes weak or broken (Hirschi, 1969). The author suggested that delinquent individuals do not have intimate attachments or moral beliefs similar to law-abiding members of society. Individuals with weak bonds have an increased likelihood of participating in crime and delinquency when compared to individuals with strong bonds (Gottfredson, 2008). Although, Hirschi focused on male juvenile delinquents, researchers have argued that Hirsch's concepts are useful when analyzing adult criminal activity (Wadsworth, 2006; Booth, Farrell, & Varano, 2008).

Generally, social control theory argues that controls are placed on individuals by society which prevents individuals from committing crimes. Focus is placed on how external factors influence an individual's desire to commit crimes and that when there are inadequate restraints from society; individuals are more likely to engage in criminal behavior. The theory recognizes that external social pressures from societal institutions encourage individuals to conform to expected standards of behavior and minimizes the inclination to participate in criminal behavior (Booth et al., 2008). Institutions that

might have this effect are places of employment, schools, families, marriage, churches, etc.

Place of employment can be viewed as an institution that parolees develop a social bond with, that is characterized by attachment, commitment, involvement, and belief. These characteristics assist in preventing parolees from engaging in recidivism. However, when the connection to society through employment is broken, parolees are more likely to recidivate, making employment a protective factor against recidivism.

Social control theory suggests that employment decreases the likelihood that individuals will participate in criminal activity because of the strong, positive social bond it provides (Sampson & Laub, 1990). On the contrary, not being employed creates weak social bonds between an individual and society causing them to deviate. Employment creates a daily routine for individuals that provide structure and the opportunity to engage in meaningful activity (Laub & Sampson, 2001). Additionally, employment reduces the opportunity to engage in deviant associations (Bahr et al., 2010).

Since employment is not a variable easy to randomly distribute in empirical research, literature on the relationship between employment and recidivism is limited where employment is the focus of the analysis. Moreover, the research that is available fails to account for the selection bias that impacts whether or not a study participant is employed. The goal of this study is to conduct an analysis using common variables in this research area in a way that mimics the random assignment of employment to measure its effect on recidivism under quasi-experimental conditions. The hypotheses

are: (1) being employed will decrease the probability of recidivism among parolees and (2) being employed increases the time it takes a parolee to recidivate.

# CHAPTER 4

# METHODS

This study analyzed data on parolees released from Iowa prisons to Iowa Community-Based Corrections in 2010 (N = 1,270). Data was obtained from the Iowa Department of Corrections Iowa Corrections Offender Network (ICON) system and other official Iowa Department of Correction records. Upon release, parolees were placed into one of eight correctional districts in Iowa which signified the geographic area the parolees would be supervised. A parolee was excluded from the sample if he or she was incarcerated for more than one "Operating While Intoxicated" offense, released due to expiration of sentence, released to an agency outside the Iowa Department of Corrections (e.g. Immigrations and Customs Enforcement), or was paroled outside the state of Iowa.

## Measures

The dependent variable was the number of days it took a parolee to recidivate, up to a maximum of two years. The recidivism variable was derived from records that include all arrests in the state as well as the parolee's history in the Iowa Department of Corrections and Iowa Community-Based Corrections. Recidivism was operationalized as the commission of a parole violation, rearrest, or readmission to the custody of the Iowa Department of Corrections. If a parolee was both arrested and readmitted to prison then the shorter time in days was utilized in the analysis.

The independent variable of employment was analyzed using two sets of dummy variables in which 0 indicated that the parolee was unemployed and 1 indicated that the

parolee was employed. The first variable, structural benefit of employment, included employment operationalized as being employed as either full-time, part-time, seasonal, or having a spot job position as well as being a student. Unemployment for this variable was operationalized as parolees who were without work, were disabled, or were retired. This variable analyzed employment in relation to the non-economic aspects of being employed, which include structure, new companions, and the potential rewards provided by employment, including promotions to assess the parolees bond to society.

The second variable, financial benefit of employment, was operationalized as being employed in either a full-time, part-time, seasonal, or having a spot job position, and being either retired or disabled. Unemployment for this variable was operationalized as parolees who were without work or were students. This variable analyzed employment in relation to the economic aspects provided by being employed or receiving an economic benefits when retired or disabled to assess how external factors influence a parolees connection with society.

Consistent with prior literature, age, gender, race, marital status, the number of dependents, and education were included in the analysis as control variables. Gender, race, and marital status were analyzed as dummy variables. For gender, 0 indicated female and 1 indicated male, for race, 0 indicated white and 1 indicated other race or Hispanic, and for marital status, 0 indicated married or common law and 1 indicated single or divorced. The number of dependents was measured by the total dependents a parolee claimed. Education was measured as the highest education received on a 1 to 6 scale with 1 indicating completion of grades 1 to 9, 2 indicating completion of grades 10

to 12, 3 indicating a high school degree or GED, 4 indicating some college, 5 indicating vocational technical school or Associates Degree, and 6 indicating a Bachelor's degree or higher.

The criminal history control variables included were, 'the official designation of legal offense status,' crime type, and the amount of months the parolee served before being paroled. The 'official designation of legal offense status' indicated the crime the parolee was convicted of; measured as 1 for any misdemeanor, 2 for a felony enhancement or other felony, 3 for a Class D Felony, 4 for a Class C Felony, and 5 for a Class B Felony. The 'crime type' variable categorized the offense that resulted in incarceration as being either a property crime, violent crime, drug/other crime, or a sex crime. Sex crimes were counted separately to account for the possibility that they could overlap with the violent crime category. Each 'crime type' was a dummy variable in which 1 indicated a property, violent, drug, or sex offense and 0 indicated all else. The 'number of months served' variable measured the amount of time a parolee severed on their prison sentence immediately prior to parole. A 'work release' variable was utilized to assess if a parolee was released to a work release supervision status in which 1 indicated released on work release status and 0 indicated all else.

An individualized treatment program approach was introduced into the corrections population in 2010 by the Iowa Department of Corrections. The program was designed to address a parolee's needs to increase their chance of successful parole completion by assigning a number of treatment programs to complete in a hierarchical manner. Parolees were required to complete a higher priority treatment need before

being assigned a lower priority treatment need. The completion of a priority 1 or 2 treatment need was included as a control variable in the analysis in which 0 indicated a priority 1 or 2 treatment need was not completed and 1 indicated a priority 1 or 2 treatment was completed. The total number of programs a parolee received in their most recent sentence prior to parole was included as a control variable. The maximum completion of a priority need 1 program was included as a control variable in which 0 indicated a priority need 1 program was not completed, 1 indicated a priority need 1 program was in progress, and 2 indicated a priority need 1 program was completed.

The Level of Service Inventory-Revised (LSI-R) risk assessment measure is administered within the Iowa Department of Corrections to evaluate an inmate's risk of reoffending when released to parole and re-administered throughout the course of the parole period to measure any changes in the parolee's risk for reoffending. The LSI-R subscale variables were included in the analysis consisting of criminal history, education and employment, attitudes, financial status, family and marital relationships, living accommodations, leisure and recreation patterns, criminal companions, alcohol and drug problems, and emotional and personal problems. The LSI-R subscale was obtained by totaling each of the answers in the subscale. The first and the last LSI-R subscale scores on file with the Iowa Department of Corrections were included in the analysis to provide an examination on how the parolee has changed from when they were first paroled to when the last LSI-R score on file was administered.

## Research Design

First, this study utilized a logistic regression model to estimate the probability that a parolee is employed while on parole given demographic characteristics, criminal history variables, and risk assessment scores. The output of this regression is the predicted probability that a parolee is employed net of being selected into employment. The predicted probability was calculated first as it was used in the propensity equations.

### Balance

The next part of the analysis assessed balance among the propensity score methods. The covariate adjustment and inverse probability of treatment weighting models were propensity models used in this study that worked to balance similar characteristics of covariates, a secondary variable that can affect the relationship between the dependent variable and independent variable, for the treated and untreated subjects. The intention of the propensity score adjustment models was to improve balance to obtain fewer differences in covariates when adjustments were made. The UNIANOVA mean difference test was utilized to analyze balance. The means were assessed without adjusting the data in which employment was assessed on control variables. Next, the predicted probability of employment was added as a control variable which is known as the covariate adjustment model and the means were analyzed. Finally, the inverse of the predicted probability of employment was calculated, creating a new variable. The sample was then weighted on this new variable which is referred to as the inverse probability of treatment weighting model. The means were assessed when the data was weighted by the inverse of the predicted

probability of employment. The UNIANOVA mean test analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software program.

**Logistic Regression**

The next part of the analysis used a logistic regression method to calculate the effects of employment on recidivism. The first logistic regression was analyzed net of any propensity score adjustments by regressing recidivism on employment along with other control variables. The results of this analysis explained the effects of employment on recidivism as it truly occurs among parolees in Iowa.

Next, a logistic regression analyzed the effect of employment on recidivism when the propensity to be employed was held constant which is known as the covariate adjustment method. The predicted probability of employment was entered into the logistic regression equation as a covariate. All of the base-line model data were used in its original structure. The effects of employment along with other independent variables were interpreted as the net effect when controlling for other variables in the model. If employment was found to be significant, then it was significant when controlling for the predicted probability that a parolee was employed. Statistical differences between covariance were eliminated in this study since the predicted probability of the employment covariate was added to the model.

The last logistic regression method altered the original sample to account for selection bias which analyzed the effects of employment on recidivism. This model is referred to as the inverse probability of treatment weighting model as it calculates the inverse of the predicted probability of employment which created a new variable. The

sample was then weighted on the inverse variable that was created. Larger weights were assigned to parolees that were likely unemployed while smaller weights were applied to parolees that were likely employed. By applying weights, a randomized experimental design was mimicked which allowed for an analysis of the unbiased effect of employment on recidivism among parolees. All of the logistic regression methods were analyzed using the SPSS software program.

**Cox Regression**

A Cox regression method was used to predict the amount of time from when a parolee was released to a recidivism event. The first Cox regression method was analyzed net of any propensity score adjustments. The results of this analysis explain the effects of employment on recidivism as it truly occurs among parolees in Iowa. This analysis is known as the unadjusted model. The second Cox regression method was analyzed using the covariate adjustment model by adding the predicted probability of employment as a covariate. The last Cox regression method was analyzed using the inverse probability of treatment weighting model which weighted the data by the inverse of the predicted probability of employment. All of the Cox regression methods were analyzed using the SPSS software program.

# CHAPTER 5

## RESULTS

Table 1 presents the descriptive statistics for the sample (N = 1,270). The majority, 85%, of the parolees in the study were male with an average age of 37 years (*SD* = 11). Among parolees, 26% were racial and/or ethnic minorities. The percentage of parolees that were single was 82% (*SD* = 0.39) with an average number of 1 dependents (*SD* = 1.48). The mean education completed was 4.2, indicating that the parolee had received some college education (*SD* = 0.865).

Among the criminal history control variables, the average official designation of legal offense status was 3.2, indicating the average parolee was incarcerated for a class D Felony (*SD* = 1.08). For the type of crime the parolee was being paroled from, thirty-two percent (*SD* = 0.47) were property crimes, 18% were violent crimes (*SD* = 0.38), and 50% were drug/other crimes (*SD* = 0.50). Parolees served on average twenty-four months in prison (*SD* = 22.85). Thirty-seven percent of the parolees were released on a work release status (*SD* = 0.48), meaning that the parolee was permitted to leave a halfway house or work release center for employment while fulfilling their sentence. The average needs one or two treatment completion was 34% (*SD* = 0.48) and the mean total number of programs that were administered during the parolees last sentence was 4.96 (*SD* = 3.6). The means for the last LSI-R score on file with the Iowa Department of Corrections according to the subscale included 6.78 for criminal history (*SD* = 1.89), 10.18 for education and employment (*SD* = 4.18), 4.10 for attitudes (*SD* = 1.89), 2.46 for financial status (*SD* = 0.92), 5.68 for family and marital relationships (*SD* = 1.81), 2.75 for

living accommodations (*SD* = 1.36), 2.76 for leisure and recreation patterns (*SD* = 1.00), 2.91 for criminal companions (*SD* = 1.01), 5.05 for alcohol and drug problems (*SD* = 3.35), 2.40 for emotional and personal problems (*SD* = 1.41), and 45.06 for the total LSI-R score (*SD* = 10.93). As this is a parole sample, the LSI-R risk scores are high by comparison to general offender norms. Additionally, the mean time in days to parole failure was 557 days (*SD* = 246.56).

**Table 1** Summary statistics and description of study variables

| **Variable** | ***M*** | ***SD*** | **Description** |
|---|---|---|---|
| Independent variables | | | |
| Structural benefit of employment | 47.10% | 0.50 | 0 = unemployed/unemployed, retired, disabled; 1 = employed/full-time, part-time, seasonal, spot job, student |
| Financial benefit of employment | 52.66% | 0.50 | 0 = unemployed/unemployed, student; 1 = employed/full-time, part-time, seasonal, spot job, retired, disabled |
| Descriptive variables | | | |
| Sex | 85% | 0.36 | 1 = male |
| Age | 37.66 | 10.59 | age in years |
| Racial and/or ethnic minority status | 26% | 0.44 | 0 = white; 1 = other race or Hispanic |
| Education | 4.2 | 0.87 | 1 = grades 1-9; 2 = grades10-12; 3 = High School Degree or GED; 4 = some college; 5 = vocational technical school or Associates Degree; 6 = Bachelor's or higher |
| Marital Status | 82% | 0.39 | 0 = married or common law; 1 = single or divorced |
| Number of dependents | 1 | 1.48 | dependents number |
| Iowa born | 74% | 0.44 | 1 = born in Iowa |
| Primary dependent variable | | | |
| Recidivism | 557 | 246.56 | Time in days to failure with a 2 year max |
| Control variables | | | |

**Table 1 Continued**

| | | | |
|---|---|---|---|
| Official designation of legal offense status | 3.2 | 1.08 | 1 = any misdemeanor; 2 = other felony or enhancement; 3 = D Felony; 4 = C Felony; 5 = B Felony; 6 = special sentence |
| Crime type: Property crime | 32% | 0.47 | 1 = property crime |
| Crime type: Violent crime | 18% | 0.38 | 1 = violent crime |
| Crime type: Drug/other crime | 50% | 0.50 | 1 = drug/other crime |
| Months served | 24 | 22.85 | Number of months served in prison |
| Treatment completed needs 1 & 2 | 34% | 0.48 | Treatment completed needs 1 & 2 (0, 1 variable) |
| Total number of programs administered in last sentence | 4.96 | 3.6 | Total number of programs that were administered in the last sentence |
| Maximum completion of a priority need 1 program | 40% | 0.73 | The maximum completion of a priority need 1 program |
| LSI-R subscale | | | Last LSI-R score on file |
| Criminal history | 6.78 | 1.89 | |
| Education and employment | 10.18 | 4.18 | |
| Attitudes | 4.10 | 1.89 | |
| Financial status | 2.46 | 0.92 | |
| Family and martial relationships | 5.68 | 1.81 | |
| Accommodations | 2.75 | 1.36 | |
| Leisure and recreation patterns | 2.76 | 1.00 | |
| Criminal companions | 2.91 | 1.01 | |
| Alcohol and drug problems | 5.05 | 3.35 | |
| Emotional and personal problems | 2.40 | 1.41 | |
| Total LSI-R score | 45.06 | 10.93 | |

## Balance

Balance was assessed to determine if the propensity methods utilized in this research corrected for the probability of a parolee being employed. Propensity methods should make the differences between the treated and untreated groups statistically similar, resulting in what is known as balance. In this study, balance was assessed by analyzing the mean difference between the unadjusted and adjusted models by using UNIANOVA analysis. Results showed that without any propensity score adjustments, the covariates are unbalanced across employment for both variables, indicating that being employed is not randomly distributed among the parolees in this study.

Propensity methods corrected for this lack of random assignment by adjusting the probability of employment among study participants. Results showed that utilizing these methods reduced the differences between the untreated and treated parolees and created pseudo-randomization between the groups. This analysis indicated that systematic differences existed in research methods not utilizing techniques that mimic random assignment and that this can have potential confounding effects. Differences were shown between parolees across various measurements of employment. The use of propensity methods removed the confounding effects of non-random assignment by balancing the covariates.

## Predicted Probability of Employment

The first logistic regression model in this analysis determined the predicted probability of employment among the sample and consisted of 34 variables. The

Pseudo-$R^2$ in the analysis of the structural benefit of employment explained 9.6% of the variation in employment, and 7.5% of the variation in employment in the analysis of the financial benefit of employment.[1] Recall that the structural benefit of employment variable includes parolees who were without work, retired, or disabled, while the financial benefit of employment variable includes parolees who were employed full-time, part-time, seasonal, or held a spot job position, and being either retired or disabled.

**Structural Benefit of Employment**

The purpose of this logistic regression was to assess the predictors of employment among parolees to determine the predicted probability of employment and the covariates that predict employment. Age ($p$ = 0.000, OR = 0.974, SE = 0.006) and being released to a work release status ($p$ = 0.000, OR = 1.841, SE = 0.152) were significant predictors of employment when the structural benefit of employment variable was measured at the $p<.05$. The first education and employment score on file ($p$ = 0.023, OR = 0.955, SE = 0.020), the last education and employment score on file (p = 0.001, OR = 0.941, SE = 0.018), and the last financial score on file ($p$ = 0.034, OR = 0.833, SE = 0.086) were the LSI-R subscale variables that were significant predictors of employment.

**Financial Benefit of Employment**

The logistic regression method was analyzed to determine the predicted probability of employment for the financial benefit of employment variable. Official

[1] There were 47 missing cases in this model.

designation of legal offense status ($p$ = 0.028, OR = 0.872, SE = 0.062) and being released to a work release status ($p$ = 0.013, OR = 1.452, SE = 0.150) were significant predictors of employment. The last employment and education LSI-R subscale score on file ($p$ = 0.000, OR = 0.933, SE = 0.018) was also significant.

Logistic Regression

**Unadjusted Model**

Table 2 and table 3 present the regression results when the structural benefit of employment and financial benefit of employment variables were analyzed for each propensity score technique, consecutively. First, recidivism was regressed on employment along with the covariate set that consisted of 36 variables. This is the unadjusted model which predicts the effects of employment on recidivism as it truly occurs among Iowa parolees. In the regression consisting of the structural benefit of employment variable, the Pseudo-$R^2$ explained 16.3% of the variation in recidivism and it explained 16.1% of the variation in the regression consisting of the financial benefit of employment variable.[2]

Structural Benefit of Employment

In the logistic regression model that analyze the structural benefit of employment, employment was a significant predictor of recidivism ($p$ = 0.002, OR = 0.692, SE = 0.119, in the absence of controls. When the set of 36 variables were added as controls, employment remained a significant predictor of recidivism ($p$ = 0.013, OR = 0.715, SE = 0.136). Additionally, sex ($p$ = 0.002, OR = 1.890, SE = 0.209), age ($p$ = 0.001,

[2] There were 47 missing cases in this model.

OR = 0.977, SE = 0.007), and the total number of programs that were administered in the last sentence ($p$ = 0.040, OR = 1.041, SE = 0.019) were significant predictors of recidivism in the logistic regression model when the structural benefit of employment variable was analyzed. Criminal history ($p$ = 0.012, OR = 1.202, SE = 0.074), education and employment ($p$ = 0.033, OR = 1.042, SE = 0.019), attitudes ($p$ = 0.031, OR = 1.103, SE = 0.046), financial status ($p$ = 0.048, OR = 1.205, SE = 0.095), alcohol and drug problems ($p$ = 0.004, OR = 1.077, SE = 0.025), and emotional and personal problems ($p$ = 0.031, OR = 1.147, SE = 0.064) were the last LSI-R subscale variables on file that were significant.

Financial Benefit of Employment

When assessing the financial benefit of employment in the absence of controls, employment was a significant predictor of recidivism ($p$ = 0.006, OR = 0.722, SE = 0.118). When the set of 36 control variables were added, employment was marginally significant ($p$ = 0.059, OR = 0.777, SE = 0.133). Significant predictors of recidivism in the analysis of the financial benefit of employment were very similar to the predictors in the analysis of the structural benefit of employment in the unadjusted logistic regression analysis. Sex ($p$ = 0.002, OR = 1.916, SE = 0.208), age ($p$ = 0.003, OR = 0.980, SE = 0.007), and the total number of programs that were administered in the last sentence ($p$ = 0.043, OR = 1.040, SE = 0.019) were additional covariates that were significant. Additionally, criminal history ($p$ = 0.012, OR = 1.204, SE = 0.073), education and employment ($p$ = 0.032, OR = 1.043, SE = 0.019), attitudes (p = 0.031, OR = 1.103, SE = 0.046), financial status ($p$ = 0.037, OR = 1.218, SE = 0.094), alcohol and drug problems ($p$ = 0.004, OR = 1.076, SE = 0.025), and emotional and personal problems ($p$ =

0.025, OR = 1.153, SE = 0.063) were the last LSI-R subscale variables on file that were significant predictors.

**Covariate Adjustment Model**

In the next part of the analysis, a logistic regression was conducted using the covariate adjustment model. The predicted probability of employment was added as a covariate in this analysis, increasing the covariates to 37. The purpose of this analysis was to measure the relationship between the dependent and independent variables when the effects of confounding were removed. In the regression of the structural benefit of employment variable, the Pseudo-$R^2$ explained 16.9% of the variation in recidivism and 16.1% of the variation in recidivism in the regression of the financial benefit of employment variable.[3]

Structural Benefit of Employment

In the absence of control variables, employment was a significant predictor of recidivism ($p$ = 0.025, OR = 0.755, SE = 0.125) when the structural benefit of employment variable was assessed. When the set of 37 control variables were added, employment remained a significant predictor of recidivism ($p$ = 0.018, OR = 0.724, SE = 0.136). Additionally, age ($p$ = 0.001, OR = 0.865, SE = 0.044), racial and/or ethnic minority status ($p$ = 0.005, OR = 0.282, SE = 0.455), marital status ($p$ = 0.033, OR = 0.504, SE = 0.322), and being born in Iowa ($p$ = 0.024, OR = 2.081, SE = 0.325) were each significant predictors of recidivism. Being released to a work release status ($p$ = 0.002, OR = 22.697, SE = 1.031), the official designation of legal offense status ($p$ = 0.017, OR =

[3] There were 47 missing cases in this model.

0.663, SE = 0.172), the number of months a parolee served ($p$ = 0.036, OR = 1.011, SE = 0.005), completing a treatment 1 and 2 need ($p$ = 0.006, OR = 0.590, SE = 0.192), the total number of programs that were administered during the last sentence ($p$ = 0.001, OR = 1.161, SE = 0.043), and the maximum completion of a priority need 1 program ($p$ = 0.031, OR = 1.807, SE = 0.274) were additional covariates that were significant predictors.

Additionally, education and employment ($p$ = 0.013, OR = 0.821, SE = 0.079), attitudes ($p$ = 0.006, OR = 0.789, SE = 0.086), financial status ($p$ = 0.001, OR = 0.557, SE = 0.172), leisure and recreation patterns ($p$ = 0.008, OR = 0.696, SE = 0.136), and criminal companions ($p$ = 0.012, OR = 1.520, SE = 0.167) were the first LSI-R subscale variables on file that were significant when the structural benefit of employment variable was analyzed. Criminal history ($p$ = 0.000, OR = 1.455, SE = 0.100), education and employment ($p$ = 0.017, OR = 0.784, SE = 0.102), attitudes ($p$ = 0.000, OR = 1.291, SE = 0.072), financial status ($p$ = 0.034, OR = 0.512, SE = 0.315), family and marital relationships ($p$ = 0.003, OR = 1.275, SE = 0.083), leisure and recreation patterns ($p$ = 0.003, OR = 1.401, SE = 0.114), and criminal companions ($p$ = 0.023, OR = 0.726, SE = 0.141) were the last LSI-R subscale variables on file that were significant predictors of recidivism.

Financial Benefit of Employment

In the absence of controls, employment was marginally significant when the financial benefit of employment variable was measured ($p$ = 0.087, OR = 0.810, SE = 0.123). When the set of 37 control variables were added, employment remained

marginally significant ($p$ = 0.061, OR = 0.778, SE = 0.134). Again, fewer variables significantly predicted recidivism when assessing the financial benefit of employment variable than when assessing the structural benefit of employment variable. Sex ($p$ = 0.001, OR = 1.943, SE = 0.209) was the only control variable, except for LSI-R subscale variables, that was a significant when the financial benefit of employment variable was analyzed. Criminal history ($p$ = 0.009, OR = 1.235, SE = 0.081) and emotional and personal problems ($p$ = 0.020, OR = 1.193, SE = 0.076) were the last LSI-R subscale variables on file that were significant predictors of recidivism.

**Inverse Probability of Treatment Weighting Model**

The inverse probability of treatment weighting model accounted for selection bias of employment by using the inverse of the predicted probability of employment and then weighting the sample by the inverse. The purpose of this analysis was to measure the relationship between the dependent and independent variables when the effects of confounding were removed. The problem of confounding is handled by weighting the data so employment can be treated as if it was handed out at random in a population. This is done by weighting those who are likely to be employed and that are employed lightly, for example. Those who statistically should not be employed but are, by contrast, would be weighted heavily.

The weighted sample size for the structural benefit of employment variable increased from 1,270 to 2,449 cases and from 1,270 to 2,504 cases for the financial benefit of employment variable. After the sample was weighted by the inverse of the probability of a parolee being employed, recidivism was regressed on 36 covariates. In

the structural benefit of employment regression, the Pseudo-$R^2$ explained 15.7% of the variation in recidivism while it explained 15.6% of the variation in recidivism in the financial benefit of employment variable.

Structural Benefit of Employment

In the absence of controls, employment was a significant predictor of recidivism when the structural benefit of employment variable was analyzed. Employment remained significant when the set of 36 control variables were added ($p$ = 0.001, OR = 0.737, SE = 0.091). Additionally, sex ($p$ = 0.000, OR = 1.922, SE = 0.149), age ($p$ = 0.000, OR = 0.976, SE = 0.005), being released on a work release status ($p$ = 0.031, OR = 1.283, SE = 0.115), and the total number of programs that were administered in the sentence ($p$ = 0.024, OR = 1.031, SE = 0.014) were significant predictors of recidivism. Living accommodations ($p$ = 0.014, OR = 1.099, SE = 0.038) and alcohol and drug problems ($p$ = 0.035, OR = 0.964, SE = 0.017) were the first LSI-R subscale variables on file that were significant. Criminal history ($p$ = 0.000, OR = 1.198, SE = 0.052), education and employment ($p$ = 0.001, OR = 1.045, SE = 0.014), attitudes ($p$ = 0.002, OR = 1.103, SE = 0.032), financial status ($p$ = 0.010, OR = 1.186, SE = 0.066), family and marital relationships ($p$ = 0.046, OR = 1.081, SE = 0.039), alcohol and drug problems ($p$ = 0.000, OR = 1.074, SE = 0.018), and emotional and personal problems ($p$ = 0.000, OR = 1.185, SE = 0.045) were the last LSI-R subscale variables on file that were significant predictors of recidivism.

Financial Benefit of Employment

In the absence of controls, employment was a significant predictor of recidivism when the financial benefit of employment variable was measured. When the set of 36 control variables were added, employment remained a significant predictor of recidivism ($p$ = 0.009, OR = 0.790, SE = 0.090). Again, similar to the covariate adjustment results, there were significantly fewer demographic and criminal history variables that significantly predicted recidivism in the analysis of the financial benefit of employment variable than in the analysis of the structural benefit of employment variable. Additionally, sex ($p$ = 0.000, OR = 2.056, SE = 0.148), age ($p$ = 0.000, OR = 0.981, SE = 0.005) and the total number of programs that were administered in the last sentence ($p$ = 0.012, OR = 1.035, SE = 0.014) were significant predictors of recidivism. Financial status ($p$ = 0.027, OR = 0.862, SE = 0.067) and living accommodations ($p$ = 0.033, OR = 1.085, SE = 0.038) were the first LSI-R subscale variables on file that were significant. Criminal history ($p$ = 0.002, OR = 1.169, SE = 0.051), education and employment ($p$ = 0.005, OR = 1.038, SE = 0.013), attitudes ($p$ = 0.003, OR = 1.098, SE = 0.032), financial status ($p$ = 0.003, OR = 1.220, SE = 0.066), alcohol and drug problems ($p$ = 0.000, OR = 1.073, SE = 0.018), and emotional and personal problems ($p$ = 0.000, OR = 1.217, SE = 0.018) were the last LSI-R subscale variables on file that were significant predictors of recidivism.

**Table 2** Logistic Regression Results by Propensity Technique Assessing the Structural Benefit of Employment

| | **Unadjusted** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | OR | SE | *p* | OR | SE | *p* | OR | SE |
| Primary independent variable | | | | | | | | | |
| Structural benefit of employment | 0.013* | 0.715 | 0.136 | 0.018* | 0.724 | 0.136 | 0.001* | 0.737 | 0.091 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.002* | 1.890 | 0.209 | 0.259 | 0.601 | 0.451 | 0.000* | 1.922 | 0.149 |
| Age | 0.001* | 0.977 | 0.007 | 0.001* | 0.865 | 0.044 | 0.000* | 0.976 | 0.005 |
| Racial and/or minority status | 0.709 | 0.940 | 0.167 | 0.005* | 0.282 | 0.455 | 0.814 | 0.973 | 0.117 |
| Marital Status | 0.654 | 1.082 | 0.175 | 0.033* | 0.504 | 0.322 | 0.891 | 1.017 | 0.123 |
| Iowa born | 0.669 | 0.934 | 0.161 | 0.024* | 2.081 | 0.325 | 0.369 | 0.903 | 0.114 |
| Control variables | | | | | | | | | |
| Work release status | 0.163 | 1.257 | 0.164 | 0.002* | 22.697 | 1.031 | 0.031* | 1.283 | 0.115 |
| Official designation of legal offense status | 0.557 | 1.040 | 0.067 | 0.017* | 0.663 | 0.172 | 0.140 | 1.073 | 0.048 |
| Months served | 0.961 | 1.000 | 0.003 | 0.036* | 1.011 | 0.005 | 0.864 | 1.000 | 0.002 |
| Treatment completed needs 1 & 2 | 0.399 | 0.903 | 0.121 | 0.006* | 0.590 | 0.192 | 0.292 | 0.870 | 0.132 |
| Total number of programs administered in last sentence | 0.040* | 1.041 | 0.019 | 0.001* | 1.161 | 0.043 | 0.024* | 1.031 | 0.014 |
| Maximum completion of priority need 1 programs | 0.420 | 0.903 | 0.126 | 0.031* | 1.807 | 0.274 | 0.470 | 0.938 | 0.088 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Education and employment | 0.369 | 1.020 | 0.022 | 0.013* | 0.821 | 0.079 | 0.267 | 1.017 | 0.016 |

**Table 2 Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Attitudes | 0.493 | 0.969 | 0.046 | 0.006* | 0.789 | 0.086 | 0.630 | 1.016 | 0.032 |
| Financial status | 0.060 | 0.836 | 0.096 | 0.001* | 0.557 | 0.172 | 0.075 | 0.886 | 0.068 |
| Accommodations | 0.114 | 1.090 | 0.055 | 0.100 | 1.095 | 0.055 | 0.014* | 1.099 | 0.038 |
| Leisure and recreation patterns | 0.332 | 0.909 | 0.098 | 0.008* | 0.696 | 0.136 | 0.103 | 0.895 | 0.068 |
| Criminal companions | 0.902 | 1.011 | 0.086 | 0.012* | 1.520 | 0.167 | 0.969 | 0.998 | 0.061 |
| Alcohol and drug problems | 0.305 | 0.975 | 0.025 | 0.118 | 1.063 | 0.039 | 0.035* | 0.964 | 0.017 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.012* | 1.202 | 0.074 | 0.000* | 1.455 | 0.100 | 0.000* | 1.198 | 0.052 |
| Education and employment | 0.033* | 1.042 | 0.019 | 0.017* | 0.784 | 0.102 | 0.001* | 1.045 | 0.014 |
| Attitudes | 0.031* | 1.103 | 0.046 | 0.000* | 1.291 | 0.072 | 0.002* | 1.103 | 0.032 |
| Financial status | 0.048* | 1.205 | 0.095 | 0.034* | 0.512 | 0.315 | 0.010* | 1.186 | 0.066 |
| Family and martial relationships | 0.221 | 1.070 | 0.055 | 0.003* | 1.275 | 0.083 | 0.046* | 1.081 | 0.039 |
| Leisure and recreation patterns | 0.134 | 1.139 | 0.087 | 0.003* | 1.401 | 0.114 | 0.054 | 1.123 | 0.060 |
| Criminal companions | 0.887 | 0.987 | 0.089 | 0.023* | 0.726 | 0.141 | 0.924 | 1.006 | 0.063 |
| Alcohol and drug problems | 0.004* | 1.077 | 0.025 | 0.330 | 1.030 | 0.030 | 0.000* | 1.074 | 0.018 |
| Emotional and personal problems | 0.031* | 1.147 | 0.064 | 0.163 | 0.836 | 0.128 | 0.000* | 1.185 | 0.045 |

*p*<.05

**Table 3** Logistic Regression Results by Propensity Technique Assessing the Financial Benefit of Employment

| | **Logistic Regression** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | OR | SE | *p* | OR | SE | *p* | OR | SE |
| Primary independent variable | | | | | | | | | |
| Financial benefit of employment | 0.059 | 0.777 | 0.133 | 0.061 | 0.778 | 0.134 | 0.009* | 0.790 | 0.090 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.002* | 1.916 | 0.208 | 0.001* | 1.943 | 0.209 | 0.000* | 2.056 | 0.148 |
| Age | 0.003* | 0.980 | 0.007 | 0.697 | 0.993 | 0.018 | 0.000* | 0.981 | 0.005 |
| Control variables | | | | | | | | | |
| Total number of programs administered in last sentence | 0.043* | 1.040 | 0.019 | 0.126 | 1.078 | 0.049 | 0.012* | 1.035 | 0.014 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Financial status | 0.067 | 0.839 | 0.096 | 0.070 | 0.771 | 0.143 | 0.027* | 0.862 | 0.067 |
| Accommodations | 0.130 | 1.087 | 0.055 | 0.851 | 1.019 | 0.098 | 0.033* | 1.085 | 0.038 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.012* | 1.204 | 0.073 | 0.009* | 1.235 | 0.081 | 0.002* | 1.169 | 0.051 |
| Education and employment | 0.032* | 1.043 | 0.019 | 0.625 | 0.933 | 0.142 | 0.005* | 1.038 | 0.013 |
| Attitudes | 0.031* | 1.103 | 0.046 | 0.099 | 1.188 | 0.104 | 0.003* | 1.098 | 0.032 |
| Financial status | 0.037* | 1.218 | 0.094 | 0.802 | 1.053 | 0.207 | 0.003* | 1.220 | 0.066 |
| Alcohol and drug problems | 0.004* | 1.076 | 0.025 | 0.376 | 1.043 | 0.047 | 0.000* | 1.073 | 0.018 |
| Emotional and personal problems | 0.025* | 1.153 | 0.063 | 0.020* | 1.193 | 0.076 | 0.000* | 1.217 | 0.018 |

$p$ <.05

Cox Regression

**Unadjusted Model**

Table 4 and table 5 present the Cox regression results by propensity score technique for the structural benefit of employment and financial benefit of employment variables, consecutively. The dependent variable of this study measured the time to failure; therefore, this analysis estimates proportional hazards using a Cox regression method to estimate the time a parolee is released from prison to a recidivism event. A Cox regression method is a more robust analysis than other methods for predicting the time to parole failure as it does not impose distributional assumptions between the time of parolee release and recidivism. The first Cox regression method analyzed the effect of employment on recidivism as it truly occurs in the correctional system with a total of 36 covariates.

Based on the chi-square statistical test in the structural benefit of employment variable analysis, the covariates had an increased effect on recidivism with a chi-square score of 240.221 and a -2 log likelihood score of 6226.819 ($p$ = 0.000). Additionally, the covariates had an increased effect on recidivism in the financial benefit of employment analysis, with a chi-square score of 238.467 and a -2 log likelihood score of 6227.881 ($p$ = 0.000). Again, the Pseudo-$R^2$ results from the unadjusted logistic regression analysis provided the average results at any given point in time and can be considered as an additional and more forgiving goodness of fit measure. In explanation, predicting parolee success at each daily increment and then averaging the effect is much more difficult than predicting eventual failure. The Pseudo-$R^2$ in the structural benefit of

employment variable explained 16.3% of the variation in recidivism and it explained 16.1% of the variation in the financial benefit of employment regression.

Structural Benefit of Employment

In the absence of controls, employment was a significant predictor of failure when the structural benefit of employment variable was analyzed ($p$ = 0.001, HR = 1.349, SE = 0.094). When the set of 36 control variables were added, employment remained a significant predictor of failure among parolees ($p$ = 0.013, HR = 1.277, SE = 0.098). Additionally, sex ($p$ = 0.007, HR = 1.564, SE = 0.164) and age ($p$ = 0.001, HR = 0.983, SE = 0.005) were control variables that were significant predictors of failure among parolees. Criminal history ($p$ = 0.001, HR = 1.183, SE = 0.052), education and employment ($p$ = 0.036, HR = 1.031, SE = 0.014), attitudes ($p$ = 0.004, HR = 1.101, SE = 0.033), alcohol and drug problems ($p$ = 0.001, HR = 1.064, SE = 0.018), and emotional and personal problems ($p$ = 0.022, HR = 1.113, SE = 0.046) were the last LSI-R subscale variables on file that were significant predictors of failure.

Financial Benefit of Employment

In the absence of controls, employment was a significant predictor of failure among parolees when the financial benefit of employment variable was analyzed ($p$ = 0.002, HR = 1.326, SE = 0.092). When the set of 36 control variables were added, employment remained a significant predictor ($p$ = 0.023, HR = 1.244, SE = 0.096). The same control variables found to be significant predictors of failure when analyzing the structural benefit of employment variable as well as the financial benefit of employment variable. Sex ($p$ = 0.005, HR = 1.578, SE = 0.164) and age ($p$ = 0.003, HR = 0.985, SE =

0.005) were significant predictors of failure among parolees. Criminal history ($p$ = 0.001, HR = 1.184, SE = 0.052), education and employment ($p$ = 0.037, HR = 1.031, SE = 0.015), attitudes ($p$ = 0.004, HR = 1.101, SE = 0.033), alcohol and drug problems ($p$ = 0.001, HR = 1.064, SE = 0.018), and emotional and personal problems ($p$ = 0.017, HR = 1.118, SE = 0.046) were the last LSI-R subscale variables on file that were significant predictors of failure among parolees.

**Covariate Adjustment Model**

Next, a Cox regression method assessed the effect of employment on recidivism by adding the predicted probability of employment as a covariate, increasing the total number of covariates in the analysis to 37. This analysis predicted time to parole failure while estimating the effects of employment on outcomes when the effects of confounding were removed. Based on the chi-square statistical test in the structural benefit of employment variable analysis, the covariates had an increased effect on recidivism with a chi-square score of 246.541 and a -2 log likelihood score of 6221.114 ($p$ = 0.000). The covariates also had an increased effect on recidivism in the financial benefit of employment analysis, with a chi-square score of 238.681 and a -2 log likelihood score of 6227.572 ($p$ = 0.000). The Pseudo-$R^2$ results from the covariate adjustment logistic regression analysis provided the average results at any given point in time and can be considered as an additional and more forgiving goodness of fit measure. Again, in explanation, predicting parolee success at each daily increment and then averaging the effect is much more difficult than predicating eventual failure. Recall that the Pseudo-$R^2$ results in the covariate logistic regression structural benefit of

employment variable explained 16.9% of the variation in recidivism and it explained 16.1% of the variation in the financial benefit of employment covariate logistic regression.

Structural Benefit of Employment

In the absence of controls, employment was a significant predictor of failure among parolees when the structural benefit of employment variable was analyzed ($p$ = 0.021, HR = 1.256, SE = 0.099). When the set of 37 control variables were added, employment remained a significant predictor of failure ($p$ = 0.020, HR = 1.259, SE = 0.099). Additionally, age ($p$ = 0.003, HR = 0.925, SE = 0.027), racial and/or ethnic minority status ($p$ = 0.018, HR = 0.513, SE = 0.282), being released on a work release status ($p$ = 0.009, HR = 5.191, SE = 0.629), completing a needs 1 and 2 treatment ($p$ = 0.018, HR = 0.659, SE = 0.176), and the total number of programs that were administered in the last sentence ($p$ = 0.003, HR = 1.085, SE = 0.027) were the control variables that were significant predictors of failure among parolees.

Attitudes ($p$ = 0.009, HR = 0.867, SE = 0.055) and financial status ($p$ = 0.010, HR = 0.747, SE = 0.133) were the first LSI-R subscale variables on file that were significant predictors of failure. Additionally, criminal history ($p$ = 0.000, HR = 1.303, SE = 0.067), attitudes ($p$ = 0.000, HR = 1.192, SE = 0.048), family and marital relationships ($p$ = 0.009, HR = 1.158, SE = 0.056), leisure and recreation patterns ($p$ = 0.010, HR = 1.222, SE = 0.078), and alcohol and drug problems ($p$ = 0.038, HR = 1.043, SE = 0.020) were the last LSI-R subscale variables on file that were significant predictors of failure.

Financial Benefit of Employment

In the absence of controls, employment was marginally significant when the financial benefit of employment variable was analyzed ($p$ = 0.052, HR = 1.205, SE = 0.096). Employment became a significant predictor of failure among parolees when the set of 37 control variables were added to the analysis ($p$ = 0.025, HR = 1.240, SE = 0.096). There were significantly fewer variables that were predictors of failure for the financial benefit of employment variable then the structural benefit of employment variable when the predicted probability of employment was added to the equation. Sex ($p$ = 0.005, HR = 1.584, SE = 0.164) was the only control variable that was a significant predictor of failure. Criminal history ($p$ = 0.001, HR = 1.193, SE = 0.054), alcohol and drug problems ($p$ = 0.025, HR = 1.055, SE = 0.024), and emotional and personal problems ($p$ = 0.015, HR = 1.130, SE = 0.050) were the last LSI-R subscale variables on file that were significant.

**Inverse Probability of Treatment Weighting Model**

The inverse probability of treatment weighting model was used in the Cox regression analysis to examine the effects of employment on recidivism. This analysis predicted the time to parole failure while estimating the effects of employment when the effects of confounding were removed. In this analysis, the integer of the weighted inverse variable was calculated and used for this analysis as the Cox regression model could only be calculated in SPSS if the weight was an integer. This increased the sample size for the structural benefit of employment variable from 1,270 to 2,534 cases and

from 1,270 to 2,561 cases for the financial benefit of employment variable and consisted of 36 covariates.

Based on the chi-square statistical test in the structural benefit of employment variable analysis, the covariates had an increased effect on recidivism with a chi-square score of 465.434 and a -2 log likelihood score of 14372.366 ($p$ = 0.000). Similarly, the covariates had an increased effect on recidivism in the financial benefit of employment analysis, with a chi-square score of 476.564 and a -2 log likelihood score of 14532.268 ($p$ = 0.000). The Pseudo-$R^2$ from the inverse probability of treatment weighting logistic regression analysis provided the average results at any given point in time and can be considered as an additional and more forgiving goodness of fit measure. Again, in explanation, predicting parolee success at each daily increment and then averaging the effect is much more difficult than predicting eventual failure. The Pseudo-$R^2$ in the structural benefit of employment regression explained 15.7% of the variation in recidivism and it explained 15.6% of the variation in the financial benefit of employment regression.

Structural Benefit of Employment

In the absence of controls, employment was a significant predictor of failure among parolees when the financial benefit of employment variable was analyzed ($p$ = 0.000, HR = 1.268, SE = 0.065). When the set of 36 control variables were added, employment remained significant ($p$ = 0.000, HR = 1.276, SE = 0.065). Additionally, sex ($p$ = 0.000, HR = 1.627, SE = 0.118), age ($p$ = 0.000, HR = 0.982, SE = 0.004), having a violent crime conviction ($p$ = 0.014, HR = 1.292, SE = 0.104), and the total number of

programs that were administered during the last sentence ($p$ = 0.018, HR = 1.022, SE = 0.009) were significant predictors of failure among parolees.

Living accommodations ($p$ = 0.019, HR = 1.069, SE = 0.028) and alcohol and drug problems ($p$ = 0.007, HR = 0.967, SE = 0.013) were the first LSI-R subscale variables on file were significant predictors of failure among parolees. Criminal history ($p$ = 0.000, HR = 1.148, SE = 0.036), education and employment ($p$ = 0.001, HR = 1.035, SE = 0.010), attitudes ($p$ = 0.000, HR = 1.091, SE = 0.023), family and marital relationships ($p$ = 0.030, HR = 1.063, SE = 0.028), leisure and recreation patterns ($p$ = 0.027, HR = 1.105, SE = 0.045), alcohol and drug problems ($p$ = 0.000, HR = 1.055, SE = 0.013), and emotional and personal problems ($p$ = 0.000, HR = 1.055, SE = 0.013) were the last LSI-R subscale variables on file that were significant.

Financial Benefit of Employment

In the absence of controls, employment was a significant predictor of failure among parolees when the financial benefit of employment was analyzed ($p$ = 0.002, HR = 1.222, SE = 0.064). When the set of 36 control variables were added, employment remained a significant predictor of failure among parolees ($p$ = 0.001, HR = 1.249, SE = 0.065). Additionally, sex ($p$ = 0.000, HR = 1.676, SE = 0.116), age ($p$ = 0.000, HR = 0.985, SE = 0.004), having a violent crime conviction ($p$ = 0.018, HR = 1.275, SE = 0.103), and the total number of programs that were administered during the last sentence ($p$ = 0.000, HR = 1.034, SE = 0.009) were significant predictors of failure.

Living accommodations ($p$ = 0.040, HR = 1.059, SE = 0.028) and alcohol and drug problems ($p$ = 0.042, HR = 0.975, SE = 0.012) were the first LSI-R subscale variables on

file that were significant predictors of failure. Criminal history ($p$ = 0.000, HR = 1.177, SE = 0.036), education and employment ($p$ = 0.015, HR = 1.025, SE = 0.010), attitudes ($p$ = 0.000, HR = 1.101, SE = 0.023), leisure and recreation patterns ($p$ = 0.005, HR = 1.137, SE = 0.046), alcohol and drug problems ($p$ = 0.000, HR = 1.049, SE = 0.013), and emotional and personal problems ($p$ = 0.000, HR = 1.176, SE = 0.032) were the last LSI-R subscale variables on file that were significant.

## Hazard Charts

Figure 1 shows the hazard functions for the structural benefit of employment and financial benefit of employment variable by propensity score technique. The charts show lower hazard among employed parolees when compared to unemployed parolees. There does not appear to be a difference in recidivism between employed and unemployed parolees at 0 days. A difference begins to appear between the two groups starting at approximately 200 days with a lower hazard among employed parolees than unemployed parolees. This difference continued to increase after 200 days at a constant rate across all of the models.

**Table 4** Cox Regression Results by Propensity Technique Assessing the Structural Benefit of Employment

| | **Unadjusted** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | HR | SE | *p* | HR | SE | *p* | HR | SE |
| Primary independent variable | | | | | | | | | |
| Structural benefit of employment | 0.013* | 1.277 | 0.098 | 0.020* | 1.259 | 0.099 | 0.000* | 1.276 | 0.065 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.007* | 1.564 | 0.164 | 0.640 | 0.870 | 0.298 | 0.000* | 1.627 | 0.188 |
| Age | 0.001* | 0.983 | 0.005 | 0.003* | 0.925 | 0.027 | 0.000* | 0.982 | 0.004 |
| Racial and/or ethnic minority status | 0.574 | 0.935 | 0.119 | 0.018* | 0.513 | 0.282 | 0.815 | 0.981 | 0.082 |
| Control variables | | | | | | | | | |
| Work release status | 0.099 | 1.213 | 0.117 | 0.009* | 5.191 | 0.629 | 0.045 | 1.178 | 0.082 |
| Crime type: Violent crime | 0.155 | 1.236 | 0.149 | 0.315 | 1.164 | 0.151 | 0.014* | 1.292 | 0.104 |
| Treatment completed needs 1 & 2 | 0.226 | 0.847 | 0.138 | 0.018* | 0.659 | 0.176 | 0.441 | 0.930 | 0.094 |
| Total number of programs administered in last sentence | 0.056 | 1.026 | 0.014 | 0.003* | 1.085 | 0.027 | 0.018* | 1.022 | 0.009 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Attitudes | 0.207 | 0.958 | 0.034 | 0.009* | 0.867 | 0.055 | 0.902 | 0.997 | 0.023 |
| Financial status | 0.233 | 0.918 | 0.072 | 0.010* | 0.747 | 0.113 | 0.428 | 0.961 | 0.050 |
| Accommodations | 0.128 | 1.064 | 0.041 | 0.101 | 1.069 | 0.041 | 0.019* | 1.069 | 0.028 |
| Alcohol and drug problems | 0.178 | 0.976 | 0.018 | 0.487 | 1.018 | 0.025 | 0.007* | 0.967 | 0.013 |

**Table 4 Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.001* | 1.183 | 0.052 | 0.000* | 1.303 | 0.067 | 0.000* | 1.148 | 0.036 |
| Education and employment | 0.036* | 1.031 | 0.014 | 0.072 | 0.894 | 0.062 | 0.001* | 1.035 | 0.010 |
| Attitudes | 0.004* | 1.101 | 0.033 | 0.000* | 1.192 | 0.048 | 0.000* | 1.091 | 0.023 |
| Family and martial relationships | 0.167 | 1.057 | 0.040 | 0.009* | 1.158 | 0.056 | 0.030* | 1.063 | 0.028 |
| Leisure and recreation patterns | 0.121 | 1.107 | 0.066 | 0.010* | 1.222 | 0.078 | 0.027* | 1.105 | 0.045 |
| Alcohol and drug problems | 0.001* | 1.064 | 0.018 | 0.038* | 1.043 | 0.020 | 0.000* | 1.055 | 0.013 |
| Emotional and personal problems | 0.022* | 1.113 | 0.046 | 0.540 | 0.951 | 0.081 | 0.000* | 1.171 | 0.033 |

*p* <.05



**Table 5** Cox Regression Results by Propensity Technique Assessing the Financial Benefit of Employment

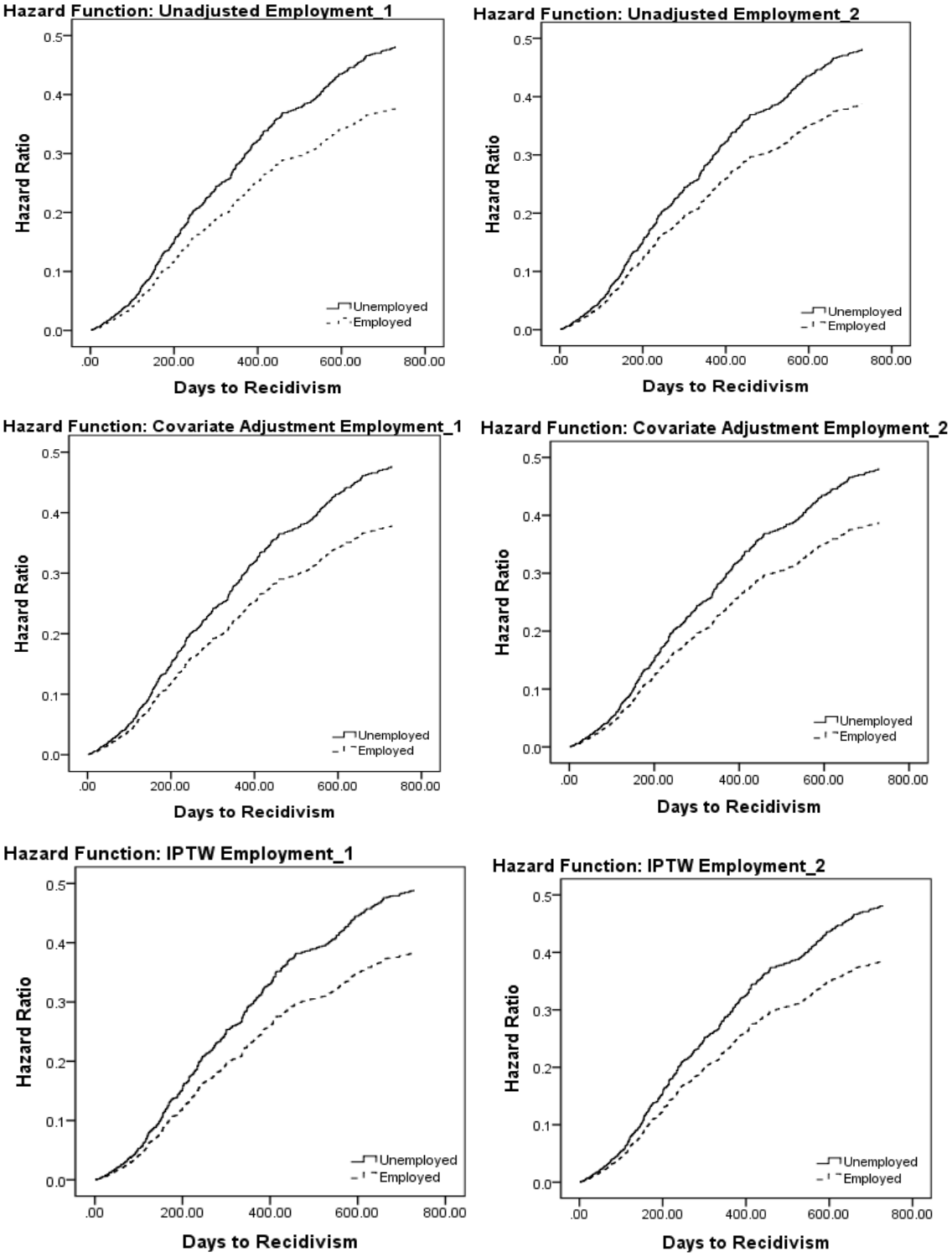
| | **Unadjusted** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | HR | SE | *p* | HR | SE | *p* | HR | SE |
| Primary independent variable | | | | | | | | | |
| Financial benefit of employment | 0.023* | 1.244 | 0.096 | 0.025* | 1.240 | 0.096 | 0.001* | 1.249 | 0.065 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.005* | 1.578 | 0.164 | 0.005* | 1.584 | 0.164 | 0.000* | 1.676 | 0.116 |
| Age | 0.003* | 0.985 | 0.005 | 0.205 | 0.989 | 0.009 | 0.000* | 0.985 | 0.004 |
| Control variables | | | | | | | | | |
| Crime type: Violent Crime | 0.147 | 1.241 | 0.149 | 0.140 | 1.246 | 0.149 | 0.018* | 1.275 | 0.103 |

**Table 5 Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total number of programs administered in last sentence | 0.056 | 1.026 | 0.014 | 0.118 | 1.037 | 0.023 | 0.000* | 1.034 | 0.009 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Accommodations | 0.141 | 1.062 | 0.041 | 0.423 | 1.043 | 0.052 | 0.040* | 1.059 | 0.028 |
| Alcohol and drug problems | 0.156 | 0.975 | 0.018 | 0.142 | 0.974 | 0.018 | 0.042* | 0.975 | 0.012 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.001* | 1.184 | 0.052 | 0.001* | 1.193 | 0.054 | 0.000* | 1.177 | 0.036 |
| Education and employment | 0.037* | 1.031 | 0.015 | 0.968 | 0.998 | 0.060 | 0.015* | 1.025 | 0.010 |
| Attitudes | 0.004* | 1.101 | 0.033 | 0.022 | 1.126 | 0.052 | 0.000* | 1.101 | 0.023 |
| Leisure and recreation patterns | 0.111 | 1.110 | 0.065 | 0.146 | 1.160 | 0.102 | 0.005* | 1.137 | 0.046 |
| Alcohol and drug problems | 0.001* | 1.064 | 0.018 | 0.025* | 1.055 | 0.024 | 0.000* | 1.049 | 0.013 |
| Emotional and personal problems | 0.017* | 1.118 | 0.046 | 0.015* | 1.130 | 0.050 | 0.000* | 1.176 | 0.032 |

*p* <..05

Figure 1: Hazard Functions by Technique



# CHAPTER 6

# CONCLUSION AND DISCUSSION

The goal of this study was to determine the effect of employment on recidivism when the problem that employment is not randomly distributed among parolees is corrected. Results showed that employment was a significant predictor of recidivism among parolees when analyzing the structural benefits of employment, such as providing a parolee with a routine. However, when employment was examined based on its financial benefits, the covariate adjustment model produced marginally significant results. With employment being a significant and a marginal predictor of recidivism across all regression models, it can be concluded that both non-economic and economic factors of employment were important in predicting recidivism among Iowa parolees.

The results suggest that it is not just the economic aspect of employment that impacts a parolee's likelihood of recidivism, but the structure that employment provides is just as important, if not more important, than income. Additionally, the results show that employment reduces the likelihood of recidivism and increases the time it takes a parolee to recidivate. Therefore, assisting parolees with obtaining the necessary skills and certifications while incarcerated as well as with obtaining employment upon release would be a worthwhile investment for the State of Iowa to reduce recidivism among parolees.

In the logistic regression models that included the structural benefit of employment, age and the total number of programs that were administered during the last sentence explained variations in recidivism. Additionally, the last LSI-R subscale

variables on file that explained variations in recidivism across all of the logistic regression models when analyzing the structural benefit of employment variable included criminal history, education and employment, attitudes, and financial status. There were significantly fewer variables that explained variations in recidivism across all of the regression models when the financial benefit of employment variable was analyzed. Sex and the last LSI-R subscale variables on file for criminal history and emotional and personal problems explained variations in recidivism across all of the logistic regression models when analyzing the financial benefit of employment variable. These results suggest that assessing the difference between the LSI-R scores may assist corrections personal in examining the risk for recidivism among parolees.

Results showed that employment was a significant predictor of recidivism across all of the Cox regression methods that included the structural benefit of employment and the financial benefit of employment variables. With employment significantly predicting recidivism across all Cox regression models, it can be concluded that both non-economic and economic factors of employment are important in reducing the time to recidivism among parolees. Additionally, parolees that were employed were found to recidivate at a lower rate than parolees that were unemployed. This is consistent with previous research by Tripodi et al. (2010) which found that employed parolees spend more months crime-free before recidivating than unemployed parolees.

In the Cox regression model that included the structural benefit of employment variable, age along with the last LSI-R subscale variables on file that included criminal history, attitudes, and alcohol and drug problems explained variations in recidivism. In

the analysis of the financial benefit of employment variable, the variables that explained variations in recidivism included sex along with the last LSI-R subscale variables of criminal history, emotional and personal problems, and alcohol and drug problems. Again, the results suggested that the last LSI-R on file indicates to corrections personal that analyzing the risk scores of parolees can assist in determining when the parolee's hazard rate is increasing.

Each of the methodologies presented in this study have advantages and disadvantages. The advantage of the unadjusted model is that it represents the true effect of employment. The advantage of the covariate adjustment model is that the data are largely unaltered as the predicted probability of the treatment variable is added as a covariate. The disadvantage is that the covariate adjustment does not consider balance or pseudo-randomization. Balance is dealt with in the inverse probability of treatment weighting model in which one of the advantages is that the weights provide a balanced number of cases to analyze. The disadvantage to this model is that it alters the original sample by increasing the sample size creating effects of the significance of the covariates. Using multiple methods of conditioning employment offers a sensitivity analysis that shows the extent to which the results are method dependent.

Findings suggested that the structural benefit of employment significantly predicted parolee recidivism, indicating that employment fostered a strong, positive bond with society. Social control theory suggests that when a social bond with society is present parolees will be less likely to recidivate. When analyzing the structural benefit

of employment, results suggested that parolees also had a decreased time to recidivism if employed. This finding is consistent with previous social control theory literature by Laub and Sampson (2011) which suggested that employment creates a daily routine for parolees that provide structure and the opportunity to engage in meaningful activity.

One of the limitations of this analysis related to the collection of data being limited to one state and parolees released during a one year time frame. Additionally, the majority of the parolees sampled were white males. Therefore, employment opportunities, parolee supervision, and treatment of parolees may vary from state to state in the United States. However, the concepts and methods presented in this study regarding treatment for selection into employment can be transferred to analyze data from other states to measure the propensity of employment on recidivism.

Another limitation of this analysis was that it measured recidivism of a parolee within two years of release. However, by condensing the sample in this analysis, an accurate representation of recidivism in Iowa through the two year timeframe confined the sample in an attempt to capture all of the recidivists. Successful parolees are able to find employment and therefore being employed is simply a proxy for low risk, law abiding parolees. This analysis provides ammunition to those who argue that employment itself is important. While the findings are not conclusive it is suggestive that employment is a worthwhile investment in that employment is not just a sorting mechanism but makes a material difference on the parolees outcomes.

Researchers should continue to acknowledge selection effects and utilize propensity methods to correct for the problem. Future research should continue to

examine the propensity of employment on recidivism in other states with different parole processes and employment opportunities than in Iowa. Although more research is needed, this study concluded that employment was a significant predictor of recidivism in relation to non-economic factors of employment. Additionally, employment marginally predicted recidivism in relation to economic factors of employment. Lastly, parolees that were employed had a lower hazard rate when compared to parolees that were unemployed.

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APPENDIX

**Covariate Balance by Propensity Technique assessing the Structural Benefit of Employment**

| | **Unadjusted** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | MS | *F* | *p* | MS | *F* | *p* | MS | *F* | *p* |
| Descriptive variables | | | | | | | | | |
| Sex | 0.402 | 1.735 | 0.188 | 0.098 | 0.424 | 0.515 | 0.025 | 0.049 | 0.825 |
| Age | 3.979 | 17.161 | 0.000 | 0.143 | 0.618 | 0.432 | 0.037 | 0.072 | 0.789 |
| Racial and/or ethnic minority status | 0.607 | 2.620 | 0.106 | 0.113 | 0.489 | 0.485 | 0.009 | 0.017 | 0.897 |
| Education | 3.481E-05 | 0.000 | 0.990 | 6.158E-05 | 0.000 | 0.987 | 0.006 | 0.012 | 0.911 |
| Marital status | 0.235 | 1.013 | 0.314 | 0.085 | 0.366 | 0.546 | 0.001 | 0.002 | 0.966 |
| Number of dependents | 0.003 | 0.012 | 0.914 | 0.001 | 0.006 | 0.938 | 0.032 | 0.061 | 0.805 |
| Iowa born | 0.285 | 1.231 | 0.268 | 0.100 | 0.432 | 0.511 | 0.004 | 0.008 | 0.929 |
| Control variables | | | | | | | | | |
| Work release status | 3.759 | 16.211 | 0.000 | 0.148 | 0.638 | 0.425 | 0.002 | 0.004 | 0.953 |
| Official designation of legal offense status | 0.535 | 2.308 | 0.129 | 0.114 | 0.494 | 0.482 | 0.039 | 0.075 | 0.784 |
| Crime type: Violent crime | 0.002 | 0.009 | 0.924 | 0.003 | 0.012 | 0.912 | 0.002 | 0.004 | 0.949 |
| Crime type: Drug/other crime | 0.023 | 0.097 | 0.755 | 0.013 | 0.058 | 0.810 | 0.009 | 0.018 | 0.893 |
| Months served | 0.115 | 0.495 | 0.482 | 0.061 | 0.265 | 0.607 | 0.057 | 0.111 | 0.739 |

| **Covariate Balance Continued** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Treatment completed needs 1 & 2 | 0.143 | 0.616 | 0.433 | 0.153 | 0.663 | 0.416 | 0.051 | 0.099 | 0.753 |
| Total number of programs administered in last sentence | 0.392 | 1.693 | 0.193 | 0.095 | 0.410 | 0.522 | 0.001 | 0.002 | 0.968 |
| Maximum completion of priority need 1 programs | 0.367 | 1.584 | 0.208 | 0.155 | 0.670 | 0.413 | 0.043 | 0.083 | 0.773 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Criminal history | 0.038 | 0.163 | 0.687 | 0.053 | 0.229 | 0.632 | 0.106 | 0.205 | 0.650 |
| Education and employment | 1.191 | 5.135 | 0.024 | 0.129 | 0.556 | 0.456 | 0.008 | 0.016 | 0.900 |
| Attitudes | 0.242 | 1.043 | 0.307 | 0.081 | 0.348 | 0.556 | 0.017 | 0.032 | 0.858 |
| Financial status | 0.232 | 0.999 | 0.318 | 0.082 | 0.355 | 0.551 | 0.000 | 0.000 | 0.983 |
| Family and martial relationships | 0.001 | 0.004 | 0.952 | 1.344E-05 | 0.000 | 0.994 | 0.003 | 0.006 | 0.940 |
| Accommodations | 1.109E-05 | 0.000 | 0.994 | 0.000 | 0.002 | 0.969 | 0.012 | 0.023 | 0.880 |
| Leisure and recreation patterns | 0.087 | 0.376 | 0.540 | 0.055 | 0.238 | 0.626 | 0.008 | 0.016 | 0.901 |
| Criminal companions | 0.251 | 1.083 | 0.298 | 0.097 | 0.420 | 0.517 | 0.023 | 0.045 | 0.833 |
| Alcohol and drug problems | 0.155 | 0.668 | 0.414 | 0.075 | 0.324 | 0.569 | 0.024 | 0.046 | 0.830 |
| Emotional and personal problems | 0.005 | 0.021 | 0.885 | 0.004 | 0.017 | 0.898 | 0.004 | 0.008 | 0.929 |

**Covariate Balance Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.012 | 0.053 | 0.818 | 0.138 | 0.594 | 0.441 | 0.076 | 0.147 | 0.702 |
| Education and employment | 2.585 | 11.149 | 0.001 | 0.146 | 0.630 | 0.427 | 0.004 | 0.009 | 0.926 |
| Attitudes | 0.137 | 0.592 | 0.442 | 0.062 | 0.266 | 0.606 | 0.000 | 0.000 | 0.987 |
| Financial status | 1.039 | 4.481 | 0.034 | 0.131 | 0.564 | 0.453 | 0.002 | 0.003 | 0.956 |
| Family and martial relationships | 0.130 | 0.560 | 0.454 | 0.058 | 0.251 | 0.616 | 0.002 | 0.003 | 0.955 |
| Accommodations | 0.005 | 0.020 | 0.888 | 0.005 | 0.022 | 0.883 | 0.029 | 0.057 | 0.811 |
| Leisure and recreation patterns | 0.077 | 0.333 | 0.564 | 0.045 | 0.193 | 0.660 | 0.028 | 0.055 | 0.815 |
| Criminal companions | 0.142 | 0.613 | 0.434 | 0.067 | 0.287 | 0.592 | 0.006 | 0.011 | 0.915 |
| Alcohol and drug problems | 0.041 | 0.178 | 0.673 | 0.027 | 0.117 | 0.732 | 0.021 | 0.040 | 0.841 |
| Emotional and personal problems | 0.279 | 1.202 | 0.273 | 0.098 | 0.423 | 0.516 | 0.002 | 0.004 | 0.951 |

**Covariate Balance by Propensity Technique assessing the Financial Benefit of Employment**

| | **Unadjusted** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | MS | *F* | *p* | MS | *F* | *p* | MS | *F* | *p* |
| Descriptive variables | | | | | | | | | |
| Sex | 0.000 | 0.002 | 0.965 | 0.000 | 0.001 | 0.974 | 0.093 | 0.178 | 0.673 |
| Age | 0.547 | 2.303 | 0.129 | 0.024 | 0.103 | 0.748 | 0.873 | 1.667 | 0.197 |
| Racial and/or ethnic minority status | 0.605 | 2.544 | 0.111 | 0.048 | 0.203 | 0.653 | 0.015 | 0.028 | 0.866 |
| Education | 0.065 | 0.272 | 0.602 | 0.013 | 0.053 | 0.817 | 0.018 | 0.034 | 0.853 |
| Marital status | 0.343 | 1.422 | 0.230 | 0.036 | 0.153 | 0.696 | 0.093 | 0.177 | 0.674 |
| Number of dependents | 0.182 | 0.766 | 0.382 | 0.030 | 0.126 | 0.723 | 0.031 | 0.060 | 0.806 |
| Iowa born | 0.090 | 0.377 | 0.539 | 0.016 | 0.067 | 0.796 | 0.001 | 0.002 | 0.964 |
| Control variables | | | | | | | | | |
| Work release status | 1.417 | 5.960 | 0.015 | 0.058 | 0.243 | 0.622 | 0.015 | 0.028 | 0.868 |
| Official designation of legal offense status | 1.147 | 4.824 | 0.028 | 0.051 | 0.213 | 0.644 | 0.044 | 0.085 | 0.771 |
| Crime type: Violent crime | 0.001 | 0.004 | 0.952 | 0.001 | 0.004 | 0.952 | 0.030 | 0.058 | 0.810 |
| Crime type: Drug/other crime | 0.118 | 0.495 | 0.482 | 0.021 | 0.087 | 0.768 | 0.019 | 0.036 | 0.849 |
| Months served | 0.504 | 2.121 | 0.146 | 0.043 | 0.183 | 0.669 | 0.018 | 0.034 | 0.854 |
| Treatment completed needs 1 & 2 | 0.132 | 0.577 | 0.456 | 0.087 | 0.364 | 0.546 | 0.021 | 0.040 | 0.842 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Covariate Balance Continued** | | | | | | | | | |
| Total number of programs administered in last sentence | 0.273 | 1.150 | 0.284 | 0.050 | 0.209 | 0.647 | 0.024 | 0.046 | 0.831 |
| Maximum completion of priority need 1 programs | 0.214 | 0.902 | 0.342 | 0.064 | 0.269 | 0.604 | 0.005 | 0.009 | 0.925 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Criminal history | 0.119 | 0.499 | 0.480 | 0.128 | 0.538 | 0.463 | 1.199 | 2.289 | 0.131 |
| Education and employment | 0.537 | 2.260 | 0.133 | 0.047 | 0.198 | 0.656 | 0.017 | 0.032 | 0.859 |
| Attitudes | 0.202 | 0.848 | 0.357 | 0.035 | 0.146 | 0.703 | 0.016 | 0.031 | 0.861 |
| Financial status | 0.076 | 0.320 | 0.572 | 0.019 | 0.081 | 0.776 | 0.047 | 0.089 | 0.765 |
| Family and martial relationships | 0.086 | 0.364 | 0.547 | 0.010 | 0.044 | 0.834 | 0.047 | 0.090 | 0.764 |
| Accommodations | 0.117 | 0.491 | 0.484 | 0.033 | 0.140 | 0.708 | 0.023 | 0.043 | 0.835 |
| Leisure and recreation patterns | 0.041 | 0.174 | 0.676 | 0.006 | 0.024 | 0.877 | 1.450E-05 | 0.000 | 0.966 |
| Criminal companions | 0.033 | 0.140 | 0.708 | 0.002 | 0.009 | 0.924 | 0.032 | 0.061 | 0.805 |
| Alcohol and drug problems | 0.001 | 0.003 | 0.953 | 7.647E-05 | 0.000 | 0.986 | 2.634E-05 | 0.000 | 0.994 |
| Emotional and personal problems | 0.145 | 0.612 | 0.434 | 0.022 | 0.092 | 0.761 | 0.077 | 0.148 | 0.701 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.167 | 0.703 | 0.402 | 0.054 | 0.229 | 0.633 | 0.880 | 1.679 | 0.195 |

**Covariate Balance Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Education and employment | 3.486 | 14.665 | 0.000 | 0.058 | 0.246 | 0.620 | 0.076 | 0.145 | 0.703 |
| Attitudes | 0.273 | 1.148 | 0.284 | 0.033 | 0.138 | 0.710 | 0.004 | 0.008 | 0.929 |
| Financial status | 0.263 | 1.106 | 0.293 | 0.038 | 0.162 | 0.688 | 0.027 | 0.051 | 0.821 |
| Family and martial relationships | 0.000 | 0.001 | 0.971 | 0.002 | 0.007 | 0.933 | 0.006 | 0.011 | 0.916 |
| Accommodations | 9.583E-05 | 0.000 | 0.984 | 0.000 | 0.002 | 0.964 | 0.097 | 0.185 | 0.667 |
| Leisure and recreation patterns | 0.301 | 1.268 | 0.260 | 0.042 | 0.178 | 0.673 | 0.057 | 0.108 | 0.742 |
| Criminal companions | 0.026 | 0.107 | 0.743 | 0.003 | 0.015 | 0.904 | 0.019 | 0.036 | 0.850 |
| Alcohol and drug problems | 0.134 | 0.564 | 0.453 | 0.031 | 0.133 | 0.716 | 0.060 | 0.115 | 0.735 |
| Emotional and personal problems | 0.036 | 0.151 | 0.689 | 0.012 | 0.051 | 0.821 | 0.001 | 0.002 | 0.961 |

**Logistic Regression Results by Propensity Technique Assessing the Structural Benefit of Employment**

| | **Unadjusted** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | OR | SE | *p* | OR | SE | *p* | OR | SE |
| Primary independent variable | | | | | | | | | |
| Structural benefit of employment | 0.013* | 0.715 | 0.136 | 0.018* | 0.724 | 0.136 | 0.001* | 0.737 | 0.091 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.002* | 1.890 | 0.209 | 0.259 | 0.601 | 0.451 | 0.000* | 1.922 | 0.149 |
| Age | 0.001* | 0.977 | 0.007 | 0.001* | 0.865 | 0.044 | 0.000* | 0.976 | 0.005 |
| Racial and/or minority status | 0.709 | 0.940 | 0.167 | 0.005* | 0.282 | 0.455 | 0.814 | 0.973 | 0.117 |
| Education | 0.727 | 1.027 | 0.077 | 0.693 | 1.031 | 0.077 | 0.457 | 1.041 | 0.055 |
| Marital Status | 0.654 | 1.082 | 0.175 | 0.033* | 0.504 | 0.322 | 0.891 | 1.017 | 0.123 |
| Number of dependents | 0.956 | 0.997 | 0.046 | 0.672 | 0.981 | 0.046 | 0.759 | 0.990 | 0.032 |
| Iowa born | 0.669 | 0.934 | 0.161 | 0.024* | 2.081 | 0.325 | 0.369 | 0.903 | 0.114 |
| Control variables | | | | | | | | | |
| Work release status | 0.163 | 1.257 | 0.164 | 0.002* | 22.697 | 1.031 | 0.031* | 1.283 | 0.115 |
| Official designation of legal offense status | 0.557 | 1.040 | 0.067 | 0.017* | 0.663 | 0.172 | 0.140 | 1.073 | 0.048 |
| Crime type: Violent crime | 0.461 | 1.165 | 0.207 | 0.830 | 1.046 | 0.212 | 0.303 | 1.164 | 0.148 |
| Crime type: Drug/other crime | 0.796 | 0.962 | 0.152 | 0.317 | 1.184 | 0.169 | 0.508 | 0.931 | 0.107 |
| Months served | 0.961 | 1.000 | 0.003 | 0.036* | 1.011 | 0.005 | 0.864 | 1.000 | 0.002 |

| **Logistic Regression Continued** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Treatment completed needs 1 & 2 | 0.399 | 0.903 | 0.121 | 0.006* | 0.590 | 0.192 | 0.292 | 0.870 | 0.132 |
| Total number of programs administered in last sentence | 0.040* | 1.041 | 0.019 | 0.001* | 1.161 | 0.043 | 0.024* | 1.031 | 0.014 |
| Maximum completion of priority need 1 programs | 0.420 | 0.903 | 0.126 | 0.031* | 1.807 | 0.274 | 0.470 | 0.938 | 0.088 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Criminal history | 0.849 | 0.988 | 0.063 | 0.746 | 0.980 | 0.064 | 0.460 | 0.968 | 0.045 |
| Education and employment | 0.369 | 1.020 | 0.022 | 0.013* | 0.821 | 0.079 | 0.267 | 1.017 | 0.016 |
| Attitudes | 0.493 | 0.969 | 0.046 | 0.006* | 0.789 | 0.086 | 0.630 | 1.016 | 0.032 |
| Financial status | 0.060 | 0.836 | 0.096 | 0.001* | 0.557 | 0.172 | 0.075 | 0.886 | 0.068 |
| Family and martial relationships | 0.450 | 0.962 | 0.052 | 0.371 | 0.955 | 0.052 | 0.170 | 0.951 | 0.036 |
| Accommodations | 0.114 | 1.090 | 0.055 | 0.100 | 1.095 | 0.055 | 0.014* | 1.099 | 0.038 |
| Leisure and recreation patterns | 0.332 | 0.909 | 0.098 | 0.008* | 0.696 | 0.136 | 0.103 | 0.895 | 0.068 |
| Criminal companions | 0.902 | 1.011 | 0.086 | 0.012* | 1.520 | 0.167 | 0.969 | 0.998 | 0.061 |
| Alcohol and drug problems | 0.305 | 0.975 | 0.025 | 0.118 | 1.063 | 0.039 | 0.035* | 0.964 | 0.017 |

**Logistic Regression Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Emotional and personal problems | 0.565 | 1.035 | 0.060 | 0.205 | 1.082 | 0.062 | 0.898 | 1.005 | 0.043 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.012* | 1.202 | 0.074 | 0.000* | 1.455 | 0.100 | 0.000* | 1.198 | 0.052 |
| Education and employment | 0.033* | 1.042 | 0.019 | 0.017* | 0.784 | 0.102 | 0.001* | 1.045 | 0.014 |
| Attitudes | 0.031* | 1.103 | 0.046 | 0.000* | 1.291 | 0.072 | 0.002* | 1.103 | 0.032 |
| Financial status | 0.048* | 1.205 | 0.095 | 0.034* | 0.512 | 0.315 | 0.010* | 1.186 | 0.066 |
| Family and martial relationships | 0.221 | 1.070 | 0.055 | 0.003* | 1.275 | 0.083 | 0.046* | 1.081 | 0.039 |
| Accommodations | 0.660 | 1.025 | 0.057 | 0.841 | 0.988 | 0.059 | 0.736 | 1.014 | 0.040 |
| Leisure and recreation patterns | 0.134 | 1.139 | 0.087 | 0.003* | 1.401 | 0.114 | 0.054 | 1.123 | 0.060 |
| Criminal companions | 0.887 | 0.987 | 0.089 | 0.023* | 0.726 | 0.141 | 0.924 | 1.006 | 0.063 |
| Alcohol and drug problems | 0.004* | 1.077 | 0.025 | 0.330 | 1.030 | 0.030 | 0.000* | 1.074 | 0.018 |
| Emotional and personal problems | 0.031* | 1.147 | 0.064 | 0.163 | 0.836 | 0.128 | 0.000* | 1.185 | 0.045 |
| Constant | 0.000* | 12.590 | 0.640 | 0.019* | 76178220.588 | 7.718 | 0.000* | 0.023 | 0.507 |

*p* <.05

**Logistic Regression Results by Propensity Technique Assessing the Financial Benefit of Employment**

| | Logistic Regression | | | Covariate Adjustment | | | IPTW | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | OR | SE | *p* | OR | SE | *p* | OR | SE |
| Primary independent variable | | | | | | | | | |
| Financial benefit of employment | 0.059 | 0.777 | 0.133 | 0.061 | 0.778 | 0.134 | 0.009* | 0.790 | 0.090 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.002* | 1.916 | 0.208 | 0.001* | 1.943 | 0.209 | 0.000* | 2.056 | 0.148 |
| Age | 0.003* | 0.980 | 0.007 | 0.697 | 0.993 | 0.018 | 0.000* | 0.981 | 0.005 |
| Racial and/or ethnic minority status | 0.719 | 0.942 | 0.167 | 0.389 | 0.628 | 0.540 | 0.171 | 0.851 | 0.118 |
| Education | 0.754 | 1.024 | 0.077 | 0.764 | 0.969 | 0.104 | 0.305 | 1.057 | 0.054 |
| Marital status | 0.628 | 1.089 | 0.175 | 0.608 | 0.807 | 0.417 | 0.731 | 1.042 | 0.121 |
| Number of dependents | 0.929 | 0.996 | 0.046 | 0.468 | 0.936 | 0.090 | 0.829 | 0.993 | 0.032 |
| Iowa born | 0.640 | 0.928 | 0.160 | 0.757 | 1.081 | 0.252 | 0.101 | 0.831 | 0.113 |
| Control variables | | | | | | | | | |
| Work release status | 0.210 | 1.227 | 0.163 | 0.304 | 2.273 | 0.799 | 0.113 | 1.196 | 0.113 |
| Official designation of legal offense status | 0.571 | 1.039 | 0.067 | 0.527 | 0.834 | 0.287 | 0.251 | 1.055 | 0.047 |
| Crime type: Violent crime | 0.453 | 1.168 | 0.207 | 0.398 | 1.193 | 0.209 | 0.198 | 1.205 | 0.145 |
| Crime type: Drug/other crime | 0.814 | 0.965 | 0.151 | 0.622 | 1.134 | 0.255 | 0.960 | 0.995 | 0.107 |
| Months served | 0.984 | 1.000 | 0.003 | 0.462 | 1.008 | 0.010 | 0.943 | 1.000 | 0.002 |
| Treatment completed needs 1 & 2 | 0.394 | 0.902 | 0.121 | 0.269 | 0.707 | 0.332 | 0.499 | 0.915 | 0.131 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Logistic Regression Continued** | | | | | | | | | |
| Total number of programs administered in last sentence | 0.043* | 1.040 | 0.019 | 0.126 | 1.078 | 0.049 | 0.012* | 1.035 | 0.014 |
| Maximum completion of priority need 1 programs | 0.411 | 0.901 | 0.126 | 0.669 | 1.157 | 0.341 | 0.241 | 0.903 | 0.087 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Criminal history | 0.802 | 0.984 | 0.063 | 0.799 | 0.984 | 0.063 | 0.812 | 0.990 | 0.044 |
| Education and employment | 0.336 | 1.022 | 0.022 | 0.669 | 0.972 | 0.067 | 0.119 | 1.024 | 0.015 |
| Attitudes | 0.058 | 0.970 | 0.046 | 0.313 | 0.908 | 0.095 | 0.728 | 0.989 | 0.032 |
| Financial status | 0.067 | 0.839 | 0.096 | 0.070 | 0.771 | 0.143 | 0.027* | 0.862 | 0.067 |
| Family and martial relationships | 0.462 | 0.963 | 0.052 | 0.950 | 1.005 | 0.075 | 0.301 | 0.963 | 0.036 |
| Accommodations | 0.130 | 1.087 | 0.055 | 0.851 | 1.019 | 0.098 | 0.033* | 1.085 | 0.038 |
| Leisure and recreation patterns | 0.344 | 0.911 | 0.098 | 0.220 | 0.864 | 0.119 | 0.162 | 0.910 | 0.067 |
| Criminal companions | 0.937 | 1.007 | 0.086 | 0.636 | 1.049 | 0.101 | 0.985 | 1.001 | 0.059 |
| Alcohol and drug problems | 0.274 | 0.974 | 0.024 | 0.251 | 0.972 | 0.025 | 0.069 | 0.969 | 0.017 |
| Emotional and personal problems | 0.537 | 1.038 | 0.060 | 0.319 | 1.118 | 0.112 | 0.734 | 0.986 | 0.042 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.012* | 1.204 | 0.073 | 0.009* | 1.235 | 0.081 | 0.002* | 1.169 | 0.051 |
| Education and employment | 0.032* | 1.043 | 0.019 | 0.625 | 0.933 | 0.142 | 0.005* | 1.038 | 0.013 |
| Attitudes | 0.031* | 1.103 | 0.046 | 0.099 | 1.188 | 0.104 | 0.003* | 1.098 | 0.032 |

**Logistic Regression Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Financial status | 0.037* | 1.218 | 0.094 | 0.802 | 1.053 | 0.207 | 0.003* | 1.220 | 0.066 |
| Family and martial relationships | 0.233 | 1.068 | 0.055 | 0.209 | 1.072 | 0.056 | 0.202 | 1.050 | 0.039 |
| Accommodations | 0.649 | 1.206 | 0.057 | 0.573 | 1.033 | 0.058 | 0.132 | 1.062 | 0.040 |
| Leisure and recreation patterns | 0.131 | 1.140 | 0.087 | 0.176 | 1.320 | 0.205 | 0.058 | 1.121 | 0.060 |
| Criminal companions | 0.899 | 0.989 | 0.089 | 0.632 | 0.953 | 0.101 | 0.486 | 1.044 | 0.062 |
| Alcohol and drug problems | 0.004* | 1.076 | 0.025 | 0.376 | 1.043 | 0.047 | 0.000* | 1.073 | 0.018 |
| Emotional and personal problems | 0.025* | 1.153 | 0.063 | 0.020* | 1.193 | 0.076 | 0.000* | 1.217 | 0.018 |
| Constant | 0.000* | 0.021 | 0.710 | 0.827 | 4.488 | 6.870 | 0.000* | 0.017 | 0.500 |

*p* <.05

**Cox Regression Results by Propensity Technique Assessing the Structural Benefit of Employment**

| | **Unadjusted** | | | **Covariate Adjustment** | | | **IPTW** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | HR | SE | *p* | HR | SE | *p* | HR | SE |
| Primary independent variable | | | | | | | | | |
| Structural benefit of employment | 0.013* | 1.277 | 0.098 | 0.020* | 1.259 | 0.099 | 0.000* | 1.276 | 0.065 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.007* | 1.564 | 0.164 | 0.640 | 0.870 | 0.298 | 0.000* | 1.627 | 0.188 |
| Age | 0.001* | 0.983 | 0.005 | 0.003* | 0.925 | 0.027 | 0.000* | 0.982 | 0.004 |
| Racial and/or ethnic minority status | 0.574 | 0.935 | 0.119 | 0.018* | 0.513 | 0.282 | 0.815 | 0.981 | 0.082 |
| Education | 0.693 | 1.022 | 0.056 | 0.762 | 1.017 | 0.056 | 0.372 | 1.036 | 0.039 |
| Marital status | 0.481 | 1.096 | 0.130 | 0.156 | 0.741 | 0.212 | 0.535 | 1.057 | 0.089 |
| Number of dependents | 0.494 | 0.978 | 0.032 | 0.346 | 0.970 | 0.033 | 0.049 | 0.957 | 0.022 |
| Iowa born | 0.652 | 0.949 | 0.115 | 0.089 | 1.426 | 0.209 | 0.174 | 0.898 | 0.079 |
| Control variables | | | | | | | | | |
| Work release status | 0.099 | 1.213 | 0.117 | 0.009* | 5.191 | 0.629 | 0.045 | 1.178 | 0.082 |
| Official designation of legal offense status | 0.684 | 1.020 | 0.049 | 0.055 | 0.812 | 0.108 | 0.314 | 1.035 | 0.034 |
| Crime type: Violent crime | 0.155 | 1.236 | 0.149 | 0.315 | 1.164 | 0.151 | 0.014* | 1.292 | 0.104 |
| Crime type: Drug/other crime | 0.832 | 0.977 | 0.111 | 0.488 | 1.087 | 0.120 | 0.643 | 0.965 | 0.077 |
| Months served | 0.930 | 1.000 | 0.003 | 0.121 | 1.005 | 0.004 | 0.875 | 1.000 | 0.002 |
| Treatment completed needs 1 & 2 | 0.226 | 0.847 | 0.138 | 0.018* | 0.659 | 0.176 | 0.441 | 0.930 | 0.094 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Cox Regression Continued** | | | | | | | | | |
| Total number of programs administered in last sentence | 0.056 | 1.026 | 0.014 | 0.003* | 1.085 | 0.027 | 0.018* | 1.022 | 0.009 |
| Maximum completion of priority need 1 programs | 0.556 | 0.947 | 0.093 | 0.115 | 1.287 | 0.160 | 0.424 | 0.950 | 0.064 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Criminal history | 0.547 | 0.974 | 0.045 | 0.494 | 0.970 | 0.045 | 0.444 | 0.977 | 0.030 |
| Education and employment | 0.282 | 1.018 | 0.016 | 0.061 | 0.911 | 0.050 | 0.233 | 1.013 | 0.011 |
| Attitudes | 0.207 | 0.958 | 0.034 | 0.009* | 0.867 | 0.055 | 0.902 | 0.997 | 0.023 |
| Financial status | 0.233 | 0.918 | 0.072 | 0.010* | 0.747 | 0.113 | 0.428 | 0.961 | 0.050 |
| Family and martial relationships | 0.558 | 0.978 | 0.037 | 0.448 | 0.972 | 0.037 | 0.138 | 0.962 | 0.026 |
| Accommodations | 0.128 | 1.064 | 0.041 | 0.101 | 1.069 | 0.041 | 0.019* | 1.069 | 0.028 |
| Leisure and recreation patterns | 0.546 | 0.958 | 0.071 | 0.054 | 0.840 | 0.090 | 0.272 | 0.947 | 0.050 |
| Criminal companions | 0.950 | 1.004 | 0.063 | 0.052 | 1.233 | 1.108 | 0.714 | 0.984 | 0.044 |
| Alcohol and drug problems | 0.178 | 0.976 | 0.018 | 0.487 | 1.018 | 0.025 | 0.007* | 0.967 | 0.013 |
| Emotional and personal problems | 0.899 | 0.995 | 0.043 | 0.756 | 1.014 | 0.044 | 0.186 | 0.960 | 0.031 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.001* | 1.183 | 0.052 | 0.000* | 1.303 | 0.067 | 0.000* | 1.148 | 0.036 |
| Education and employment | 0.036* | 1.031 | 0.014 | 0.072 | 0.894 | 0.062 | 0.001* | 1.035 | 0.010 |

**Cox Regression Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Attitudes | 0.004* | 1.101 | 0.033 | 0.000* | 1.192 | 0.048 | 0.000* | 1.091 | 0.023 |
| Financial status | 0.162 | 1.103 | 0.070 | 0.090 | 0.716 | 0.197 | 0.073 | 1.092 | 0.049 |
| Family and martial relationships | 0.167 | 1.057 | 0.040 | 0.009* | 1.158 | 0.056 | 0.030* | 1.063 | 0.028 |
| Accommodations | 0.372 | 1.038 | 0.042 | 0.702 | 1.017 | 0.043 | 0.330 | 1.029 | 0.029 |
| Leisure and recreation patterns | 0.121 | 1.107 | 0.066 | 0.010* | 1.222 | 0.078 | 0.027* | 1.105 | 0.045 |
| Criminal companions | 0.725 | 0.977 | 0.066 | 0.054 | 0.833 | 0.095 | 0.718 | 0.984 | 0.046 |
| Alcohol and drug problems | 0.001* | 1.064 | 0.018 | 0.038* | 1.043 | 0.020 | 0.000* | 1.055 | 0.013 |
| Emotional and personal problems | 0.022* | 1.113 | 0.046 | 0.540 | 0.951 | 0.081 | 0.000* | 1.171 | 0.033 |

*p* <.05

**Cox Regression Results by Propensity Technique Assessing the Financial Benefit of Employment**

| | Unadjusted | | | Covariate Adjustment | | | IPTW | | |
|---|---|---|---|---|---|---|---|---|---|
| | *p* | HR | SE | *p* | HR | SE | *p* | HR | SE |
| Primary independent variable | | | | | | | | | |
| Financial benefit of employment | 0.023* | 1.244 | 0.096 | 0.025* | 1.240 | 0.096 | 0.001* | 1.249 | 0.065 |
| Descriptive variables | | | | | | | | | |
| Sex | 0.005* | 1.578 | 0.164 | 0.005* | 1.584 | 0.164 | 0.000* | 1.676 | 0.116 |
| Age | 0.003* | 0.985 | 0.005 | 0.205 | 0.989 | 0.009 | 0.000* | 0.985 | 0.004 |
| Racial and/or ethnic minority status | 0.597 | 0.939 | 0.119 | 0.456 | 0.833 | 0.245 | 0.197 | 0.899 | 0.082 |
| Education | 0.710 | 1.021 | 0.056 | 0.966 | 1.003 | 0.065 | 0.197 | 1.051 | 0.038 |
| Marital status | 0.466 | 1.099 | 0.130 | 0.984 | 1.004 | 0.208 | 0.182 | 1.128 | 0.090 |
| Number of dependents | 0.436 | 0.975 | 0.032 | 0.346 | 0.957 | 0.046 | 0.098 | 0.964 | 0.022 |
| Iowa born | 0.627 | 0.946 | 0.115 | 0.942 | 0.990 | 0.141 | 0.233 | 0.907 | 0.080 |
| Control variables | | | | | | | | | |
| Work release status | 0.112 | 1.205 | 0.117 | 0.288 | 1.446 | 0.347 | 0.105 | 1.141 | 0.081 |
| Official designation of legal offense status | 0.724 | 1.017 | 0.049 | 0.705 | 0.953 | 0.126 | 0.412 | 1.028 | 0.033 |
| Crime type: Violent crime | 0.147 | 1.241 | 0.149 | 0.140 | 1.246 | 0.149 | 0.018* | 1.275 | 0.103 |
| Crime type: Drug/other crime | 0.880 | 0.983 | 0.111 | 0.823 | 1.032 | 0.141 | 0.869 | 1.013 | 0.077 |
| Months served | 0.951 | 1.000 | 0.003 | 0.658 | 1.002 | 0.005 | 0.720 | 1.001 | 0.002 |
| Treatment completed needs 1 & 2 | 0.216 | 0.844 | 0.138 | 0.216 | 0.775 | 0.206 | 0.239 | 0.896 | 0.094 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Cox Regression Continued** | | | | | | | | | |
| Total number of programs administered in last sentence | 0.056 | 1.026 | 0.014 | 0.118 | 1.037 | 0.023 | 0.000* | 1.034 | 0.009 |
| Maximum completion of priority need 1 programs | 0.554 | 0.946 | 0.093 | 0.965 | 1.006 | 0.144 | 0.500 | 0.958 | 0.063 |
| LSI-R subscale (First LSI-R on file) | | | | | | | | | |
| Criminal history | 0.508 | 0.971 | 0.045 | 0.516 | 0.972 | 0.045 | 0.317 | 0.970 | 0.030 |
| Education and employment | 0.278 | 1.018 | 0.016 | 0.936 | 1.003 | 0.032 | 0.214 | 1.014 | 0.011 |
| Attitudes | 0.220 | 0.960 | 0.034 | 0.209 | 0.941 | 0.048 | 0.362 | 0.979 | 0.023 |
| Financial status | 0.251 | 0.921 | 0.071 | 0.204 | 0.898 | 0.084 | 0.107 | 0.923 | 0.050 |
| Family and martial relationships | 0.566 | 0.979 | 0.037 | 0.842 | 0.991 | 0.044 | 0.200 | 0.967 | 0.026 |
| Accommodations | 0.141 | 1.062 | 0.041 | 0.423 | 1.043 | 0.052 | 0.040* | 1.059 | 0.028 |
| Leisure and recreation patterns | 0.572 | 0.961 | 0.071 | 0.462 | 0.945 | 0.077 | 0.272 | 0.947 | 0.050 |
| Criminal companions | 0.981 | 1.002 | 0.063 | 0.842 | 1.013 | 0.066 | 0.844 | 0.991 | 0.044 |
| Alcohol and drug problems | 0.156 | 0.975 | 0.018 | 0.142 | 0.974 | 0.018 | 0.042* | 0.975 | 0.012 |
| Emotional and personal problems | 0.975 | 0.999 | 0.043 | 0.726 | 1.020 | 0.057 | 0.163 | 0.959 | 0.030 |
| LSI-R subscale (Last LSI-R on file) | | | | | | | | | |
| Criminal history | 0.001* | 1.184 | 0.052 | 0.001* | 1.193 | 0.054 | 0.000* | 1.177 | 0.036 |

**Cox Regression Continued**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Education and employment | 0.037* | 1.031 | 0.015 | 0.968 | 0.998 | 0.060 | 0.015* | 1.025 | 0.010 |
| Attitudes | 0.004* | 1.101 | 0.033 | 0.022 | 1.126 | 0.052 | 0.000* | 1.101 | 0.023 |
| Financial status | 0.127 | 1.112 | 0.070 | 0.548 | 1.065 | 0.105 | 0.052 | 1.098 | 0.048 |
| Family and martial relationships | 0.172 | 1.057 | 0.040 | 0.163 | 1.058 | 0.040 | 0.066 | 1.053 | 0.028 |
| Accommodations | 0.368 | 1.038 | 0.042 | 0.355 | 1.039 | 0.042 | 0.123 | 1.045 | 0.029 |
| Leisure and recreation patterns | 0.111 | 1.110 | 0.065 | 0.146 | 1.160 | 0.102 | 0.005* | 1.137 | 0.046 |
| Criminal companions | 0.721 | 0.977 | 0.066 | 0.610 | 0.965 | 0.069 | 0.748 | 0.985 | 0.046 |
| Alcohol and drug problems | 0.001* | 1.064 | 0.018 | 0.025* | 1.055 | 0.024 | 0.000* | 1.049 | 0.013 |
| Emotional and personal problems | 0.017* | 1.118 | 0.046 | 0.015 | 1.130 | 0.050 | 0.000* | 1.176 | 0.032 |

$p < .05$