THE RELATIONSHIP BETWEEN PARTICIPATION IN DIFFERENT TYPES OF TRAINING PROGRAMS AND GAINFUL EMPLOYMENT OF FORMERLY INCARCERATED INDIVIDUALS

BY

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DISSERTATION

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ABSTRACT

According to the United States Department of Justice (2017), over 10,000 formerly incarcerated individuals are released each week from federal and state prisons. Approximately two-thirds of this population will be re-arrested within three years of release. Although employment has been found to reduce recidivism, the majority of formerly incarcerated individuals lack the education and skills necessary to compete in the labor market. The purpose of this study is to draw upon human capital theory and workforce development concepts to examine the relationship between participation in different types of training programs and gainful employment of formerly incarcerated individuals. The three types of training programs considered in this study are school-based training programs, pre-employment training programs, and post-employment training programs. Generalized linear mixed models are used to determine if each type of training is related to employment status and income. Based on a sample from the National Longitudinal Survey of Youth 1997 (NLSY97), post-employment training programs are positively related to gainful employment for formerly incarcerated individuals.

Keywords: human capital, workforce development, formerly incarcerated

To My Father

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CHAPTER 1: INTRODUCTION

According to the *New York Times*, the United States has less than 5% of the world's population but nearly 25% of the world's prisoners. Criminologists and legal scholars from other industrialized nations are mystified by the number of incarcerated individuals in the United States, as well as the harshness of the prison sentences. In comparison, the incarceration rate in the United States is six times the rate of the median incarceration rate of all other countries (Liptak, 2008). This tough on crime stance took hold in the late 1970s and continued into the 1990s. The population statistics reported by the news media were substantiated with a comprehensive report jointly sponsored by the MacArthur Foundation and the U.S. Department of Justice. Based on data from 2012, The National Research Council of the National Academies (Travis, Western, & Redburn, 2014) found that the United States continues to imprison a quarter of the world's prisoners. The magnitude of the incarceration growth is a unique trend, both historically and culturally.

To put mass incarceration into perspective, over 1.5 million people are serving more than one year in state or federal prisons. An estimated 95% will eventually be released back into society. The U.S. Department of Justice reported that over 637,000 prisoners were released in 2012 alone (Carson & Golinelli, 2013), which is comparable in magnitude to the entire population of Washington D.C.

In economic terms, the number of working-aged formerly incarcerated individuals in the United States was estimated to be between 12 and 14 million people in 2008. This represents approximately 3% of the total working age population (or one in 33 working-aged adults). If all individuals with a felony record are considered, regardless of incarceration, the number increases to approximately 7% of the working-age population (or one in 15 working-aged adults).

According to Schmitt and Warner (2011), the annual loss of output due to unemployment and underemployment of formerly incarcerated individuals is between $57 and $65 billion. Further, the number of formerly incarcerated individuals in the labor force is expected to increase into the foreseeable future.

Although aggregate statistics demonstrate the pervasiveness and magnitude of the growing problem in terms of society, incarceration is determined by personal choices leading to individual consequences that are influenced through environmental factors. Once formerly incarcerated individuals return to society, they face what can seem to be insurmountable odds in securing employment. According to Beth Johnson, Director of Legal Programs at Cabrini Green Legal Aid, there are 45 thousand cataloged collateral consequences signed into law in the United States impacting formerly incarcerated individuals, including laws restricting employment. Employment is an important aspect of an individual's identity and helps define an individual's place in society. As such, formerly incarcerated individuals employed after release are less likely to return to prison (Boodhoo, 2016). Despite the recent easing of some of these legal obstacles, new found employment opportunities can only be realized if formerly incarcerated individuals can acquire the skills and education needed to transition into the workforce successfully. The greatest concerns expressed by employers when faced with hiring formerly incarcerated individuals were the lack of people skills, deficits in education and training, customer perception, coworker discomfort, inadequate time to adapt to life outside of prison, employee turnover, and fear of victimization (Giguere & Dundes, 2002).

Correlation studies have found both prison education programs and post-release employment help reduce recidivism (Chappell, 2004; Erisman & Contardo, 2005; ICECO, 2010; Lockwood, Nally, & Ho, 2016; Steurer, Tracy, & Smith, 2001). Besides individual studies, four

comprehensive meta-analyses have verified the connection between prison education programs and recidivism (Aos, Miller, & Drake, 2006; Davis, Bozick, Steele, & Miles, 2013; MacKenzie, 2006; Wilson, Gallagher, & MacKenzie, 2000). The focus of prison education research has now shifted from *if* education reduces recidivism to *how* education reduces recidivism.

Attempts have been made to explain the connection between education and recidivism through various theories. Depending on the field of study and curriculum, the reduction in recidivism accompanied with participation in education and training programs has been attributed to improvements in cognitive skills, executive functioning, and moral development. In the economics of education, the explanation has centered on employability. Unlike the correlation found between prison education programs and recidivism, the link between prison education programs and employment remains inconclusive (Davis et al., 2013; MacKenzie, 2006). Among the looming questions in prison education research, identification of successful program features is the most pressing. The inability to explain the impact of prison education programs on employment and recidivism is referred to as the "black box" of correctional education (Davis et al., 2013, p. xvii; MacKenzie, 2008, p. 13).

Problem Statement

While training and education programs are believed to reduce recidivism among incarcerated individuals, not every type of program may reduce recidivism to the same extent. That is, programs that emphasize self-development goals may differ in their effects on recidivism than programs that emphasize employment-related goals. A review of the literature shows that the question of how programs with differing emphases affect recidivism has not been specifically addressed. Understanding the nature of the training and education programs may further inform

the factors that influence employability of formerly incarcerated individuals, by extension, the factors that influence recidivism.

Without constructing categories of training programs intended to improve employability, the influence of education and training programs on recidivism specifically through gainful employment will remain uncertain. Current employment studies on formerly incarcerated individuals lack measurements that distinguish between general knowledge acquisition and job-specific skill development. A description of the intermingled training and academic education measurements used in current prison education studies is found in a documentation of best practices by the U.S. Department of Education (Lichtenberger & Ogle, 2008). Current studies typically capture the education component through data sources from local or state correctional education systems. Generally, the programs are categorized as vocational, GED, college, cognitive, or parenting. An education hierarchy is created and used in conjunction with the program categorization to define the highest level of education that is credited with the post-release outcome. For example, a student with both a GED and a construction-related vocational certificate "could be considered as having achieved a higher level of education than a participant in a single program" (p. 8). Erisman and Contardo (2005) caution that the majority of prison education data systems combine all college credit education regardless of the program.

In contrast to higher education, some prison systems define academic as for-credit education and vocational as non-credit education. Results found in prison education studies that are titled as vocational education represent only the non-credit portion of vocational training programs. Davis et al. (2013) explained that the categorization found in prison education studies only "include at least some component" of the program category (p. 35). Although many studies compare vocational and academic program results, a direct comparison should not be made due

to the uncertainty of the groupings. The inaccuracy in categorizing a training program either vocational or academic prevents the identification and isolation of education and training programs intended to improve employment outcomes.

Human capital theory distinguishes between investments in general education versus job-specific training. Benefits associated with an investment in job-specific training are unique to that particular employer and not easily transferable to other employers. Individuals with job-specific training contribute to an employer's competitive advantage which makes them highly valued. In contrast, general education is not unique to a particular job and is easily transferred to other employers. Instead of attempting to categorize training programs into vocational versus academic as an indirect representation of general versus job-specific human capital, directly categorizing program types based on types of training is needed to determine if employment outcomes are realized. Training types can be constructed through categorizing individual training programs into: (a) school-based training programs designed for general skill development; (b) post-employment training programs intended to develop job-specific skills; and (c) pre-employment training programs meant as a transition from school to work with a combination of general and job-specific skills.

In the current prison education studies, education and training records from the correctional facility or agency are linked to earnings information from the state unemployment insurance (UI) records. The earnings data do not include the informal labor market, which is a prevalent source of income for many formerly incarcerated individuals. Self-reported earnings can be as much as 53% higher than UI-wage data. Once the data are collected, the methodology typically used in prison education research is propensity score matching. The credibility of the results is dependent on the ability to closely match participants with non-participants in order to

control for pre-existing differences between the groups. Most prison education evaluations and research studies use an ex-post facto methodology that cannot be considered a true quasi-experimental design. The comparison groups in prison education studies include non-completers, no-fault non-completers, and wait-listed non-participants (Lichtenberger & Ogle, 2008).

Limiting the education and training program measurement to information from state and federal prison systems does not take into consideration the growing community-based resources that offer similar programs. Instead of focusing on the limited and fragmented formal training found within an incarcerated individual's record, a more complete and compelling picture emerges by re-conceptualizing learning and skill acquisition in a workforce development context. This perspective requires that all investments in training - regardless of location or affiliation - are captured in a comprehensive system. If prison education studies are limited to prison programs, then the scattered community-based education and training programs are not taken into consideration. For example, the Illinois Crime Reduction Act passed in 2009 diverts non-violent individuals to local sites for community-based services and interventions. A prominent mandate for correctional facilities in the Illinois Crime Reduction Act is the establishment of evidence-based education programs with a teacher to student ratio of no more than 1:30. Compliance with the act is graduated with 75% participation within five years of the effective date (Illinois General Assembly, 2009). As more rehabilitation programs are becoming local, a workforce development context is needed to capture all training program participation of formerly incarcerated individuals. This change in perspective expands our field of vision as well as opens up the possibility to take advantage of other data sources and methodologies. Workforce development studies typically draw upon national longitudinal datasets and use a fixed effects design.

The inability to describe *how* education and training programs impact employment and recidivism has fueled fiscal policy debates. An increasing proportion of state and local budgets are diverted from education and healthcare to fund the prison system. As state budgets tighten, evidence-based workforce development initiatives are needed to address the unprecedented growth of incarceration in the United States. From 1980 to 2009, the combined state budgets increased by over 400% to fund the associated 475% increase in the prison population (Travis et al., 2014).

Purpose of Study

Given the importance of employment as a means to reduce recidivism, this study adds to the research on the employment outcomes of formerly incarcerated individuals with respect to training program participation. To this end, the purpose of this study is to examine the relationship between the different types of training programs and gainful employment for formerly incarcerated individuals. The three types of training programs considered in this study are school-based training programs, pre-employment training programs, and post-employment training programs. The three independent research questions are:

1. What is the relationship between school-based training participation and gainful employment of formerly incarcerated individuals?
2. What is the relationship between pre-employment training participation and gainful employment of formerly incarcerated individuals?
3. What is the relationship between post-employment training participation and gainful employment of formerly incarcerated individuals?

Through constructing categories for education and training programs that isolate the components intended to improve employability, the influence of education and training programs on gainful employment can be determined.

Significance of Study

This study contributes to existing literature in several dimensions. First and foremost, employment outcomes of formerly incarcerated individuals have never been studied using constructs representing types of training programs. Fundamentally, categorizing training programs based on general versus job-specific human capital will provide further insight on the subset of training and education programs designed to reduce recidivism through gainful employment.

Second, the training programs included in the study are not dependent on location. The workforce development context of the study warrants the use of a national dataset. Expanding the education to include all sources circumvents some of the problems encountered in prison education studies. Prison education programs - along with most rehabilitation programs - are fraught with poor design and inadequate dosage. The very nature of prisons hinders learning and achievement. Limited funding of prison education programs and difficulty with staffing remote prison locations constrain the number of available training and education opportunities. Courses and trainings are prone to interruptions with lockdowns, administrative issues, infectious health outbreaks, and student transfers. Access to information, technology, and instructional resources to aid learning is diminished in a prison setting.

Third, the population of formerly incarcerated individuals is not addressed in HRD research. This particular population is a growing component of the labor force and often unemployed or underemployed. Formerly incarcerated individuals tend to have greater skill

deficiencies than the general population. By focusing on individuals with the least skills, a relatively small investment produces the maximum return. The field of HRD can be instrumental in maximizing production by addressing underutilized human resources. Although the questions raised in this study pertain to formerly incarcerated individuals, the same questions can be posed regarding other marginalized populations as well as the general population. The insight gained in this study can be used as a comparison for future studies.

Fourth, the majority of studies devoted to workforce development have been published by employer-sponsored consulting firms. The general consensus of the reports concludes severe skill shortages exist in their respective industries. In response to the shortages, the reports call for two policy changes: (a) to align current course content in higher education to meet employer needs and (b) to increase immigration. These conclusions are based on results that are typically from poorly designed surveys with questionable methodological standards (Cappelli, 2015). An alternative approach to skill shortages is an investment in workforce development for the long-term unemployed or underemployed. Securing employment opportunities for disadvantaged populations would simultaneously improve productivity as well as reduce public assistance.

Finally, the study is intended to provide insight on *how* education impacts employment of formerly incarcerated individuals through training programs intended to improve employability. This information is helpful to a wide audience. Formerly incarcerated individuals can benefit from knowing the type of training programs that will improve their likelihood of finding employment. Trainers can capitalize on the findings to identify the most beneficial training programs to offer students. Policymakers can consult the information to make informed decisions. Researchers are provided with a unique perspective on a topic that has historically

been analyzed purely based on prison education programs with intertwined education and training measurements.

Study Limitations

This study utilized data from the National Longitudinal Survey of Youth 1997 (NLSY97). As with all self-reported data, validity is subject to response accuracy. Studies on self-reported data have found information accuracy to be a common problem across all social sciences. The accompanying bias is not considered serious for large groups, but the effect of inaccurate data can be problematic for subsets. In particular, data inaccuracy is thought to be more prevalent among at-risk populations. Research on training is found in both state and national datasets. Both datasets pose unique challenges. The ability to analyze state or local trends is limited in national datasets, including the NLSY97.

In addition, the theories and empirical studies referenced in the literature review are predominantly based on the general population. Although the socio-economic and demographic attributes of the prison population can help determine the aspects of human capital that are particularly applicable to the group of interest, the research devoted specifically to this segment of the population is limited.

Definition of Terms

Besides specifying limitations, it is important to provide context to the terms used throughout the study. The definitions of human capital vary widely depending on the field and focus of the study. For this study, a mico-level view of human capital is adopted and defined as any investment that results in an increase of an individual's productivity. Frank and Bernanke (2007) summarize this view of human capital as "an amalgam of factors such as education,

experience, training, intelligence, energy, work habits, trustworthiness, and initiative that affect the value of a worker's marginal product" (p. 355).

Likewise, the term workforce development has been used to represent many things to many different people. The definition used in this study emphasizes the collaborative nature of a workforce development system that connects individuals, organizations, and communities. According to Jacobs and Hawley (2009) "Workforce development is the co-ordination of public and private sector policies and programmes that provides individuals with the opportunity for a sustainable livelihood and helps organizations achieve exemplary goals, consistent with the societal context" (p. 2543).

In this study, human capital theory and workforce development concepts are applied to training investments of a particular population, formerly incarcerated individuals. Formerly incarcerated individuals in this study are individuals who have previously been incarcerated in a state or federal facility. Regarding the statistical analysis, the population was identified by analyzing the monthly incarceration status in the NLSY97 to pinpoint the time a survey respondent became a formerly incarcerated individual.

Finally, the purpose of the study is to shed light on the relationship between participation in different types of training programs and gainful employment. Gainful employment represents consistent employment that generates adequate income. To this end, gainful employment was determined by evaluating two measurements – (1) employment and (2) income.

CHAPTER 2: LITERATURE REVIEW

This chapter is divided into four sections. The first section begins with a review of human capital theory, which forms the theoretical foundation for this study. Next, the second section discusses workforce development initiatives that focus on skill problems facing individuals, organizations, and communities. Once human capital theory and workforce development concepts have been presented as an underlying framework, the literature review presents prison training programs in the United States. The final section presents a conceptual framework for the study.

The initial query of literature began with sources found in the Academic Search Complete PLUS (EBSCO) database with keywords associated with the topic. These words and combinations included human capital, workforce development, skill shortage, skill gap, employability, ex-offender, prisoner, incarceration, employment, recidivism, education, health, vocation, prison industries, outcome, prison, and social capital. References from the initially retrieved sources provided additional sources that were also included in the review. The social sciences citation index was queried for key sources referenced in this paper. With the exception of historical information, the search was limited to articles published between 2000 through 2016 to capture the current environment.

Human Capital Theory

This section is comprised of three parts. The first part discusses the historical development and defining characteristics of human capital theory in regards to modern research in the field of education. Part two draws upon studies from the field of economics of education to discuss general human capital. In comparison, part three introduces job-specific human capital from an HRD perspective.

History of human capital theory. Before 1960, economists considered the main factors of production to be physical capital, labor, land, and management (Nafukho, Hairston, & Brooks, 2004). The idea of human capital first took root in the presidential address by Theodore W. Schultz at the annual meeting of the American Economic Association on December 28, 1960, in St. Louis, Missouri. Schultz (1961) recounted how he and other economists were called upon to assess the impact of wartime losses on economic recovery. Their underestimation of the recovery efforts led Schultz to reconsider the production model. The gap (or residual factor) in the production function was ultimately identified as human capital.

According to Schultz (1961), expenditures on human capital are comprised of both consumption and investment components. To isolate the investment component of a human capital expenditure, the change in human capital expenditure is the focus of interest. For example, a calculation of the change in earnings associated with completion of a training program isolates the investment component of the human capital expenditure. In essence, a change in expenditure allocation - not the total rate- alters the rate of return. Direct expenditures on education, health, internal migration, forgone earnings, and on-the-job training were all viewed by Schultz as investments in human capital.

Becker soon expanded on human capital theory with his 1964 book, *Human Capital – A Theoretical and Empirical Analysis with Special Reference to Education.* At the time of the publishing, the concept of human capital was controversial. The idea of equating people with machines was considered demeaning. The hostility surrounding the topic led Becker (1993) to hesitate on naming the book *Human Capital*. The long subtitle, which he could not later recall, was added to "hedge the risk" (p. 392). The majority of human capital theorists still follow Becker's framework and rely heavily on neo-classical economic thought. Consistent with neo-classical economics, human capital theorists contend that people rationally choose their level of educational attainment through utility maximization. Utility is determined individually and is anything that enhances an individual's well-being; however, education policy normally assumes that people "primarily seek to rationally maximize their own material wealth" (Gilead, 2009, p. 559). In his original endeavor, Becker calculated the return on investment for college and high school in the United States. In 1993, he expanded the definition of education to include training, general schooling, and other knowledge. Due to his pioneering contribution in measuring the returns to education, Becker is credited as being the founding father of the economics of education (Zula & Chermack, 2007).

Although education has been the primary focus of research, it is not the only type of investment in human capital. Becker (1993) also mentioned experience, expenditures on health, addictions, and the formation of habits as potential investments or dis-investments in human capital. The inclusion of many kinds of behavior under the framework of human capital theory makes the theory useful. Becker (2007) proposed that different classes of human capital are complements. Individuals with greater life expectancies tend to have higher incomes, more

education, better habits, greater savings, and lower discount rates on future utility. The classes of human capital are non-competing, yet interrelated, in determining an individual's total wellbeing.

Another concept introduced by Becker was the distinction between general versus specific skills. Whereas formal education is an investment in general skills, on-the-job training is an investment in specific skills. The distinction of training in specific skills as a form of human capital extends the investment decision to organizations. Just as individuals invest in general skills to better themselves, organizations invest in training specific skills to increase employee productivity and ultimately profits. Job-specific skills increase an individual's productivity solely for that particular organization. In contrast, an investment in general skills increases an individual's productivity in any organization (Dobbs, Sun, & Roberts, 2008).

Through the years, the economics of education has become prominent in the arena of public policy formation for public finance and economic growth. The earlier growth models failed to adequately explain the impact of human capital on economic growth. After a time of stagnated research, the topic emerged once again in economic literature with endogenous growth models (Schultz, 1993). For example, McMahon (2004) collected and analyzed data from 78 countries. He used a three-part equation to determine the total social and external benefits of education. The first part of the equation endogenously calculated GDP (output). The second part of the equation calculated the total satisfaction for time outside of work. Finally, a term was included to represent an investment in education. The nine endogenous variables that are both a function of output and a variable of output included health, fertility, net population growth, democratization, political stability, crime, poverty, environmental influences, and technology. Unlike the previous static growth models which found limited or inconclusive evidence of externalities in the benefits of education, the dynamic approach—extending the model to include

developmental goals—found that the benefits of education in terms of non-monetary returns are substantial.

The field of economics of education continues to make ground-breaking contributions in human capital research. A textbook that can be found in graduate courses in both education and economics is Goldin and Katz's (2008) *The Race Between Education and Technology*. The Journal of Economic Literature heralded the book as rivaling "Becker's *Human Capital* in ambition and potential influence over the economics profession and beyond" (Acemoglu & Autor, 2012, p. 426). Goldin and Katz provided extensive data to support their claim that the widening wealth inequality in the United States can be explained by trends in education and technology. Prior to the 1970s, the mass secondary education movement—unique to the United States at the time—kept pace with soaring technological advances. Essentially, the rise in wealth inequality has been created by a lack of human capital accumulation to accommodate the skill-biased technological changes. Although the demand for skilled labor has remained unchanged, the supply of skilled labor has declined. The decay of educational institutions has caused the United States to lose the status of being a global educational leader. A reversal of this trend can be achieved through reform and reinvestment. Skill shortages are considered to be the dominant reason for the development of HRD as a field of practice in organizations and a field of research and teaching in universities (Kuchinke, 2008).

The definition of human capital is dynamic. Nafukho et al. (2004) compiled a list of definitions by leading economic scholars spanning from 1960 to 2001. The dependent variables found in the various definitions included quality of the workforce, private returns, social returns, pecuniary returns, non-pecuniary returns, productivity, profits, the stock of knowledge, growth rate, employment, earnings, and efficiency. Based on these definitions, the authors concluded

that the main outcomes stemming from an investment in human capital could be categorized into levels of analysis. At the micro-level, an increase in human capital results in improved performance on the individual level. With a meso-level point of reference, an increase in human capital impacts productivity and profitability on an organization level. Finally, a macro-level analysis calculates returns associated with societal benefits generated from an increase in human capital.

The variation in the definitions of human capital occurs across disciplines as well. To demonstrate the range of diversity, definitions of human capital from textbooks currently used by a university (Carnegie Classification Master's Colleges and Universities - larger programs) are presented in table 2.1. The list of textbooks was constructed by referencing the index of each book held at the university's textbook rental. At this particular university, human capital was referenced in courses devoted to economics, education, geography, marketing, management, and sociology. No references to human capital were found in textbooks from other disciplines, including psychology. The dependent variables in the various definitions included stock of knowledge, productivity, income, investment, development, the standard of living, organizational value, and rewards. Similar to the findings of Nafukho et al. (2004), the returns to an investment in human capital can be categorized into individual, organizational, or societal levels (Flatt, 2016).

General human capital. General human capital can be divided into private returns versus social returns. Private and social returns can be further dissected into direct returns versus indirect returns. Capturing the private versus social returns to education is an important part of public finance. An educated community is more productive and less reliant on government financial support, which ultimately translates into higher net tax revenue. For example, the

lifetime earning of a high school graduate was found to be $260,000 higher than a high school dropout. This higher income would generate approximately $60,000 of additional tax revenue (Psacharopoulos, 2006). In essence, an increase in state resources for public education would simultaneously increase tax revenue while reducing societal costs associated with welfare programs, public health, and corrections. In turn, an increase in tax revenue would provide additional state resources that could be re-invested in public education to further stimulate the economy and reduce reliance on welfare programs.

Private returns to higher education (micro-level). The private returns received by an individual from an investment in higher education have been studied extensively. For every dollar invested in education, an individual enjoys an average return of 10%. With advances in technology, the returns to higher education have been rising and are expected to continue to rise in most dynamic economies (Psacharopoulos, 2006).

Grubb (1997, 2002a, 2002b) published several studies that examined the rate of return associated with pre-baccalaureate education with Mincerian earnings functions. He found that "learning to earn" does not hold for every type of education or every type of learner (Grubb, 1997, p. 231). Based on national data, Grubb (2002a) found that earning less than 12 credit hours in a community college does not significantly impact earnings. Further, the rate of return of an associate degree in academic subjects is insignificant. Grubb contended that earning an associate degree in an academic subject but failing to transfer to a 4-year college was a poor investment. The rate of return for an associate degree in engineering, public service, or vocational subjects was found to be higher than the rate of return for a baccalaureate degree in the humanities or education. On average, men with an associate degree earned 18% more than high school graduates.

With state-level data, Grubb (2002b) found that community college students who earned an associate degree, on average, experienced a 54% increase in salary three years after their last year of college. Students earning a certificate had an increase in income of 29.3% whereas students earning less than 12 credits experienced an increase in income of 7.8%. Consistently, several conclusions can be drawn based on the studies regardless of data source. In order to maximize the earning potential of pre-baccalaureate education, students should: (a) complete the credential; (b) find employment in the field of study; (c) transfer to a 4-year college to complete a bachelor degree if the associate degree is an academic subject; and (d) select a vocation with a high rate of return if the degree or certification is vocational.

Several studies have expanded on Grubb's initial work on sub-baccalaureate credentials. Dadger and Trimble (2015) found the average return on investment for an associate degree was 6.3% for women and 2% for men. The authors used an individual fixed effects model with data from the state of Washington (n=24,221). Comparatively, the average return on investment for a long-term certificate was 15% for women. No return on investment was found for short-term certificates for men or women; however, this finding might be attributable to negative selection for participation in programs with short-term certificates. It is worth noting that the average return on investment was found to vary considerably by field of study. The higher return on investment experienced by women was predominantly driven by the nursing field. The wages for women increased approximately 37.7% with an associate degree in nursing and 29.3% with a long-term certificate in nursing. In contrast, the wages for men increased approximately 27.2% with an associate degree in nursing and 19.9% with a long-term certificate in nursing. For men, the returns to a long-term certification in transportation led to a 13% increase in wages. It was

also noted that the returns to a short-term certification in protective services led to an increase in wages of 22%.

Regarding employment, both long-term certificates and associate degrees increased the likelihood of employment. An associate degree increased the likelihood of employment by 11% for women and 8% for men. A long-term certificate increased the likelihood of employment by 9% for women and 11% for men. In contrast, short-term certificates did not increase the likelihood of employment for men or women. The number of hours worked per week also increased with a long-term certificate at 1.8 hours per week for women and 0.7 hours per week for men (Dadger & Trimble, 2015).

Jepsen, Troske, and Coomes (2014) used a student fixed effects model to capture the labor market returns to community college degrees, diplomas, and certificates. Data for the study was from the Kentucky Community and Technical College System during the academic years 2002-2003 and 2003-2004. On average, the quarterly return on investment for associate degrees or diplomas was $2,400 for women and $1,500 for men. The return on certificates was lower ($300 per quarter for both men and women) and certificates were associated with higher levels of employment for only women. Degrees and diplomas were associated with higher levels of employment for both men and women. The results represented the treatment effect on the treated. As with other studies, the highest returns for associate degrees or diplomas occurred in health-related fields ($4,000 per quarter for both men and women). The highest returns for certificates were in vocational fields for men ($368 per quarter) and health-related fields for women ($375 per quarter).

Although capturing the returns to sub-baccalaureate degrees, diplomas, and certificates are useful, community colleges have been criticized for their cooling out effect. Alfonso, Bailey,

and Scott (2005) used logistic regression on national datasets to determine the percentage of students that reach their educational goals. They found

- 49% of occupational students completed occupational certificates compared to only 31% of academic peers completed academic certificates,
- 22% of academic associates left without any degree compared to 42% of occupational associates, and
- 43% of academic associates failed to reach their educational goal whereas 62% of occupational associates failed to reach their goal.

In summary, students enrolled in occupational majors were less likely to achieve their educational goals than their academic counterparts. The difference was partially explained by demographic factors. Occupational students were comparatively older, came from lower SES households, and had greater family responsibilities than academic students. After controlling for these differences, a gap in the achievement of educational goals remained.

Taking non-completion into account, Zeidenberg, Scott, and Clive (2015) examined the labor market returns to progressing through community college using data from the North Carolina Community College System in the academic years 2002-2003 through 2004-2005. According to the authors, approximately two-thirds of community college students did not receive a credential within six years. Even though non-completers made up the majority of community college students, minimal research has focused on the labor market returns for this particular group. The authors used a novel approach of categorizing a non-completer's tentative program by using an algorithm that assigned the program of study based on the student's transcript. Once the program of study was established, the progress towards program completion was determined. The market returns were calculated for non-completers as well as pathways

along completion. In addition, an ex-ante return was calculated by combining data from both completers and non-completers to take into consideration the likelihood of completing a program. They found progression towards a credential only increased earnings at a rate comparable to earning general credits. For programs associated with low completion rates, the ex-ante returns were substantially diminished. Although the particular subject influenced the rate of return, the effect was most likely overstated once the likelihood of completion was taken into account. The return to a program should take into consideration the probability of program completion.

One of the most comprehensive calculations of returns to education is found in *Higher Learning, Greater Good* by education economist Walter McMahon (2009). He calculated the private returns to higher education by education level and sex. As depicted in table 2.2, the data indicate that the private rate of return for a male with an associate degree was 18% higher than if he had chosen to settle with a high school diploma. For the levels of master and above, the rate of return reflects the incremental rate of return from the bachelor level.

In addition to direct financial gain, education benefits an individual in other aspects of his or her life. Subsequently, these improvements in other areas can ultimately lead to a financial gain and are considered indirect returns to an investment in education. The total private return to education should account for both the direct and indirect benefits of education. According to Psacharopoulos (2006), education promotes consumer efficiency and better health for oneself and one's family. For example, the life expectancy of high school dropouts has been found to be 9.2 years shorter than high school graduates. Individuals in the upper end of the education scale have been shown to live at least six years longer in western cultures. For each additional year of

college, an individual exercised 17 more minutes per week and consumed 1.6 fewer cigarettes per day (McMahon, 2009).

Social returns to higher education (macro-level). McMahon (2009) defines the social rate of return to education as money earnings that directly benefit society after taking into consideration the costs associated with public funding and financial aid. The calculation included the increased tax revenue that pays for public goods. As presented in table 2.3, McMahon found that the direct increase in economic returns to society for a male with an associate degree was 14% higher than if he had settled with a high school diploma.

In addition to the direct monetary returns to society, education can have an indirect impact on the local economy. Moretti (2004) estimated the income spillover effect of a college education by comparing the wages of individuals with similar attributes between cities with varying proportions of college graduates in the local labor force. One of the possible explanations for income spillover was the sharing of knowledge and skills across workers that occurs through interactions. He found that a percentage increase in the supply of college graduates raised high school dropout wages by 1.9%, high school graduate wages by 1.6%, and other college graduate wages by 1.4%.

Other indirect social benefits accompanying an increase in education include a: decrease in infant mortality; decrease in the spread of infectious diseases; increase in longevity; improvement in child, spouse and public health; decrease in the fertility rate; promotion of democratization and human rights; improvement in political stability; decrease in the crime rate; decrease in poverty; and reduction in inequality (McMahon, 2009). Using an approach developed by Haveman and Wolfe (1984), McMahon pioneered the first quantification of the total direct and indirect social benefit by summing each social benefit in monetary terms. This method

permitted individual studies to be evaluated and combined to find the optimal value to represent the overall benefit of education to society. As shown in table 2.4, the total annual value of indirect social benefits for a bachelor's degree was found to be $27,726.

Overall, McMahon (2009) found that 52% of total benefits to education are social benefits. This figure implies that 52% of the investment in education should be funded through endowment funds and government sources. Economic efficiency in the higher education industry is achieved when 48% of post-secondary education is financed through tuition, fees and foregone earnings (room and board).

Although there are many articles focused on externalities of education, McMahon's (2009) work was the first to provide a clear and thorough quantification of the spillover benefits society gains by an individual earning a bachelor degree. Since education is a key driving force behind society's economic and social well-being, concern over the crowding out effect of increasing public aid expenditures in state budgets is warranted. As the cost of public assistance, Medicaid, public health, and criminal justice continue to rise, funding for higher education is squeezed out. A drop in higher education funding causes income to drop, which starts the cycle once again.

Job-specific human capital. Whereas the economics of education predominantly focuses on private and social returns to education, HRD is primarily concerned with specific skills needed within an organization to improve productivity and profitability. Regarding competitive advantage, the knowledge embedded in human capital is thought to be the most universally valuable yet imperfectly replicable. Job-specific human capital is not easily transferred and applied to other organizations. Due to this attribute, employee compensation for individuals with

job-specific skills is typically lower than his or her true value to the employing organization (Crook, Todd, Combs, Woehr, & Ketchen, 2011).

Not all skills and knowledge are of equal importance in terms of strategic importance. To address this issue, Lepak and Snell (1999) combined transaction cost economics, resource-based view of the firm, and human capital theory to form their human resource architecture to describe human resource strategies in human capital acquisition. In transaction cost economics, people are considered opportunistic by nature and adaption is thought to be the central problem of organizations. A transaction is comprised of three steps: (1) determine the needed asset (e.g. skills and knowledge); (2) identify the various modes of acquisition (e.g. make or buy); and (3) determine the most efficient mode of acquisition for the needed asset (Tadelis & Williamson, 2010).

The resource-based view of the firm takes a strategic look at resources within an organization. For example, this economic theory investigates decisions such as determining the optimal resources to produce the highest profits and deciding whether an organization should use existing resources or develop new resources. In terms of competitive advantage, the resource-based view considers the organization with the first move to have the initial advantage. Subsequent organizations that enter the market, experience position barriers for scarce resources. In essence, organizations positioned to own or control resources to meet product demands by customers have a competitive advantage (Wernerft, 1984).

Combining the three economic theories led to the development of a four-quadrant matrix of employment modes. Based on the value and uniqueness of human capital, an organization may increase human capital by developing it internally or acquiring it externally. Internal development of human capital provides greater stability and predictability to the firm's stock of

skills and capabilities, enhances socialization, and lowers transaction costs. Acquiring human capital externally also can be beneficial to the organization. External employment allows an organization to decrease overhead and administrative costs, balance workforce requirements, enhance organizational flexibility, and access vendor innovations while focusing on core capabilities. Human capital can be acquired externally through acquisitions, contracts, or alliances. The human resource architecture portrays the optimal strategy of human capital attainment through quadrants defining both the level of uniqueness and value of human capital. In quadrant 1, human capital is internally developed due to high uniqueness and high value. Quadrant 2 depicts human capital acquisition due to high value and low uniqueness. Quadrant 3 shows human capital as contracted due to low value and low uniqueness. Finally, quadrant 4 finds human capital is optimally attained through the formation of an alliance due to low value and high uniqueness (Lepak and Snell, 1999).

The value of human capital is dependent on its potential to bolster the organization's competitive advantage whereas the uniqueness of human capital represents the degree of specificity to the organization. Since human capital considered by the organization to be both high in uniqueness and value will generally undergo internal development, organizations can strategically alter the value and uniqueness of human capital through adjusting the level of firm-specificity in skills. Managing the human resource hierarchy can become a core capability that other firms are not able to easily replicate and lead to a significant competitive advantage within an industry (Lepak & Snell, 1999).

To investigate the impact of job-specific human capital on organizational performance, Crook et al. (2011) conducted a meta-analysis to measure the relationship between human capital and firm performance. The sample included 68 studies with a total of 12,163 observations. In

general, they found human capital to be positively related to performance. An increase in one standard deviation of human capital increased performance by .21 of a standard deviation. They found firm-specific human capital to have a greater impact on performance than general human capital. Specifically, the results were 71% higher for job-specific human capital compared to general human capital. The performance was also higher for organizations that developed human capital across multiple levels of hierarchy rather than just one level. Finally, they found human capital to have a greater impact on performance when operational performance measures were included. The authors concluded that neglecting measures of operational performance outcomes leave important sources of competitive advantage and disadvantage undetected within a firm. Including a measurement of operational performance mediates the relationship between human capital and organizational performance. In addition to global organizational performance indicators, researchers should include operational performance indicators within the organization as part of the model to strengthen the explanatory power.

In the same year, Park and Jacobs (2011) performed a structural equation modeling (SEM) on data from the 2005 and 2007 Human Capital Corporate Panel Survey of South Korean companies. The authors defined workplace learning as the acquisition of job-related knowledge and skills through both formal training programs (typically sponsored by the employer) and informative social interactions between employees. They found that, in and of itself, an investment in HRD programs did not necessarily lead to an improvement in an organization's financial performance. For investments in HRD programs to impact financial performance, the investments should address organizational needs. Workplace learning outcomes act as a mediator between workplace learning and an organization's financial performance.

Workforce Development

This section is divided into three parts. The first part recounts the evolution of workforce development systems in the United States. Part two reviews workforce development literature dedicated to the skill development of individuals. In contrast, part three shifts the focus to skill problems faced by organizations.

Evolution of workforce development. According to Short and Harris (2014), workforce development is unique in that it combines traditional ideas from management theory (such as an engaged workforce) with operationalization techniques that utilize new technology and branding. Workforce development is increasingly used in education, policy, and research. The literature on workforce development often draws from the fields of human resource development, human resource management, workforce planning, and workforce capability development. In addition to the skill development of individuals, workforce development addresses shortages in the labor force.

The term workforce development emerged globally in the mid-1990s to emphasize the need for an employer-demanded approach rather than the supply-sided focus inherent in employment training. The Australian Workforce and Productivity Agency defined workforce development as “those policies and practices which support people to participate effectively in the workforce and to develop and apply skills in a workplace context, where learning translates into positive outcomes for enterprises, the wider community and for individuals throughout their working lives” (p. 67). This definition of workforce development categorizes outcomes into organizational, societal, and individual levels. Concerning prioritization, the organization is the primary focus (Harris & Short, 2014).

The concept of workforce development has continued to grow in popularity around the world. In May 2011, the World Bank launched the Systems Approach for Better Education Results (SABER) initiative. The goal of the system is to create diagnostic tools to assess policy and institutional factors that influence the outcome of education and training systems. Workforce development (WfD) is one of 13 areas of educational policy that is currently analyzed through SABER. The WfD component of SABER focuses on job-related skills obtained through initial preparation, continuing education, or training. In contrast to the SABER tool for higher education, SABER-WfD is designed for mid-level positions such as skilled craftsmen, technicians, and production supervisors. The SABER-WfD tool provides a measurement of indicators in terms of strategic framework, system oversight, and service delivery. The initiative is currently in the pilot phase with data collected from Chile, the Republic of Korea, Ireland, Singapore, and Uganda (Tan, Lee, Valerio, & McGough, 2013).

Compared to work preparation efforts in other parts of the world, the structure of workforce development programs is unique to the United States. Preparation for work is decentralized in the United States with a network of local, regional, and state-level institutions. Consequently, this means that the federal system has a relatively minor influence on skills training and education. In the United States, businesses provide training for employed adults while the government provides training for youth and the unemployed. Business associations have begun to play a larger role in providing workforce development, but they have not been given clear direction in their role of offering technical skills training or remedial academic instruction. Unlike other countries, there is no clear transition—such as apprenticeships—from school to work in the United States (Hawley & Taylor, 2006).

In the United States, the Workforce Investment Act (WIA) is the primary workforce development legislation which replaced the Job Training Partnership Act (JTPA) in 1998. The act describes the planning and development of local workforce strategies to be accomplished through the Workforce Investment Board (WIB), comprised of employers, business organizations, and workforce development providers (Hawley & Taylor, 2006).

There are several defining features of WIA pertaining to the structure as well as performance measurements and goals. The WIA established 17 performance measures based on labor market outcomes to evaluate program performance. Specifically, the labor market measurements are collected from unemployment insurance records. Performance goals are created to adjust goals for participant demographics through negotiations with state and local agencies in conjunction with a regression model developed by the Federal Department of Labor. Goals for programs servicing disadvantaged populations are adjusted accordingly. The WIA program created One-Stop Career Centers governed by the local WIBs. The program offers graduated services comprised of core services, intensive services, and training services (Moore & Gorman, 2009).

Historically, workforce development initiatives have been federally funded and characterized by short-term training programs with durations of less than six months. Since 2002, six workforce development initiatives sponsored predominantly by private sources have been instrumental in shifting the focus and landscape of workforce development. These initiatives include

- Bridges to Opportunity (2002-2008) sponsored by the Ford Foundation;
- Integrated Basic Education and Skills Training (I-BEST, 2004-present) sponsored by the state of Washington;

- Breaking Through (2006-present) sponsored by the National Council for Workforce Education, Jobs for the Future, and the Bill & Melinda Gates Foundation;
- Shifting Gears (2007-2014) sponsored by the Joyce Foundation;
- Accelerating Opportunity (2011-present) sponsored by Jobs for the Future, Washington State Board for Community and Technical Colleges, the National Council for Workforce Education, the National College Transition Network, the Bill & Melinda Gates Foundation, the U.S. Department of Labor, the Joyce Foundation, the W.K. Kellogg Foundation, Kresge Foundation, the Open Society Foundations, the Arthur Blank Foundation, the Woodruff Foundation, the Casey Foundation, and the University of Phoenix; and
- Completion by Design (2011-present) funded by the Bill & Melinda Gates Foundation over a five-year period.

Together, the recent workforce development initiatives have been instrumental in making two noteworthy contributions. First, the definition of success has shifted from access to achievement and completion. Second, the recent workforce development initiatives are predominantly collaborative efforts funded by private foundations. Collaboration fosters efficient use of scarce resources and provides connections to a wider range of expertise. The knowledge, experience, and success gained from each workforce development initiative have been used and expanded by subsequent collaborative efforts (Fox, 2015).

The workforce development efforts by community colleges have tended to be isolated, short-term, local initiatives that often competed with peer institutions for limited resources. The quality of workforce development programs offered by community colleges has greatly varied.

Program outcomes have been hampered due to the stigma associated with the concept and clients of workforce development, insufficient funding, misalignment in efforts with labor force needs and trends, and limited success with education completion and employment attainment (Fox, 2015).

Workforce development has been a topic of growing interest among policymakers, multiple levels of government, and researchers spanning across several disciplines. Given the diversity of expertise, the concept of workforce development means different things to different people. Over the years, the literature devoted to workforce development has provided insight on the underlying factors driving the demand for skill development, the areas of focus, and the collaborative nature of the field.

Workforce development is driven by five interrelated streams: globalization; technology; the new economy; political change; and demographic shifts. Globalization has resulted in the interconnection and integration of people, organizations, and governments around the world. Through unprecedented access to markets and information, organizations in remote villages can compete with modern facilities in developed countries. This global competition has raised the need for workforce development. Employees are increasingly mobile, resulting in a need for transferrable skills recognized across borders. In response, multi-national organizations tend to focus on long term workforce development. Within the global context, the purpose of workforce development initiatives is to foster economic growth and development (Harris & Short, 2014; Jacobs & Hawley, 2009).

Directly impacting globalization, information technology greatly expands production location possibilities. Manufacturing technology allows organizations to produce higher quality products at lower costs. Through the use of technology, the need for memorization is reduced

while learning opportunities are expanded with the use of virtual environments to promote problem-solving, reflection, and experiential learning. Technology is embedded in course content and social structure. In addition, technology increases the accessibility of information (Jacobs & Hawley, 2009). Technology will continue to break down learning barriers in terms of time and location. The use of technology expands the traditional face-to-face learning environments to include simulated or blended learning possibilities (Harris & Short, 2014; Jacobs & Hawley, 2009).

The new economy emerges from a free market system in a global society that encourages organizations to offer competitive prices for quality goods and services. The competition among organizations is thought to ensure high efficiency, high quality, and low inflation. Economic shifts have resulted in new job classifications that require training and adult education in specialized fields (Jacobs & Hawley, 2009).

Political changes also influence the need, structure, and philosophies for workforce development. The national training systems in Europe and Asia are typically collaborative efforts involving governments, trade unions, and business groups to produce a skilled workforce. In contrast, the workforce initiatives in the U.S. have historically been isolated efforts, but providers of workforce development services have similarly begun to forge relationships. Finally, demographic shifts greatly impact the need for workforce development. The size of the U.S. workforce has increased by more than 50% in the past two decades. As the baby boom generation retires, an increase in workforce development efforts will be needed as positions are filled (Jacobs & Hawley, 2009).

Workforce development has four distinct areas of focus: developing skills to prepare individuals to enter or re-enter the workforce; learning opportunities for employees to improve

organizational performance; training programs and organizational development in response to changing skill requirements; and transitioning support for individuals approaching the age of retirement. For individuals entering the workforce, workforce development consists of vocational-technical training, cooperative education, and apprenticeships. In the United States, secondary career and technical education institutions typically provide these types of services. The school-based services provide adults with vocational skills, literacy, math skills, and transition services. While this focus is predominantly used as second chance education, the programs are broader outside of the United States. For example, apprenticeship programs provided by employers are prevalent in Germany and other European countries (Jacobs, 2006).

After initially preparing for a career, most subsequent training stems from the needs of employers or businesses. Government plays an insignificant role in supporting human resource development within organizations. As skill requirements change, organizations respond with organizational development and training. Examples of changes that impact skill requirements include technology and reorganization of work processes. With the changing demographics, organizations have relied on older workers to fill positions. Employers must meet the training needs of older employees as well as support the transition into and out of the workforce (Jacobs, 2006).

The perceptions, goals, factors, and recipients of workforce development initiatives can greatly vary, but one common feature is found within all successful workforce development programs. Collaboration is vital to the success of any workforce development initiative (Fox, 2015; Harris & Short, 2014; Hawley, Sommers, & Melendez, 2005; Jacobs, 2006; Jacobs & Hawley, 2009) According to Harris and Short (2014), a comprehensive approach to workforce development includes employer engagement, deep community connections, career advancement,

human service supports, industry-driven education and training, and the connective tissue of networks. Although workforce development cannot be considered a unique field, it is a global phenomenon. Workforce development efforts address policies about complex economic and social problems that can only be answered through research and expertise from multiple fields and disciplines.

Workforce development networks come in three forms in community-based organizations (CBO): hub and spoke employment networks; peer-peer employment networks; and intermediary employment and training networks (Harrison and Weiss, 1998). The hub and spoke employment networks use a formal organization to enroll in a training or intervention program and then link individuals to services provided by other agencies. In contrast, the peer-peer employment networks use a network of like organizations specializing in a particular service (e.g., one organization provides training while another organization provides employment assistance). Finally, the intermediary for employment and training networks is an organization that facilitates workforce development but may not provide any services directly (Hawley & Taylor, 2006).

Based on a mixed methods study of 5,183 individuals who completed a program from an adult workforce education provider from July 2000 to June 2001, Hawley et al. (2005) found that individuals participating in programs with stronger collaborations have higher quarterly earnings than their counterparts. Further, individuals participating in vocational training programs characterized by formal relationships also had higher quarterly earnings. Ultimately, the success of one societal program was dependent on connections with other programs. Workforce development is a system comprised of inter-related organizations such as schools, community

colleges, universities, government agencies, unions, non-profit institutions, and businesses (Jacobs, 2006).

Several studies have measured the returns to training. Haelermans and Boghans (2012) conducted a meta-analysis on the returns to on-the-job training from studies published between 1981 and 2010. They included 38 studies with 71 effect estimates. The average wage effect of on-the-job training was found to be 2.6%. The wage effects varied widely by training type, but on-the-job training may be profitable for individuals up to age 61. While wage returns to regular schooling was more stable than on-the-job training, the authors concluded that "Comparing the average number of hours spent on on-the-job training with the average number of hours spent on schooling gives a wage increase of 30 per cent for on-the-job training, compared with 8 per cent for the return to schooling" (p. 523).

Schone (2004) questioned why the return to training is found to be so high. He used both ordinary least squares (OLS) and fixed effects to explain the impact of training on hourly wages. With OLS, the return to training was found to be approximately 5% (equivalent to one year of education). Comparatively, a fixed effects model lowered the return to training to 1%. It was noted that the results represent the return to training for the trained, not necessarily the untrained.

Using the NLSY79 dataset, Sicilian and Grossber (2001) analyzed the effect of training on the gender wage gap. Training was categorized into off-the-job, on-the-job, and apprenticeships. Although they concluded training was not related to the gender wage gap, they found gender differences in the relationship between training and wages. For men, on-the-job training was the only type of training that impacted wages. A 50% increase in current on-the-job training raised the average hourly wage by 14 cents. Using dummy variables for training, the hourly wages for men who received on-the-job training were approximately 10% higher than

their counterparts. For women, previous off-the-job training was found to positively impact wages.

Besides differences in labor market outcome found with training types and gender, the increase in wages experienced by high school graduates from skills acquisition was not found with high school dropouts. Compolieti, Fang, and Gunderson (2010) found basic education, literacy, and numeracy to be a pre-condition for life-long learning. They concluded skill training is a complement rather than a substitute for formal education.

A well-functioning workforce development system matches skills demanded with skills supplied with a high degree of precision, promoting faster economic growth. Aligning skills demanded with skills supplied is achieved by (1) enabling individuals to acquire the knowledge and skills necessary to secure gainful employment or enhance performance in an individual's profession (i.e., employability development) and (2) providing employers a means to obtain employees with the skills necessary to meet their needs. A mismatch of skills is accompanied by slower economic growth, brain drain, and technological stagnation (Tan, Lee, Valerio, & McGough, 2013).

Employability. According to Fugate, Kinicki, and Ashforth (2004), employability consists of adaptability in three specific dimensions - career identity, social and human capital, and personal adaptability. The dimensions of employability mutually influence each other and form a constellation of factors that must be examined in its totality. Fugate et al. provide an inter-disciplinary approach to employability that has been cited over 150 times. They contend that employability does not ensure actual employment but increases the likelihood of attaining employment. In other words, an individual can be employable without necessarily being employed. In 2007, the model proposed by Fugate et al. was empirically tested using SEM in a

longitudinal study of 416 unemployed Australians (McArdle, Waters, Briscoe, & Hall, 2007). Based on the goodness of fit indices, the authors concluded that their results supported the employability model.

Koen, Klehe, and Van Vianen (2013) further tested the employability model using a logistic regression model and extending the theoretical framework to the long-term unemployed. Variables were entered into the model in three steps – control variables, employability dimensions (adaptability, social capital, human capital, and career identity), and job search intensity. The significant increase in chi-square after adding each step indicated an improvement in the predictive power of the enhanced model. Specifically, the authors questioned if employment barriers were simply too high for the long-term unemployed regardless of their level of employability. They concluded that employability, as defined by Fugate et al. (2004), can predict job search and reemployment success for long-term unemployed individuals. To be most effective, employability interventions should be individually tailored and aim to develop each dimension of employability. Since long-term unemployed individuals face multiple barriers to employment, they recommended combining employability interventions with programs designed to address barriers to help this particular population re-enter the workforce.

Academic research has made significant contributions to the study of employability but, in reality, employability is determined by employers. Employer surveys have consistently stressed the increasing importance of specific behaviors and personal attributes as top skills needed in today's workplace (Casner-Lotto & Wright, 2006; Partnership For 21St Century Skills, 2008; SHRM & Wall Street Journal Career Journal, 2008). This literature review takes into consideration both employer perspectives and the interdisciplinary employability model.

Career identity. The first dimension, career identity, represents "who I am" (Fugate et al., 2004, p. 17). It can include goals, hopes, fears, personality traits, values, beliefs, norms, interaction styles, identity awareness, and self-efficacy. It has been noted that many long-term unemployed individuals still identify themselves as workers (Koen, Klehe, &Van Vianen, 2013; Lindsay, 2002).

In terms of self-efficacy, there have been several studies devoted to self-perceived employability. Berntson and Marklund (2007) found self-perceived employability increased with education but decreased with age. Wittekind, Raeder, and Grote (2010) found that education, employers' support for career and skill development, and the current level of job- related skills all positively influenced perceived employability. Willingness to change jobs was a predictor of perceived employability; however, willingness to develop competencies did not significantly influence perceived employability. Conversely, De Vos, De Hauw, and Van der Hiejden (2011) found participation in competency development initiatives, as well as perceived employer support for competency development, increased self-perceived employability. It can be noted that age, willingness to change, education, and employer support all impacted perceived employability. Taken together, the findings of these studies demonstrate the interdependence of all dimensions of employability – career identity, adaptability, human and social capital.

Capital accumulation. The next component of the employability model entails an investment in capital accumulation. The investments described by Fugate et al. (2004) consist of both social and human capital. In contrast to human capital as described in a previous section, the basic concept of social capital is that family, friends, and acquaintances are also assets. Social capital can be summarized as the networks and assets available to an individual through relationships (Nahapiet & Ghoshal, 1998).

Putnam (2000) defined two functions of social capital, bonding and bridging. Bonding reinforces community ties, cultures, and values whereas bridging establishes links outside the community. When it comes to job seeking, weak ties with distant acquaintances are more valuable than strong ties with close friends and families. Whereas bonding social capital is good for getting by, bridging social capital is a means of getting ahead.

On the downside, social capital is not always a positive factor (Woolcock & Narayan, 2000). Social capital is typically distributed unequally and can result in intergenerational inequalities. Portes (1998) found four attributes of social networking that can result in negative consequences: (a) the exclusion of outsiders; (b) excessive obligations on group members; (c) restrictions placed on individual freedom; and (d) downward leveling of social norms. In addition, ethnic loyalty and familial attachment can prevent individuals from linking to better opportunities in other communities (Woolcock & Narayan, 2000). For social capital to be most beneficial, the two components of social capital (bonding with friends and family versus bridging to new opportunities) need to be balanced. For the disadvantaged, the challenge of social capital is to capture the positive aspects of bonding while expanding opportunities through bridging.

Adaptability. The final dimension described by Fugate et al. (2004) is personal adaptability. Employers have also emphasized the need for adaptable employees who encompass a wide range of applied skills. Casner-Lotto and Wright Benner (2006) surveyed 400 employees to determine what knowledge and skills were considered important. For each level of education, four out of the five categories were considered applied skills which are considered more behavioral in nature. For example, skills considered important for high school graduates included (a) professionalism and work ethic, (b) teamwork and collaboration, (c) oral communication, (d) ethics and social responsibility, and (e) reading comprehension.

As the level of education increases, the expectations and level of importance expressed by employers for applied skills also increase. For example, 80.3 percent of employers surveyed indicated that professionalism and work ethic are very important for high school graduates entering the workforce. Comparatively, 83.4 percent and 93.8 percent of employers surveyed rated professionalism and work ethic as very important for 2-year technical graduates and 4- year graduates entering the workforce. Employers indicated several academic deficiencies among high school graduates including English writing, mathematics, and reading comprehension. In terms of applied skills considered important, they found high school graduates deficient in written communication, professionalism/work ethic, critical thinking/problem-solving, and lifelong learning/self-direction. To achieve employability, it is no longer enough to acquire basic knowledge. Employees must also be willing and able to apply the knowledge (Casner-Lotto & Wright Benner, 2006).

Similarly, the Society for Human Resource Management teamed up with the Wall Street Career Journal (2008) to determine the skills that have increased in importance for new employees. The top six skills included (a) adaptability and flexibility, (b) critical thinking and problem-solving, (c) professionalism and work ethic, (d) information technology application, (e) teamwork and collaboration, and (f) diversity. Many of the skills listed are the same skills that have been found lacking among high school graduates.

Skill problems. Cappelli (2015) categorized skill problems into skill gaps, skill shortages, and skill mismatches. A skill gap occurs when there is a shortfall of basic skills. In contrast, a skill shortage exists if there is a shortfall in a particular occupation. A skill mismatch exists if the supply of a particular skill is not equal to the demand for that skill.

Over the past few years, the media has increasingly featured articles on skill problems facing the nation. Employee surveys across industries have attempted to quantify the problem. A few of these reports are listed below.

- The Manufacturing Institute reported 5% of current jobs (600,000 jobs) remained unfilled due to a lack of qualified candidates (Morrison, Maciejeski, Giffi, Stover, McNelly, & Carrick, 2011).
- ASTD (2012) reported that 84% of survey respondents indicated skill gaps existed in their organization. Specifically, the growing middle-skills industries (manufacturing, construction, and healthcare) faced the most significant skills shortages.
- The FMI corporation conducted the 2015 Talent Development Survey in the Construction Industry and found 86% of survey respondents indicated experiencing a skilled labor shortage (Arnold, 2015; Hoover, Wilson, & Powers, 2015).
- The Korn Ferry Institute predicted an unprecedented labor shortage in the logistics industry (Korn Ferry Institute, 2015).
- AMN Healthcare Services projected a shortage of healthcare workers (Detar, 2016).
- The Association of American Medical Colleges expects the shortage of physicians to top 90,000 by 2025 (Detar, 2016).
- The Wall Street Journal predicts labor demand will exceed labor supply within the next 10 to 15 years, constraining economic growth (Sparshott, 2016).

Likewise, economists have also begun to weigh in on the subject. Oslund (2016) compared job opening data with hiring and separations data from the Job Openings and Labor Turnover Survey conducted by the Bureau of Labor Statistics. She concluded that jobseekers

should focus their efforts in the durable goods manufacturing, information, all levels of government, healthcare and social assistance, and finance and insurance industries.

Levanon, Cheng, and Paterra (2014) calculated labor shortage indexes for 464 occupations in 266 industries for the year 2022. The indexes were based on 12 determinants of labor shortages. The main determinant for future labor shortages was the projected gap between labor supply and labor demand in 2022. Other occupation-level variables included in the study were average years of education, required years of education, required work experience, required on-the-job training, percentage of workers who work part-time, percentage of workers who are immigrants, percentage of workers who are unionized, occupation wage premium, occupational off-shore-ability, and the probability of the occupation being automated. The index was constructed by a weighted average of the individual normalized components. They concluded that the retirement of the baby boom generation is expected to cause labor shortages in some organizations, occupations, industries, and regions in the coming decade. The industries hardest hit with shortages are expected to be health services, transportation, utilities, religious organizations, social assistance, mining, construction, and libraries. Concerning occupations, the authors listed approximately 60 occupations that are at risk of a labor shortage.

Not all researchers agree that labor shortages exist. In fact, there is not even a universal definition for the term labor shortage. Barnow, Trutko, and Piatak (2013) analyzed occupational shortages in four occupations – special education teachers, pharmacists, physical therapists, and home health workers. Although the authors did not conclude labor shortages currently exist in the four occupations under review, they found schools employed less qualified special education teachers to avoid an occupational shortage. Hiring less qualified teachers does not represent a

labor shortage in the economic sense if the quality of education meets standards mandated by law.

Likewise, Cappelli (2015) did not find evidence of skill gaps or shortages. A popular skill gap argument in the United States is based on student achievement. Compared to other countries and previous generations, the current U.S. test scores are perceived as low. In actuality, the test scores are average. There is no statistical difference between U.S. test scores compared to some of the other countries with higher rankings. Student test scores from the U.S. have been towards the middle of the distribution since the initial comparison in 1964 and have remained in the same position. Although the test scores have increased in absolute terms, scores from other countries have also increased. In contrast, the Programme for International Assessment of Adult Competencies (PIAAC) found that the United States workforce is below average in literacy, numeracy, and problem-solving. The Organisation for Economic Co-Operation and Development (OECD) provides an international comparison of workforce skills. Out of the 24 participating countries, the United States ranked 17th in literary, 22nd in numeracy, and 14th in problem-solving. Taken together, Cappelli concluded that the comparatively low reading and numeracy skills of U.S. workers are attributable to differences in skill acquisition after leaving school.

Articles and reports frequently cite the shrinking population and labor force as the major contributing factor in an eminent skill shortage. Conversely, Cappelli (2015) stated that the rate of increase in the labor force is only expected to slow if the baby boom generation does not delay retirement. Further, this rate of slowdown is trivial compared to cyclical changes.

Regarding skill mismatches, the problem is common for many countries. In the United States, the skill mismatch is typically in the form of over-skilled workers as opposed to under-

skilled workers. According to Cappelli (2015), employer concerns tend to center around attitude, lack of experience, and the level of maturity with youth entering the labor force. Nevertheless, hiring difficulties may very well exist for several reasons. First, there has been a widespread decline in employee tenure which translates to more overall hiring. Second, there has been a decline in promotion-from-within. Unlike entry-level positions, key positions require precise skills that are challenging to find with external hires. Overwhelmingly, employers seek experienced workers even from students that have yet to hold full-time positions. Employers prefer to hire candidates with skills rather than develop the skills of the existing workforce. Only 17% of employees reported participating in an employer-sponsored training program in 1991. Of the training that was offered, the most common type of training was workplace safety. From 2003 to 2012, the number of apprenticeships registered with the Department of Labor declined from 33,000 programs to 21,000. In terms of participants, the decrease was approximately 44%, declining from approximately 500,000 to 280,000. The number of vocational education courses has also declined since 1990. From 2000 to 2005 alone, the average number of credit hours per student decreased by half.

Drawing conclusions from the articles, surveys, and reports addressing skill problems should be done carefully for two reasons. First, the reports addressing skill problems generally do not use a scientific method to reach conclusions, are poorly designed, and are often contradictory. There are issues with sampling sizes, leading questions, and validity. Consulting firms lack objectivity given their affiliation with employers. There is a clear incentive for employers to show the existence of skill problems in their respective industry. Increasing the number of qualified applicants through formal education or immigration would ultimately drive down labor costs. Cappelli (2015) stated “The topic of skill problems in the United States

represents something reasonably new for labor market and public policy discussions. It is difficult to think of another labor market issue for which academic research or even research using standard academic techniques has played such as small role" (p. 283). Second, the reports tend to shift all skill development responsibility to job seekers and schools. Some skills can only be learned in the workplace. Instructors have a limited ability to recreate workplace problems in classroom settings. In addition to school-based education, experience and on-the-job training are necessary components of skill development that is needed to meet the skill requirements of employers.

Prison Training Programs

This section is divided into three parts and organized as an input-output system. The first part focuses on the inputs of prison training programs. The second part describes the process of implementing prison training programs. Finally, the third part presents the outcomes found in prison studies. This organization provides a simple framework that thoroughly describes incarcerated students, prison training programs, and the post-release outcomes of formerly incarcerated individuals.

Inputs. Inputs represent the characteristics of the student before training program participation. Similar to medicine, not all consumers benefit from treatment. Just as not all patients respond to a particular medical treatment, not all students learn from a specific training program. Likewise, some patients improve with an ineffective medical treatment just as some students develop regardless of the curriculum (Astin, 1993). The input section describes the unique characteristics of the population of interest in this study. This part provides a review of socio-demographic information and the general health of formerly incarcerated individuals.

Socio-demographics. Formerly incarcerated people are sons, daughters, brothers, and sisters. More often than not, they are also fathers and mothers. Re-entry studies typically examine parole cohorts to describe the population returning home. Individuals convicted of non-violent or drug offenses cycle out of the system faster than those convicted of violent offenses. According to the Bureau of Justice Statistics, most of the characteristics of adult parolees have remained stable in recent years (Carson & Golinelli, 2013). The adult parole population is approximately 89% male and 59% minority, but not everyone released from prison is subject to parole. Approximately 33 percent of individuals released from prison are released unconditionally.

Instead of using parolees as a proxy for the formerly incarcerated population, Petersilia (2005) defined *soon-to-be-released* as all state and federally incarcerated individuals that were expected to be released within 12 months (p. 16). Using data from the 1997 Inmate Survey, the author was able to provide a depiction of formerly incarcerated people. The typical incarcerated or paroled individual can be classified as a minority male characterized by limited skill development, educational deficits, and substance abuse issues. Most incarcerated individuals were raised in single-parent homes and pass the same experience on to their children. This depiction of a typical incarcerated or paroled individual has remained steady over the years, but there have been some notable changes.

In recent years, the percentage of incarcerated females in terms of the total population has increased. The number of incarcerated individuals with drug addictions has also increased. Besides the increasing prevalence of substance abuse, truth-in-sentencing laws have resulted in longer sentence lengths subsequently leading to an older incarcerated population. Approximately 25% of state incarcerated individuals and 33% of federally incarcerated individuals will have

served more than five years upon release. As such, there are a greater number of older individuals released from prison. The longer prison sentences and prevalence of addictions translate to weaker family ties and social networks. Regarding ethnicity, Latinos are the fastest-growing minority in prison.

Based on the responses from the Inmate Survey, Petersilia (2005) presented several tables describing offenses, educational attainment, social networks, substance abuse, and treatment participation. Nearly 50% of offenses by soon-to-be-released state incarcerated individuals were comprised of four categories: drug trafficking (13.5%), drug possession (13.1%), robbery (11.4%), and burglary (11.3%). Comparatively, over 55% of soon-to-be-released federally incarcerated individuals were convicted of drug-related crimes.

Fifty-eight percent of soon-to-be-released state and 41% of soon-to-be-released federally incarcerated individuals indicated they have less than a high school education. The majority indicated that they drink and use drugs on a regular basis. A third of all soon-to-be-released state incarcerated individuals indicated they were unemployed during the month before arrest compared to 27% of soon-to-be-released federally incarcerated individuals. Approximately one-fourth of the respondents indicated they received income from illegal sources in the month before the arrest. To evaluate program participation of incarcerated individuals, Petersilia (2005) cross-referenced participation by need. Just over 50% of soon-to-be-released incarcerated individuals identified as high need for education or employment services reported participating in a program.

Once released, formerly incarcerated individuals struggle to become established in the community. Western, Braga, Davis, and Sirois (2014) conducted interviews with 122 men and

women returning to Boston neighborhoods following incarceration. Two months post-release, they found

- 29% of formerly incarcerated individuals surveyed were living in unstable and temporary housing,
- only 44% were employed,
- 70% were enrolled in food stamps or other social programs, and
- 40% received money or were residing with family.

For those fortunate enough to have strong family ties, support was mostly provided by mothers, grandmothers, or sisters. Two months post-release, the respondents who reported weak family ties were less likely to be in stable housing, employed, or receiving family support. Those struggling on their own were typically over the age of 44, suffering from mental illness, or battling drug addiction.

Health. In economics, the inclusion of both health and education components in a model is considered a double-pronged approach in explaining employment outcomes. Health and education have a strong inter-related and inter-dependent relationship. Due to the relationship between health and education, many economic studies find the inclusion of health in an employment model improves the explanatory power of education.

The emerging literature surrounding health as an investment in human capital includes three interrelated fields: the optimal investment in health, the value of life, and the link between health and other forms of human capital, such as education. The relationship between health and education has been debated extensively. Some argue that better health influences educational attainment (Le, Diez Roux, & Morgenstern, 2013), whereas others believe individuals with higher educational attainment have a greater incentive to invest in health (McMahon, 2009). An

alternative view is that individuals with a lower discount rate on future utility invest more in both health and education. Traditionally, economists have treated discount rates as exogenous, fixed values. With a change in perspective, the discount rate could be viewed as an endogenous variable influencing both education and health (Becker, 2007). For example, each person prefers to receive $100 today rather than receive $100 a year from now. Would the preference change if the choice is to receive $95 today or $100 a year from now? The discount rate represents the amount of discount applied to present earnings to make waiting for the future worthwhile. Individuals who have a greater propensity to wait for future benefits are more likely to invest in both health and education. To illustrate this viewpoint, Fuchs (1980) conducted a random phone survey of 500 individuals between the ages of 25 – 64 with questions regarding health, education, and time preference (discount rate). He found time preference to be related to both education and health.

Currie and Madrian (1999) assert that failing to control for health in a wage equation leads to an over-estimation of the effects of education. Through an extensive review of empirical studies devoted to the impact of health on the labor market, Currie and Madrian found the magnitude of this impact to be dependent on the definition used in the study to represent health. The definitions of health can be categorized into eight types: (a) self-reported health status; (b) health limitations on the ability to work; (c) functional limitations in daily living activities; (d) presence of chronic or acute conditions; (e) utilization of medical care; (f) clinical assessments of medical conditions; (g) nutrition status; and (h) expected or future mortality. Regardless of the definition, including one or more variables to represent health in a wage regression model increases the explanatory power.

Across empirical studies with varying definitions of health, Currie and Madrian (1999) found that health has a greater effect on the number of hours worked rather than the wage rate. That being said, wage discrimination was still found to exist. The compounding effect of reduced working hours and low wages manifests into lower overall earnings.

With the aging of the prison population, the medical needs of incarcerated individuals are a growing concern. Approximately 44% of state incarcerated individuals and 39% of federally incarcerated individuals are reported to have chronic medical conditions. The most commonly reported conditions are arthritis and hypertension. Roughly a quarter of federally incarcerated individuals and a third of state incarcerated individuals were considered impaired. The most common impairment was reported as learning (13% of the federally incarcerated population and 23% of the state incarcerated population). Roughly 16% of state incarcerated individuals and 8% of federally incarcerated individuals were documented as having multiple impairments (Maruschak, 2008).

In addition to medical conditions, incarcerated individuals frequently have mental health or substance abuse issues. Based on the 1997 inmate survey, Petersilia (2005) concluded that the majority of incarcerated individuals with a history of significant mental health problems received treatment (63% of state and 75% of federally incarcerated individuals) while incarcerated. Although the statistics are encouraging, mental health services remain inadequate for this particular population. Often, the optimal diagnostic tools or treatments are not found in a prison setting. For example, most prison systems do not allow prison psychologists to administer medications for ADHD. Once a formerly incarcerated individual returns to his or her community, the mental health services that were readily available in prison become less accessible.

According to Travis et al. (2013), drug addiction is a disease of the brain that is treatable. Although relapse is frequent, the rate of success for those who adhere to treatment is comparable to other medical conditions such as hypertension or diabetes. Only 36.5% of state incarcerated individuals rated high need due to a history of alcohol problems participated in an alcohol program. Likewise, only 39.6% of state incarcerated individuals with a high need of drug treatment participated in a drug program (Petersilia, 2005).

Training Process. This section is divided into two parts. The first part discusses the policies directly impacting the development of training programs designed for formerly incarcerated individuals. The second part highlights the training programs available to this particular population. In contrast to previous sections of this review, the literature reviewed in this section captures the vocational education and training research specific to formerly incarcerated individuals.

Policies. The prison education and training policies, as well as funding, are heavily influenced by the philosophy of the criminal justice system. Over the decades, the philosophy has cycled from punishment to rehabilitation back to punishment. With the fiscal strain of the current prison system, the merits of a rehabilitative approach are beginning to emerge once again. As history is beginning to repeat itself, this passage recounts the different eras of prison vocational education and training programs. Prison programs—and even confinement as a form of punishment—are a fairly recent development.

In colonial America, there was not a clear distinction between the widow, orphan, sick, aged, or insane (Rothman, 1971). The focus was on need and not the circumstances. They were all considered poor and in need of relief. In the local community, supporting the poor was viewed as supporting one of their own. Individuals who chose laziness or crime received

financial support in moderation. Even though they were viewed as undeserving, all people were considered undeserving of God's mercy. In this light, it was better not to discriminate too closely with acts of charity. Since both crime and poverty were expected and accepted as part of society, there was no effort to eradicate it. The presence of the poor was necessary so that the more fortunate people in society had opportunities to do good works. The focus was on the giver and the deed rather than the poor.

Disorder was linked to sin and allowing sin would bring God's judgment on everyone. Capital punishment was seen fit for crimes ranging from disrespecting parents to murder. Execution sermons served as warnings that all people are guilty of sin and the consequences that can result from sin. To guard against crime, communities established settlement laws. Vagrants were returned to their places of origin, usually after a whipping. Innkeepers could be fined for keeping outsiders for more than a month. Residency requirements for newcomers were often specified, such as references from the previous town and church or completion of apprenticeships (Rothman, 1971).

The initial workhouses were not intended for residents but only for outsiders. Even then, they were intended to discourage vagrants from coming to the town in the first place by isolating strangers from the town and forcing hard labor. A distinction existed between almshouses and workhouses. Almshouses were intended for poor residents whereas workhouses were designed for drifting vagabonds. In reality, few of either establishments existed since they were considered an option of last resort (Rothman, 1971).

Just as almshouses were a last resort for the poor, jails were not typically used to address deviant behavior. Punishments included fines, whippings, stocks, public caging, banishment, and the gallows. Discretion was given to the presiding magistrate on the type or combinations of

punishments. Jails were only used for confinement until judgment. The two most common punishments were fines and whippings with the financial circumstances of the criminal determining the punishment. In the pre-Revolutionary era, crimes that brought capital punishment included pickpocketing, burglary, robbery, counterfeiting, horse stealing, grand larceny, and murder. First offenses were frequently pardoned, but recidivism brought the gallows. Eighteenth century jails were simply homes with sturdier doors and were ran similar to any other household. The jail keeper and his family lived in one room of the jail and prisoners lived together in a separate room with unrestricted movement (Rothman, 1971).

The 19th century brought urbanization, manufacturing, social mobility, geographic mobility, and Enlightenment ideas. Old punishments were viewed as barbaric and the origins of crime (i.e. sin) was called into question. The importance of statehood made local banishments to control crime obsolete. Severe penalties that were sporadically enforced were thought to encourage rather than discourage deviant behavior. The new philosophy espoused the belief that moderate punishment strictly enforced was a better approach to crime. By the 1820s, criminal codes in most states called for incarceration which was followed by widespread prison construction. The notion of corruption replaced the idea that people were born in sin. Children were thought to be born innocent and later corrupted by parents or society. Given this view of corruption, the remedy for crime was the construction of corrupt-free environments for criminals—the penitentiary (Rothman, 1971).

Visitors from all over the world came to see America's new penitentiary system. A popular debate was the merits of two competing penitentiary models, the Auburn system and the Pennsylvania system. With the Auburn system, incarcerated individuals spent the night in single cells but saw other incarcerated people in the day during work and meal times. They were

forbidden to talk or look at each other. In contrast, the Pennsylvania system required complete physical isolation at all times. New prisoners arrived hooded so they would be unable to see other prisoners (Rothman, 1971).

Every aspect of the architecture, rules, and practices of the penitentiary were designed to embrace the new rehabilitation philosophy of isolation. Incarcerated individuals were separated from the public, friends, family, and other incarcerated individuals. For example, the warden of Sing-Sing is quoted as telling newly arriving incarcerated individuals in 1826 “It is true that while confined here you can have no intelligence concerning relatives or friends. You are to be literally buried from the world” (Rothman, 1971, p. 95). Prison walls were intended to keep the world out as much as keep individuals incarcerated.

The Auburn style prison system spread across the country. It was preferred over the practices in Philadelphia because it was perceived as a less costly option that was equally successful. The Auburn prison system used harsh disciplinary practices to maintain an isolated existence instead of the 24-hour physical isolation. This meant that pre-Civil War prisons ensured obedience of the incarcerated by using the whip (Aburn, Charlestown, Columbus, and Wetherfield), yoke, ball and chain (Maine), iron gag (Pennsylvania), cold showers (Conneticut), and food rationing for even minor infractions. The original idealism that fueled prison construction in the 1820s vanished by the 1830s. Assistant warden Robert Wiltse reported to the New York legislature that most reformers no longer believed in the “general and radical reformation of offenders through a penitentiary system” but that a prison “should not be governed in such a manner as to induce rogues to consider it as a comfortable home. They must be made to submit to its rules, and this by the most energetic means; corporeal punishments for transgression, which to be effectual must be certain, and inflicted with as little delay as possible”

(Rothman, 1971, p. 101-102). Although prison administrators did not believe they could make anyone honest, they believed they could make someone submit to honest habits. Since idle time gave individuals an opportunity to lead a life of crime, hard labor became the social and fiscal solution to address crime.

The most extreme example of the use of prison labor occurred in the south after the Civil War. With many of the prisons destroyed, southern states began to lease prisoners to private contractors. The private contractors paid the state a fee and were responsible for clothes, food, and housing. The leased laborers were used to build railroads, mine coal, clear timber, grow cotton, and make turpentine. Whereas slaves were an investment, prison laborers were expendable and easily replaced. Since some newly enacted laws only pertained to black individuals and acquittal was rare, nearly all leased laborers were black. The annual death rate of Mississippi prisoners in the 1880s ranged between 9% to 16%. Since juveniles and adults were treated the same, hundreds of children were leased to private contractors (Oshinsky, 1996). Eventually chain gangs and prison farms replaced leased labor. Oshinsky describes life at the Parchman prison farm from 1904 to the 1930s. The farm was essentially a plantation with the superintendent acting as slaveowner and the guards functioning as overseers.

The 1928 publication of Austin H MacCormick's study of prisons is considered a pivotal point in modern prison education. MacCormick found "…that there were no schools in thirteen out of the sixty prisons studied, and that not one single prison made adequate provision for vocational education" (Martin, 1976, p. 42). In response, MacCormick offered a comprehensive guideline for academic, vocational, social, and cultural education. Beginning in 1930, three significant changes began occurring in prison education and training programs: the breakdown of

prison industries; the development of educational facilities in the federal prison system; and the concept of social education to aid incarcerated individuals to re-enter society (Roberts, 1971).

The Great Depression brought with it a change in the way society viewed prisons. Society began to realize that poverty was not always the fault of the individual and perhaps crime could have social origins. For the first time, the idea emerged that incarcerated individuals may not be entirely responsible for their situation and capable of rehabilitation. This correctional philosophy gradually took hold and dominated the field from 1946 to 1980. The change in perspective brought possibilities of expanding prison education and training programs. Although this study focuses on training programs, the majority of training programs completed by formerly incarcerated individuals are vocational education programs, which is impacted by higher education funding.

In 1972, Senator Claiborne Pell sponsored the legislation to amend the Higher Education Act of 1965 by including the Basic Education Opportunity Grant Program (or Pell Grant Program). Once financial aid for incarcerated students was available, postsecondary prison education and training programs flourished nation-wide (Palmer, 2012).

By the mid-1970s, the philosophy of corrections had started to shift from rehabilitation back to punishment. The success of prison education and training programs depend largely on the support of administration, wardens, and prison guards. Indifference to rehabilitation efforts results in poorly functioning programs that are frequently canceled for security reasons. State support for prison education and training varies in accordance with mandatory education laws and state funding. On the federal level, the tough on crime stance in the mid-1990s resulted in policy shifts. The Violent Crime Control and Law Enforcement Act of 1994 revoked Pell Grant funding to incarcerated individuals, forcing many postsecondary prison education programs to

close. The Workforce Investment Act (WIA) also reduced funding for prison education. Before 1998, states were required to spend a minimum of 10% of their Basic State Grant for Adult Education in state institutions, which include prisons. After WIA, the 10% floor became a ceiling. Essentially, states are no longer required to spend any of the funds on adult basic education in prisons. Similarly, the amended Carl D Perkins Vocational and Technical Act changed the minimum 1% spent on vocational education in state institutions to a maximum of 1%. The remaining federal funding sources include the Workplace and Community Training for Incarcerated Youth Offenders state grant (IYO) and the Neglected and Delinquent Youth state grant (Tolbert, 2002).

As prison programs vary by state, the Institute for Higher Education set out to capture prison education policies from all 50 states. They found 68% of postsecondary prison education and training programs are provided by community colleges. Depending on the state, the services contracted with community colleges by state correction agencies can range from solely vocational to providing the full education and training program (basic, vocational, and academic). Fifteen prison systems enrolled 89% of the postsecondary prison education and training participants. After the loss of Pell grant funding, enrollment in postsecondary prison education and training programs fell by 40% the following year and continued to decline for a few years before rebounding to the 1994 level by 2003-2004. Even with the return of enrollment to the previous level, Erisman and Contardo (2005) found that only 5% of incarcerated individuals have access to postsecondary prison education and training. Further, 11% of eligible incarcerated individuals participate in postsecondary prison education and training programs, with different states ranging from 4% to 14%. Lower enrolling prison systems rely solely on the IYO to fund prison education and training whereas higher enrolling prison systems subsidize the

IYO block grants with other fund sources. IYO grant fund eligibility is restricted to individuals 25 or younger who are within five years of release. The IYO grant was modified by the Higher Education Opportunity Act of 2008 to increase the age limit from 25 to 35 years of age and the spending cap from $1,500 to $3,000 per student.

The federal government has also funded several initiatives including $100 million for communities to develop programs and training under the president's Prisoner Reentry Initiative. The Prisoner Reentry Initiative was reauthorized and expanded by the Second Chance Act of 2007. Whether grants flow through the student in the form of aid or through the community as a workforce development initiative, community colleges are often the providers of vocational education programs. The U.S. Department of Education (2009) published a report by the Pacific Institute for Research and Evaluation on the partnerships formed between community colleges and prisons to provide workforce education and training programs to combat recidivism. With open access policies, community colleges are ideal candidates for partnerships with prison programs. Community colleges are affordable, conveniently located throughout the state, accredited, and willing to partner. Funding for prison education and training programs through community colleges is predominantly accomplished by line items in the state budget. Each state determines the type of program offered to incarcerated and formerly incarcerated individuals. For example, Texas relies on labor market data provided by the Texas Workforce Commission to determine 28 workforce investment areas associated with vocational credit certificates and college noncredit certificates. The 24 vocational credit certificates include programs in HVAC, automotive specialties, cabinet making, construction, computer, culinary, drafting, horticulture, marketing, counseling, truck driving, and welding.

Although prison education and training programs have suffered from lack of funding and administrative support, the Department of Education announced 67 colleges and universities would be participated in the Second Chance Pell pilot program. Through the program, approximately 12,000 incarcerated individuals scheduled to be released within five years will be participating in education and training programs funded by Pell grants. The press release noted that many state correction agencies have expressed strong support and are willing to accommodate the daily classroom operations. The participating postsecondary institutions work to form partnerships with prisons, community-based organizations, local non-profits, and foundations with the goal of enabling, supporting, and preparing incarcerated students for re-entry into society (Department of Education, 2016). The Second Chance Pell Pilot Program began its second year in fall 2017.

Programs. The primary focus of this study is to examine the relationship between participation in different types of training programs and gainful employment. To this end, the factors of successful reentry of most interest are school-based training, pre-employment training, and post-employment training.

School-based training. Although there are many types of investments that affect human capital, the most prominently studied investment has been education (Nahapiet, 2011). As opposed to formal academic education, school-based training consists of basic instruction to address education and training deficits. Examples of school-based education include remedial courses and GED preparation.

The typical incarcerated individual has a lower educational attainment than the general population. According to the Bureau of Justice Statistics (Harlow, 2003)

- 41.3% of incarcerated individuals have some high school or less,

- 23.4% of incarcerated individuals have obtained a GED,
- 22.6% of incarcerated individuals have received a high school diploma, and
- Only 12.7% of incarcerated individuals have had some postsecondary education.

The majority of formerly incarcerated individuals find themselves in the low-skilled jobs market, but even most unskilled jobs (95%) require a high school diploma and some work experience (Holzer, Raphael, and Stoll, 2003). For individuals lacking a high school diploma, the economic outlook is grim. McMahon (2009) states the real earnings of males with one to three years of high school education declined by 10% from 1980 to 2007. In 1980, workers with a high school education or less earned 72% of the amount earned by college graduates. Comparatively, this percentage fell to 43% by 2007. Further, job market indicators suggest this pattern will continue in the future. Of the 30 fastest growing occupations, all require two to four-year degrees except for home healthcare workers and medical/pharmacy aids. For most types of formerly incarcerated individuals, the healthcare industry is an unlikely reality. In regards to the 30 occupations experiencing the steepest decline, 28 are considered low-skilled.

In contrast to the findings reported for the general population, studies focusing directly on the impact of school-based training on employment have found education to be insignificant (Needels, 1996; Visher, Smoker, & O'Connell, 2010). Tyler and Kling (2006) found that minority group high school dropouts who obtained a GED in prison earned 15% higher earnings during their first-year post-release compared to their counterparts who failed to obtain a GED in prison; however, there was no difference in earnings between the two groups after three years. White high school dropouts earned the same whether or not they obtained a GED in prison.

Through the decades, statistical standards and techniques have improved. There are four frequently cited meta-analyses that summarize the results and quality of rehabilitation studies. A

description of each meta-analysis and the findings are presented below. These studies will be referenced throughout the remainder of the literature review. Wilson et al. (2000) were the first to analyze prison programs through a meta-analysis. The meta-analysis included 33 studies published after 1975 with a rating of two or higher on the Maryland SMS. They found a reduction of 18% in the rate of recidivism associated with studies combining ABE and GED results.

The meta-analysis by MacKenzie (2006) expanded the studies to include 25 types of re-entry programs in terms of recidivism effectiveness. Studies rated three or higher on the Maryland SMS and published after 1980 were included in the meta-analysis. Since literacy scores for approximately half of all incarcerated individuals fall below the sixth-grade level, academic prison programs range from primary to post-secondary levels. Based on mean odds ratios of 16 independent samples, MacKenzie concluded that ABE, GED, and post-secondary educational programs reduced the rate of recidivism by 14%.

During the same year, the Washington State Institute for Public Policy conducted a meta-analysis of 571 rehabilitation programs published since 1970 with ratings of three or higher on the Maryland SMS. The study reported a 5.1% reduction in the rate of recidivism associated with ABE programs in prison (Aos et al., 2006).

Finally, The Office of Justice Programs' Bureau of Justice Assistance in conjunction with the RAND Corporation conducted a meta-analysis of research on prison education programs. The study set out to describe the current state of prison education, the effectiveness of prison education programs, and the implementation of effective prison academic and vocational education programs across different settings. Davis et al. (2013) included 58 studies on prison education programs in the United States between 1980 and 2011. Primarily, the authors focused

on studies with ratings of four and five on the Maryland SMS. They reported participants in academic education programs were 1.1 times more likely to be employed than non-participants. The rate of recidivism for participants in ABE was reduced by 33% compared to non-participants. Similarly, the rate of recidivism for participants in high school or GED was reduced by 30% compared to non-participants.

Although basic education increases knowledge, other aspects of job requirements (skills and abilities) also need to be cultivated. If school-based training is seen as the only mechanism for solving skill deficits, then the value of experience and training is ignored (Cappelli, 2015). Compared to school-based training, there is considerably less research on training programs offered by the prison system.

Pre-employment training programs. After Pell grant funding was revoked for incarcerated students, there has been a notable shift in prison education programs towards vocational education. Nearly two-thirds of formerly incarcerated students participating in postsecondary prison education were enrolled in for-credit vocational certificate programs in 2003-2004. The debate on whether vocational or academic education is most beneficial to formerly incarcerated students is ongoing. Many of the studies on vocational education only capture non-credit vocational education programs. Vocational education resulting in college credit is typically combined with other postsecondary education coursework. According to Erisman and Contardo (2005), the combined reporting of vocational and academic college credits make it impossible to assess the difference in outcomes of postsecondary academic and postsecondary vocational education programs.

The meta-analyses capturing pre-employment training programs of formerly incarcerated individuals are predominantly from programs described as vocational education. Davis et al.

(2013) reported a reduction in the rate of recidivism of 36% for participants in vocational education. Participants in vocational education were 1.3 times as likely to be employed compared to their counterparts. Wilson et al. (2000) found participants in vocational education were twice as likely to be employed post-release compared to non-participants and vocational education was found to reduce the rate of recidivism by 22%. Similarly, MacKenzie (2006) found vocational education to reduce the rate of recidivism by 26%. The Washington State Institute reported vocational education in prison lowers the rate of recidivism by 12.6%. Participation in employment training and job assistance in the community were found to lower the rate of recidivism by 4.8% (Aos et al., 2006).

Bouffard, Mackenzie, and Hickman (2000) assessed employment re-entry studies in terms of rigor and findings. The authors found 13 studies on vocational education meeting the minimum standards of scientific rigor. Interpretation of vocational education prison studies is challenging given the inability to separate vocational education from other components in a prison education program. The lack of clearly defined programs prevents researchers from drawing conclusions on the true impact of vocational education on employment and recidivism. Despite mixed findings, Bouffard et al. (2000) concluded that the overall findings show vocational education reduces recidivism.

An individual recidivism study by the Illinois Correctional Education Contractors Organization (ICECO) followed vocational completers from 2001 to 2004. The recidivism rate for vocational education completers was found to be nearly half of the overall IDOC recidivism rate. For the sample used in the study, the reduction in recidivism saved IDOC approximately $8.1 million in the first year and $14.8 million by the end of the three-year study (ICECO, 2010).

Post-employment training programs. The post-employment training programs available to formerly incarcerated individuals occur through prison industries and work-release programs. Wilson et al. (2000) found participants in prison industries were 1.55 times more likely to be employed post-release compared to non-participants. Although they calculated a 20% decrease in the rate of recidivism associated with prison industries, the authors reported insufficient evidence to make a conclusion. MacKenzie (2006) also found insufficient evidence to make a definitive conclusion. In contrast, Aos et al. (2006) found prison industries programs reduce the rate of recidivism by 7.8% in the report commissioned by the Washington State Institute for Public Policy.

More recently, Cox (2016) compared the employment outcomes of prison industry workers versus participants in the prison industry enhancement certification program (PIECP). With the PIECP program, federal law mandated workers to receive the market wage with no lower than minimum wage. There were three different employment models with varying degree of labor control in a PIECP arrangement – manpower, customer, and employer. In a manpower arrangement, the private organization manages the employee, but the department of corrections acts as the employer. With a customer arrangement, the private organization simply purchases the end product and has no direct involvement with production. Finally, the employer model allows the private organization full control over employee engagement. In other words, the private organization is involved in hiring, firing, training, supervising, and paying the incarcerated employee. Typically the wages are set at the federal minimum wage. The private employer is responsible for consulting with local labor unions and ensuring that the employment of incarcerated employees will not dislocate non-incarcerated employees. The study found PIECP participants were employed more quickly (especially women) and had greater earnings.

However, there was no evidence that the duration of formal employment was any longer for PIECP participants compared to non-participants. Individuals most likely to maintain employment had more education, greater work experience, no history of mental illness, never been self-employed, served a maximum of 13 years in prison, fewer prior incarcerations, no history of juvenile delinquency, no other categories of offenses, and (if female) worked in food or retail prior to incarceration.

Like prison industries, work release programs are also designed to provide incarcerated individuals with training and experiences before release. Jung (2014) found that completing work release programs successfully increased post-release employment and earnings for participants. The study consisted of 12,193 male formerly incarcerated individuals in the Illinois prison system released between 1995 and 2003. The treatment group consisted of 6,056 Adult Transition Center (ATC) participants with 2,464 successfully completing the program. In contrast, the comparison group was comprised of 6,136 minimum security incarcerated individuals who either did not apply or were not selected to participate in ATC. Prior to incarceration, the treatment group earned approximately $200 per quarter less than the control group. After imprisonment, the group of 2,464 individuals who successfully completed the ATC program earned an average of $200 more per quarter than the control group and an average of $400 more per quarter than the ATC dropouts. In terms of employment, the quarterly rate of employment for the successful ATC completers was 8.5% higher during the initial two years following release compared to the control group. For three years and beyond, the quarterly rate of employment for the successful ATC completers was comparatively 7.3% higher.

As with vocational education programs, the studies on correctional industry programs rarely isolated the correctional industry component of a larger multi-faceted program. The

overarching program combined services, such as vocational education, correctional industries, job search services, and work release programs. Based on five studies on correctional industries, Bouffard et al. (2000) concluded that the programs helped reduce recidivism, but the program component that contributed to the reduction in recidivism could not be identified. Seven studies on community employment programs were found to meet the minimum standard for scientific rigor. The services provided by community employment programs included half-way houses, job search services, work release, and employment services programs. The authors concluded that there was some evidence that work release has a modest effect on recidivism. Although not statistically significant, half-way houses might show some promise of reducing recidivism. The authors concluded job search and employment services helped reduce recidivism.

Outcomes. For incarcerated individuals, studies on outcomes primarily fall into three categories: recidivism, employment, and skill development.

Recidivism. Employment measures and recidivism are inter-related and interdependent. Inherently, an incarcerated individual cannot be employed outside of prison walls. At the same time, employment in the legal labor market reduces the likelihood that a person will return to prison. If for no other reason, the time spent in illegal activity is reduced while the formerly incarcerated individual is actively engaged in work. Many of the programs designed to reduce recidivism also improve the odds of obtaining employment. The concept of recidivism seems straightforward, but the lack of a uniform definition presents challenges when comparing and interpreting research results. Mandel et al. (1965) classified recidivism in eight different categories based on seriousness of offense: (a) convicted of a felony; (b) alleged felony without conviction; (c) commission of a misdemeanor; (d) technical parole violation; (e) misdemeanor without a parole violation; (f) traffic violation; (g) charged with a felony with no further record

of conviction; and (h) charged with a misdemeanor with no further record of conviction. Besides varying events that can result in different usage of the term recidivism, there is no standard method of data collection or set time-frame to define the monitoring period. Further, the same state or local agency can use different definitions of recidivism depending on the purpose (Gehring, 2000). Due to this lack of clarity, drawing conclusions based on recidivism studies should be done cautiously. Utilizing recidivism as a measurement of program success remains a controversial issue.

Nonetheless, recidivism is a topic of growing importance in addressing the unprecedented growth in incarceration experienced in the United States. The first comprehensive review of rehabilitation programs dates back to the mid-1970s. Lipton, Martinson, and Wilks (1975) reviewed 231 studies of various types of rehabilitative efforts. Martinson's (1974) summary of the elaborate report titled, *What works? – Questions and answers about prison reform,* influenced the course of rehabilitation and policy. Martinson concluded "With few and isolated exceptions, the rehabilitative efforts that have been reported so far have had no appreciable effect on recidivism" (p. 10). Although the report lacked clear evidence to form the stated conclusions, rehabilitation programs were put on the defensive.

Overall, Wilson et al. (2000) concluded that the rate of recidivism for participants in prison education programs was 11% lower than the rate of recidivism for non-participants. They cautioned that 89% of the studies included in the meta-analysis were of poor methodological quality. Based on mean odds ratios, MacKenzie (2006) found the programs that worked included academic education, vocation education, cognitive behavior programs, and drug treatment programs. The study by the Washington State Institute for Public Policy found the most effective programs to reduce recidivism included drug programs, cognitive-behavior treatment programs,

intensive supervision, prison industries, adult basic education (ABE), employment training and job assistance in the community, and vocational education in prison (Aos, Miller & Drake, 2006). Whereas training and education are ways to enhance human capital, the goal of cognitive behavioral therapy is to address the way an individual thinks about their life circumstances. Compared to non-participants, Davis et al. (2013) found participation in prison education programs reduced the rate of recidivism by 13%. Based on a three-year period, the odds of recidivating were 43% lower for participants of prison education compared to non-participants.

It can be argued that simply staying out of prison should not be the only goal. As with any individual, success should be aimed at reaching his or her full potential which ultimately benefits society as a whole. Staying out of prison is the first step in a long journey towards gainful employment.

Employment. Several studies have attempted to quantify the impact of incarceration on employment. Based on data from the NLSY1997, Apel and Sweeten (2010) found incarceration led to an 11% reduction in the probability of formal employment through their fixed effects model. Western (2007) provided a summary of studies using different data sources, methods, and definitions to determine the effect of incarceration on employment and earnings. The studies that compared formerly incarcerated individuals to their counterparts found incarceration adversely impacts employment by as much as 59% and reduced earnings anywhere from 11% to 28%. In contrast, Kling (2006) examined the impact of an additional year of incarceration on earnings. An additional year of incarceration was found to increase earnings by as much as 30% in the short term. No earnings loss was found seven to nine years post-release. This finding was consistent with earlier research showing that the majority of human capital loss occurs during the first year of incarceration in the form of lost reputation.

Many economists reject the idea of a single labor market. Instead, dual labor market theory proposes primary and secondary labor markets. The primary labor market is characterized by higher wages and better working conditions. In contrast, the secondary labor market consists of poor working conditions, low job security, and low wages. Employment in the secondary labor market can create a stigmatization in and of itself, making it difficult to enter the more privileged sector (Berntson & Marklund, 2007). With proper training and career development, there is still hope of escaping the secondary labor market and building a secure future.

Research has found that some industries provide better prospects for low-wage earners than other industries; however, the stigmatization of prison and laws barring individuals with a criminal record from holding positions in many occupations makes it unlikely that a formerly incarcerated individual will be able to climb out of poverty with employment prospects alone. Andersson, Holzer, and Lane (2005) analyzed the data covering firms in California, Florida, Illinois, Maryland, and North Carolina to determine which types of firms regularly provide a pathway out of low-wage work. Based on the firm's past practices, a prediction using fixed effects was made on the employment outcome of low-wage earners. In some industries, employees escaped low wages by simply staying within a firm. In contrast, other industries act as a stepping stone to subsequent higher paying positions. Table 2.5 provides insight on the industries associated with the ability of employees to escape from low wages. Formerly incarcerated individuals employed in the construction or temporary agency industries were more likely to escape low wages by leaving the firm. For formerly incarcerated individuals employed in the industries of durable goods manufacturing or wholesale trade, the optimal strategy to escape from low wages was to stay with the firm. Besides industry type, educational attainment

was a contributing factor as to who could escape low wages. Those lacking a high school diploma rarely secured better jobs.

Based on data from Virginia, Lichtenberger (2006) found that manufacturing, construction, food services, and administrative & support services (temporary agencies) industries were most likely to hire formerly incarcerated individuals - accounting for over 72% of the hires. Nally, Lockwood, and Ho (2011) found similar results in Indiana. In their longitudinal study, the top four industries hiring formerly incarcerated people included temporary help, manufacturing, wholesale and retail trades, and construction. The authors noted that employment in construction and manufacturing allows formerly incarcerated people to gain skills in specialized fields. Further, employers in the construction and manufacturing were more likely to hire formerly incarcerated people than other industries (Holzer, Raphael, & Stoll, 2003).

Formerly incarcerated people encounter barriers to employment unique to their situation. Holzer et al. (2003) found 90% of employers surveyed were willing to consider hiring a welfare recipient, but only 40% were willing to consider hiring a formerly incarcerated individual. A combination of factors contributes to the lack of willingness to hire a formerly incarcerated person. First, many occupations are legally closed for an individual convicted of a felony. Depending on the state, they may be prohibited from becoming a barber, cosmetologist, postal worker, butcher, or park district employee (Peck & Nik, 2008).

In addition, employers can be held liable for criminal action by an employee both on and off the job. Evidence of prior negligent acts, such as a criminal history, can be introduced in negligent hiring cases. According to Connerley, Arvey, and Bernardy (2001) as cited in Holzer et al. (2002), employers have lost 72% of negligent hiring cases. The average settlement was found to be more than $1.6 million. Data on the number and frequency of negligent hiring cases are

elusive. Even so, there is no shortage of case law examples cited in the media. Along with examples, the California Employer Daily references a webinar as the source of information, warning “Negligent hiring litigation is expensive – it is estimated that average settlement of a negligent hiring lawsuit is nearly $1 million. And employers lose 79 percent of all negligent hiring suits” (Ceplenski, 2014). Whether fact or fiction, employers have taken heed to the warnings. According to the Society for Human Resource Management (2012), only 14% of surveyed employers reported that they do not conduct criminal background checks on job candidates. The primary reason cited for conducting background checks was to reduce legal liability for negligent hiring. Whether or not the risks involved with hiring an employee with a criminal background are legitimate, the perception of risk by employers is real. To alleviate hiring concerns, government incentives can be used to encourage hiring a formerly incarcerated individual. Employers are reported to be more willing to hire formerly incarcerated individuals who are bonded, insured, and licensed (Albright & Denq, 1996). Specifically, bonding was found to increase the willingness of surveyed employers to hire formerly incarcerated people from 12% to 51%.

The magnitude of the stigmatization faced by individuals with a criminal record is further exemplified through interviews conducted by Peck and Nik (2008). Interviews revealed that some formerly incarcerated Latinos in Chicago occasionally passed themselves off as illegal immigrants because they felt an illegal immigrant had a greater chance of securing a job than a formerly incarcerated individual. Job developers have been known to teach basic Spanish to their formerly incarcerated clients to boost their chances of landing manufacturing jobs.

Finally, some employers simply prefer to hire individuals without criminal records when given a choice. The study conducted by Pager (2003) is often cited to demonstrate the effects of

race and criminal records in hiring decisions. The study utilized matched-pairs of applicants applying for real entry-level jobs. Two teams consisting of two applicants of the same race (black versus white) were formed. The applicants were 23-year-old college students matched in physical appearance and style of presentation. One applicant from each team was randomly assigned a criminal record for a week. During the following week, the criminal record was switched to the other team member. In this manner, each member of the team served as a formerly incarcerated individual for an equal number of job applications. The criminal record entailed a drug crime with 18 months of served prison time. For white applicants, a criminal record reduced the likelihood of a callback by 50%. That is, the white applicant with a criminal record received callbacks at a rate of 17% compared to a rate of 34% without a criminal record. In comparison, the black applicant without a criminal record only received callbacks from 14% of their applications. Even more striking, the black applicant with a criminal record only received callbacks from 5% of their applications.

Prison education and training programs can help improve the odds of securing employment. Davis et al. (2013) has provided the most extensive research on the relationship between prison education and employment. Between 1980 and 2011, they found 18 eligible studies with 22 effect size estimates to use in their meta-analysis. The most common definition of employment across the studies (9 studies) entailed part-time or full-time work by the formerly incarcerated individual since release. The most frequently used time period (7 studies) was 18 months post-release. The overall odds ratio calculated from all studies, regardless of ratings on the Maryland SMS scale, was 1.13. That is, the odds of securing employment were found to be 13 percent higher for students of prison education and training programs compared to non-participants. Ideally, an odds ratio would also be calculated for the subset of higher quality

studies as a comparison. Unfortunately, there were no prison education and training studies devoted to employment that meet WWC standards and only one study that met WWC standards with reservations. Based on the odds ratios and the percentage of formerly incarcerated individuals supporting themselves 15 months post-release, the authors estimated that 114 incarcerated individuals would need to participate in prison education and training programs for one additional formerly incarcerated individual to be employed. The odds ratio for vocational programs was slightly higher; however, not significantly different than the odds ratio for academic programs. They concluded vocational and academic programs were equally effective in preparing incarcerated individuals for the labor market. Often the positive effects associated with the current education and training available through rehabilitation programs only partially compensated for the detrimental impact of incarceration on employment (Davis et al., 2013).

The single study cited by Davis et al. (2013 p. 44) rated as meeting WWC standards with reservations was "Training inmates through industrial work participation and vocational apprenticeship instruction" by Saylor and Gaes (1997). They collected data on more than 7,000 federally incarcerated individuals from 1983 through October 1987. The post-release employment project (PREP) was designed as a longitudinal evaluation of vocational training and work experience. The participants completed at least six months of vocational education or work experience before release (57% prison industries only; 19% prison industries and vocational education; 24% vocational education, apprenticeship, or a combination). Propensity score matching was used to address selection bias. Compared to the control group, the frequency of disciplinary reports by the participants was 4% lower (26.2 versus 22.2%). Additionally, types of misconduct associated with the participants were less severe. Based on employment information for participants released to half-way houses, the participants were more likely to be employed

full-time (86.5% versus 62.1%) or with day labor (9% versus 1.3%). After 12 months, participants were 35% less likely to recidivate (6.6% compared to 10.1%) and 14% more likely to be employed (71.7% versus 63.1%). There was no difference in average earnings.

Bushway and Apel (2012) have claimed correlational relationships between training programs and employment outcomes are valuable even if causal relationships cannot be established. The authors proposed that completion of an employment-based reentry program provides a signal to employers that an individual has chosen to stop illegal activity and could potentially be a good hire. In labor economics, education is considered to be a good signal. In other words, a college degree sends a strong signal that an individual is productive and successful even if the investment in education does not produce a causal impact on work productivity. Both signaling theory and human capital theory predict earnings will increase with education. Although the self-selection into education and training program participation hinders the ability to make a causal inference, this sorting process is essential to signaling theory by providing employers with a natural screening mechanism. The signaling effect of education and training programs is a value in and of itself. According to Bushway and Apel, the four primary reasons work programs have produced disappointing results in terms of employment and recidivism include:

(1) Program non-compliance is problematic. The intent to treat (ITT) is substantially different than the average treatment effect on the treated (ATT) if non-compliance is prevalent.

(2) This particular population generally has an extensive history of employment problems. In essence, individuals with a criminal history may need more than an education and

training program to be employable. Reentry programs that do not address poor social and problem-solving skills that are common in this population will most likely be ineffective.

(3) Formerly incarcerated individuals tend to have skill and education deficiencies that hinder the job search process.

(4) The observed level of employment improvement might not be sufficient to produce an observable decrease in recidivism. Employment is considered an intermediate outcome in the relationship between employment-based reentry programs and recidivism.

An alternative reason for the poor results of employment re-entry programs was proposed by Cook, Kang, Braga, Ludwig, and O'Brien (2015). They suggest that the disappointing results found in previous studies could be due to the evaluation of a one-dimensional approach to address the multiple challenges faced by formerly incarcerated individuals. In order to improve labor market outcomes, the re-entry program should address challenges such as family relations and substance abuse in addition to deficits in training and education. Their study followed the Wisconsin Department of Corrections (WIDOC) pilot re-entry program, Milwaukee Safe Streets PRI, that included 236 high-risk incarcerated individuals with a history of violence or gang violence scheduled to be released in the Milwaukee area. The participants were males who were 35 years old or younger. The program included six months of services before release followed by community support services for up to a year post-release. The sample consisted of 106 program participants in the treatment group and 130 individuals in the control group. The community services included in the Milwaukee Safe Streets PRI program were extensive – vocational skills assessment, training, a 12 to 16-week Breaking Barriers cognitive program, alcohol and drug treatment, remedial education, health services, and a coordinated care team to ensure housing, transportation, documents, and job search services. To encourage employer participation in the

program, employers were provided tax-credit certification for PRI program participants and bonding options. The program participants were 20 percentage points more likely than the control group to be employed during each quarter. In addition, the PRI participants earned about $400 per quarter more than the control group.

During the same year, Duwe (2015) followed Minnesota's prisoner re-entry program, EMPLOY. The 232 participants were released between 2006 and 2008 with an average follow-up period of 28 months. Propensity score matching was used to match the participants with 232 non-participants released during the same time period. The unique contribution of this study is the continuum of employment programs delivered in both prisons and in the community. EMPLOY offered incarcerated individuals assistance to locate, gain, and retain post-release employment. The program worked with the Minnesota Correctional Industries while the individual was incarcerated and assisted with community support for up to a year post-release. Employers of EMPLOY participants were eligible for the Work Opportunity Tax Credit and provided with information on the Minnesota Federal Bonding Service. The bonding service protects employers against employee theft of money or property. Compared to non-participants, the rate of recidivism was 32% lower and the odds of securing post-release employment was 72% higher for EMPLOY participants. There was no significant difference in the hourly wage of the two groups. Overall, wages were higher for the participants of EMPLOY due to a greater number of hours worked.

Skill development. The published research evaluating the effectiveness of prison education programs on academic skill improvement is limited. After an extensive search in 12 electronic databases for the period January 2003 – June 2014, Reed (2015) found only six studies with outcome measures related to academic or vocational skill development. The outcomes

included academic tests, course credits earned, industry certifications, and vocational tests. Four studies on adult basic education and one study of vocational education produced medium to strong effects based on Hedges' g. All six studies found that correctional education participants, on average, improved their skills. None of the studies controlled for other potential influences that could have accounted for the participants' educational progress. In particular, the studies did not address the possibility of participants simultaneously enrolled in multiple programs.

Conceptual Framework

A thorough literature review on prison training programs has revealed that the relatively few studies measuring the impact of training, education, and work programs on employment are inconclusive. The current prison education studies link intermingled prison education and training data with state UI records. While this approach may work well for the general public, this particular population is more likely to participate in the informal labor market both pre- and post-incarceration. Before incarceration, Petersilia (2005) found that 25% of respondents from the 1997 Inmate Survey reported income from illegal sources. In interviews conducted by Peter and Nik (2008), formerly incarcerated Latinos reported passing themselves off as illegal immigrants to improve their chances of employment. Besides the difficulty in finding employment in the formal labor market, child support orders and arrearages discourage many formerly incarcerated individuals from reporting income. The Bureau of Justice Statistics reports 52% of state and 63% of federally incarcerated individuals are parents with minor children. The estimated number of minor children with incarcerated parents was over 1.7 million (Glaze and Maruschak, 2008).

The training and education data included in prison education studies have been generally provided by individual prisons or by state correctional agencies. There is a growing trend to

encourage collaborative community-based training and education programs that partner with multiple local organizations. The training and education received by formerly incarcerated individuals from local sources - such as libraries, businesses, workforce development agencies, and non-profit agencies – are not captured in prison databases. As warned by Erisman and Contardo (2005), the education data provided by state correction agencies often lump multiple types of education together. The lack of quality in education data in prison databases is not surprising. Information systems found in public school systems and institutions of higher education are specially designed for education. The information systems found in state correction agencies have a completely different configuration in their validation and rule tables. Prison information systems are primarily designed to capture details on demographics, convictions, sentencing, risk assessments, classification decisions, release dates, registry, supervision, and violations.

The literature review provides insight on data sources, statistical methods, and models that can be applied to this study. Studies found in human capital theory and workforce development stress the importance of multi-institutional, longitudinal datasets. Some of the data sources found in human capital studies include the National Longitudinal Survey of the Class of 1972 (NLS72), the High School and Beyond Study (HSB), the National Longitudinal Survey of Youth (NLSY), Survey of Income and Program Participation (SIPP), National Survey of Adult Literacy (NALS), and Current Population Survey (CPS) as well as state-level data sources (Grubb, 2002a). Data sources found in workforce development studies include NLSY, the Longitudinal Employer-Household Dynamics Program Data (LEHD), American Community Survey, Bureau of Labor Statistics Employment Projections, and larger datasets from workforce development providers.

The most current quantitative studies in this literature review preferred propensity score matching, logistic regression, fixed effects, and regression discontinuity design. Workforce development studies generally prefer to use an individual fixed effects approach (Moore & Gorman, 2009).

This study draws upon human capital theory to construct three types of training programs to provide insight as to how different types od training programs influence gainful employment for formerly incarcerated individuals. School-based training programs provide general skills that are transferable to any employer. Since general skills are not unique to an employer, organizations tend to contract lower-valued general skills and acquire the higher-valued specialized skills. School-based training programs for formerly incarcerated individuals address basic education and training deficits. Since this type of training is designed to minimize the gap between poor and average performance, school-based training is expected to have no impact on employment or income.

In contrast, post-employment training programs provide predominantly job-specific skills that are considered highly unique and highly valued by an organization. Employees selected for training are generally individuals selected based on the expectation that he or she will remain employed, and possibly advance, with that particular organization. Since the trainees are already employed, post-employment training programs are expected to be positively related to both employment and income. Finally, pre-employment training programs provide participants with both basic and job-specific skills. The job-specific component of pre-employment training programs is expected to be positively related to both employment and income. Table 2.6 provides a summary of the hypotheses associated with each research question.

In addition to human capital theory, workforce development is incorporated into the model by expanding the definition of training programs to include programs regardless of location or affiliation. Increasingly, a workforce development collaborative approach is encouraged to meet the needs of formerly incarcerated individuals. Both federal and state government agencies provide funds to community organizations to help with re-entry efforts. Disadvantaged populations, such as formerly incarcerated individuals, can benefit from a collaborative workforce development approach to employability development. The goal of a workforce development system is to transform program participants into workers through skill development programs based on employer-desired skills.

A systems model provides a flexible framework that is designed to capture differences in a particular outcome that results from training while taking into consideration the system inputs and environmental factors. In this study, the inputs represent the characteristics of the formerly incarcerated student before participating in a training program. The outcomes are the student characteristics after exposure to the training program. For this study, the outcome of interest is gainful employment in the form of employment status and income. To capture the relationship between the different types of training programs and gainful employment, all other factors serve as control variables in the model. In particular, formal academic education is taken into account as a control variable. As Becker (2007) claims and Campolieti et al. (2010) support with empirical evidence, skill training is a complement to formal academic education. When possible, the duration and quality of instruction should be taken into consideration to account for dosage. Figure 2.1 shows the relationship between types of training programs and gainful employment for formerly incarcerated individuals.

Figures and Tables

Table 2.1

Definitions of Human Capital across Academic Disciplines

Discipline	Course Title	Book Title	Citation	Human capital is…
Economics	Principles of Macroeconomics	*Macro-Economics*	Arnold, 2013	…knowledge and skills a person acquires through education, training, and experience.
Economics	Urban and Regional Economics	*Urban Economics*	O'Sullivan, 2011	…knowledge and skills acquired through education and experience that increase productivity and income.
Economics	Health Economics	*Health Economics: Theories, Insights, and Industry Studies*	Santerre, 2009	…an approach that equates the value of a human life to the discounted market value of the output produced by an individual over an expected lifetime.
Economics	Advanced Macroeconomic Theory	*Macroeconomics*	Blanchard & Johnson, 2012	…the set of skills possessed by the workers in an economy.
Economics	Advanced Microeconomics Theory	*Microeconomics Theory: Basic Principles and Extensions*	Nicholson, 2011	…an investment in formal education, other formal methods of skills acquisition (taking night a night course), on-the-job-training, and general life experiences that increase marginal productivity.
Economics	Problems in Labor Economics	*Labor Economics*	Cahuc & Zylberberg, 2004	…an investment in education that produces future income.
Economics	Economics of Human Resource	*Modern Labor Economics: Theory and Public Policy*	Ehrenberg & Smith, 2014	…an accumulated investment in activities such as education, job training, and migration.
Education Admin	Comparative and International Education	*Comparative Education: Exploring Issues in International Context*	Kubow & Fossum, 2007	…is a structural-functionalist approach that describes a direct and functional relationship between education and development.
Geography	Population Geography	*Population: An Introduction to Concepts and Issues*	Weeks, 2011	…an investment in people that can improve their economic productivity and overall standard of living.

Table 2.1

Definitions of Human Capital across Academic Disciplines (Continued)

Discipline	**Course Title**	***Book Title***	**Citation**	**Human capital is…**
Marketing	Business-to-Business Marketing	*Business Marketing Management: B2B*	Hutt & Speh, 2012	…the availability of employees who have the skills, talent, and know-how to perform activities required by the strategy.
Management	Organizational Behavior	*Organizational Behavior*	McShane & Von Gilnow, 2014	…the stock of knowledge, skills, and abilities among employees which provide economic value to the organization.
Management	Compensation Management	*Compensation*	Milkovich & Newman, 2013	…the education, experience, knowledge, abilities, and skills required to perform the work.
Management	Employee Staffing and Management	*Employee Training and Development*	Noe, 2012	…the sum of attributes, life experiences, knowledge, inventiveness, energy, and enthusiasm an employee invests in their work.
Sociology	Sociology of Education	*The Sociology of Education: A systematic Analysis*	Ballantine & Hammack, 2008	…an investment in education that transforms a person's beliefs, values, and behaviors into those necessary for economic modernization (diligence, rational calculation, orderliness, frugality, punctuality, achievement orientation, and meritocracy).
Sociology	Social Organization	*Sociology of Organizations: Structures and Relationships*	Godwyn & Hoffer Gittell, 2011	…rewarded in the neutral environment of the labor market. Workers are rewarded for their skills, experience, and productivity.

Source: Compiled by the author

Table 2.2

Private Rates of Return in the United States, 2005

Education level and sex	**Private rate**
High school graduate, male	0.10
High school graduate, female	0.12
Associate degree (2), male	0.18
Associate degree (2), female	0.24
College 1-3 (average 1.5 years), male	0.16
College 1-3 (average 1.5 years), female	0.13
Bachelor's degree (4), male	0.20
Bachelor's degree (4), female	0.21
Master's degree (1.5 past BA), male	0.17
Master's degree (1.5 past BA), female	0.17
Doctorate degree, male	0.22
Doctorate degree, female	0.28
Professional degree, male	0.31
Professional degree, female	0.27

Note: Adapted from McMahon (2009, p. 187)

Table 2.3

Social Rates of Return in the United States, 2005

Education level and sex	**Social rate**
High school graduate, male	0.06
High school graduate, female	0.06
Associate degree (2), male	0.14
Associate degree (2), female	0.16
College 1-3 (average 1.5 years), male	0.11
College 1-3 (average 1.5 years), female	0.08
Bachelor's degree (4), male	0.14
Bachelor's degree (4), female	0.13
Master's degree (1.5 past BA), male	0.10
Master's degree (1.5 past BA), female	0.08
Doctorate degree, male	0.08
Doctorate degree, female	0.08
Professional degree, male	0.13
Professional degree, female	0.09

Note: Adapted from McMahon (2009, p. 187)

Table 2.4

Social Benefit Externalities of Education

Annual Indirect Social Benefit (2007 Dollars)	**Annual Value of Social Benefits for each Bachelor Graduate**
Democratization	$1,830
Human rights	$2,865
Political stability	$5,813
Life expectancy	$2,308
Reduced inequality	$3,110
Lower crime	$5,647
Lower public costs	$544
Environment (indirect)	$5,609
Social Capital	+
R & D	+
TOTAL	**$27,726**

Annual Direct Social Benefit (2007 Dollars)	**Annual Value of Social Benefits for each Bachelor Graduate**
Growth equation estimate	$16,832

Note: Adapted from McMahon (2009, p. 232-234)

Table 2.5

Optimal Strategy for Escaping Low Wages by Industry

Stay or leave the firm	**Stay with the firm**	**Leave the firm**	**No escape**
-Finance, Insurance, and Real Estate -Transportation and utilities -Health Services	*-Manufacturing: Durable Goods** *-Wholesale Trade** -Social Services	*-Construction** *-Temp Agencies**	*-Manufacturing: Apparel and Textiles** -Personal Service -Hotels *-Eating and Drinking** *-Retail Trade**

Note: Adapted from Andersson, Holzer, & Lane, 2005

*Top employing industries of formerly incarcerated individuals

Table 2.6

Hypotheses by Research Question

Research Question	Hypo-thesis	Outcome	Training Type	Relationship
1. What is the relationship between school-based training participation and gainful employment for formerly incarcerated individuals?	1	Employment	School-based	No relationship
	2	Income	School-based	No relationship
2. What is the relationship between pre-employment training participation and gainful employment for formerly incarcerated individuals?	3	Employment	Pre-employment	Positive
	4	Income	Pre-employment	Positive
3. What is the relationship between post-employment training participation and gainful employment for formerly incarcerated individuals?	5	Employment	Post-employment	Positive
	6	Income	Post-employment	Positive

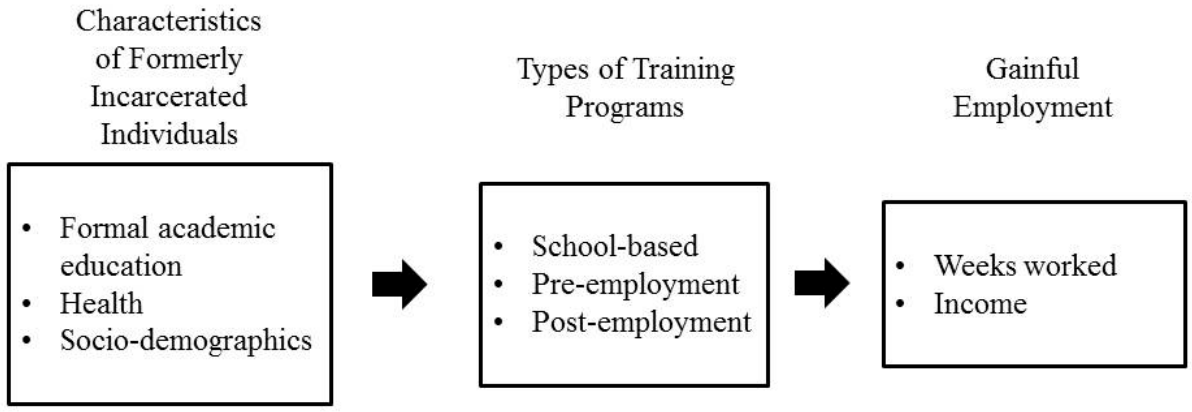

Figure 2.1. The relationship between participation in different types of training programs and gainful employment of formerly incarcerated individuals.

CHAPTER 3: METHODOLOGY

This chapter describes the methodology used to address the research questions of the study. The first section describes the type of research utilized in this particular study to answer the research questions. The second section provides information about the data source and sample used to represent the formerly incarcerated population. The third section presents operational definitions to provide a detailed account of data collection and measurement for the population and variables included in the model. The fourth section explains the choice of generalized linear mixed methods as the statistical method used in the study. Finally, the fifth section discusses data limitations innate to the data and statistical technique associated with this study.

Research Type

A longitudinal data analysis was used to determine the relationship between training categories and gainful employment. Longitudinal data are datasets with dependent variables repeatedly measured over time for each unit of analysis. In education, longitudinal data analysis is used to study student growth over time. It involves repeated measures of an outcome variable with the purpose of predicting or explaining changes that occur over time. There are two main objectives with this type of analysis. First, longitudinal data analysis involves describing the correct functional form of growth experienced over time. Second, it is used to describe the relationship between the independent variable of interest and the outcome (Nese, Lai, & Anderson, 2013).

Data Source and Sample Description

This study used the publicly available data set, NLSY97, which documents the transition from school to work of the population born between 1980 and 1984. The survey originally consisted of 8,984 individuals interviewed each year between 1997 and 2013 for a total of 16

rounds to date. Although originally intended to collect data on youth education and work experience, the NLSY97 also contains special sets of data on topics related to the military, the school system, crime, and health. Survey data can be downloaded by the public from the United States Department of Labor, Bureau of Labor Statistics (BLS), National Longitudinal Surveys website. Geocoded fields are available upon request from the BLS. A list of the NLSY97 fields selected for this study is archived online (Flatt, 2017a). In addition, the data for the variables in this study are also provided as online supplementary material (Flatt, 2017b).

The incarceration status of an individual is reported in the NLSY97 for each month between January 1992 and July 2014 in question INCARC_STATUS. As shown in table 3.1, answers to the question include one for incarceration during that particular month, 99 for previous incarceration, and -4 for a valid skip. By December 2011, a total of 700 individuals were either incarcerated or had been formerly incarcerated at some point.

Demographic information is available in table 3.2 and population statistics are available in table 3.3. From the demographic information, 81% of formerly incarcerated individuals were male and 59% of formerly incarcerated individuals were considered a minority. According to the last survey in 2013, the average number of months spent incarcerated was 18 with a minimum of one month and a maximum of 177 months (or just short of 15 years). The median number of months spent in prison was 8. The average income reported in 2011 by formerly incarcerated individuals for the previous year was $22,158 with a median income of $20,000. The average level of education for this particular group was approximately 11th grade. The median level of education was also 11th grade, but the grade level ranges from six to 21. Both the mother and father's highest grade was just below 12th grade with a range from one to 20.

The total number of observations in the dataset for this particular population between 2000 and 2011 was 4,282. Table 3.4 provides the number of observations for each year included in the study.

Operational Definitions

An operational definition provides a detailed description of the nature and properties of a given term sufficient for independent replication of the measurement. Operational definitions are provided for gainful employment, training categories, and control variables.

Gainful employment. There were two employment outcomes considered independently in this study that encompass gainful employment– the number of weeks employed and income. Employment is defined as the state of being formally employed, part-time or full-time, in the labor force. It includes self-employment, active military service, and employment association with an employer. Income is defined as the gross earnings from all formal or informal jobs.

Employment status for each week from the first week of 1997 through the 29th week of 2014 is found in the NLSY97 EMP_STATUS field. The years of 2005 and 2011 included 53 weeks. Figure 3.1 compares the average percentage of weeks worked during a calendar year by formerly incarcerated individuals versus individuals with no incarceration history. The youngest survey participants reach the age of 18 in 2002. During adulthood, the difference between the two groups is negatively related to the overall employment rate. In other words, the gap widens as the overall employment rate decreases.

Total gross annual income from the previous year is captured in question YINC-1700 from survey years 1997 through 2013. The income variable includes wages, salary, commissions, or tips from all jobs during the previous year. Figure 3.2 shows the average income earned by formerly incarcerated individuals versus individuals with no history of incarceration. Both

groups are limited to individuals who are considered in the labor force. In 2002, the age of the survey participants ranged from 18 to 22 years. After that point, the income inequality gradually increases between the two groups.

Training categories. According to Gavalas (2005), humans think in concepts and naturally form conceptual categories. Throughout history, scholars have used classification systems and conceptual relationships to advance knowledge in their respective fields.

The formation of categories is an abstract process that simplifies and isolates relationships. Irrelevant aspects are stripped away in order to analyze the heart of the relationship. Categories are groupings of objects that can be considered, more or less, the same in a certain context. The features that are chosen to be ignored are based on context (Cheng, 2015).

Training programs can be categorized as school-based training, pre-employment training, and post-employment training. Each type of training category is expected to have a different relationship with employment and income. School-based training programs are designed to address academic deficits. This type of training provides general education that becomes part of the learner. General education can be applied to any type of work at any place of employment. Pre-employment training programs are intended for individuals who are unemployed, entering the labor force, or employed in a temporary capacity. The goal of the program is to improve employability in order to achieve stable and permanent employment. A pre-employment training program can contain both general education transferable to any employer or job-specific knowledge found within a particular vocation. In contrast, post-employment training programs provide job-specific knowledge for employed individuals. Post-employment training is less transferable to other employers.

The graphs found in figure 3.3 display the percentage of formerly incarcerated training completers (solid line) versus non-completers (dashed line) by the number of quarters worked. Non-completers represent either non-participants or participants who failed to complete the training program. In terms of all types of training, the graphs look nearly identical for training completers versus non-non-completers. The differences between the two groups emerge once the training categories are taken into consideration. The graph of employment in terms of school-based training completion shows non-completers as employed for a greater proportion of the year (47% of non-completers) compared to training completers (36% of participants); however, this relationship could be due to negative selection of school-based training programs. In contrast, the graph of post-employment training indicates that completers are more likely to be employed (59%) than their counterparts (44%).

Graphs in figure 3.4 represent the percentage of formerly incarcerated training completers (solid line) versus non-completers (dashed line) by income quartile. The graph showing the largest income difference between training completers versus non-completers is found with post-employment training. It suggests that post-employment training completers may earn more income than non-completers.

In order for a training program to be included in the survey, each individual training program must last more than two weeks. The responses to the training participation can be found in question YTRN-3600 from 1997 to 2011 and 2013. Since the information for this question was not collected in 2012, the time period for this study ends with the year 2011. Table 3.5 provides a listing of the survey questions associated with the dependent and independent variables included in the study.

Control variables. To help control for omitted variable bias, the model included control variables found in table 3.6. The insignificant variables were individually analyzed to determine their explanatory power within the model.

Self-reported health is often included in labor force models to increase the explanatory power of education. Health is defined as the perceived level of general health by an individual. An individual with poor health can be limited in the amount and kinds of employment. By controlling for poor health, the explanatory power of the model is expected to improve. Beginning in 2007, the NLSY97 added several questions regarding the respondent's health. Question YHEA-100 asks the respondent to choose from five categories to describe general health. The categories include poor, fair, good, very good, and excellent (see table 3.7). Questions were also added to ascertain if the amount or kind of work the individual could perform is limited by health status.

The highest grade completed was collected each survey year in question CVC_HGC_EVER. Age at the time of the interview was also collected each year in question CV_AGE_INT_DATE. Marital status by month is available in question MAR_STATUS. The monthly marital status responses were used to calculate the proportion of the year the respondent was married or cohabitating with a partner.

Statistical Method

Linear mixed models (LMM) are statistical models that can be applied to continuous outcome variables characterized by normally distributed residuals that might be dependent or have non-constant variances. In particular, LMM is an appropriate choice for study designs using longitudinal datasets since measurements of the same individual over time are likely to be correlated (Dobson, 2002). Generalized linear mixed models (GLMM) are an extension of

LMMs that can accommodate models suspected to have non-linear relationships or residuals with other distributions, such as binomial or gamma distributions.

As the name reflects, GLMMs are generalized linear models that include independent variables with both fixed effects parameters and random factors. A fixed effect is an intrinsic, unknown constant parameter that influences the relationships of the independent variables with the outcome variable for the entire population or sub-population defined by the levels of the fixed factor (West, Welch, & Galecki, 2015).

In contrast, random effects are unobserved random variables that are assumed to be normally distributed. Random effects are specific to groups or clusters within the population. The random variation in a dependent variable is captured at different levels of the data. In essence, the random factor is "randomly sampled from a population of levels" in the study (Welch et al., p. 13). For longitudinal datasets, there are two advantages of GLMM over other statistical procedures. First, GLMM accommodates subjects with missing time points without dropping the subject from the analysis. Second, GLMM allows for time-varying independent variables in addition to the variable representing time.

For studies using repeated measures data, multiple measurements are made on the same subject over time or under different conditions. There are two levels of data in a repeated measures data set. Level 1 data represent within-subject variation. In contrast, level 2 data represent the between-subject variation.

The random effects model should be the simplest model that provides a good fit to the data. For longitudinal data, which is characterized by a fixed occasion design, a random intercept only model is referred to as a compound symmetry model. A compound symmetry model assumes (a) constant variance over time and (b) that the correlation between observations is

independent of time. Snijders and Bosker (2012) state that "The compound symmetry model is a very restrictive model, and often an unlikely one" (p. 252). Including time or age as the random slope is the simplest random effects model for longitudinal datasets.

In general terms, GLMM is typically specified as:

$g(E(Y_{it} | \gamma_i)) = X_{it}\beta + Z_{it}\gamma_i$ where

where g is the appropriate link function

Y is an n x 1 vector of responses

X is an n x p matrix of fixed effects regressors

β is a p x 1 vector of fixed effects regression coefficients

Z is a 1 x q subset of X_{it} of random effects regressors

γ_i is a q x 1 vector of random effects

The link function is chosen based on theory and the distribution of the data. The distribution of the random component of the dependent variable determines the type of GLMM and the link function. Common link functions include logit, probit, logarithm, and multinomial logit (Liao, 1994).

For this particular study, there were two GLMM models. Model 1 examined the relationship between weeks employed and training with a logistic link function and binomial distribution. This employment model consisted of nine covariates, three independent variables, and random effects. As shown below, model 1.1 examined the relationship between weeks employed and all training completed by formerly incarcerated individuals. In addition, two subsets of training were analyzed separately using the same functional form. Model 1.2 focused on the relationship between the number of weeks employed and completion of quality training

programs. Finally, model 1.3 analyzed the relationship between weeks employed and completion of prison training programs.

Model 1.1: Employment

$$\text{logit}(\text{WeeksEmployed}_{it}/\ \text{WeeksLaborForce}_{it}) = \beta^* X_{it}$$

$$+ \beta_{10} * (\text{CUMULATIVE SCHOOL-BASED TRAINING}_t)$$

$$+ \beta_{11} * (\text{CUMULATIVE PRE-EMPLOYMENT TRAINING}_t)$$

$$+ \beta_{12} * (\text{CUMULATIVE POST-EMPLOYMENT TRAINING}_t) + Z_{it}\,\gamma_i$$

The second model analyzed the relationship between income and training with a log link function and a gamma distribution. Model 2 included eleven covariates, three independent variables, and random effects. The income model was also used to analyze the subsets of quality training (model 2.2) and prison training (model 2.3).

Model 2.1: Income

$$\log(\text{INCOME}_{it}) = \beta^* X_{it}$$

$$+ \beta_{12} * (\text{CUMULATIVE SCHOOL-BASED TRAINING}_t)$$

$$+ \beta_{13} * (\text{CUMULATIVE PRE-EMP TRAINING}_t)$$

$$+ \beta_{14} * (\text{CUMULATIVE POST-EMP TRAINING}_t) + Z_{it}\,\gamma_i$$

Data Limitations

There are several data limitations that became apparent during the study. First, some training programs are easily categorized, but other training programs could be categorized differently based on context. For example, a government training program could be post-employment training for military personnel rather than job preparation. Second, missing survey responses can impact results. The survey questions about health were only available for the years 2007 – 2011. For all other years, the responses to health-related questions were coded as missing.

Likewise, the survey responses indicating non-interview or skipped were also coded as missing. GLMM assumes missing data are missing at random. Although GLMM results based on missing data are still considered unbiased, there is a loss of precision. Finally, the random effects must be uncorrelated with the other independent variables in the model. Over-parameterization in a GLMM model can result in non-convergence or uninterpretable models.

Figures and Tables

Table 3.1

Identification of Population Through NLSY97 Responses

Type of Variable	Observed Variables	Question	Question Name	Possible Responses
Population Identification	Incarceration	Total number of incarcerations	INCARC_TOTNUM	0 - 12
		Total months of incarceration	INCARC_TOTMONTHS	0 - 299
		Incarceration status	INCARC_STATUS	0: Not incarcerated this month or previous months 1: Incarcerated during all or some of this month 99: Incarcerated previously but not in this month -4: Valid skip

Table 3.2

Demographic Statistics for Formerly Incarcerated Individuals – 2011

Gender	Ethnicity	FI Count	FI %	All Count	All %
Female	African American	40	29	1,166	27
Female	Latino	24	18	924	21
Female	Mixed Race, Non-Latino	4	3	43	1
Female	Non-African American, Non-Latino	68	50	2,252	51
Total Female		136		4,385	
Male	African American	213	38	1,169	25.4
Male	Latino	126	22	977	21.2
Male	Mixed Race, Non-Latino	4	1	40	0.9
Male	Non-African American, Non-Latino	221	39	2,413	52.5
Total Male		564		4,599	

Note: FI = Formerly Incarcerated

Table 3.3

Incarceration, Workforce, and Education Statistics for Formerly Incarcerated Individuals

Variable	N	Mean	Standard Deviation	Min	Max
Formerly Incarcerated Individuals					
Months Incarcerated 2013	780	18	24.66	1	177
Weeks Employed 2011	636	29.41	22.09	0	52
Income 2010 reported in 2011	316	22,158.38	18,332	$0	$146,002 (Average of top 2%)
Highest Grade	636	11.26	2.59	6	21
Dad's Highest Grade	444	11.34	2.86	1	20 or more
Mom's Highest Grade	555	11.64	2.60	1	20 or more
All Individuals					
Weeks Employed 2011	8,984	41.31	19.26	0	52
Income 2010 reported in 2011	5,302	34,163.66	25,726	$0	$146,002 (Average of top 2%)
Highest Grade	8,984	13.71	4.08	5	22
Dad's Highest Grade	7,120	12.56	3.21	1	20 or more
Mom's Highest Grade	8,290	12.44	2.91	1	20 or more

Table 3.4

Observations by Survey Year

Year	**Number of Observations**	**Percent**
2000	116	2.40
2001	182	3.77
2002	254	5.26
2003	298	6.17
2004	336	6.96
2005	392	8.12
2006	432	8.95
2007	488	10.11
2008	519	10.75
2009	573	11.87
2010	602	12.47
2011	636	13.17
Total	4,282	

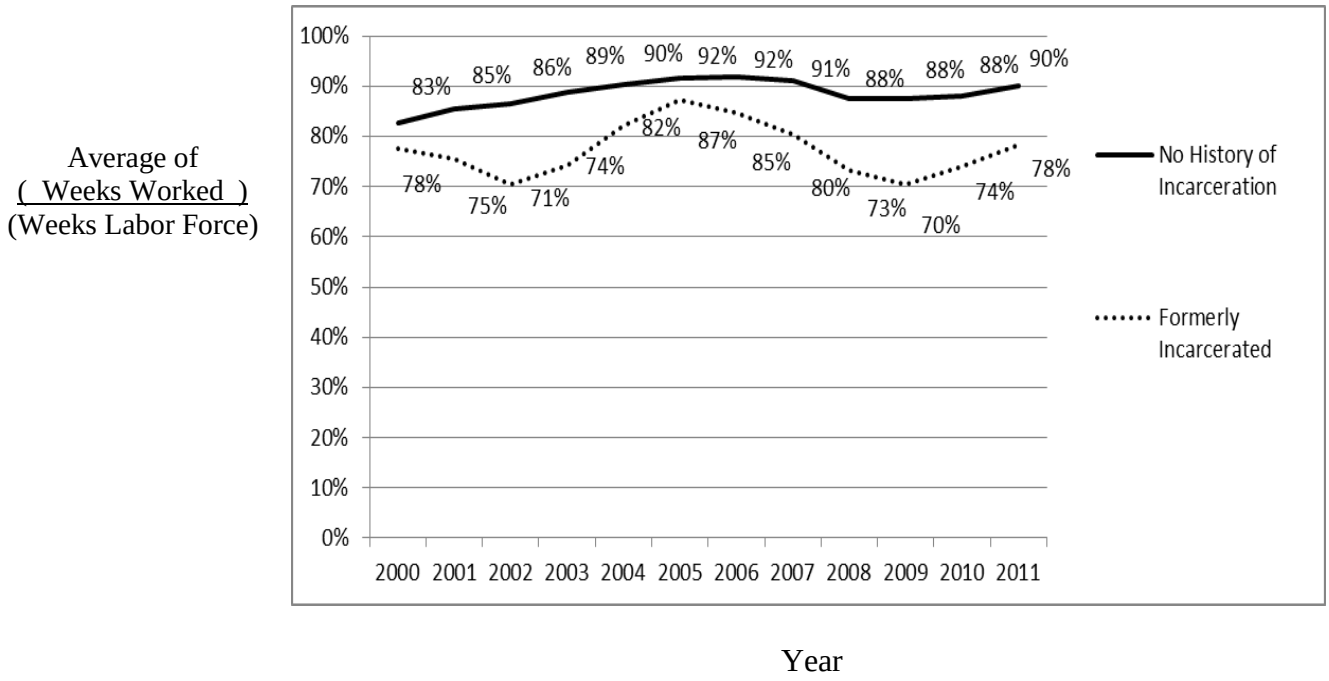

Figure 3.1. Average percentage of weeks worked by individuals with no history of incarceration versus formerly incarcerated individuals.

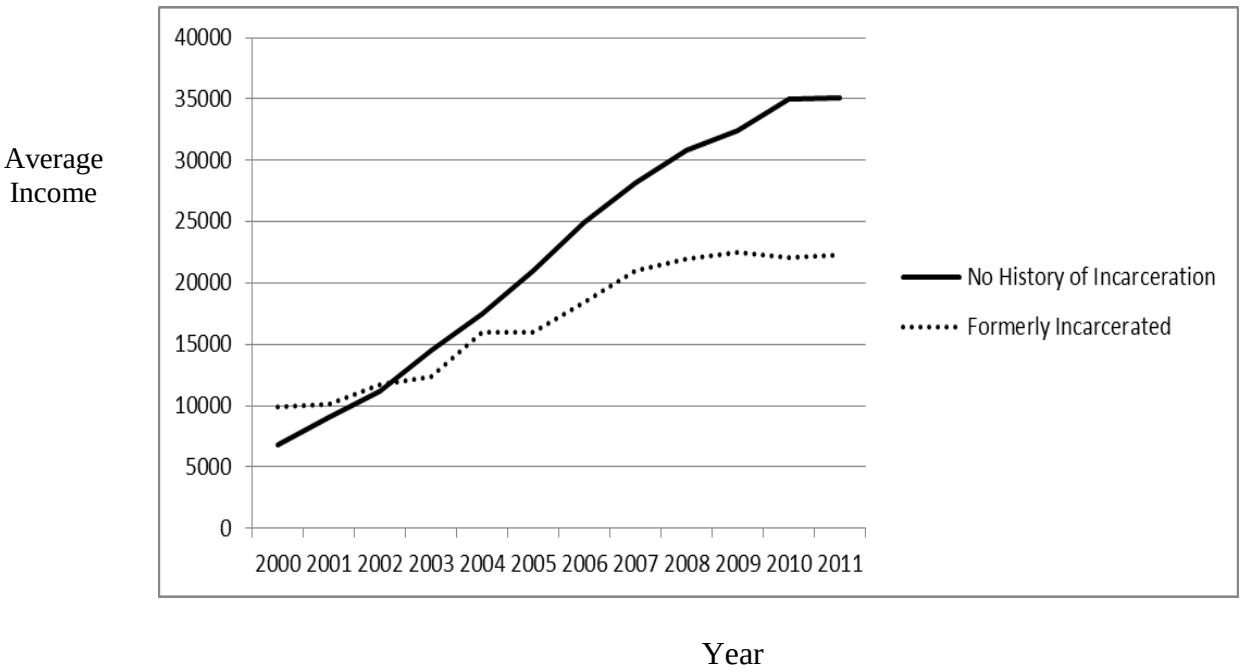

Figure 3.2. Average income of individuals with no history of incarceration versus formerly incarcerated individuals.

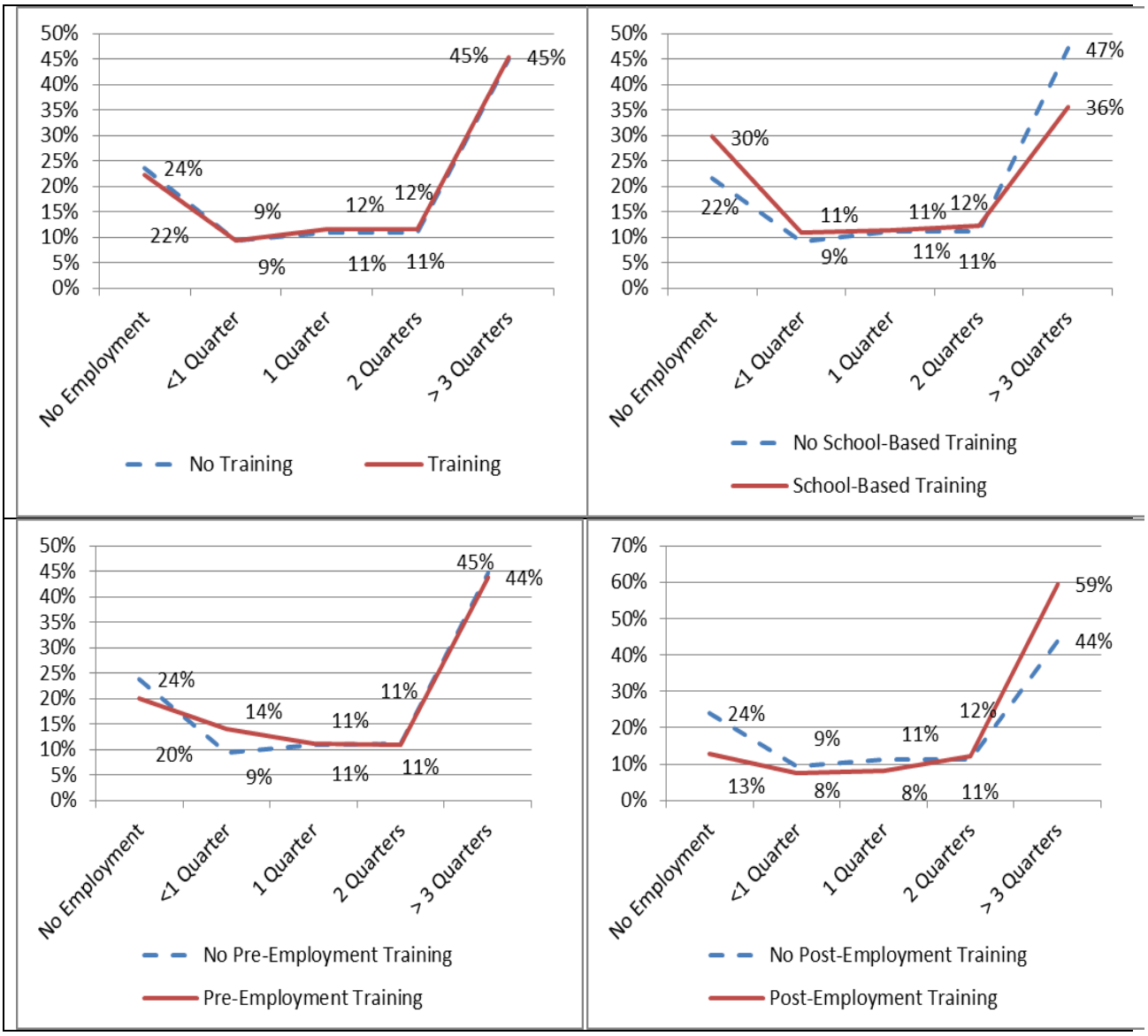

Figure 3.3. Percentage of formerly incarcerated training completers versus non-completers by number of quarters worked

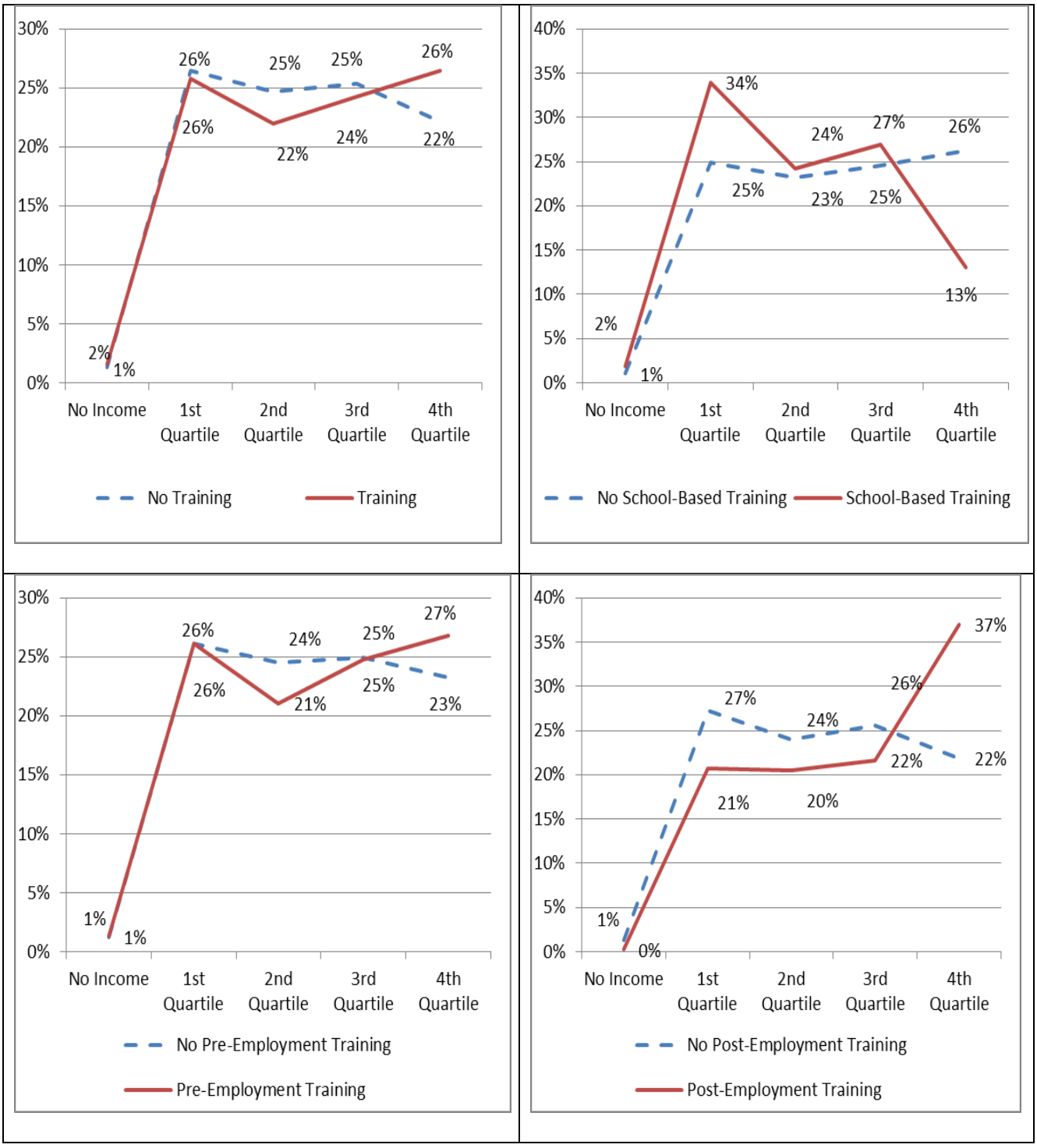

Figure 3.4. Percentage of formerly incarcerated training completers versus non-completers by income quartile

Table 3.5

Gainful Employment and Training NLSY97 Questions

Type of Variable	Observed Variables	Question	Question Name	Possible Responses
Dependent	Weeks Worked	Weekly employment status	EMP_STATUS	0: No information 1: Not associated with an employer and not actively searching 2: Not working but labor force participation cannot be determined 3: Associated with an employer but periods are missing 4: Unemployed 5: Out of labor force 6: Active military service 9701 – 201399: Employer code -4: Valid skip -5: Non-interview
	Income	Total income from wages and salary in the past year	YINC-1700	Amount or coded as -1: Refusal -4: Valid skip -5: Non-interview
Independent	Training	When did you start attending this training program?	YTRN-1200	Month/Day/Year
		When did you stop attending this training program?	YTRN-1500	Month/Day/Year
		What type of training program?	YTRN-3600	See table 4.3
		Were tests or demonstrations used to measure progress?	YTRN-6800	1:Took exams and received grades 2: Demonstrated mastered skills by performing tasks 3: Both 4: None
		Did you complete this training?	YTRN-7600	0: No 1: Yes

Table 3.6

Socio-demographic NLSY97 Questions

Type of Variable	Observed Variables	Question	Question Name	Possible Responses
Control		Net worth of household according to parent	CV_HH_NET_WORTH_P	Dollar amount
		Biological mother's highest grade completed	CV_HGC_BIO_MOM	0: None 1: 1st Grade . . . 20: 8th Year College or more
		General Health (only available after 2007)	YHEA-100	1: Excellent 2: Very good 3: Good 4: Fair 5: Poor
		Have learning/emotional problem limiting school/work performance	PC9-004	1: Yes 0: No
		Gender of Youth	KEY!SEX	1: Male 2: Female
		Age	CV_AGE_INT_DATE	12 - 34
		Combined race - ethnicity variable	KEY!RACE_ETHNICITY	1: Black 2: Hispanic 3: Mixed Race (Non-Hispanic) 4: Non-Black / Non-Hispanic
		Highest grade completed	CVC_HGC_EVER	0: None 1: 1st Grade . . . 20: 8th Year College or more
		Work Experience	CVC_WKSWK_YR_ET	Number of weeks
		Marital status by month	MAR-STATUS	0: Never married, not cohabitating 1: Never married, cohabitating 2: Married 3: Legally separated 4: Divorced 5: Widowed

Table 3.7

Self-Reported Health Status of Formerly Incarcerated Individuals versus All Individuals in 2011

Self-Reported Health	Formerly Incarcerated (%)	All (%)
Excellent	20.66	22.05
Very Good	30.64	36.20
Good	29.05	29.82
Fair	17.63	10.54
Poor	2.02	1.39

CHAPTER 4: RESULTS

This chapter presents the results from the generalized linear mixed models (GLMMs) and is divided into five sections. The first section describes the data, as well as the data cleaning steps required to identify the variables included in the model. The second section presents the selection of the appropriate random effects models. The third section answers research question 1, pertaining to the relationship between school-based training and gainful employment for formerly incarcerated individuals. The fourth section answers research question 2, focusing on the relationship between pre-employment training and gainful employment for formerly incarcerated individuals. Finally, the fifth section answers research question 3, regarding the relationship between post-employment training and gainful employment for formerly incarcerated individuals.

Data Description and Data Cleaning

This section describes the data cleaning necessary prior to statistical analysis. Dirty data consists of inaccurate, incomplete, or erroneous data that prevents the true relationship from emerging in a statistical analysis. In this section, the data cleaning process is described for each NLSY97 field used in the study.

Data description. Table 4.1 presents the descriptive data for the variables included in the models. The maximum net worth was capped at $600,000 in the survey responses. Any responses over $600,000 were changed to $600,000. Likewise, income was capped based on the average of the top 2% of all survey participants. All training variables are positively skewed and leptokurtic.

The Pearson correlation coefficients are presented in table 4.2. Aside from year, the variables exhibiting the highest correlation coefficient are age and work experience with a value of 0.51755.

Data cleaning. This section is divided into four parts. The first section describes the data cleaning needed to capture the population of interest, formerly incarcerated individuals. Next, the data cleaning steps for the dependent variables are described. Likewise, the data cleaning process used in constructing the independent variable of interest—training categories—is presented. Finally, the data cleaning steps necessary to ensure accuracy of the control variables is outlined.

Population. The population of interest consists of formerly incarcerated individuals. The NLSY97 provides monthly incarceration status for all survey participants. A dummy variable for each month was created to reflect if a survey participant was incarcerated during a particular month. If the value of incarceration status for a particular month was equal to one, then the incarceration dummy variable was also equal to one. Similarly, a dummy variable for each month was created to indicate if an individual was considered formerly incarcerated during a particular month. If the value of incarceration status for a particular month was equal to 99, then the formerly incarcerated dummy variable was equal to one during that particular month.

The survey was reduced from 8,984 survey participants to 700 individuals with a designation of formerly incarcerated. The total number of observations during the time period 2000 through 2011 for the 700 formerly incarcerated individuals was 4,282. Training considered prison training was approximated by comparing the month and year of the training start date with the monthly incarceration status.

Dependent variables. The dependent variables are based on the weekly employment status and income reported by participants in the NLSY97. In order to calculate the number of

weeks employed, the weekly employment status field needed to be converted into a value of one representing employment. Survey data with no information, skipped, or not interviewed were considered missing. Participants who were not associated with an employer, not working, unemployed, or out of the labor force were coded with a weekly employment status value of 0. Individuals who reported as actively serving in the military or currently employed with an employer were coded with a weekly employment status of 1. The dependent variable of weeks employed is the summation of the weekly employment status.

Total income from wages and salary from the previous year was captured in question YINC-1700. The income field represents all income from wages, salary, commissions, and tips from all jobs prior to deductions. Responses that indicated refusal to answer, unknown, skipped, or not interviewed were coded as missing.

Independent variables. The variables that required the greatest amount of modification were the constructed independent variables. The training categories were based on question YTRN-3600. The question was repeated until all attended trainings by the survey participant during the survey year had been captured. Depending on the year, the number of individual training programs attended ranged from four in 1997 to ten in 2009. In other words, there are ten separate responses to question YTRN-3600 (YTRN-3600.01 – YTRN-3600.10) in 2009. In addition, all questions pertaining to characteristics about the training program also have ten separate responses in 2009.

Prior to constructing the training categories, each training program was adjusted for incompletion. If a survey participant indicated that he or she did not complete the training (question YTRN-7600), then training participation was changed from one to zero. After adjusting for incompletion, each training measurement was weighted to reflect the length of the

training program in a four step process. First, the weight of the training program was calculated based on the difference between the end date (YTRN-1500) and start date (YTRN-1200) plus one day to eliminate the possibility of a zero weight. Second, the average number of days elapsed was calculated at 59.65 days. Third, the weights were calculated by dividing the total number of days elapsed for each individual training program by 59.65 days. Finally, missing weights were estimated as the average weight value (1). In other words, training programs lasting more than 59.65 days were weighted greater than one and training programs lasting less than 59.65 days were weighted less than one. If the start or end dates of the training programs were unknown then the timeframe of the training programs was assumed to be average. Information on the length of training in terms of days and hours was collected for only a select few years. Since inclusion of these fields would have substantially reduced the size of the data set, they were not included in the analysis. The weighted individual training can be expressed as: $\text{weighted training}_j = [(\text{end date}_j - \text{start date}_j + 1)/59.65] * [\text{training}_j]$ where j represents each individual training of a survey respondent.

Once each training program was weighted, variables representing the three types were constructed. Categorization of training programs reported in the NLSY97 into school-based training, pre-employment training, and post-employment training was assisted by graduate students. The graduate students were provided operational definitions of the training categories and the list of NLSY97 training programs (Appendix A). They were asked to assign each individual training program to a training category. The results from the ten completed categorizations are presented in tables 4.3 and 4.4. The intra-class correlation (ICC) was used to determine inter-rater reliability. The ICC was specified as a two-way mixed model with absolute

agreement. The ICC of 0.438 indicates only a fair amount of agreement. In other words, 56% of the observed variance is due to differences in ratings between coders.

The results of two training program categorizations (vocational education and government) were tied between pre-employ training and post-employment training. After reviewing NLSY documentation and current literature, both training programs were categorized as pre-employment training. In the workforce development literature from Chapter 2, employers in the United States have the expectation that employees are fully trained prior to hiring. Given this trend, vocational education was categorized as pre-employment training. In subsequent questions, the government programs were identified as predominantly workforce development (including JTPA, Job Corps, JOBS, Youth Build, Event Start, Upward Bound, and Talent Search). With the emphasis on job-readiness for youth, government training programs for formerly incarcerated individuals were categorized as pre-employment training. Participation in vocational education programs represents 34% of all training participation of formerly incarcerated individuals. Government training participation consists of 9% of all training participation.

The results of nursing and online or correspondence courses were also split between school-based training and pre-employment training. Ultimately, both of these categories were coded as school-based training based on the likelihood that a school would administer the programs. Only 1% of training participation occurred in a nursing program and 1.8% of training participation was considered correspondence or online.

With the adjustment and weighting of training programs prior to categorization, the quantity of the training was taken into account. However, the quality of the training is also an important aspect that should be taken into consideration. Although quality cannot be fully

captured through a survey, the NLSY97 provides some insight into program quality. Question YTRN-6800 asks the survey participants if testing or demonstration were required during the training program. For this study, a measure of quality was captured through a dummy variable coded as one if the survey participant indicated the training program required testing or demonstrations of skill development. Since each training program can be described by the quality of instruction and setting (prison versus non-prison), the independent variables can be further modified accordingly to help explain the relationship.

Control variables. Several control variables were included in the model with the goal of improving explanatory power. These variables also required data cleaning prior to statistical analysis. Gender was captured as a dummy variable with one representing male. The ethnicity field in the NLSY97 was used to create a dummy variable representing minority status for responses of African American, Hispanic, and mixed race. For the mother's highest grade, skipped responses were recoded as missing.

The age of the survey participant was asked during each interview. Although no responses were missing on the initial survey, subsequent surveys occasionally had missing values. For the missing values, the age at the initial interview was adjusted to reflect the age associated with the survey year. Likewise, the survey participant's highest grade was collected on an annual basis. The initial survey in 1997 provided a complete record of each participant's grade level. Occasionally, the information on highest grade was missing in subsequent years. Responses indicating skipped or non-interview were replaced with the prior year's response.

Marital status and cohabitation is provided in the NLSY in question MAR-COHABITATION by month. The variable of marriage/cohabitation represents the percentage of

months during the year that the survey participant was cohabitating with either a spouse or partner. Missing or skipped monthly responses were coded as 0.

The number of weeks worked an employee job was included as a control variable for the income model. This study uses YTRN question CVC_WKSWK_YR_ET to capture the number of weeks in a given year that the survey participant worked. Skipped responses were recoded from -3 and -4 to 0.

Finally, health measurements are available in the NLSY97 from 2007 through 2011. Work limitations due to health were coded as 1. All other responses are coded as 0 including refusals, unknowns, skipped and non-interviews.

Model Selection

Table 4.5 presents the two models considered in this study. Maximum Likelihood (ML) was chosen as the estimation method with an unstructured covariance. With an unstructured covariance, no constraints are imposed on the values. Since each variance and covariance is uniquely estimated from the data, the unstructured approach provides the best possible model fit based on the data.

The control variable of net worth in dollars resulted in a standard error of zero and infinite t-value. To address the issue, the variable for net worth was normalized. In model 2, the standard error for work experience was also found to be zero. Work experience was also normalized. In both cases, the normalized control variables produced meaningful standard errors. Since information about a survey participant's general health and work limitations was limited to survey years 2007 through 2011, the parent's response in the initial survey was used as an indication of the participant's work limitations.

The first step in determining the appropriate GLMM is to test if the random effects associated with the intercept for each formerly incarcerated individual can be omitted from the

model. Based on the results of the likelihood ratio (LR) test of the random intercept model versus a nested model, the random intercept should be included in model 1.1. As shown in table 4.6, the likelihood ratio test of 29,757.28 was well above the critical value of 5.42 for an alpha of 0.001 with a 50-50 mixture of chi-square distributions (Sniejders & Bosker, 2012, p. 99).

The second step in the process is to test the significance of the random effects of age. The LR test calculated from a comparison of the random effects model and the random intercept-only model from ML estimation found a likelihood ratio of 11,899.96 with a critical value of 12.81 for an alpha=0.001 (Sniejders & Bosker, 2012, p. 99). This indicated that the random effects of age should be retained in the model.

Finally, the model is reduced by removing nonsignificant fixed effects one at a time and examining the results. In particular, the Akaike information criterion (AIC) is a measurement of the quality of a statistical model and used in model selection. Elimination of non-significant variables based on an alpha of 0.05 resulted in a change of the AIC from a small decrease to a large increase in the AIC. Based on theory and the AIC results, all variables were retained in the model.

The same process was used to determine the appropriate GLMM for formerly incarcerated individuals completing quality training programs (table 4.7). Quality training programs consisted of the subset of training programs that required demonstration of knowledge either in the form of a written test or a physical demonstration. Based on the likelihood ratio test, the random intercept and the random slope (age) were retained in the model. Likewise, all variables were retained in the model based on theory and examination of statistical changes when non-significant variables were omitted from the model one at a time.

A similar analysis was performed for the subset of training programs that most likely were offered in a prison setting. The subset of prison training was determined through a comparison of the training start date and the incarceration status of the training participant during that particular month. As with models 1.1 and 1.2, the likelihood ratio tests for random intercept and random slope (age) indicated that random effects should be retained in the model. All variables found in table 4.8 were retained in the model based on theoretical grounds and an examination of the AIC values in reduced models.

The statistical analysis for model 2 follows the same systematic process. In contrast to model 1, model 2 focused on the relationship of income with training programs. In addition to the covariates found in the employment model, the income model included work experience and work experience squared as control variables. Table 4.9 provides the results of the log-link GLMM of income and training categories.

The likelihood ratio test in the random intercept model of 437.04 was greater than the critical value of 5.42, indicating that the random intercept should be retained in the model. The addition of a random slope of age resulted in a likelihood ratio test of 63.55. Based on a comparison with the critical value of 12.81, the random slope of age was retained in the model. The final step in the process entailed examining the AIC and any changes in significance of the training variables as the non-significant control variables are removed one at a time from the model. Based on theory and the statistical results of the reduced models, all variables were retained in model 2.1.

The relationship between quality training program completion and income is presented in table 4.10. As with the previous models, the random intercept was retained in the model due to the likelihood ratio test of 448.86 compared to the critical value of 5.42. The likelihood ratio test

for the random slope of age was found to be 66.79, which is greater than the critical value of 12.81.

Finally, the relationship between prison training programs and income is presented in table 4.11. The likelihood ratio tests of 452.30 for the intercept-only model and 71.20 for the random slope model were both well above the critical value associated with an alpha of 0.001. Both the random intercept and the random effect of age were retained in the model. As with all models presented in this study, a reduced model did not significantly improve the AIC value or change the significance of the training variables. Based on theory, all non-significant variables were retained in the model.

Research Question 1: Are School-based Training Programs Related to Gainful Employment?

The number of total observations in the dataset was 4,828 from the 700 formerly incarcerated individuals. Of the total number of observations, only 2.5% of the observations reflected participation in a school-based training program during the period of 2000 through 2011 (table 4.12).

In terms of cumulative school-based training programs, approximately 21.6% of formerly incarcerated individuals in 2011 had participated in at least one school-based training program. From table 4.13, the percentage of formerly incarcerated individuals participating in school-based programs reduced to 12.7% when the analysis was restricted to quality school-based training programs. Of the total formerly incarcerated individuals in 2011, 3.4% had participated in a prison school-based training program. Further, only 1% of formerly incarcerated individuals have participated in a quality school-based prison training program.

A plot of the average annual employment percentage versus the cumulative number of school based training programs for formerly incarcerated individuals is found in figure 4.1. The shape of the graph suggests negative selection. Instead of school based training improving employment prospects, the graph shows that individuals who are not employed tend to participate in more school-based training programs.

A graph of the average annual income versus the cumulative number of school based training programs for formerly incarcerated individuals is found in figure 4.2. As with annual employment percent, the shape of the graph may suggest negative selection.

The results from the employment random effects model showed that the training subsets - quality school-based training (model 1.2) and school-based prison training (model 1.3) - were found to be significant; However, the coefficients are negative in both cases. In general, school-based training was found to be statistically insignificant (model 1.1) in the employment random effects model. The results from the income random effects model found all forms of school-based training to be statistically insignificant. School-based programs were not related to gainful employment.

Research Question 2: Are Pre-Employment Training Programs Related to Gainful Employment?

As shown in table 4.14, the annual pre-employment training program completion was 5%, with the vast majority of participants completing one pre-employment training course. In cumulative terms, approximately 41% of formerly incarcerated individuals completed at least one pre-employment training program. From table 4.15, the percentage of formerly incarcerated individuals completing at least one quality training program was 28%. Only a small amount of the pre-employment training takes place in a prison setting. Approximately 5% of formerly

incarcerated individuals completed a pre-employment training program in prison and only about half of the prison training programs werre considered quality programs.

A graph of the average annual employment percentage versus the cumulative number of pre-employment training programs for formerly incarcerated individuals is found in figure 4.3. The shape of the graph suggests a positive relationship.

The graph of the average annual income versus the cumulative number of pre-employment training programs for formerly incarcerated individuals is found in figure 4.4. The shape of the graph does not shed much light on the positive or negative nature of the relationship.

Pre-employment training was not found to be significant in any of the models that included a random intercept and random slope with the exception of model 2.3. Cumulative pre-employment prison training was positively related to income. Holding all other variables equal, completion of a pre-employment training program of average duration increased income by an average of 100 ($e^{0.2687}$ -1) = 100 (1.308 – 1) = 30.8%. Taking both employment and income into consideration, pre-employment training programs were not related to gainful employment.

Research Question 3: Are Post-Employment Training Programs Related to Gainful Employment?

As shown in table 4.16, the annual completion of post-employment training programs was only 2.4%. Further, very few individuals complete more than one post-employment training course. Cumulatively, only 20.6% of formerly incarcerated individuals completed at least one post-employment training program (table 4.17). The figure reduced to 13.7% when only quality post-employment training courses were considered.

A graph of the average annual weeks worked versus the cumulative number of post-employment training programs for formerly incarcerated individuals is found in figure 4.5. The shape of the graph predominantly shows a positive trend.

A graph of the average annual income versus the cumulative number of post-employment training programs for formerly incarcerated individuals is found in figure 4.6. Aside from the average income associated with five cumulative post-employment trainings, the shape of the graph suggests a positive relationship between the average income and post-employment training.

In contrast to the other training categories, cumulative post-employment training was found to be positively related to both employment and income. From model 1.1, the odds of working were 1.36 times higher for formerly incarcerated individuals who completed a post-employment training program of average duration compared to formerly incarcerated individuals who did not complete a post-employment training program. In other words, the odds of working increased by 100*($e^{0.31}$ -1) = 36.6% for individuals who completed a post-employment training program.

Model 1.2 produced a similar finding. The odds of working was found to be 1.34 times higher for formerly incarcerated individuals who completed a quality, post-employment training program of average duration compared to non-completers. The odds of working increased by 34.1% for individuals who completed a quality post-employment training program.

From the income model, completion of an additional post-employment training of average duration increased income by an average of 100*($e^{0.1406}$ -1) = 100*(1.1509 – 1) = 15.1%. On average, completion of an additional quality post-employment training program resulted in an increase in income of 19.6%.

Since post-employment training increases both the odds of employment and income, post-employment training was positively related to gainful employment. This finding was true for all post-employment training as well as the subset of quality post-employment training that required knowledge or skill demonstration.

Figures and Tables

Table 4.1

Number of Observations, Mean, Standard Deviation, Skewness, Kurtosis and Range of Selected Variables

Variable	N	Mean	Standard Deviation	Skewness	Kurtosis	Min	Max
Weeks Employed	4,828	30.44	21.82	-0.35	-1.60	0.0	53.0
Weeks in Labor Force	4,548	36.21	20.21	-0.86	-0.93	0.0	53.0
Income	2,319	$19,101	16,279.88	1.81	6.57	$ -	$146,002
Networth 1997	4,828	$42,011	94,984.38	3.80	17.04	$(313,250)	$600,000
Work / School Limits 1997	4,217	0.19	0.39	1.60	0.56	0.0	1.0
Mother's Highest Grade	4,240	11.69	2.70	-0.56	2.40	1.0	20.0
Age	4,828	25.07	3.23	-0.24	-0.67	16.0	32.0
Highest Grade	4,828	10.99	2.56	1.27	2.76	6.0	21.0
Marriage/Cohabitation	4,828	0.37	0.45	0.52	-1.59	0.0	1.0
Male	4,828	0.81	0.39	-1.56	0.43	0.0	1.0
Work Experience	4,828	4.13	3.14	0.89	0.67	0.0	20.6
Poor Health	2,570	0.02	0.15	6.49	40.19	0.0	1.0
Cumulative School-Based Training	4,828	0.20	0.66	4.78	29.13	0.0	6.1
Cumulative Pre-Employment Training	4,828	0.54	1.43	6.85	97.05	0.0	34.4
Cumulative Post-Employment Training	4,828	0.13	0.54	10.24	218.52	0.0	16.8
Cumulative Quality School-Based Training	4,828	0.64	0.31	7.49	86.27	0.0	5.6
Cumulative Quality Pre-Employment Training	4,828	0.30	1.14	10.48	203.29	0.0	33.4
Cumulative Quality Post-Employment Training	4,828	0.08	0.46	14.71	400.54	0.0	16.8
Cumulative Prison School-Based Training	4,828	0.02	0.15	7.03	52.91	0.0	2.0
Cumulative Prison Pre-Employment Training	4,828	0.04	0.29	12.21	249.63	0.0	8.9

Table 4.2

Pearson Correlation Coefficients (Prob > |r| under H_0: $\rho = 0$)

	Networth 1997	Work / School Limits 1997	Mother's Highest Grade	Age	Highest Grade	Marriage / Cohabitation	Male	Work Experience	Year	Cumulative Pre-Employment Training	Cumulative Post-Employment Training	Cumulative School-Based Training
Networth 1997	1	-0.00329	0.23607	0.00576	0.14586	-0.01743	-0.00518	0.11117	0.0207	0.04177	-0.02744	-0.01389
		0.8309	<.0001	0.6888	<.0001	0.226	0.7189	<.0001	0.1505	0.0037	0.0566	0.3347
Work / School Limits 1997	-0.00329	1	0.17121	-0.00351	-0.0902	-0.05461	0.05504	-0.1092	0.01671	-0.04133	-0.02647	-0.00866
	0.8309		<.0001	0.82	<.0001	0.0004	0.0003	<.0001	0.278	0.0073	0.0857	0.5739
Mother's Highest Grade	0.23607	0.17121	1	0.03268	0.15187	-0.0523	0.00159	0.08409	-0.00212	0.07063	0.01097	-0.01842
	<.0001	<.0001		0.0333	<.0001	0.0007	0.9177	<.0001	0.8905	<.0001	0.4753	0.2305
Age	0.00576	-0.00351	0.03268	1	0.11774	0.1743	0.00374	0.51755	0.89225	0.15085	0.12646	0.07482
	0.6888	0.82	0.0333		<.0001	<.0001	0.795	<.0001	<.0001	<.0001	<.0001	<.0001
Highest Grade	0.14586	-0.0902	0.15187	0.11774	1	0.00499	-0.05162	0.22217	0.09131	0.06154	0.05473	-0.13168
	<.0001	<.0001	<.0001	<.0001		0.7289	0.0003	<.0001	<.0001	<.0001	0.0001	<.0001
Marriage / Cohabitation	-0.01743	-0.05461	-0.0523	0.1743	0.00499	1	-0.02724	0.20403	0.16723	0.01247	0.00724	-0.03251
	0.226	0.0004	0.0007	<.0001	0.7289		0.0584	<.0001	<.0001	0.3862	0.615	0.0239
Male	-0.00518	0.05504	0.00159	0.00374	-0.05162	-0.02724	1	0.05173	-0.00992	0.02354	-0.02395	0.0471
	0.7189	0.0003	0.9177	0.795	0.0003	0.0584		0.0003	0.4907	0.1019	0.0962	0.0011
Work Experience	0.11117	-0.1092	0.08409	0.51755	0.22217	0.20403	0.05173	1	0.46168	0.11539	0.10574	-0.01394
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0003		<.0001	<.0001	<.0001	0.3329
Year	0.0207	0.01671	-0.00212	0.89225	0.09131	0.16723	-0.00992	0.46168	1	0.11548	0.11029	0.08275
	0.1505	0.278	0.8905	<.0001	<.0001	<.0001	0.4907	<.0001		<.0001	<.0001	<.0001
Cumulative Pre-Employment Training	0.04177	-0.04133	0.07063	0.15085	0.06154	0.01247	0.02354	0.11539	0.11548	1	0.06513	0.01106
	0.0037	0.0073	<.0001	<.0001	<.0001	0.3862	0.1019	<.0001	<.0001		<.0001	0.4423
Cumulative Post-Employment Training	-0.02744	-0.02647	0.01097	0.12646	0.05473	0.00724	-0.02395	0.10574	0.11029	0.06513	1	0.07538
	0.0566	0.0857	0.4753	<.0001	0.0001	0.615	0.0962	<.0001	<.0001	<.0001		<.0001
Cumulative School-Based Training	-0.01389	-0.00866	-0.01842	0.07482	-0.13168	-0.03251	0.0471	-0.01394	0.08275	0.01106	0.07538	1
	0.3347	0.5739	0.2305	<.0001	<.0001	0.0239	0.0011	0.3329	<.0001	0.4423	<.0001	

Table 4.3

Inter-rater reliability for training categories constructed from NLSY97 question YTRN-3600

NLSY97 Responses	**Training Categories**		
Training Program	***School-based*** (General education only)	***Pre-employment*** (Combination of general education and job-specific knowledge)	***Post-employment*** (Job-specific knowledge)
1 Business or secretarial	3	2	**5**
2 Vocational, technical, or trade	0	**5**	5
3 Apprenticeship program	1	**6**	3
4 Nursing school (LPN or RN) or CAN training	**4**	4	2
5 Vocational rehabilitation center	2	**6**	2
6 Adult Basic Education (pre-GED)	**7**	3	
7 GED program	**7**	1	2
8 Online or correspondence course	**4**	4	2
9 Formal company training run by employer		3	**7**
10 Seminar or training program at work run by someone other than employer		3	**7**
11 Seminar or training outside of work		3	**7**
12 Community or junior college	**9**	1	
13 Government training		**5**	5
15 School based / Includes ROTC	**9**	1	
16 Job search or job placement training		**8**	2

Table 4.4

Categorization of training programs

Training Categories		
School-based (General education only)	***Pre-employment*** (Combination of general education and job-specific knowledge)	***Post-employment*** (Job-specific knowledge)
Nursing school Adult Basic Education (pre-GED) GED program Online or correspondence course Community or junior college School based / Includes ROTC	Vocational, technical, or trade Apprenticeship program Vocational rehabilitation center Government training Job search or job placement training	Business or secretarial Formal company training run by employer Seminar or training program at work run by someone other than employer Seminar or training outside of work

Table 4.5

Gainful Employment Models

Model	Dependent Variable	Link Function	Distribution	Treatment (cumulative and weighted)
1.1	π = Weeks Employed$_{it}$ n = Weeks in Labor Force$_{it}$	Logistic	Binomial (π, n)	Training
1.2	π = Weeks Employed$_{it}$ n = Weeks in Labor Force$_{it}$	Logistic	Binomial (π, n)	Quality Training
1.3	π = Weeks Employed$_{it}$ n = Weeks in Labor Force$_{it}$	Logistic	Binomial (π, n)	Prison Training
2.1	Income	Log	Gamma	Training
2.2	Income	Log	Gamma	Quality Training
2.3	Income	Log	Gamma	Prison Training

Table 4.6

Model 1.1: Relationship between Different Types of Training Programs and Employment

	No Random Effects			Random Intercept			Random Intercept & Random Slope (Age)		
Fixed Effect Parameters	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*
Intercept	166.33	10.312	<.0001	166.35	112.850	0.141	166.33	128.620	0.197
Networth 1997	0.03	0.008	0.000	0.25	0.135	0.067	0.07	0.140	0.604
School/Work Limits 1997	-0.40	0.019	<.0001	-0.69	0.336	0.040	-0.39	0.353	0.264
Male	0.02	0.020	0.259	-0.15	0.340	0.658	0.03	0.353	0.942
Minority	-0.49	0.016	<.0001	-0.93	0.274	0.001	-0.50	0.290	0.083
Age	0.03	0.005	<.0001	0.03	0.057	0.582	0.06	0.066	0.343
Highest Grade	0.10	0.004	<.0001	-0.12	0.012	<.0001	-0.11	0.017	<.0001
Mother's Highest Grade	0.01	0.003	<.0001	0.08	0.052	0.119	0.11	0.055	0.055
Marriage/Cohabitation	0.58	0.017	<.0001	0.24	0.027	<.0001	0.15	0.037	<.0001
Year	-0.08	0.005	<.0001	-0.08	0.057	0.152	-0.08	0.065	0.204
Cumulative Pre-Employment Training	0.05	0.007	<.0001	0.02	0.020	0.464	-0.01	0.038	0.850
Cumulative Post-Employment Training	0.23	0.017	<.0001	0.38	0.046	<.0001	0.31	0.091	0.001
Cumulative School-Based Training	-0.03	0.011	0.004	-0.16	0.034	<.0001	-0.09	0.057	0.113
Covariance Parameters				*Estimate*	*SE*	*Pr>Z*	*Estimate*	*SE*	*Pr>Z*
UN(1,1) = τ_{00}^2				7.59	1.226	<.0001	39.77	1.299	<.0001
UN(2,1)= τ_{10}^2							-1.64	0.056	<.0001
UN(2,2)= τ_{11}^2							0.08	0.000	
Model Information (Subject = ID)									
Likelihood Ratio Test					29,757.28			11,899.96	
Critical values alpha=.001					5.42			12.81	
-2 ML log likelihood		82,387.99			52,630.71			40,730.75	
AIC		82,413.99			52,658.71			40,762.75	
BIC		82,492.34			52,718.87			40,831.51	

Table 4.7

Model 1.2: Relationship between Different Types of Quality Training Programs and Employment

	No Random Effects			Random Intercept			Random Intercept & Random Slope (Age)		
Fixed Effect Parameters	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*
Intercept	174.16	10.256	<.0001	174.17	112.13	0.121	174.16	146.840	0.236
Networth 1997	0.03	0.008	0.000	0.25	0.14	0.067	0.07	0.141	0.619
School/Work Limits 1997	-0.39	0.019	<.0001	-0.69	0.34	0.038	-0.39	0.353	0.269
Male	0.02	0.020	0.291	-0.16	0.34	0.648	0.02	0.353	0.946
Minority	-0.49	0.016	<.0001	-0.93	0.27	0.001	-0.50	0.292	0.086
Age	0.04	0.005	<.0001	0.04	0.06	0.515	0.07	0.075	0.369
Highest Grade	0.11	0.004	<.0001	-0.12	0.01	<.0001	-0.11	0.018	<.0001
Mother's Highest Grade	0.02	0.003	<.0001	0.08	0.05	0.120	0.10	0.055	0.062
Marriage/Cohabitation	0.58	0.017	<.0001	0.24	0.03	<.0001	0.16	0.037	<.0001
Year	-0.09	0.005	<.0001	-0.09	0.06	0.130	-0.09	0.074	0.244
Cumulative Quality Pre-Employment Training	0.03	0.009	0.000	0.01	0.02	0.688	0.04	0.044	0.337
Cumulative Quality Post-Employment Training	0.25	0.022	<.0001	0.38	0.06	<.0001	0.29	0.108	0.007
Cumulative Quality School-Based Training	-0.13	0.025	<.0001	-0.33	0.05	<.0001	-0.16	0.077	0.045
Covariance Parameters				*Estimate*	*SE*	*Pr>Z*	*Estimate*	*SE*	*Pr>Z*
UN(1,1) = τ_{00}^2				7.61	1.221	<.0001	39.55	1.302	<.0001
UN(2,1)= τ_{10}^2							-1.63	0.055	<.0001
UN(2,2)= τ_{11}^2							0.08	0.000	
Model Information (Subject = ID)									
Likelihood Ratio Test						29,868.63			11,881.35
Critical values alpha=.001						5.42			12.81
-2 ML log likelihood			82,496.80			52,628.17			40,746.82
AIC			82,522.80			52,656.17			40,778.82
BIC			82,601.15			52,716.33			40,847.58

Table 4.8

Model 1.3: Relationship between Different Types of Prison Training Programs and Employment

	No Random Effects			Random Intercept			Random Intercept & Random Slope (Age)		
Fixed Effect Parameters	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*
Intercept	161.92	10.335	<.0001	161.93	109.82	0.141	161.92	127.310	0.204
Networth 1997	0.03	0.008	0.002	0.23	0.14	0.087	0.07	0.141	0.642
School/Work Limits 1997	-0.42	0.019	<.0001	-0.71	0.34	0.038	-0.42	0.353	0.239
Male	0.03	0.020	0.096	-0.15	0.34	0.654	0.04	0.354	0.919
Minority	-0.48	0.016	<.0001	-0.93	0.28	0.001	-0.49	0.291	0.090
Age	0.04	0.005	<.0001	0.03	0.06	0.588	0.06	0.066	0.331
Highest Grade	0.10	0.004	<.0001	-0.11	0.01	<.0001	-0.11	0.017	<.0001
Mother's Highest Grade	0.02	0.003	<.0001	0.08	0.05	0.120	1.06	0.055	0.054
Marriage/Cohabitation	0.56	0.017	<.0001	0.26	0.03	<.0001	0.16	0.037	<.0001
Year	-0.08	0.005	<.0001	-0.08	0.06	0.151	-0.08	0.064	0.212
Cumulative Prison Pre-Employment Training	0.14	0.030	<.0001	0.32	0.14	0.019	0.13	0.272	0.621
Cumulative Prison School-Based Training	-0.78	0.051	<.0001	0.33	0.18	0.062	-0.72	0.259	0.005
Covariance Parameters				*Estimate*	*SE*	*Pr>Z*	*Estimate*	*SE*	*Pr>Z*
UN(1,1) = τ_{00}^2				7.79	1.241	<.0001	40.20	1.312	<.0001
UN(2,1)= τ_{10}^2							-1.66	0.056	<.0001
UN(2,2)= τ_{11}^2							0.08	0.000	
Model Information (Subject = ID)									
Likelihood Ratio Test						29,730.43			11,938.34
Critical values alpha=.001						5.42			12.81
-2 ML log likelihood			82,457.23			52,726.80			40,788.46
AIC			82,481.23			52,752.80			40,818.46
BIC			82,553.55			52,808.66			40,882.92

Table 4.9

Model 2.1: Relationship between Different Types of Training Programs and Income

	No Random Effects			Random Intercept			Random Intercept & Random Slope (Age)		
Fixed Effect Parameters	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*
Intercept	-17.65	27.371	0.519	-17.65	120.880	0.839	-17.65	113.940	0.877
Networth 1997	-0.003	0.020	0.874	0.04	0.038	0.431	0.04	0.038	0.349
School/Work Limits 1997	-0.13	0.058	0.030	-0.12	0.107	0.169	-0.13	0.107	0.228
Male	0.56	0.051	<.0001	0.56	0.099	<.0001	0.57	0.099	<.0001
Minority	-0.27	0.040	<.0001	-0.32	0.082	0.000	-0.32	0.082	<.0001
Age	-0.02	0.014	0.116	-0.04	0.056	0.392	-0.05	0.055	0.368
Highest Grade	0.06	0.009	<.0001	0.08	0.016	<.0001	0.08	0.016	<.0001
Mother's Highest Grade	0.01	0.008	0.169	0.02	0.016	0.143	0.01	0.016	0.445
Marriage/Cohabitation	0.29	0.043	<.0001	0.22	0.047	<.0001	0.17	0.048	0.000
Work Experience	0.36	0.034	<.0001	0.45	0.051	<.0001	0.47	0.053	
Work Experience^2	-0.06	0.012	<.0001	-0.05	0.014		-0.07	0.018	<.0001
Year	0.01	0.014	0.337	0.01	0.061	0.787	0.01	0.057	0.082
Cumulative Pre-Employment Training	0.02	0.015	0.264	0.01	0.024	0.698	0.00	0.026	0.985
Cumulative Post-Employment Training	0.19	0.037	<.0001	0.16	0.050	0.001	0.14	0.054	0.009
Cumulative School-Based Training	-0.07	0.028	0.020	-0.03	0.052	0.630	-0.04	0.054	0.491
Scale	0.67	0.020							
Covariance Parameters				*Estimate*	*SE*	*Pr>Z*	*Estimate*	*SE*	*Pr>Z*
UN(1,1) τ_{00}^2				0.46			4.37		
UN(2,1) τ_{10}^2							-0.17		
UN(2,2) τ_{11}^2							0.01		
Residual σ^2				0.40	0.033		0.35	0.030	
Model Information (Subject = ID)									
Likelihood Ratio Test						437.04			63.55
Critical values alpha=.001						5.42			12.81
-2 ML log likelihood			39,887.85			39,450.81			39,387.26
AIC			39,919.85			39,484.81			39,425.26
BIC			40,008.33			39,557.86			39,506.91

Table 4.10

Model 2.2: Relationship between Different Types of Quality Training Programs and Income

	No Random Effects			Random Intercept			Random Intercept & Random Slope (Age)		
Fixed Effect Parameters	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*
Intercept	-12.21	27.075	0.652	-12.21	112.470	0.914	-12.21	107.810	0.910
Networth 1997	0.00	0.021	0.876	0.04	0.039	0.353	0.04	0.038	0.349
School/Work Limits 1997	-0.11	0.058	0.057	-0.11	0.011	0.302	-0.12	0.107	0.279
Male	0.56	0.051	<.0001	0.56	0.100	<.0001	0.56	0.099	<.0001
Minority	-0.27	0.040	<.0001	-0.32	0.083	0.000	-0.32	0.082	<.0001
Age	-0.02	0.014	0.187	-0.04	0.052	0.413	-0.05	0.052	0.340
Highest Grade	0.06	0.009	<.0001	0.08	0.016	<.0001	0.08	0.016	<.0001
Mother's Highest Grade	0.01	0.008	0.164	0.02	0.016	0.269	0.01	0.016	0.517
Marriage/Cohabitation	0.28	0.043	<.0001	0.22	0.047	<.0001	0.17	0.048	0.001
Work Experience	0.37	0.034	<.0001	0.45	0.050	<.0001	0.48	0.053	<.0001
Work Experience^2	-0.06	0.012	<.0001	-0.05	0.014	0.000	-0.07	0.018	<.0001
Year	0.01	0.014	0.442	0.01	0.057	0.852	0.01	0.054	0.844
Cumulative Quality Pre-Employment Training	0.02	0.022	0.361	0.03	0.031	0.334	0.03	0.034	0.392
Cumulative Quality Post-Employment Training	0.21	0.045	<.0001	0.18	0.059	0.002	0.18	0.063	0.005
Cumulative Quality School-Based Training	-0.07	0.080	0.399	-0.04	0.108	0.742	-0.04	0.115	0.748
Scale	0.67	0.020							
Covariance Parameters				*Estimate*	*SE*	*Pr>Z*	*Estimate*	*SE*	*Pr>Z*
UN(1,1) τ_{00}^2				0.46			4.73		
UN(2,1) τ_{10}^2							-0.19		
UN(2,2) τ_{11}^2							0.01		
Residual σ^2				0.40	0.030		0.35	0.029	
Model Information (Subject = ID)									
Likelihood Ratio Test						448.86			66.79
Critical values alpha=.001						5.42			12.81
-2 ML log likelihood			39,900.49			39,451.63			39,384.84
AIC			39,932.49			39,485.63			39,422.84
BIC			40,020.98			39,558.68			39,504.48

Table 4.11

Model 2.3: Relationship between Different Types of Prison Training Programs and Income

	No Random Effects			Random Intercept			Random Intercept & Random Slope (Age)		
Fixed Effect Parameters	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*	*Estimate*	*SE*	*Pr>|t|*
Intercept	-24.15	27.550	0.381	-24.15	121.060	0.842	-24.15	115.430	0.834
Networth 1997	-0.01	0.021	0.741	0.04	0.038	0.353	0.04	0.038	0.347
School/Work Limits 1997	-0.12	0.058	0.034	-0.12	0.108	0.260	-0.13	0.107	0.240
Male	0.56	0.513	<.0001	0.56	0.100	<.0001	0.57	0.099	<.0001
Minority	-0.26	0.040	<.0001	-0.31	0.083	0.000	-0.31	0.082	0.001
Age	-0.02	0.014	0.113	-0.05	0.057	0.400	-0.06	0.056	0.327
Highest Grade	0.07	0.009	<.0001	0.08	0.016	<.0001	0.08	0.016	<.0001
Mother's Highest Grade	0.01	0.008	0.114	0.02	0.016	0.268	0.00	0.016	0.539
Marriage/Cohabitation	0.29	0.043	<.0001	0.23	0.047	<.0001	0.17	0.048	0.000
Work Experience	0.37	0.034	<.0001	0.46	0.051	<.0001	0.48	0.053	<.0001
Work Experience^2	-0.06	0.012	<.0001	-0.05	0.014	0.000	-0.07	0.018	<.0001
Year	0.02	0.014	0.236	0.02	0.061	0.786	0.02	0.058	0.774
Cumulative Prison Pre-Employment Training	0.30	0.085	0.001	0.27	0.132	0.042	0.27	0.138	0.052
Cumulative Prison School-Based Training	-0.43	0.228	0.057	-0.44	0.338	0.198	-0.44	0.335	0.192
Scale	0.68	0.020							
Covariance Parameters				*Estimate*	*SE*	*Pr>Z*	*Estimate*	*SE*	*Pr>Z*
UN(1,1) τ_{00}^2				0.46			5.15		
UN(2,1) τ_{10}^2							-0.21		
UN(2,2) τ_{11}^2							0.01		
Residual σ^2				0.40	0.033		0.35	0.031	
Model Information (Subject = ID)									
Likelihood Ratio Test						452.30			71.20
Critical values alpha=.001						5.42			12.81
-2 ML log likelihood			39,912.57			39,460.27			39,389.07
AIC			39,942.57			39,492.27			39,425.07
BIC			40,025.52			39,561.03			39,502.42

Table 4.12

2000 – 2011 Annual Participation in School-Based Training Programs

Year	No School-Based Training	1 School-Based Training	2 School-Based Trainings
2000	112	4	0
2001	178	4	0
2002	247	7	0
2003	283	15	0
2004	328	6	2
2005	380	12	0
2006	420	12	0
2007	478	8	2
2008	508	11	0
2009	559	14	0
2010	591	10	1
2011	624	12	0
TOTAL	4,708	115	5

Table 4.13

2011 Cumulative Participation in School-Based Training Programs

2011	Total School Based Trainings		Quality School Based Trainings		Prison School Based Trainings		Quality Prison School Based Trainings	
	#	%	#	%	#	%	#	%
0	549	78.43	611	87.29	676	96.57	693	99
1	79	11.29	78	11.14	22	3.14	7	1
2	48	6.86	10	1.43	2	0.29		
3	17	2.43	1	0.14				
4	4	0.57						
5	1	0.14						
6	1	0.14						
7	1	0.14						
Total	700	100	700	100	700	100	700	100

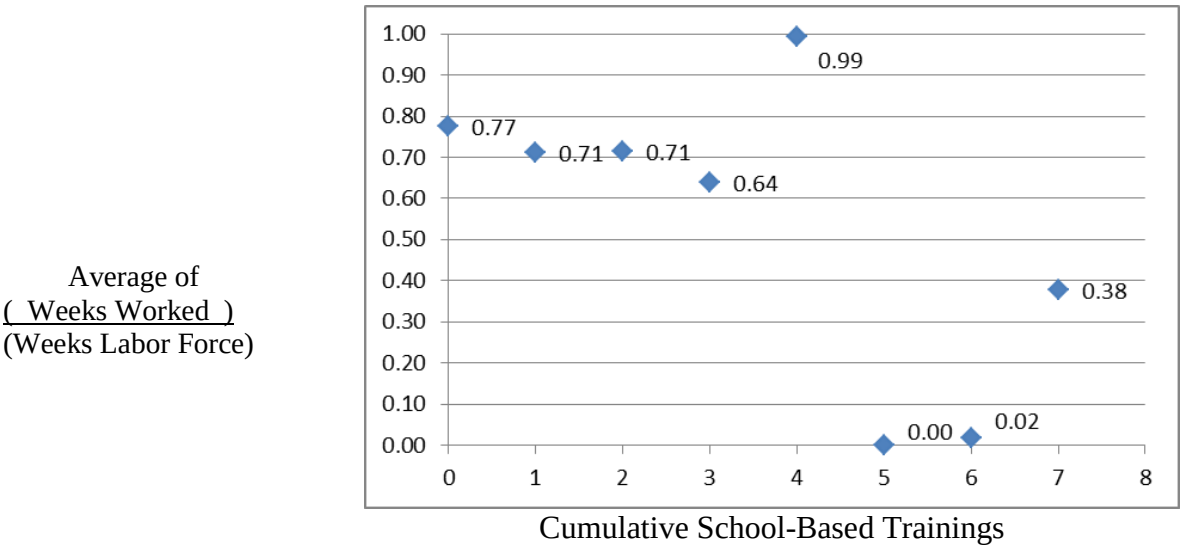

Figure 4.1. Average percentage of weeks worked by the cumulative school-based trainings for formerly incarcerated individuals

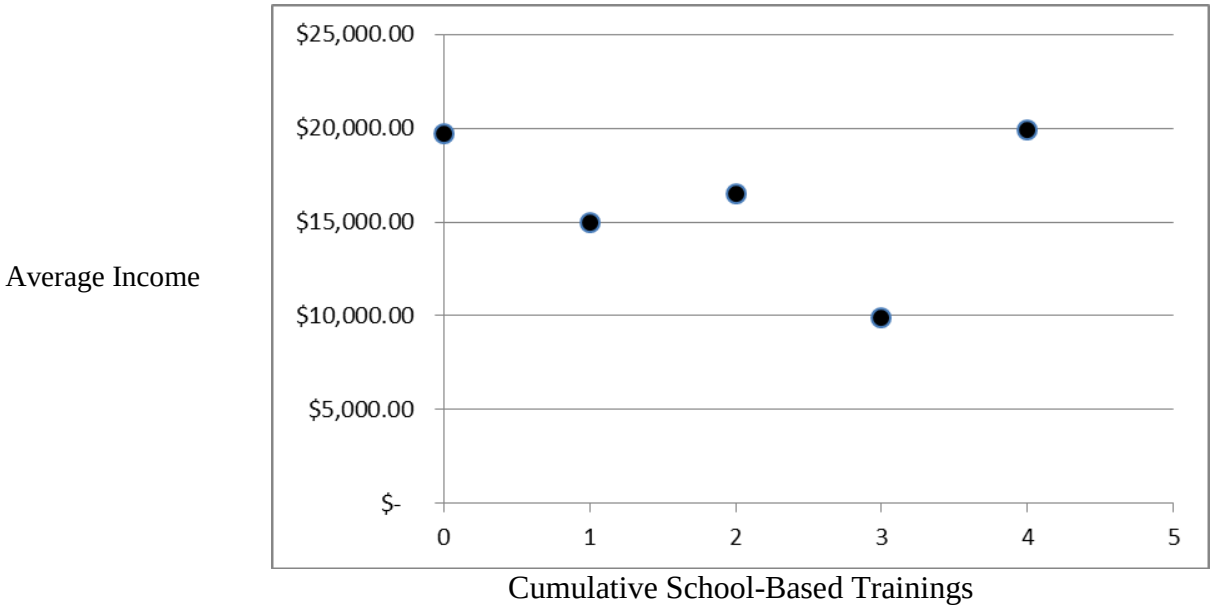

Figure 4.2. Average income by cumulative school-based trainings for formerly incarcerated individuals

Table 4.14

1997 – 2011 Annual Non-Cumulative Participation in Pre-Employment Training Programs

Year	No Pre-Employment Trainings	1 Pre-Employment Training	2 Pre-Employment Trainings	3 Pre-Employment Trainings	4 Pre-Employment Trainings
2000	109	6	1	0	0
2001	175	5	2	0	0
2002	232	19	3	0	0
2003	282	15	1	0	0
2004	325	11	0	0	0
2005	369	22	1	0	0
2006	413	19	0	0	0
2007	473	14	1	0	0
2008	492	22	4	0	1
2009	539	31	3	0	0
2010	571	30	1	0	0
2011	606	29	0	1	0
TOTAL	4,586	223	17	1	1

Table 4.15

2011 Cumulative Participation in Pre-Employment Training Programs

2011	Total Pre-Employment Trainings		Quality Pre-Employment Trainings		Prison Pre-Employment Trainings		Quality Prison Pre-Employment Trainings	
	#	%	#	%	#	%	#	%
0	416	59.43	505	72.14	666	95.14	682	97.43
1	154	22.00	148	21.14	30	4.29	18	2.57
2	78	11.14	34	4.86	4	0.57		
3	28	4.00	8	1.14				
4	9	1.29	2	0.29				
5	8	1.14	2	0.29				
6	2	0.29	1	0.14				
7	2	0.29						
8	3	0.43						
Total	700	100	700	100				

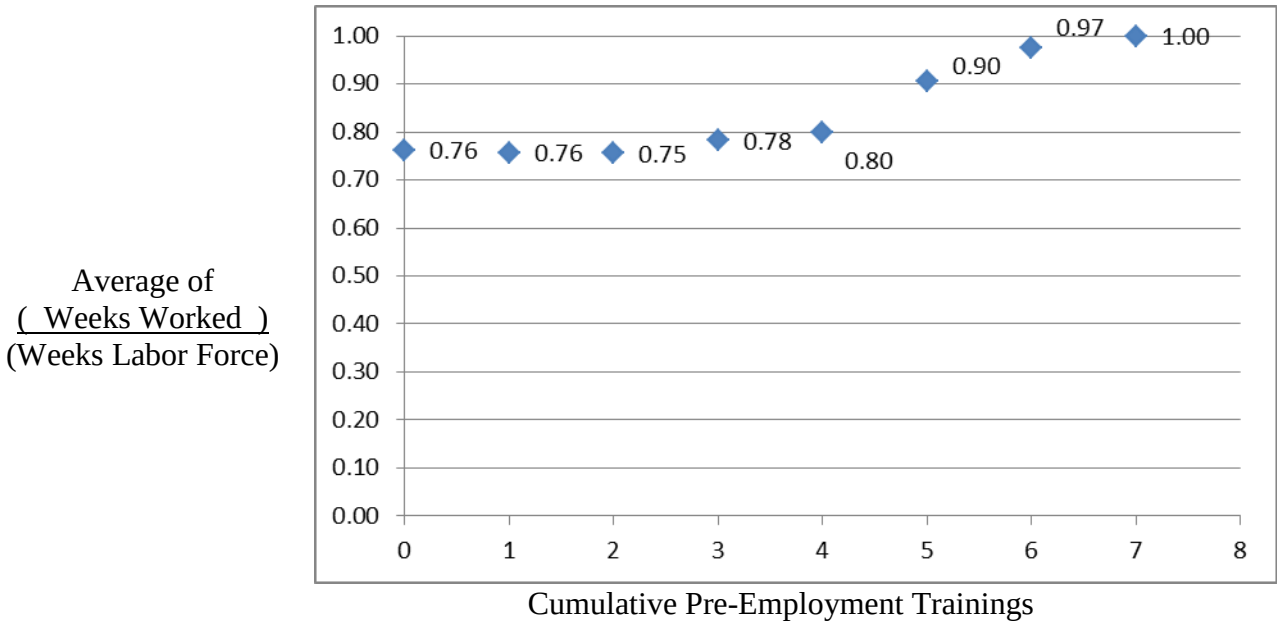

Figure 4.3. Average percentage of weeks worked by the cumulative pre-employment trainings for formerly incarcerated individuals

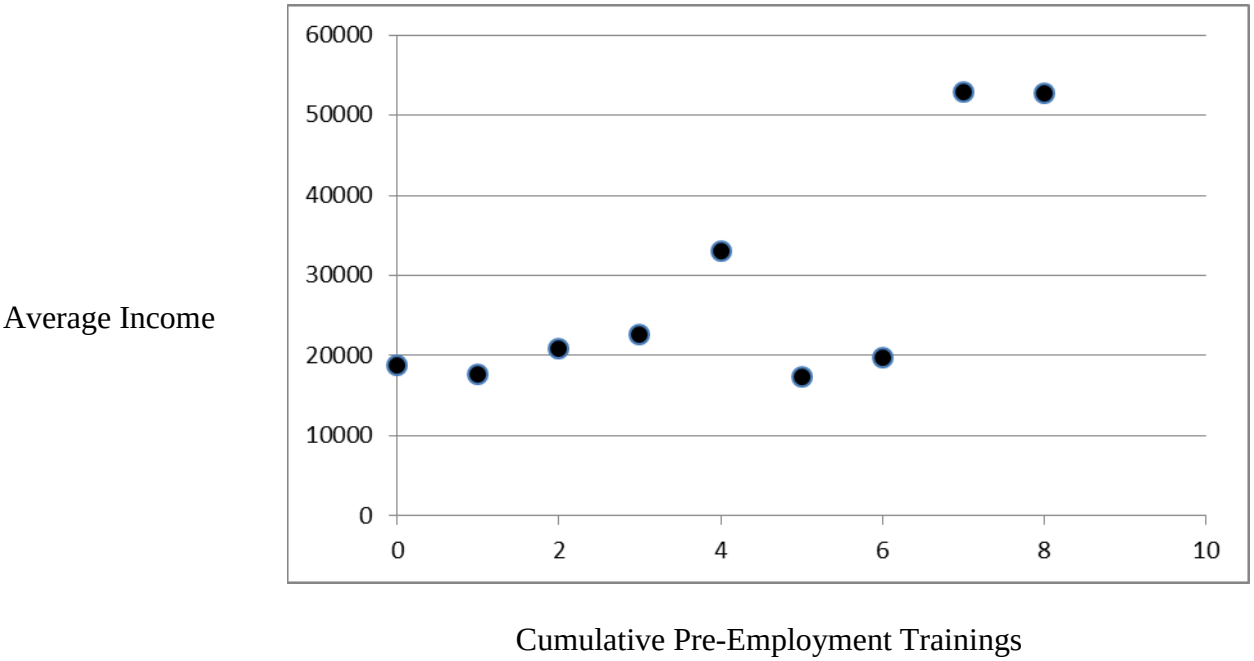

Figure 4.4. Average income by cumulative pre-employment trainings for formerly incarcerated individuals

Table 4.16

2000 – 2011 Annual Non-Cumulative Participation in Post-Employment Training Programs

Year	No Post-Employment Trainings	1 Post-Employment Training	2 Post-Employment Trainings	3 Post-Employment Trainings	4 Post-Employment Trainings
2000	113	3	0	0	0
2001	181	1	0	0	0
2002	251	3	0	0	0
2003	293	5	0	0	0
2004	328	8	0	0	0
2005	385	7	0	0	0
2006	419	13	0	0	0
2007	478	9	1	0	0
2008	507	10	2	0	0
2009	561	10	1	1	0
2010	582	19	0	1	0
2011	616	17	2	0	1
TOTAL	4,714	105	6	2	1

Table 4.17

2011 Cumulative Participation in Post-Employment Training Programs

2011	Total Post-Employment Trainings		Quality Post-Employment Trainings	
	#	%	#	%
0	556	79.43	604	86.29
1	105	15.00	74	10.57
2	23	3.29	16	2.29
3	10	1.43	5	0.71
4	4	0.57	1	0.14
5	1	0.14		
6	1	0.14		
Total	700	100	700	100

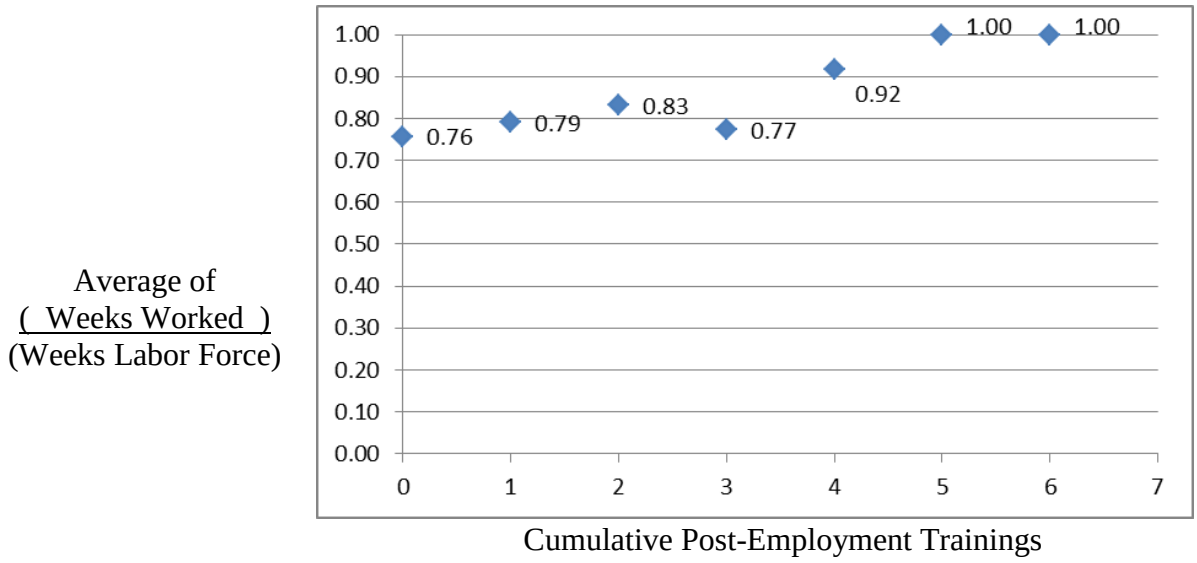

Figure 4.5. Average percentage of weeks worked by the cumulative post-employment trainings for formerly incarcerated individuals

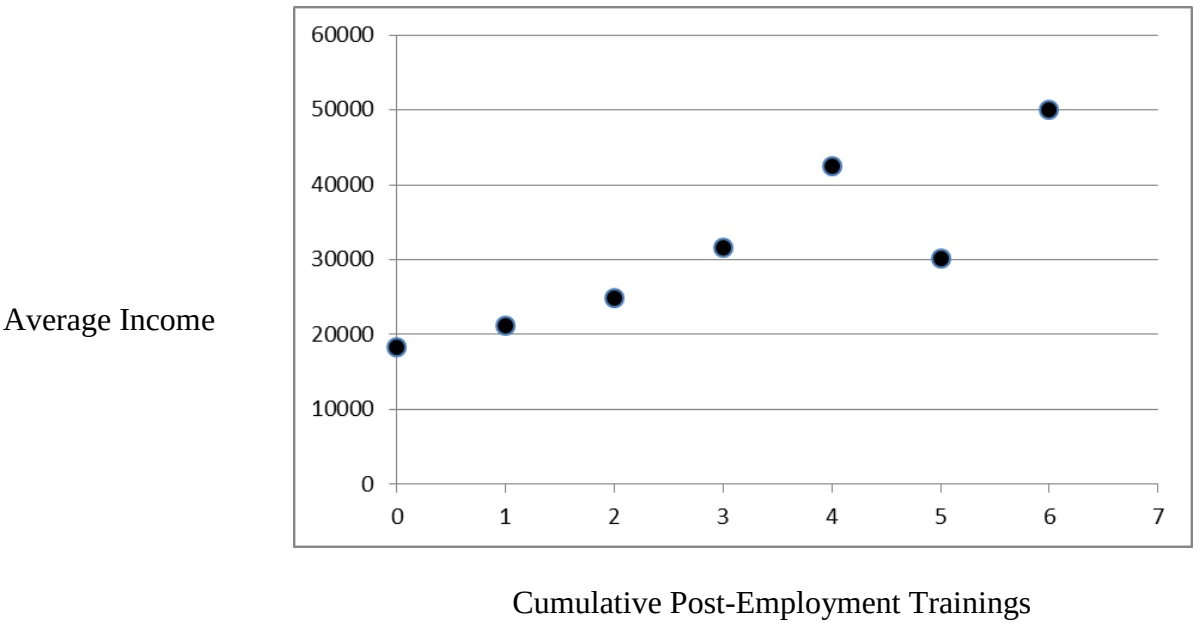

Figure 4.6. Average income by cumulative post-employment trainings for formerly incarcerated individuals

CHAPTER 5: CONCLUSION

Chapter 5 is divided into four distinct parts. The first part provides a summary of the results from chapter 4. The second part discusses the overall results in relation to current research. The third part presents the policy implications that emerged from this study to help formerly incarcerated individuals in their quest for gainful employment. Finally, the fourth part outlines future research opportunities pertaining to training and employment.

Summary of Results

Based on the findings from the generalized linear mixed models (GLMMs), six results were identified from this study.

- The return on investment in the form of income was higher for job-specific human capital than general human capital.
- A workforce development system approach was needed to ensure all training is included in the analysis.
- The relationship between age and gainful employment was unique to each individual.
- School-based training programs were not related to gainful employment.
- Pre-employment training programs were not related to gainful employment.
- Post-employment training programs were related to gainful employment.

Discussion

Taken together, the results from this study as well as results from past studies provide six insights. First, job-specific training program completion is an important part of re-entry for formerly incarcerated individuals. Organizations consider job-specific skills both unique and valuable. Individuals who possess job-specific skills help organizations achieve a competitive advantage in the marketplace. By its very nature, training programs for job-specific skills are

considered investments by an organization. As an organization invests in an individual, he or she can expect an increase in both the amount of work and income (i.e. gainful employment). The results of this study demonstrate this expectation. As hypothesized, an investment in general human capital in the form of school-based training did not improve gainful employment. The investment in both general and job-specific human capital found in pre-employment training programs resulted in an improvement in gainful employment but the relationship was not statistically significant. Most important, an investment in the job-specific human capital found in post-employment training programs was positively related to gainful employment.

Second, investment in education and training programs is not enough to secure gainful employment for this population. Based on human capital theory alone, there were some unexpected results. The negative selection found between school-based education and employment has been a common result in past studies, but the choice of GLMM should have addressed selection bias. The non-significant relationship between pre-employment training and gainful employment does not support human capital theory. Finally, the results based on the subset of quality training programs were similar to the results for all training programs regardless of quality. Compared to all post-employment training, the subset of quality post-employment program completers had higher incomes, but the likelihood of employment was lower. Perhaps human capital theory is an ideal rather than a fundamental truth. Can human capital theory exist in the presence of stigmatization? Is human capital theory true for populations who do not possess the social or communication skills to convey their newly acquired knowledge?

The results also demonstrate signaling theory with negative selection present in school-based training programs and positive selection found in post-employment training programs. As pre-employment training programs have aspects of both school-based and post-employment

training programs, the insignificant relationship between pre-employment training programs and gainful employment could be the net effect of negative and positive selection.

Third, a workforce development model is needed to address the needs of formerly incarcerated individuals. Just as fiscal policy is used to address imperfections in the economy, workforce development needs to be adopted to ensure education and training programs result in gainful employment for formerly incarcerated individuals. Studies on long-term unemployed individuals advocate for programs that can be tailored to the unique needs of the individual. Formerly incarcerated individuals are simply a subset of the long-term unemployed population. The hub and spoke model for workforce development uses a formal organization to administer training program and then links individuals to services provided by other agencies. This type of workforce development is needed to ensure formerly incarcerated individuals receive all the necessary services for successful re-entry into the workforce. Education and training programs are only effective if barriers to employment are address—such as transportation, access to health services, childcare, and housing. Each formerly incarcerated individual has unique barriers that need to be eliminated for human capital theory to be realized.

The system approach of workforce development also ensures that all aspects of the system are taken into consideration. In this study, the inclusion of all training programs regardless of location is warranted. From the NLSY97, survey participants reported only 11% of training occurred during incarceration. As the responsibility for training programs are increasingly shifted to communities, adopting workforce development systems are essential to ensure all aspects of training and education are represented in the statistical analysis.

Fourth, the inclusion of age as a random effect improves the statistical model. Unlike previous studies, the statistical technique chosen for this study was GLMM. During the analysis, several variables in each model were evaluated for random effects. Ultimately, the variable of age produced the highest likelihood ratio value. This finding is consistent with recommended statistical models for longitudinal datasets found in statistical textbooks. The rate of change over time is seldom the same for everyone. In this case, age is an indirect measurement of maturity. Since the rate of maturity can vary between individuals, the coefficients for age demonstrate different slopes for different folks.

The second hypothesis proposed that pre-employment training is positively related to gainful employment. Although this type of training is comprised of both general and job-specific human capital, the portion of job-specific human capital was expected to be positively related to both employment and income. When random effects are absent from the models, a strong positive relationship is found between pre-employment training and employment. Even so, the conclusion that a positive relationship exists between pre-employment training and employment would be erroneous. The standard errors and p-values calculated from the model lacking random effects are based on the assumption that the observations are independent. Since the data consist of repeated observations of the same individuals over time, the assumption of independence is violated. Once random effects were included in the model, the relationship between pre-employment training and employment became statistically insignificant.

Fifth, selection bias cannot be ruled out as a possible, or even a probable, explanation for this study's results. The first hypothesis of this study asserted that school-based training is not related to employment. The results from model 1.1 supported this hypothesis and found the coefficient of school-based training to be insignificant. Both the models for quality school-based

training (model 1.2) and prison school-based training (model 1.3) demonstrated negative selectivity.

Selection bias can be problematic in education research. A randomized controlled experiment eliminates selection bias, but withholding a training program for the sake of research is unethical. In the absence of random assignment, regression discontinuity or propensity score matching statistical techniques can minimize selection bias. Regression discontinuity requires a strict cut-off point based on a specific measurement (such as test scores). Training programs typically operate independently with varying levels of resources, expertise, and support. Resource availability largely determines the participants served by an education and training program. Alternatively, propensity score matching requires knowledge of individual aspects to determine if the similarities of two individuals are adequate. With the complexity of substance abuse and mental health problems prevalent in this particular population, matching training participants to non-participants may not be possible.

The final hypothesis proposed that a positive relationship exists between post-employment training and gainful employment. The results from the random effects models supported this hypothesis. Post-employment training was positively related to employment with an alpha of 0.01. The odds of future employment increased by 36% for formerly incarcerated individuals who participated in a post-employment training program of average duration. As with school-based training, selection bias cannot be ruled out. Job-specific skill training is an investment by an organization with an expectation of return on investment. The selection of an employee for a training program is an indication that the organization expects a future return from an individual's newfound knowledge and skills. The return can only be realized if the individual is retained as an employee. Essentially, the selection of an employee for training is

also a selection of that employee for future employment. The negative and positive selections demonstrated in this study add a new dimension to Bushway and Apel's proposition on signaling theory. Based on the training categories, the positive correlation was present between post-employment training and employment but minimal or non-existent with the other two types of training. If the positive correlation is an indication of a signaling effect, then the type of training largely determines the presence of the positive signal.

Sixth, completion of a post-employment training program can offset the decrease in income experienced by formerly incarcerated individuals due to the stigmatization of incarceration. Post-employment training was found to be positively related to income. Income increased approximately 15% for post-employment training completers and 20% for quality post-employment training completers. For formerly incarcerated individuals, post-employment training programs can offset the negative impact of incarceration on employment. As reported by Western (2007), studies have found that incarceration reduces income between 11 and 28%. If a formerly incarcerated individual completes a post-employment training program, then the reduction in income due to the stigmatization of incarceration could be largely offset or eliminated.

Implications for Public Policy

Four implications for public policy emerge from the results of the study. First, the results from this study demonstrated the need for planning and prioritization of training programs for formerly incarcerated individuals. Second, a comprehensive workforce development system is needed for formerly incarcerated individuals. Third, the quality and quantity of training and education data on formerly incarcerated individuals need to be improved. Finally, performance improvement engineering is the ideal management structure for formerly incarcerated individuals.

Proper planning and prioritization of training programs are needed for formerly incarcerated individuals. This study used existing training program participation to explain the relationship between the type of training program and gainful employment. The training programs listed in the NLSY97 left the intent of the program open to interpretation. The type of training program was easier to identify for some training programs compared to others. In addition, the categorization of the type of training program occasionally depended on the population of interest. Instead of categorizing existing training programs, training programs for formerly incarcerated individuals should be intentionally designed based on the job-specific skills desired by employers.

The results from this study provide insight on *how* education impacts gainful employment for formerly incarcerated individuals through training programs intended to improve employability. Given adequate basic education, this study finds that not all types of training programs result in gainful employment. Specifically, training programs designed to provide job-specific skills are positively related to gainful employment. Formerly incarcerated individuals who participate in post-employment training programs tend to work more weeks per year and have a higher income than their counterparts. Further, the findings suggest that trainers designing programs intended to enhance employability should focus on job-specific content. Finally, policymakers can use these findings to support policies and programs that provide incentives to employers who provide job-specific training to formerly incarcerated individuals.

A comprehensive workforce development system is needed for formerly incarcerated individuals. Previous prison employment studies have taken a myopic approach to education and training. Workforce development research has shown that collaboration among government agencies, schools, employers, associations, and the community is the key to a

successful workforce development initiative. In re-entry studies, the most promising programs used a multi-faceted approach that combined services—such as job placement, substance abuse, mental health, job training, remedial education, and housing assistance. These services, as well as the organizations that provide them, are complementary. Although there have been temporary programs that have included some attributes of workforce development, the creation of a comprehensive workforce development system for formerly incarcerated individuals is greatly needed.

System theory is one of the foundational theories of HRD. As such, it provides a comprehensive framework for workforce development efforts. A system consists of unique parts (or elements) that interact and inter-relate with each other within a given environment. The system, in its entirety, functions as a whole. It is made up of inputs, processes, and outputs as well as feedback or feedforward. With the HRD systemic approach, the end goals are specified first followed by the means to achieve those goals. Mapping out each component of the system ensures the inclusion of all critical variables in the system (Jacobs, 2014). The ultimate goal of a workforce development system is to improve the employability of formerly incarcerated individuals through program participation. The output of a workforce development system consists of the knowledge, skills, and attributes associated with employability. Based on academic research and practitioner surveys, these components include career identity, social capital, human capital, and adaptability of personal traits.

The inputs of the system are comprised of static and dynamic characteristics of formerly incarcerated individuals. Static characteristics represent individual attributes that cannot be changed, such as race. In contrast, dynamic characteristics are personal attributes that can be altered and are often targeted in rehabilitation programs. Finally, the process consists of

programs designed to enhance employability. A review of the literature revealed employability could be achieved through programs that emphasize learning and skill development while simultaneously eliminating employment barriers. A comprehensive workforce development system assists with the identification and coordination of essential programs designed to improve gainful employment.

Data collection efforts need to be improved for education and training programs completed by formerly incarcerated individuals. As other authors have noted (Davis et al., 2013; MacKenzie, 2006; Wilson, Gallagher, & MacKenzie, 2000), the quality of prison education data is poor. The root of the problem is not necessarily inadequate or inconsistent data entry, but rather the inherent design and configuration of the prison information system. The information system found in prison settings is designed for prison administration. The training and education records of formerly incarcerated individuals are fragmented across prison systems, school systems, and community-based agencies. Although the information systems of community colleges and public school systems are designed for education administration, these systems only contain the student records generated or accepted as transfer credit by that particular institution. Comprehensive education and training data can only be achieved through a collaborative effort by all training and education providers.

Since 2005, the U.S. Department of Education has provided $265 million to states to develop statewide longitudinal databases. The databases are intended to link preschool, K-12, postsecondary education, and workforce datasets (U.S Department of Education, 2009). Expanding the longitudinal database to incorporate education and training information from prison systems and community programs would provide the comprehensive longitudinal database needed to improve the quality of data for this particular population.

Forty-one state longitudinal data systems are newly completed or close to completion. The state agencies that administer the state longitudinal data system have been instrumental in improving and facilitating training and education data collection efforts. They are uniquely situated to shape the depth and breadth of future education and training research for decades to come to the extent of their collaboration efforts. This collaborative effort should be extended to data from state prison systems and communities. As community-based training and education programs are predominantly publicly funded, internal data collection should already be a part of evidence-based practices. The statewide longitudinal data system administrators possess the needed expertise and networks to address the data quality problems that are pervasive in prison research.

In addition to improving the quality of data, data analytics are needed to aid policy formation. Goals and benchmarks are useful in monitoring the success of training and education programs. Given limited resources, data analytics can help establish priorities and influence decisions.

Performance improvement engineering principles should be used to manage formerly incarcerated employees. This study was not intended to highlight the importance of HRD in addressing mass incarceration, nor was it the expected outcome. Given the findings, the field of HRD can be an integral part of helping employers address organizational skill gaps and assisting formerly incarcerated individuals with successful re-entry into the workforce.

One of the most influential performance improvement models in HRD is Gilbert's (2007) human competency model. Performance engineering entails the transformation of human potential into human capital through worthy performance. Worthy performance is achieved through increasing accomplishments, decreasing costly behavior, or a combination of the two

approaches. Under this model, rewards are based on the net worth of an individual's performance. The human competency model views competency as external to an individual. That is, competency is an effect that an individual can have in the world if he or she chooses to learn from an exemplary performer. A good manager communicates expectations, provides adequate guidance, supplies appropriate tools, rewards generously, and delivers useful training. The reward structure of the human competency model fosters aspirations and instills self-efficacy through worthy performance. When worthy performance is achieved, the financial rewards are received by both the employer and the exemplary performer. This type of management style is an ideal employment structure for formerly incarcerated individuals. Formerly incarcerated individuals would receive the training, guidance, tools, and support needed to achieve worthy performance—and ultimately gainful employment.

Future Research

Although all types of education and training can reduce recidivism, this study suggests that training programs designed to enhance job-specific skills are strongly related to gainful employment. Other studies are needed to substantiate this finding using different data sources and statistical techniques. With the improvements in the quantity and quality of data in conjunction with the statewide longitudinal data systems, new possibilities to use different statistical techniques, models, and data analyses will follow.

The low inter-rater reliability in categorizing the training programs into different types of training programs is problematic. Low inter-rater reliability may increase the probability of type-II errors. In other words, the lack of agreement between raters could prevent the ability to detect a relationship that actually exists (Hallgren, 2012). The fair level of agreement is most likely due to the selection of the raters. The graduate students assisting in the categorization of education

and training programs were predominantly international HRD students from several different countries. Their knowledge of types of training offered in the United States specifically to formerly incarcerated individuals was limited. Preferably, the rating should have been performed by formerly incarcerated individuals. In reality, only formerly incarcerated individuals know which training programs are offered to them and can categorize those training programs into types.

The relationship of age with employment and training is an important consideration in policy formation. Federal funding for prison education tends to be aimed at youth. The rationale is that an investment in youth will result in a greater number of years to collect on the return on investment. An alternative viewpoint is found in the research on turning points (Uggen, 2000). Turning points are behavioral changes triggered by an event or intervention over a life course. Uggen found that work served as a turning point (i.e., desistance of criminal activity) for formerly incarcerated individuals but only for individuals 27 years old and over. The research questions on turning points can also be applied to education and training programs. Does participation in education and training programs produce turning points? Is the relationship among participation in different types of training programs and gainful employment for formerly incarcerated individuals different for participants under the age of 27?

Comparing the results from this study with other populations or sub-populations is also beneficial. How do these results compare to results from the general population, female versus male formerly incarcerated individuals, veterans, or individuals with special needs?

Finally, recidivism should not be the only measurement of success for formerly incarcerated individuals. As with any individual, the ability to stay out of prison is not an indicator of success in any aspect of life. There is a need to think more creatively about

identifying true measurements of success and subsequently design programs specifically with objectives based on those measurements. Categorizing re-entry programs with the primary intent of the program would provide further insight on *how* a re-entry program influences recidivism.

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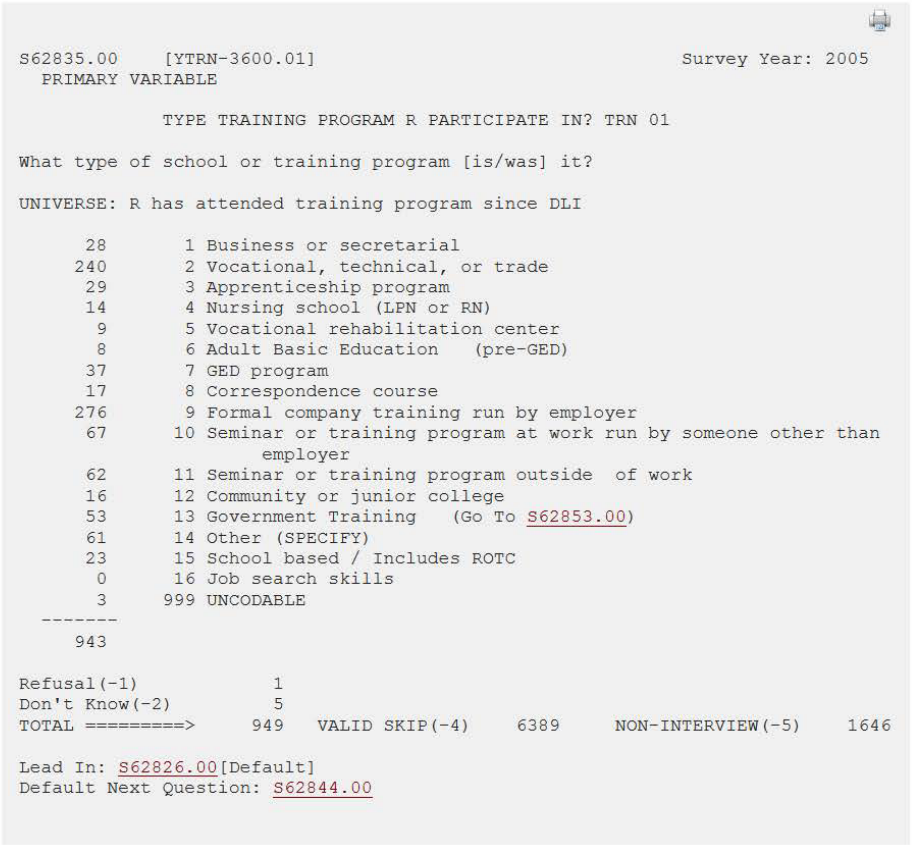
APPENDIX A: INTER-RATER RELIABILITY INSTRUMENT

Inter-rater Reliability

The National Youth Longitudinal Survey 1997 (NYLS97) collects training information in addition to education. While formal academic education is captured through highest grade and degree attainment, training is defined as programs lasting over 2 weeks that, may or may not, count towards a license or credential. If a survey participant indicates they have attended training during the survey year, then he or she selects from a list of training programs. Below is question YTRN-3600 with the training program options.



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S62835.00    [YTRN-3600.01]                                  Survey Year: 2005
  PRIMARY VARIABLE

            TYPE TRAINING PROGRAM R PARTICIPATE IN? TRN 01

What type of school or training program [is/was] it?

UNIVERSE: R has attended training program since DLI

      28       1 Business or secretarial
     240       2 Vocational, technical, or trade
      29       3 Apprenticeship program
      14       4 Nursing school (LPN or RN)
       9       5 Vocational rehabilitation center
       8       6 Adult Basic Education   (pre-GED)
      37       7 GED program
      17       8 Correspondence course
     276       9 Formal company training run by employer
      67      10 Seminar or training program at work run by someone other than
                   employer
      62      11 Seminar or training program outside  of work
      16      12 Community or junior college
      53      13 Government Training   (Go To S62853.00)
      61      14 Other (SPECIFY)
      23      15 School based / Includes ROTC
       0      16 Job search skills
       3     999 UNCODABLE
  -------
     943

Refusal(-1)            1
Don't Know(-2)         5
TOTAL ==========>     949   VALID SKIP(-4)    6389     NON-INTERVIEW(-5)    1646

Lead In: S62826.00[Default]
Default Next Question: S62844.00
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As part of my dissertation study, I categorize the training programs into three mutually exclusive types of training categories. The operational definitions are as follows:

School-based training programs are designed to address academic deficits. This type of training provides general education only that becomes part of the learner. General education can be applied to any type of work at any place of employment. An example of school-based training is a remedial math class.

Post-employment training programs provide job-specific knowledge for employed individuals. Typically, this type of training is less transferable to other employers. An example of post-employment training is SCT Banner training for building a course within the university information system. This course could be taught either on-campus or off-campus. The trainer could be a university employee, the SCT vendor, or a third-party.

Pre-employment training programs are intended for individuals who are unemployed, entering the labor force, or employed in a temporary capacity. The goal of the program is to improve employability in order to achieve stable and permanent employment. The training program can contain both general education transferable to any employer or job-specific knowledge found within a particular vocation. An example of pre-employment training is the Workforce Investment Act that established a system of state and local entities to provide skills to participants for the specific purpose of increasing employment and earnings.

Based on the operational definitions provided above, please select a single best training category for each training program.

NYLS 97 Responses	**Training Categories**		
Training Program	***School-based*** (General education only)	***Pre-employment*** (Combination of general education and job-specific knowledge)	***Post-employment*** (Job-specific knowledge)
1 Business or secretarial			
2 Vocational, technical, or trade			
3 Apprenticeship program			
4 Nursing school (LPN or RN) or CAN training			
5 Vocational rehabilitation center			
6 Adult Basic Education (pre-GED)			
7 GED program			
8 Online or correspondence course			
9 Formal company training run by employer			
10 Seminar or training program at work run by someone other than employer			
11 Seminar or training outside of work			
12 Community or junior college			
13 Government training			
15 School based / Includes ROTC			
16 Job search or job placement training			

APPENDIX B: TOTAL TRAINING COUNTS

Total Training Counts				
Code	**Program**	**Count**	**% of Total Training**	**% of Training Type**
School-Based Training				
4	Nursing	10	1.00%	3.80%
6	ABE	32	3.20%	12.30%
7	GED	171	17.30%	65.80%
8	Online / Correspondence	18	1.80%	6.90%
12	Community College	10	1.00%	3.80%
15	Schoolbased	19	1.90%	7.30%
Total School-Based Training		260	26%	100%
Pre-Employment Training				
2	Vocational	340	34.40%	65.40%
3	Apprenticeship	48	4.90%	9.20%
5	VRC	15	1.50%	2.90%
13	Gov	89	9.00%	17.10%
16	JobTraining	28	2.80%	5.40%
Total Pre-Employer Training		520	53%	100%
Post-Employer Training				
1	Business	27	2.70%	13.00%
9	Employer	136	13.80%	65.40%
10	Work Seminar	13	1.30%	6.30%
11	Seminar	32	3.20%	15.40%
Total Post-Employer Training		208	21%	100%
Grand Total		988	100%	

APPENDIX C: IRB APPROVAL

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Vice Chancellor for Research

Office for the Protection of Research Subjects
528 East Green Street
Suite 203
Champaign, IL 61820

January 11, 2016

Ronald Jacobs
College of Education
1310 S. 6th St.
Champaign, IL 61820

RE: *The Moderating Role of Health: An Explanation of Education's Impact on Employment for Formerly Incarcerated Individuals*
IRB Protocol Number: 16376

Dear Dr. Jacobs:

Thank you for submitting the completed IRB application form for your project entitled *The Moderating Role of Health: An Explanation of Education's Impact on Employment for Formerly Incarcerated Individuals*. Your project was assigned Institutional Review Board (IRB) Protocol Number 16376 and reviewed. It has been determined that the research activities described in this application meet the criteria for exemption at 45CFR46.101(b)(4).

This determination of exemption only applies to the research study as submitted. Please note that additional modifications to your project need to be submitted to the IRB for review and exemption determination or approval before the modifications are initiated.

Exempt protocols will be closed and archived five years from the date of approval. Researchers will be required to contact our office if the study will continue beyond five years. If an amendment is submitted once the study has been archived, researchers will need to submit a new application and obtain approval prior to implementing the change.

We appreciate your conscientious adherence to the requirements of human subjects research. If you have any questions about the IRB process, or if you need assistance at any time, please feel free to contact me at OPRS, or visit our website at http://oprs.research.illinois.edu

Sincerely,

Dustin L. Yocum, MA, CIP
Human Subjects Research Specialist, Office for the Protection of Research Subjects

c: Candace Flatt