The Effects of Prison Education on Employment of the Formerly Incarcerated: A Meta-Analysis of Correctional Education Programs in the United States

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A Thesis Submitted in Partial Fulfilment of the Requirements for the Degree

Master of Public Administration
Economics and Governance

at

The Faculty of Governance and Global Affairs
Leiden University

October 7, 2020

Advisor: Dr. A. Poama
Second Reader:

Abstract

The average incarceration rate in the United States has increased substantially in recent decades; this necessitates research on the social and economic implications of related policy decisions. Observed effects for the growing population of formerly incarcerated individuals are significant toward understanding how incarceration impacts society. Interventions designed to improve reintegration are pertinent to this analysis for their effects on post-release employment outcomes among the formerly incarcerated. A meta-analysis was conducted to estimate the pooled intervention effect of participation in correctional education programs. This level of analysis is justified by previous meta-analyses in the field, and reliability was ensured through definition of robust inclusion criteria. Value is added to existing research through inclusion of updated studies and new estimation techniques to limit bias. Findings for post-release employment outcomes support a significant, positive effect from participation in correctional education. Program type comparisons of academic and vocational programming support signaling theory. Vocational programs were expected to have higher job relevance, contributing to greater employment effects. Results observe the expected outcome, but the difference in magnitude has limited statistical significance. Additional studies could bolster future meta-analysis results. Corrections for publication bias, performed in the current analysis, support validity for the estimated direction of effect.

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Introduction

The United States has a higher rate of incarceration per capita than any other modern, developed nation. The most recent census of correctional facilities, conducted in 2017, reported that approximately 1.5 million individuals were incarcerated in the United States (Bronson & Carson, 2019). Incarceration refers to the practice of housing individuals in correctional facilities operated under government jurisdiction. Local jails, operated at the municipal level, house inmates sentenced to less than one year of confinement. These individuals have committed lower-level offenses, violated probation or parole, or await final sentencing. Federal and state-level prisons are correctional facilities housing individuals given more than a one-year sentence; inmates were likely convicted of a felony offense (Dumont et al. 2012). Felony convictions carry greater weight and consequences than lower-level misdemeanour offenses. This distinction for felony status is further relevant to an individual's criminal record and their long-term outcomes (Shannon et al, 2017). As such, there can be notable differences in experience for individuals based on their placement in jail or prison.

Over the last four decades, the national rate of incarceration increased by approximately 220% (Council of Economic Advisors, 2016). Acceleration can be at least partly attributed to the enactment of federal and state policies that implemented harsher sentencing laws (Ofer, 2019). This trend has significant implications not only for the current incarcerated population but also the growing population of formerly incarcerated individuals. Most incarcerated individuals will return to society at some point, and their successful transition upon release is a major area of political and economic importance. During 2017 alone, approximately 625,000 individuals were released from incarceration in the United States (Bronson & Carson, 2019). Recidivism refers to the likelihood of a convicted criminal re-offending; for discussions of incarceration, recidivism typically refers to an individual re-entering a correctional facility (Hall, 2015). The criminal justice system is designed to reduce the occurrence of crime, but recidivism is not the only indicator of re-entry success.

Progress in the societal reintegration of formerly incarcerated individuals can be understood through an analysis of relevant outcome measures. Employment is an important factor when transitioning back to participation in normal society, representing a potentially valid indicator. Active citizenship norms expect capable individuals to support themselves through gainful, legal employment. Moreover, probation and parole agreements for recently released individuals can stipulate employment conditions (Overview of Probation and Supervised Release Conditions, 2016). A correlation between employment and positive recidivism outcomes has also been observed, suggesting that post-release employment has significant influence on the general reintegration experiences of formerly incarcerated individuals (Skardhamar & Telle, 2012). Both recidivism and employment outcomes can be impacted by barriers to re-entry for the formerly incarcerated.

Collateral consequences refer to the formal and informal obstacles that an individual continues to face after the completion of their required punishment (U.S. Commission on Civil Rights, 2019). Previous research, as will be discussed in the literature review, has provided understanding of how these impediments manifest for the formerly incarcerated. In an attempt to overcome these barriers and assist formerly incarcerated individuals' transition upon release, supportive policies are needed. Reintegration measures are policy mechanisms implemented at the federal, state, or local level to facilitate an individual's return to active participation in society (Visher, 2015). These policy decisions have the potential for significant impact on collateral consequences and determinants of successful re-entry. Correctional education programs are one type of reintegration measure implemented during incarceration that provide resources and educational development to offenders. Comprising academic and vocational programming, correctional education focuses on skill development (Klein et al. 2004). The accumulation of skills during incarceration represents a potential influence on employment after release. As such, participation in educative programming during incarceration could be a potential means toward improving reintegration outcomes.

The remaining sections of this paper will proceed as follows: After definition of the research question, academic and practical relevance will be addressed. The theoretical framework and development of hypotheses will then be discussed as they influence research design. A literature review will briefly discuss incarceration policy in the United States, followed by an evaluation of evidence for the influence of collateral consequences. Correctional education program types will be differentiated and previous meta-analyses in the field discussed. Research Design will discuss the selection of an analysis method and research objectives. Operational decisions will be justified with considerations of reliability and validity; inclusion criteria are defined as they relate. The procedures for data collection and a description of included studies will follow. Intervention effects calculations are discussed in the analysis section, followed by an interpretation of the meta-analysis results. Program type comparisons are evaluated for their implications on Signaling theory. Method limitation are discussed, but publication bias corrections support the validity of results. To conclude, the paper will discuss support for defined hypotheses, policy implications, and potential for further research.

Research Question

The present research is interested in examining the impact of correctional education programs on relevant reintegration outcomes. Post-release employment has been selected as the outcome measure for this analysis. Although recidivism has typically been the focus of correctional program evaluations, employment is a valuable measure for understanding the

potential causal mechanisms by which programming can impact recidivism. Correctional education programs focus on marketable skill development that can improve employment outcomes; this can support the observation of post-release employment as a causal outcome of program participation. Signaling theory provides further support for the association between program participation and improved post-release employment. Reductions in recidivism have been positively associated with employment, but the relationship is mediated by many factors (Tripodi et al. 2010). It is possible that intermediate outcomes related to educational programming, such as post-release employment, do not exert a significant effect on recidivism. However, this second-order effect on recidivism introduces other variables that could potentially bias estimations of intervention effect. Focusing on employment as the primary outcome measure of this analysis, the research question is:

How does participation in correctional education programs affect post-release employment among the formerly incarcerated?

Through a systematic review and meta-analysis, this paper will attempt to gain insights relevant to the presented research question. Prior program evaluations have estimated the intervention effect of correctional education programs on post-release employment, but s studies are limited in size and predictive validity. Findings of individual studies are restricted to the subpopulations featured in their analysis; a meta-analysis allows for an estimation of pooled intervention effect relevant to the entire target population. The population of interest for this meta-analysis is formerly incarcerated individuals in the United States. Existing studies have been identified as suitable for meta-analysis research, since the subpopulations and interventions are comparable. Inclusion criteria will be defined to ensure that selected studies satisfy requirements of reliability and validity. A meta-analysis also allows for program-type comparisons not supported at the level of individual studies. This perspective is relevant to researchers and policymakers, should post-release employment effects be dependent on the type of correctional education programming participated in.

Academic and Practical Relevance

This analysis seeks to support and expand upon previous findings in the correctional education field. Existing research regarding collateral consequences suggests that post-release employment outcomes can be depressed among the formerly incarcerated. This observation should necessitate investments in reintegration measures, including correctional education. Opposing perspectives have suggested that the presence of poor labor market outcomes prior to incarceration implies that there are existing barriers to employment beyond criminal history (Looney and Turner, 2018). Although demographic characteristics of incarcerated individuals are disproportionately represented by minorities and low-income

individuals, these pre-incarceration qualities alone are not sufficient to explain labor market outcomes upon release. Collateral consequences provide a perspective for understanding employment outcomes dependent on criminal history, which in turn allows for an analysis of means for improvement. While the occurrence of depressed employment among the formerly incarcerated is worthy of analysis, policymakers can obtain greater value from analyzing what interventions improve outcomes. This analysis accepts the position of previous research that incarceration has a negative effect on post-release employment (Geller et al. 2006). The current meta-analysis of correctional education programs will contribute to the field by providing an updated estimation of the pooled intervention effects and program-type comparisons.

An analysis of in-prison education programs considering outcomes other than recidivism is significant toward the study of economics and governance. Policies affecting the employment of ex-offenders have direct economic impacts; gainful employment among the formerly incarcerated reduces public subsidy expenditures and increases economic activity. Existing research supports the positive impact of correctional educational programs on post-release employment (Davis et al. 2013; Bozick, 2018). Research also supports a second order effect where positive employment can potentially reduce recidivism (Tripodi et al. 2010). Labor market outcomes are an indicator for program effectiveness that provide insight into the causal mechanisms impacting recidivism outcomes. Improved understanding of recidivism factors is economically significant also from a cost avoidance perspective. This meta-analysis will contribute to the field through an updated discussion of post-release employment outcomes and relevance to policy decisions. A program-type comparison of correctional education programs will provide insight on the effectiveness of programming to impact relevant outcomes. Societal gains from improved reintegration of formerly incarcerated individuals also support this direction of research.

Theoretical Framework

Motivation for this analysis and the creation of a relevant theoretical framework arises from a need to understand the nature and significance of impacts made by correctional education programs. Investments in correctional education are evaluated for success based on their perceived returns, similar to other government investments. However, the criteria for assessing these returns are unique to the United States' current system of incarceration. Reductions in recidivism and the associated cost avoidance savings are primary outcome measures discussed when analyzing returns from correctional program investments (Council of Economic Advisors, 2018). Post-release employment is also a recognized measure and highly pertinent to the current discussion, yet the number of program evaluations considering this outcome are far less than for recidivism.

Additional focus should be given to the multi-dimensional impacts of correctional education programs especially, given that they target marketable skill development rather than personal and life skills counseling. The link between correctional education programs and post-release employment outcomes thus could be more significant than with recidivism. The relationship between post-release employment and recidivism has itself been studied, with evidence supporting a positive association between the two (Uggen, 2000). Additional focus on employment outcomes could provide further evidence into how correctional education programs have relevant second-order impacts on recidivism. Understanding the overall impact of correctional education programs on post-release employment is important to policymakers, but program-specific findings can be more valuable for determining where to channel potential investments. Previous publications have compared program types when determining the return on investment for recidivism reducing programs (Council of Economic Advisors, 2018), suggesting a need to understand outcomes differentiated by program type. Post-release employment is also a relevant outcome to correctional education programs, which could potentially provide understanding through program type comparisons.

The category of correctional education presents an opportunity for further analysis based on the type of programming completed. Educational programs can be differentiated by subject, programming length, and difficulty (Duwe, 2017). Relevant program types can then be established based on similar characteristics. This analysis will compare academic and vocational programs, as the interventions differ in qualities relevant to post-release employment outcomes. Previous research provides evidence that intervention effects can be significantly different depending on the type of programming participated in (Sabol, 2007). Individual studies can lack the multiple treatment groups necessary to compare program types, supporting the selection of meta-analysis estimation. Insignificant results when considering education programs in aggregate could potentially be attributed to high returns on some programs and negative effects from others. Presuming all interventions have the intended positive effect, which is not expected, it would still be valuable to identify those programs presenting the strongest effect. As such, this meta-analysis will attempt to gain relevant insights through a program-type comparison.

The development of a research motivation thus led to the identification of qualities applicable to the theoretical framework for this analysis. A relevant theory should provide a means for explaining the contrasting post-release employment outcomes observed among individuals completing different types of correctional education programs. Several criminological theories could conceivably be relevant, but labeling theory and the related signaling perspective establish a direct causal link. The signaling perspective provides a mechanism for understanding the disparate impact of correctional education program types based on their perceived value to potential employers.

Theory Selection

Chiricos and colleagues (2007) discuss labeling theory as it relates to the formerly incarcerated, suggesting that labeling someone an ex-offender serves to further separate them from society upon release. One aspect of labeling theory considers the transformation of identity an individual could face as they try to navigate society with an assigned deviant label (Moore et al. 2016). Battling negative stereotypes and discrimination will prevent the individual from re-integrating into society as a law-abiding citizen; the perceived cleavage between an individual and society is one factor that influences illegal behavior (Gold & Richards, 2012). The internalization of stereotypes is a necessary area of focus for labeling theory research; however, it is not within the realm of this analysis.

Rather, the focus of this paper is on the structural impediments faced by individuals as they attempt to rejoin society, resulting in formal and informal barriers that influence re-entry and employment. Labeling theory is one perspective for analyzing the barriers that former prisoners encounter when trying to re-integrate, otherwise known as collateral consequences (Davies & Tanner, 2003). It is especially relevant in examining an economic manifestation of collateral consequences through desperate labor market outcomes. Individuals with a criminal label encounter systemic barriers when applying for gainful employment, such as exclusion or ineligibility due to criminal record. This results in decreased employment opportunities, especially in higher wage professions, among the formerly incarcerated. Stigmatization can also contribute to various informal exclusions, referring to social barriers and discriminatory actions of individuals or entities (James, 2015).

The perception of ex-offenders as lacking necessary job skills has been shown as one factor harming employment opportunities for the formerly incarcerated community (Williams, 2007). Potential employers equate time spent incarcerated with skill deprecation and expectations of poor performance. However, previous studies have not found a significant relationship between criminal status or incarceration length and decreased job performance (Kling, 2006; Minor et al. 2018). Evidence supports the influence of criminal labels in affecting reintegration outcomes. Labeling theory is relevant to understanding the causal mechanisms that contribute to depressed employment outcomes among the formerly incarcerated. However, that is not the primary focus of this analysis. The related signaling perspective is more applicable to an evaluation for correctional education programs; it can provide insight into how program participation can improve observed outcomes (Spence, 1973). This meta-analysis will develop and test hypothesis based on the signaling perspective, but implications relevant to labeling theory will also be discussed. Labeling and signaling are related concepts, such that signaling value cannot be understood without reference to the framework introduced by labeling theory.

Signaling perspective provides a way of understanding the causal mechanisms by which the voluntary completion of in-prison education programs can affect post-release

employment. This framework allows researchers to conceptualize how in-prison education programs impact the collateral consequences discussed in labeling theory (Bushway & Apel, 2012). The underlying situation that contributes to the need for signaling can be summarized in terms of imperfect information. Employers perceive that individuals released from prison are less prepared to enter the workplace, more likely to re-offend. All individuals with this label are treated with similar prejudice, resulting in employment discrimination in the absence of a signal (Spence, 1973). The formerly incarcerated have more information on their likelihood of individual outcomes than potential employers; individuals with the necessary conviction to remain legally employed and out of prison need a means identify themselves. These individuals require a desistence symbol to differentiate themselves from peers and signal their intentions. Educational programs have been proposed as one potential mechanism for distinguishing individual intentions and character (Tewksbury & Lees, 2006).

The available research supports a perspective that signals are needed in the formerly incarcerated community. Employers and other relevant decision makers often have biased perceptions of individuals with a criminal history, resulting in negative hiring decisions and other acts of discrimination (Pager, 2003). A “transformation of identity” could be outwardly perceived, in that a formerly incarcerated individual is often assumed to remain criminally involved or otherwise a liability. Individuals who complete a voluntary education program can perhaps signal to employers that they intend to focus on personal development and being a productive member of society. Completing a voluntary correctional program has been shown to differentiate the offender from other individuals with a criminal history (Latessa, 2012). The completion of in-prison education programs is a valid signal, as the accumulation of human capital relates individual characteristics. Opportunity costs of completion differ for individuals based on job-relevant factors; the costs of spent time and effort completing correctional programming are dependent on an individual’s skillset. The completion of an educational program in prison could potentially signal to employers that an individual’s human capital has not deteriorated while imprisoned. The completion of programming also relates information on an individual’s intentions upon release.

A potential limitation of signaling theory is that it provides a theoretical framework best for understanding initial employment decisions. Signaling value allows an individual to differentiate themselves while being compared with other candidates of similar characteristics (Bushway & Apel, 2012). This perspective has relevance to discussions of application and hiring procedures, but limited implications for long term employment decisions such as promotion or wage increases. It is assumed that after an initial positive hiring decision, impressions are no longer impacted by the signal so much as the performance attributes of the individual (Bushway & Apel, 2012). Signaling value is perceived as an indication of individual characteristics that influence performance, suggesting there could be an association between initial signaling and later occupational advancement.

Individuals that participate in correctional education programs could exhibit characteristics relevant to positive employment outcomes in the long-term.

Development of Hypotheses

Signaling perspective approaches the value of educational programming from a similar ideology as labeling theory but incorporates additional considerations. Employer perceptions related to a criminal label are suggested as influencing employment outcomes. It is not just the quantity of skills developed through an education program that influence outcomes, but opinions of those skills held by relevant decision makers. Although programs requiring more effort can have strong signaling value, the signaling value is also obtained through the completion of the programming with high job relevance. While a post-secondary degree could hold more significance for certain positions, vocational training could provide a stronger signaling value to employers in other sectors. Many formerly incarcerated individuals are employed in positions not requiring a college degree but occupational skills, such as manufacturing and construction. An analysis of education program-types should also consider the relevant level and quality of employment associated with these program types.

Hypothesis 1: Voluntary participation in correctional education programs will have a positive effect on post-release employment among the formerly incarcerated.

Hypothesis 2: Correctional education programs classified as vocational will have a stronger, positive effect on employment outcomes than academic programs.

Within this meta-analysis, program types will be evaluated as they relate to academic or vocational skill development. This should allow for adequate differentiation between program types relevant to signaling theory; vocational training is expected to have a stronger average signaling value than academic programs. An analysis at more specific program levels could potentially be suitable for future development, but the current number of studies would lose significance at that level of division. Additional studies of high scientific value are needed in the field of correctional education to further analysis; however, the current research does allow for differentiation at a level significant to policymakers. A meta-analysis will be the best tool for gaining insight related to the listed hypotheses, as it allows for comparisons from multiple observations relevant to the target population. This pooled calculation could potentially provide insight not available on the scale of individual studies.

Considerations for Research Design

Allowing for program-type comparisons is relevant to discussions of signaling in criminology. Voluntary participation in an education program while incarcerated has value in that it signals to potential employers, and other relevant decision makers, that an individual

intends to rejoin society (Bushway & Apel, 2012). Academic and vocational programs differ in considerations of rigor and relevance to potential employment, creating conditions that would support assumptions of varying signaling value. Academic programs can feature greater requirements of time and effort, especially post-secondary degrees, but occupational relevance is not always direct. Vocational programs are considered highly relevant to future occupational experiences, which could potentially result in higher signaling value and a greater intervention effect. Greater insights could be reached from further differentiation by program type, but the present body of scholarly work restricts the level of analysis. When considering academic programs in aggregate against vocational programs, it is anticipated that vocational programs will hold greater signaling value.

The primary suggestion of a signaling perspective is that individuals who complete a voluntary program will have different outcomes than those that do not participate or do not finish the program (Latessa, 2012). Unfortunately, most studies do not present results separate for program completers and failed or partial participants. Results are typically presented only for program completers or at aggregate for all who participated in the program; not allowing for a comparison of program participation and completion. Thus, analysis is restricted to the difference in outcomes for those who are involved in the program versus those who have no involvement. This perspective could be considered "intent-to-treat", where in anyone who participated in treatment is evaluated regardless of whether the intervention was completed.

Literature Review

A systematic review was completed to evaluate the available literature relevant to the research question of interest. A brief discussion of incarceration policy in the United States will identify policies that have contributed to current conditions. Collateral consequences from incarceration are discussed as they impact the return of formerly incarcerated individuals to society. This is a necessary framework for understanding the systemic and social constraints impacting post-release outcomes. A specific focus is given to the outcome of post-release employment to establish its relevance for analysis. Reintegration measures are introduced as a means to counteract the negative effects of collateral consequences and ease the transition after release. This analysis will focus on one category of reintegration measures, correctional education programs, discussing in more detail the consensus of existing research. Standard efficacy measures are discussed as they related to the current analysis. Correctional education program types will be further differentiated with regard to potential signaling value. Previous evidence supporting the observation of post-release employment outcomes will be discussed.

Incarceration Policy in the United States

The rate of incarceration observed in the United States has not increased without cause. While academics debate the many contributing factors, federal and state level policy decisions can be viewed as at least partially responsible. The full extent and influence of relevant policies is outside the scope of this analysis; however, it is necessary to address conditions motivating the present research. Certain policies contribute to the current discussion by exerting direct influence on former prisoner experiences and the evaluation of correctional education program efficacy. Other trends in policy making, such as decisions to decrease correctional funding, have further impacted relevant research considerations. Policy implications will be identified only as they influence the research topic.

The 1994 Crime Bill introduced the most significant piece of federal legislation in recent history to contribute toward increased incarceration (Ray & Galston, 2020). Formally known as The Violent Crime Control and Law Enforcement Act of 1994, this legislation served as part of larger administrative effort to launch a "war on crime." The lasting repercussions of which can be seen in the current system of mass incarceration in the United States. State legislatures have greater discretion over policies for incarceration, but federal guidelines supported by the act had a significant impact on state-level decisions (Ofer, 2019). Provisions of the bill promoted mandatory minimum sentences for certain offenses, requiring a prison sentence if convicted regardless of individual considerations. These policies existed at the state level prior to passage of this legislation, but significantly expanded after encouragement from the federal government. The bill also introduced truth in sentencing guidelines, which require an individual serve a minimum amount of their sentence before being eligible for probation or parole (Ray & Galston, 2020). Although mass incarceration was already prevalent prior to 1994, the included policies supported a continued increase in the incarcerated population over the next two decades.

The 1994 Crime Bill can also be observed as having direct influence on trends of educational attainment among incarcerated individuals. Included provisions prevent inmate students from receiving federal Pell grants, which do not have to be repaid, to pursue a college education (Dortch & James, 2019). As such, in-prison college programs lost all federal funding and needed state or private contributions to remain operational. This legislation signaled how the government would approach opposing objectives in incarceration and education, with support for correctional education markedly diminished. Federal policy initiatives can influence state-level funding decisions, resulting in additional funding decreases for post-secondary programs offered in correctional facilities. As of 2020, there are 25 states offering no college programming to prisoners (May, 2020). Other types of educative programming at correctional facilities have also experienced decreases in funding, with resource scarcity resulting in further depreciation of prisoner opportunities.

Prisoner satisfaction surveys have shown that a majority of inmates wish to participate in correctional programming of some type, but many are unable to enter their desired program (Braggins, 2003). Despite an overwhelmingly increase in the number of people being incarcerated, average participation rates in correctional education programs have actually decreased (Harlow, 2003). Limitations on access to correctional programming have significant implications for skill depreciation and the reintegration of individuals upon release. Policy decisions at state and federal levels have contributed to the proliferation of incarceration and deflation of correctional funding allowances. Incarceration policies can exert direct or indirect influence on the experiences of formerly incarcerated individuals as they attempt to re-join society, presenting added research considerations.

Collateral Consequences

Collateral consequences can be defined as the formal and informal restrictions that a criminally convicted individual continues to face after completion of their sentence (Pinard, 2006). Consequences can arise as social, legal, or economic impediments that prevent a former prisoner's ability to fully re-integrate within society (Mauer & Chesney-Lind, 2002). Certain punishments result in greater collateral hardships, such as felony convictions resulting in a prison sentence. Formal restrictions are not based not only on incarceration history, but rather the criminal record of convicted individuals. Felonious convictions are a permanent record of prior deviancy, resulting in consequences beyond those required during sentencing (Georgia Center for Opportunity, 2014).

In this analysis, formal barriers refer to policies implemented at the federal, state, or local level that restrict formerly incarcerated individuals relative to the general population. Policies can be explicitly discriminatory or overtly biased, but the depressive effect on relevant outcome measures is cumulatively significant. Outcomes of successful reintegration, including recidivism, can be impacted by discriminatory policy decisions (The United States Commission on Civil Rights, 2019). Post-release employment provides one indicator for assessing the negative effect of collateral consequences on outcomes among the formerly incarcerated. Formal consequences impacting employment refer to legal and systemic barriers preventing those with a criminal record from pursuing or obtaining a certain occupation (Radice, 2012). Discretion for policies of criminal disenfranchisement is largely granted at the state level. State legislatures determine the restrictions that an individual will face after conviction (Green, 2019). Despite research suggesting that post-release employment could lead to a significant improvement in outcomes for the formerly incarcerated, state-level policy for can differ greatly (Visher et al., 2010).

The most direct example of state legislatures affecting the employment outcomes of the formerly incarcerated can be observed in occupational license bans for felony

convictions. Occupational licenses are required for employment in certain professions. Statutory barriers prevent individuals with a felony record from obtaining the necessary qualifications for legal employment in that field (Georgia Center for Opportunity, 2014). Licensing restrictions represent a concentrated effort by state-level governments to limit employment opportunities for some members of the population. Recent trends have shown a number of states revise or lift their occupational license restrictions (Institute for Justice, 2020). Policies are still present in certain jurisdictions and remain relevant to the current analysis. An analysis of re-entry experiences among the formerly incarcerated must consider the systemic barriers that influence post-release outcomes, as this will better inform analyses of program effectiveness.

Collateral consequences for the formerly incarcerated extend beyond those associated with policies; various informal exclusions result from a criminal conviction. Informal barriers can arise from negative perceptions for those with a criminal history. This perspective is relevant to discussions of labeling theory, as it is the individual's criminal record that labels them for social and professional considerations (Chiricos et al. 2007). Incarceration history has further influence on the perceptions of others, as prison experiences are viewed negatively by the general population. Perceptions of the formerly incarcerated held by others can have a significant impact on post-release employment outcomes. Barriers to employments can manifest as observable instances of bias during the application or interview process. Applicants indicating a criminal record can be excluded from consideration; this is referred to as front-end discrimination (Agan & Starr, 2017). Prejudice can also be present, whether outwardly apparent or not, in relevant decision-making processes. The opportunities available to the formerly incarcerated are informally moderated by the negative perceptions held by decision makers (Pager, 2003). This dynamic has significant implications for career advancement and employment longevity.

Considerations of economic impact support more research and investment into a means to improve post-release outcomes. The economic costs of barriers to employment among the formerly incarcerated can influence individual and community outcomes (Bucknor & Barber, 2016). Research found that only two percent of previously incarcerated men advanced from the bottom fifth of the earnings distribution to the top fifth over a twenty-year period. During that same period, fifteen percent of men never incarcerated achieved that level of earnings growth Moreover, it was observed that formerly incarcerated individuals were twice as likely to remain in the lowest earnings bracket (The Pew Charitable Trusts, 2010). Stagnation in economic mobility has significant implications for the community and future generations, as children of the formerly incarcerated could also face depressed economic prospects (Western, 2002). This trend can prolong the depressive effects of collateral consequences indefinitely into the long-term, further contributing to cycles of incarceration (The United States Commission on Civil Rights, 2019).

Post-Release Employment

Previous studies have shown that incarceration has a negative effect on employment and earnings growth upon re-entry to society (Western et al. 2001; Geller et al. 2006). The formerly incarcerated, on average, have been observed to have poorer labor market outcomes than individuals with similar characteristics without a criminal record (Looney & Turner, 2018). Moreover, research has shown that the formerly incarcerated seek employment at a higher rate than the general unemployed working-age population but have a far lower average success rate at obtaining full-time employment (Pager, 2003). These observations suggest it is the former prisoner's criminal label that further exacerbates barriers preventing long-term, gainful employment (Couloute & Kopf, 2018).

Collateral consequences manifest through employment impediments. Restrictions on occupational licenses prevent career development in former prisoners, which can negatively impact both recidivism and correctional spending (Schanzenbach et al., 2016). Many other policies have overt or implicit biases against individuals with a criminal history that can have impacts on employment outcomes. However, it is hard to separate the influence of any one policy when systemic barriers are presented through a variety of interconnected legal and societal structures. Formal occupational restrictions to the formerly incarcerated are present and promote unemployment among a certain segment of the population (Zhang, 2018). Informal employment barriers are also present; post-release employment outcomes can be mediated by the perceptions of relevant actors. Potential employers perceive the prison system as not designed to prepare an ex-offender for work, leaving individuals with poor job readiness and a lack of job-related skills (Obatusin & Ritter-Williams, 2019). In the absence of an intervention to counteract skills erosion, it can be expected that an individual with leave prison with fewer employment opportunities. Despite this, employment among formerly incarcerated people has been observed as highest within the two years after release (Couloute & Kopf, 2018). This suggests that support services preceding and immediately following release are impactful.

Employment outcomes can also hold relevance to discussions of recidivism. Individuals participating in correctional education programs can potentially increase their qualifications and eligible wage level. Higher wages are assumed to increase the returns of legal earnings relative to illegal earnings, reducing incentives for illegal activities and crime (Agan and Makowsky, 2018). Higher wages thus can contribute to improved recidivism; however, the incomes of the formerly incarcerated grow little with age compared to those that have never been in prison (Schanzenbach et al. 2016). The implications of wage stagnation and limited upward mobility in the formerly incarcerated population are significant. For individuals who are excluded from high-wage positions, the likelihood of returning to criminal activities remains higher. Employment is one factor that can improve recidivism, but the quality of employment can be an important consideration in whether an

individual will return to crime (Skardhamar & Telle, 2012). Educational program completion focused on professional skill development could result in better post-release employment outcomes, as it prepares an individual to earn improved wages. This supports an analysis of in-prison education with post-release employment as an outcome measure, as it can provide additional insights into the relevant casual mechanisms impacting recidivism.

Reintegration Measures

Reintegration measures refer to mechanisms implemented at the federal, state, or local level to ease the transition from imprisonment to participation in normal society. Measures attempt to overcome barriers created by collateral consequences, with the additional aim of preventing the re-occurrence of crime. They can take the form of legal protections, developmental programming during incarceration, or post-release resource provision (Visher, 2015). Reintegration measures can be funded by private or public investments, but this analysis will focus on programs implemented under government financing. Legal protections refer to policies that benefit the formerly incarcerated, such as bans on occupational restrictions and front-end discrimination during the hiring process. These measures operate in opposition to legal barriers restricting the abilities of formerly incarcerated individuals, such as occupational license bans (Zhang, 2018).

Developmental programming during incarceration, otherwise known as correctional programming, is offered to individuals while they are still in-prison. Measures provide resources and development to offenders, with the goal of improving attributes that contribute to criminal behaviors. Mandatory programming can be required based on aptitude tests or personal history. Voluntary participation programs are also offered related to personal and professional development. Correctional programs can generally be categorized into those affecting mental health, substance abuse, or education. (Council of Economic Advisers, 2018). Post-release resources are largely community based and depend on the environment an individual is returning to after release. The availability of post-release resources varies significantly with the population density of a region and other demographic factors. As such, it could be inaccurate to compare community-based intervention effects for individuals returning to urban or rural environments. This analysis will focus on correctional education programs, specifically as they effect reintegration indicators for employment.

Types of Correctional Education Programs

Correctional education programs provide incarcerated adults with the opportunity to advance their skills and knowledge during a time when skill depreciation would otherwise be expected. As reported in the most recent censures of state and federal correctional facilities, conducted in 2005, approximately 84 percent offer some form of formal educational programming to prisoners (Stephan, 2008). Mandatory education programs can be required for prisoners scoring below a certain level on the relevant aptitude test, but most programming features voluntary participation. Correctional education encompasses a variety of course and program types that can be aimed at academic or vocational development. Academic programs range from remedial education to post-secondary degrees; levels can be further divided within the academic category as they relate to standardized development and degree qualifications. Courses related to vocational training and job preparation also fall under the category of educative programming in prisons. Vocational programs teach technical knowledge and job-specific skills (Duwe & Clark, 2014). There are many different programming types under the vocational category based on the relevant industry; however, these are often considered at the aggregate level as all relating to occupational skills.

The efficacy of correctional programming is typically assessed as it relates to four outcomes - prison misconduct, recidivism, post-release employment, and cost avoidance (Duwe, 2017). Prison misconduct refers to instances of bad behavior during incarceration; this pre-release measure has limited implications for reintegration outcomes. As such, researchers typically focus on post-release indicators of program success including recidivism, employment, and cost avoidance. A reduction in recidivism, or the re-occurrence of criminal activity upon release, is a main outcome measure used by policy makers. (National Institute of Justice, 2017). Cost avoidance is a concept often related to recidivism in the literature and offers a measure of direct economic returns from a reduction in incarceration fees. Program evaluations considering post-release employment outcomes do exist, with a majority focused on labor market participation or employment probability. Often, program evaluations that consider post-release employment also analyze effects on recidivism (Tyler & Kling, 2006). While recidivism reduction is a necessary focus of correctional programming, previous research suggests post-release employment can provide an alternative perspective for analyzing educational program success (Ellison et al. 2017).

1. Academic

Academic programs are implemented to improve the core competencies and advanced knowledge of incarcerated individuals, with an overall goal of reducing the risk of recidivism (Schumacker et al. 1990). Academic correctional programs can be considered in aggregate or roughly categorized into Adult Basic Education (ABE), Adult Secondary Education (ASE), and

Post-Secondary Education. One notable study included in this meta-analysis is Visher, Debus-Sherill, and Yahner (2011), which estimates the intervention effect for participation in any academic correctional program. Program evaluations of correctional education are typically concentrated within one state's boundaries; this study added further insight by focusing on several states in unique geographic regions. The inclusion of data from multiple regions allowed for post-release employment outcomes to be observed more representative of national labor market conditions. The authors also used extensive longitudinal data to create relatively well-matched treatment and comparison groups, although the study size was small. Results shows an improvement in post-release employment outcomes for individuals participating in correctional education programs.

Academic programming tiers are described below as they influence the inclusion of relevant studies. Within this meta-analysis, program-type analysis will be considered for academic programs at the categorical level against vocational programs. Comparative analysis at the level of academic programming tiers is a potential area for future research. Additional discussions of notable academic program evaluations are included in Appendix A.

1.1. Adult Basic Education

Adult Basic Education (ABE) programs are provided to those individuals reading below a ninth-grade level; they are aimed at developing competent reading, writing, and arithmetic skills (Cho & Tyler, 2008). These programs are the pre-requisite for further academic development within the correctional institution, as individuals cannot complete any higher-level academic program if they do not satisfy basic education requirements. In some states, participation in ABE programs is mandatory for individuals who test below a certain proficiency threshold. Individuals who then meet or exceed a ninth-grade level, as per the relevant aptitude tests, are able to progress to Adult Secondary Education (ASE) and preparations for the General Education Development (GED) qualification (Cho & Tyler, 2013). The widespread implementation of ABE programs indicates their relevance to the discussion of correctional education programs. Likewise, previous research has shown the relevance of ABE programming to post-release employment outcomes (Darolia et al. 2020). Despite participation requirements in some jurisdictions, resource scarcity results in self-selection to treatment groups. Notable program evaluations considered for this meta-analysis feature well-matched treatment and comparison groups to minimize the influence of selection bias.

1.2. Adult Secondary Education

Adult Secondary Education (ASE) refers to those programs exceeding a ninth grade-level but not at the level of university or vocational training. These programs are roughly equivalent to the level of high school instruction in the United States, and primarily focused on preparing for the General Education Development (GED) exam (Duwe & Clark, 2014). Passing this

standardized examination is comparable to completing all levels of required schooling; individuals who obtain certification are equal to high school graduates. GED certification is typically required before an individual can commence any formal post-secondary education. The GED is also a basic qualification for competitive employment required by most entry-level positions; thus, it is expected that this designation should have significant impact on post-release outcomes. Adult secondary program evaluations are one of the most common to appear in scholarly literature for correctional education. Individual studies were evaluated during the research process for relevance to defined inclusion criteria. ASE programs are not mandatory and thus do not feature random assignment. Notable program evaluations considered for this meta-analysis feature large sample sizes and matched treatment and comparison groups to minimize the influence of selection bias (Sabol, 2007).

1.3. Post-Secondary Education

Post-Secondary Education programs are equivalent to college and university offerings. In the United States, associate degrees are offered for two-year programs, such as would be available at the community college level. Bachelor's degrees require approximately four years of credit hours and are more similar to accredited university programs. Master's degrees also fall under the category of post-secondary education (Visher et al. 2011). The length of required programming can influence program participation rates. Evaluations of associate degree programs are the most common in existing research, while bachelor's programs are more prevalent than masters. Post-secondary program evaluations are not as prominent in the scholarly literature (Chappell, 2004). This phenomena can potentially be attributed to less individual demand for academic programs of this level, resulting in fewer eligible participants to form treatment groups. However, there also exist systemic factors limited the availability of post-secondary education while incarcerated, such as the Pell Grant ban previously discussed. Signaling theory suggests that, within a specific area of focus, higher qualifications should produce better outcomes among otherwise similar individuals. As such, researchers would anticipate the completion of post-secondary education to be an adequate intervention to affect employment outcomes.

2. Vocational

Vocational education refers to correctional programming offered in an attempt to build job relevant skills. Certification courses can be focused on general employment skills or the development of specific competencies necessary for future employment in a certain industry or trade (Lichtenberger, 2007). A 2005 census of federal and state correctional facilities found that approximately 52 percent of facilities offering formal education programs had vocational programs (Stephan, 2008). Further research has shown that during the period of

1991 to 2004, participation in vocational programs at state-level correctional facilities decreased from 32.1 percent to 27 percent (Crayton and Neusteter, 2008). Participation rate declines are partially attributable to increases in prison populations and decreases in funding, resulting in less availability of vocational programming. Vocational education programs represent an area for potential correctional investments, provided that evidence of positive returns can be presented to policy makers. Previous studies of high scientific quality have reported results from the positive impact of vocational training on employment outcomes (Duwe, 2015). These findings are supported by signaling theory, as vocational certifications can be considered the most relevant signals to potential employers within a specific industry.

Saylor and Gaes (1997) collected data on over 7,000 offenders who were released from the U.S. Federal Bureau of Prisons during the mid-1980's. Individuals within the federal prison system provide a more diverse sample for post-release employment outcomes, since labor market outcomes are not focused within one state. In order to evaluate potentially subtle impacts of vocational and apprenticeship training, the authors created a relatively large treatment group of approximately 1,500 former inmates. The authors were unable to create a randomly assigned treatment but used an exceptionally rigorous matching technique to control for potential selection bias. The statistical matching procedure was intended to model a training program selection process; propensity scores were developed from 20 variables relevant to baseline characteristics. This allowed for individual treatment subjects to be matched with an individual from the comparison reservoir that would provide the most accurate results for intervention effect. The comparison reservoir featured all other inmates released in the same quarter who did not complete vocation training. If multiple individuals featured a propensity score relevant for analysis, multiple comparison subjects could be added. As such, the comparison group is slightly larger at approximately 1,830 former inmates.

Results show that vocational training participants are more likely to find employment in the first twelve months after release. Saylor and Gaes (1997) find that these results are more pronounced for ethnic and racial minorities. Demographic characteristics could have significant influence on observed outcomes; studies of high-quality address these considerations in the analysis. Matched treatment and comparison groups control for the influence of baseline characteristics on intervention effect. As with other propensity score matching approaches, the validity of findings by Saylor and Gaes could be challenged on the basis of omitted variable bias. However, the authors reasonably support their assertion that omitted variables related to the treatment selection process are controlled for. Additional program evaluations of vocational education included in this analysis are discussed in the extended systematic review, Appendix A..

Previous Meta-Analyses of Correctional Education

Previous meta-analyses on the effectiveness of in-prison education programs have been completed in conjunction with government agencies to assess impact on intended outcomes, primarily recidivism (Davis et al., 2013). Other meta-analyses conducted through private motivation have produce similarly significant results. These reports are further used as a means to evaluate returns on investment for correctional education, thus confirming the practical value and demand for meta-analyses of this subject. However, existing research has largely failed to consider returns on investment outside of a recidivism framework. This analysis will indicate that improvements in post-release employment likewise have economic effects that should be considered in program evaluations. The impact of correctional education program participation on economic mobility among the formerly incarcerated is not fully addressed in previous meta-analyses.

Table 1: Previous Meta-Analyses Considering Employment Outcomes

Previous Meta-Analysis	Number of Employment Outcome Studies Included	Average Publication Year of Included Studies	Reported Odds Ratio
Wilson et. al. (2000)	9	1994	1.86
Gaes (2008)	17	1998	n/a
Davis et. al. (2013)	18	1999	1.13
Ellison et. al. (2015)	5	2007	1.24
Bozick et. al. (2018)	21	2001	1.12
Current Meta-Analysis	21	2006	Estimated 1.19

Seven previous meta- analyses were identified as relevant to the correctional education field. Two of these studies focused exclusively on recidivism outcomes, but five included some discussion of post-release employment outcomes. Table 1 lists the previous meta-analyses that have considered employment outcomes. Available studies are limited relative to those focused on recidivism, but publication has increased since the meta-analysis of Wilson et. al (2000). Previous meta-analyses have included all studies published from 1980 until the period of analysis. This meta-analysis has been designed to update and provide support of previous findings. Studies published prior to 1990 included participants released from incarceration under drastically different macro-economic conditions that could impact employment outcomes. As such, this meta-analysis will estimate the pooled effect size without these observations. The average publication year of studies included in this analysis is 2006, which is significantly more up to date than previous meta-analyses of this size. The analysis section of this meta-analysis will discuss estimation of the odds ratio 1.19.

Research Design

Method Selection

It has been established that program-type comparisons might hold valuable insight. Program evaluations considering all correctional education programs offered to a certain population estimate the average intervention effect across programs. This is relevant to discussions of overall return on investment but provides limited insight into potential means to improve targeted returns. Evaluations that focus on a specific program-type provide suitable observations to estimate the intervention effect attributable to that program. However, these studies lack available data to compare outcomes between multiple treatment groups. There is little opportunity for an exhaustive comparative analysis of program-type effects at the level of an individual study. Program evaluations might analyze multiple program types, but observations remain specific to a certain setting and sub-population. As such, the predictive validity of a single, comparative program evaluation is limited when extrapolated to the larger population. A meta-analysis can combine observed outcomes across subpopulations to calculate a pooled effect size more representative of the true population effect. This method also allows for greater focus on program specific effects, by performing a program-type analysis of differential outcomes.

A meta-analysis's ability to reliably represent the target population is dependent on choices made by the researcher. Discussions of heterogeneity determine if a meta-analysis is suitable, as between study variability should be expected or explained in the analysis. Heterogeneity is expected in observed effects of correction education programs, as unobservable characteristics at the individual level will impact employment outcomes. However, the relevance of individual program evaluations and their included subpopulations to the target population is supported. Meta-analyses have previously been used in the field of correctional programming and for correctional education programs in particular. Although individual characteristics differ, all formerly incarcerated individuals face some shared circumstances. Previous meta-analyses have supported a position that subpopulations of formerly incarcerated individuals can provide valid estimations of pooled intervention effect (Bozick, 2018). Inclusion of studies with well-matched comparison groups allows for more accurate estimation of the intervention effect that can be attributed to educational program participation.

Research Objectives and Scope

The primary objective of this research is to observe the intervention effect of correctional education program participation on post-release employment. A meta-analysis will allow for the synthesis of several relevant studies, producing greater insight for understanding the

average effect. Further objectives are to determine if the type of program participation, academic or vocational, has a significant impact on the direction and/or magnitude of intervention effect. A meta-analysis is suitable for the scope of this research, as it allows for program-type comparisons that are often not seen in individual studies. Moreover, it allows for a variation across states that is likewise not captured on the level of most individual studies. This perspective could be valuable to federal-level policymakers, who make funding decisions that can impact the state-level implementation of correctional programming. A meta-analysis can potentially provide an indication of aggregate success for in-prison educational programs, while also showing what types of programs have the greatest effect. The validity of these findings as they apply to the target population is backed by defined inclusion criteria and tests for publication bias. This supports the relevance of the analysis to the population of interest, formerly incarcerated individuals.

Operationalization

Correctional education programs are important social initiatives that serve a disadvantaged population group in the United States, formerly incarcerated individuals. Individual program evaluations observe outcomes in a sub-population specific to the study. If these studies are reasonably assumed to hold relevance for outcomes in the target population, additional insight can be gained by performing a meta-analysis of the pooled intervention effect (Lipsey & Wilson, 2001). As with any scientific research of definable quality, certain decisions about operationalization are required before the analysis can begin. A meta-analysis features dependent and independent variables, which influence data collection and the estimation of intervention effects. The defined variables features in this meta-analysis also determine the inclusion criteria of potential studies, given that eligibility is dependent on a relevant intervention and outcome measure.

The independent variable chosen for this research is participation in a correctional education program. These programs were chosen over other reintegration measures, because the standardized treatment environment inside correctional facilities allows for easier determination of eligible study participants and interventions. A focus on in-prison education programming was also meant to lessen the influence of community specific factors affecting the intervention. Although participant characteristics still have a significant impact on outcomes, interventions are standardized when delivered in a correctional setting, providing for greater reliability in estimations of intervention effect. This meta-analysis presumes between study heterogeneity due to differences in subpopulations, but intervention effects remain relevant to the target population. Restricting the target population to formerly incarcerated individuals provides potentially greater insight than an analysis of all criminal record holders. There are greater similarities in previous experience and continued challenges. Correctional education programs also hold relevance to

discussions of signaling theory. Reintegration measures implemented post-release are more influenced by social capital and the formation of support networks within a community. For the defined independent variable to be present, a study must feature an eligible intervention in the form of a correctional education program. Further inclusion criteria defining eligible academic and vocational program interventions are described in data collection.

The dependent variable considered in this meta-analysis is post-release employment. Post-release employment was chosen for being a historically accepted outcome measure of correctional programming that has received less prominence than recidivism in previous research (Gaes, 2008). Employment after release is presented as a potential outcome measure of greater relevance for correctional education programs, given that program focus is on marketable skill development. A more direct association between independent and dependent variables will result in greater validity for the meta-analysis. The chosen theoretical framework of a signaling perspective also supports an effect of program participation on post-release employment. Studies feature different employment indicators, such as wages and duration of employment, but the most common indicator is employment status. All included studies feature indicators relevant toward understanding the impact of correctional education participation on post-release employment outcomes. Further criteria defining an eligible outcome measure are described in data collection.

Reliability and Validity

Reliability refers to an assessment of consistency for a measure; how capable are the methods for producing repeatable results (Roberts & Priest, 2006). Within this meta-analysis design, reliability has been considered at the level of individual studies and the present analysis. The quality of a meta-analysis is dependent on the quality of included studies (Greco et al. 2013). As such, inclusion criteria related to scientific quality were developed to ensure component studies meet sufficient reliability requirements. The number of studies included is also a determinant of reliability for meta-analysis results; an incomplete analysis cannot be completely reliable. Reliability standards suggest that other researchers should be able to repeat a study under similar conditions and observe similar results. This is relevant for meta-analyses, since future research will include many of the same observations. Results are influenced by estimation models and the weight assigned to individual studies in the meta-analysis, but it would be expected the similar meta-analyses find similar direction of effect. Modeling decisions in the current analysis are supported by previous research (Bozick). The expected reliability of the current analysis will be partly assessed as it compares to previous meta-analyses in the field.

Validity refers to the accuracy of a measure; an assessment of how well a method can estimate the observed outcome (Roberts & Priest, 2006). Within this meta-analysis design, validity was considered in conjunction with reliability. Both qualities are required to provide

well-supported findings. Internal validity concerns indications of potential bias within the research; this has been considered at the level of individual studies and the meta- analysis. The number and quality of included studies impacts the external validity of meta-analysis results. Limited observations can produce distorted results when one or few studies have disproportionally large weight in the calculations. This analysis sought to identify all relevant observations, such that included studies and their subpopulations are sufficient to represent the target population of the meta-analysis. Inclusion criteria for eligible participants, interventions, and outcome measures were created relevant to the target population of formerly incarcerated individuals in the United States.

Inclusion Criteria

Studies evaluated for this meta-analysis must have a comparable degree of scientific validity and relevance to the research topic. Inclusion criteria have been developed as a standardized metric to determine the eligibility of a study to be included; the quality of a meta-analysis depends on the quality of included studies (Lipsey & Wilson, 2000). These criteria guide efforts of data collection and likewise provide a basis for determining when a study should be excluded. Preliminary inclusion requirements for publication restrict eligibility to studies published in English after 1990; this ensures that there are no errors in translation and the findings remain relevant to current conditions. January 1st, 1990 was chosen as the cutoff date to provide a specific thirty-year interval for study identification.

This meta-analysis also attempts to update the results of previous analyses that have included studies published during the 1980's. Studies published prior to 1990 can feature data collection periods in earlier decades that are potentially less applicable to current conditions. Although macroeconomic conditions are constantly changing, restriction to a thirty-year publication interval is intended to the strengthen the reliability and validity of findings. Eligible studies must also take place at correctional institutions within the United States. The inclusion criteria for this meta-analysis can be approximately grouped into four categories of importance - eligible study attributes, eligible participants, having an eligible intervention, and having an eligible outcome variable.

1. Study Attributes

Study attributes refer to the methodological characteristics that determine quality standards for scientific research and academic publication. Setting an eligibility limit ensures that meta-analysis results can be supported. The inclusion of studies of poor quality has the potential to lower the statistical power of the meta-analysis, whereas more studies of higher quality will improve validity. However, this requirement must be balanced with the desire to include all studies that observe a relevant effect. Program evaluations considered from this meta-

analysis must meet minimum requirements, such as including treatment and comparison groups. This meta-analysis aims to include studies of the highest methodological quality but also includes all relevant studies that have a treatment and comparison group. This is necessary for effect size calculations and ensures that all included studies can accurately assign outcome significance to the intervention.

1.1. Methodological Rating Scale

To further refine eligibility criteria based on study attributes, the Maryland Scientific Methods Scale is used as adopted for criminology research (Wilson et al. 2000). Studies to be included must have at least a two out of five on the scale. This corresponds with a minimum requirement of intervention and comparison groups. The intervention group, as defined for the purpose of this meta-analysis, is a group of inmates that participate in or complete a correctional education program. The difference in outcomes between program participants who do not finish and those who complete programming is one area for potential study. Existing program evaluations of correctional education do not always make this distinction in their analysis. For those few studies that did separate treatment groups into program completers and non-completers, an intent-to-treat approach is used to justify the formation of a single treatment group for inclusion in this meta-analysis. A comparison group must feature comparable inmates who do not participate in the educational program of focus. Table 2 on lists the categories of the Maryland Scientific Methods Scale as they apply to this analysis.

Table 2: Adapted Maryland Scientfic Methods Scale

Rating	Description
5	Randomized control trials - not common for program evaluations of voluntary interventions
4	Treatment and comparison groups matched on at least five relevant variables to establish baseline equivalence; studies controlling for at least five co-variates in analysis.
3	Treatment and comparison groups matched on less than five relevant variables - baseline equivalence can not be verified; studies controlling for less than five co-variates.
2	Unmatched treatment and comparison groups - authors should adress composition of group demographics to establish relevance
1	Studies without a comparison group - excluded from this analysis

Level five refers to studies of the highest validity, featuring the random assignment of offenders to the intervention and control conditions. As previously mentioned, this requirement is rarely met by correctional education studies. The body of work is further constrained when focusing on employment outcomes, as previous studies of high quality

have focused primarily on recidivism (Davis et al. 2013). Level four refers to quasi-experimental research designs where the treatment and comparison groups are relatively well matched on baseline characteristics such as gender, age, criminal history, and prior education level. This allows for a greater degree of confidence to be placed on the intervention creating an effect in the case of different outcomes between the two groups. This analysis sought to find level four ratings as the ideal study type, given that randomized control trials are often implemented for correctional education program evaluations.

Level three classifications are studies that feature treatment and comparison groups matched on relatively few characteristics other than gender. Studies of this quality could also feature statistical controls for confounding variables in their analysis; the key feature is that some attempt has been made at controlling for baseline differences between study groups. Level two is the lowest requirement that a study can meet and still be considered for this meta-analysis. In these research designs the treatment and comparison groups can be considered unmatched, meaning there are also no attempts at statistical controls for baseline differences within the analysis. These studies have less statistical power to implicate that an intervention is causing an observed outcome but remain significant to determine the direction of effect. Individual study ratings from the Maryland Scientific Methods Scale will later be considered as they account for trends in the meta-analysis.

2. Participants

Eligible participants are adults incarcerated during the applied intervention period. Participants would also need to meet all relevant eligibility criteria applied by the correctional institutional to participate in voluntary education programs; these vary depending on the jurisdiction. The stipulation of adult offenders is necessary, as there are a number of program evaluations focused on educational programming provided to juvenile offenders. It can also be reasoned that employment outcomes for adult and juvenile offenders are significantly different based on available opportunities. Moreover, a juvenile criminal record is often sealed and does not have the same implications as an adult criminal history. As such, the results of juvenile education program evaluations cannot reasonable be compared with their adult counterparts. The impact of correctional education on juvenile employment outcomes remains a promising are of future research, but outside the scope of this analysis. Other than a lower age limit, there are no background characteristic restrictions placed on eligible participants at this level. Program evaluations can be focused on a single gender, but all observations are included in this meta-analysis. This allows for the largest number of comparable studies to be identified. Individual studies are expected to control for background characteristics within their analysis such that results can be comparable to other literature. Studies with unmatched groups can still be included if relevance is established.

3. Intervention

An eligible intervention within the study must take the form of educational programming implemented during incarceration. Program evaluations that consider post-release programming are not included, as these programs operate under very different contexts outside of correctional institutions. Some program evaluations focused on multi-step measures that combine in-prison education programs with reintegration support after release. The extent of post-release support was critical to determining eligibility. Interventions featuring supervision or personal support after release could be included, as all recently released individuals have some degree of post-release supervision related to parole or re-entry. Other studies focused on transitional job programs that combined correctional programming with employment support or post-release job placement. These studies were excluded from the meta-analysis.

The direct influence of outside actors on employment outcomes, through subsidized job placement, creates effects that cannot be compared with those of in-prison education. For similar reasons, evaluations of work release programs are excluded from this meta-analysis, as they more closely resemble a transitional job program than correctional programming. Individual participation in an intervention also must be voluntary; this relates to signaling theory as the acquisition of a signal requires individual choice. Although some states mandate adult basic education for individuals testing below a certain proficiency, completion is not required. As such, there remains self-selection into the treatment group and a valid comparison group. It should also be noted that educative courses related to addiction or psychological well-being are not considered relevant interventions for correctional education programs. These are better classified as addiction treatment or behavioral therapy and should be considered with caution when educational programs.

4. Outcome Variable

The outcome measure of focus for this meta-analysis is post-release employment. Recidivism measures are often reported as well as employment outcomes, but these will not be considered within this analysis. Studies that primarily focused on recidivism could still be included, given that post-release employment outcomes were also reported for both treatment and comparison groups. An eligible outcome variable must be a suitable indicator for post-release employment, such as employment probability, actual employment levels, or average wages. These outcome variables all contribute toward a direction of effect that is relevant when discussing the impact of educational programs on post-release employment.

Studies must define their period of data collection for the outcome variable, as the follow-up duration of a program evaluation can be of significance. The start of an outcome duration should take place upon release and continue for at least three months to be

included in this meta-analysis. In instances where a study reports results for multiple follow-up durations, the duration closest to one year will be chosen as this is the most common outcome duration in reviewed studies. Multiple durations in a single study will not be included in the meta-analysis, as this could alter results by double-counting participants. Previous research has suggested that employment levels of former prisoners are lowest in the years immediately following release (Berg & Huebner, 2011). As such, the observable difference in outcomes attributable to an intervention could potentially be largest within the first years after release. Studies with other outcomes durations, less than twelve months or greater than two years, were included if all other eligibility criteria are met.

Data Collection

After a thorough search of relevant scholarly publications, scientific review processes were applied to those studies deemed sufficient based on the established inclusion criteria. Case selection describes the review and procedures for narrowing down the list of potential studies. A standardized data collection form was created to guide evidence collection and ensure that all relevant supporting information is collected. Appendix B contains the completed data collection forms for all included studies. Relevant study attributes are recorded to ensure that all inclusion criteria are sufficiently met. The data collection form also records values needed for individual study estimations of intervention effect; this information will be necessary as inputs to perform the meta-analysis. Some studies contained multiple independent treatment groups. For this reason, the number of observations and effects sizes included in the analysis is greater than the number of individual studies A description of included studies follows case selection. The distribution of observations across program types and average values is discussed.

Case Selection

Eligible studies were attained by completing a comprehensive literature search of numerous online databases related to criminology and scholarly work in general. Databases included the Education Resource Information Center (ERIC), the National Criminal Justice Reference Service (NCJRS), JSTOR, Sage Journals, and Google Scholar. In order to find the most relevant studies and ensure each database is effectively searched, key words and phrases were selected to be used during queries. These included terms such as correctional programming, vocational programs, education programs, program evaluation, incarceration, and employment. Studies that appeared during these searches were judged by title and then abstract statement if deemed relevant to the meta-analysis. Those studies that seemed promising were then added to a spreadsheet list to be further evaluated in relation to the

four main inclusion criteria. Approximately 140 scholarly articles and papers were identified through this method. When evaluated at a greater level of detail, not all studies met the requirements to advance to data collection.

During the research process, seven meta-analyses of correctional education were also found. Although the primary outcome measure was recidivism, some reported employment outcomes for a limited number of studies. Others completed a meta-analysis only for recidivism but utilized studies that also reported employment effects in their original publication. A thorough review was applied to determine if any included studies were applicable to the current meta-analysis. As inclusion criteria vary, studies selected for previous meta-analysis might not meet the current requirements. Potential studies were then checked against the cumulative spreadsheet of materials sourced from online databases to determine if it had already been identified. Bibliographies were also reviewed for any cited studies not used directly in the meta-analysis that could be of relevance. Some studies that did not meet the inclusion criteria of other researchers were deemed potentially relevant for this analysis, often because a focus on employment effects had not been needed for an analysis of recidivism. Any literature that seemed related, based on the title, was added to the spreadsheet list of studies to be evaluated for all inclusion criteria. Approximately 40 scholarly articles and papers were identified through this method.

After a thorough search of available resources, the eligibility list contained 180 studies. The 2013 meta-analysis of Davis et al. considered 229 studies for potential inclusion; however, their analysis featured different inclusion criteria and a multi-person research team. For the scope of this analysis, it is reasonably assumed that the 180 studies identified accurately represent the available literature. Of these studies, only 21 met all four inclusion criteria. Commonly, an educational program evaluation would meet all requirements but only consider recidivism outcomes. The existing scholarly body of work surrounding correctional education programs strongly prioritizes a focus on recidivism. While a valid outcome, a positive relationship between recidivism and employment has been observed to justify further academic focus on employment outcomes (Uggen, 2000). Other studies observed the correct outcome but lacked the proper intervention, study attributes, or were published before 1990 and excluded from this updated meta-analysis. A list of excluded studies, shown in Appendix C, accounts for those studies that met at least three of the inclusion criteria. Two additional studies were identified from previous meta-analyses as potentially relevant for inclusion but could not be found online. These studies were excluded from consideration, since data could not be verified with the original publication. Table 3 on the next page lists the studies included in the present meta-analysis.

Table 3: Studies Included in Present Meta-Analysis					
Author(s)	Program Type	Study Size	Follow- up Period (in months)	Methodological Rating	Employment Findings (Approx. from Odds Ratio)
Batiuk et. al. 1997	Academic	318	12	2	+ 168%
Bohmert & Duwe, 2012	Vocational	448	48	4	+ 47.5%
Cho & Tyler, 2008	Academic	9800	12	3	+ 5%
Cho & Tyler, 2013	Academic	12838	12	3	+ 6%
Cronin, 2011	Academic	12516	24	2	+ 38%
Duwe & Clark, 2014	Academic - Secondary Academic - Postsecondary	1820 1386	24	4	+ 48% + 14%
Duwe, 2015	Vocational	464	28	4	+ 56%
Hill et. al. 2017	Vocational	29592	3	4	- 8%
Hull et. al. 2000	Both	347	150	2	+ 196%
Lichtenberger, 2007	Vocational	6532	46.5	3	+8%
Lichtenberger et. al. 2009	Vocational	7982	19.5	2	+ 39%
Nally et. al. 2012	Both	2155	6	3	+ 31%
Sabol, 2007	Academic Vocational	33059 31695	30	3	+ .05% - 11%
Saylor & Gaes, 1996	Vocational	3334	12	4	+ 48%
Schumacker et. al. 1990	Academic Vocational	535 394	12	2	- 16% + 35%
Smith, 2005	Both	953	12	2	-12.5%
Streurer et. al. 2001	Both	1936	36	3	-22.5%
Tyler & Kling, 2006	Academic	11556	12	2	+ 34%
Van Steele et. al. 1998	Vocational	92	6	3	+ 136%
Visher & Kachnowski, 2007	Vocational	205	6	3	+ 292%
Visher et. al. 2011	Academic Vocational	482 482	8	3	+ 1.5% + 5%
Total Observations:	Academic - 10 Vocational - 11 Both - 4	Mode:	12	3	

Description of Included Studies

Twenty-five observations can be categorized into three program types (Table 3). Academic programs, comprising all levels of academic correctional education, have ten observations from nine included studies. Vocational programs have eleven observations resulting from eleven included studies. The category of both refers to the remaining four program evaluations that looked at a combination of program types. Employment findings are estimated based on the odds ratio observed for each study. The odds ratio reports the

probability of a positive outcome occurring in the treatment group relative to the probability for a comparison group (Bland & Douglas, 2000). This is the most common outcome value used in correctional program evaluations; calculation methods are described in analysis. The effects are nearly all positive, which supports the position that correctional programming improves employment outcomes, but also raises the concern of publication bias. This potential bias will be tested for during the meta-analysis to estimate its influence.

The study size varies significantly among included studies. Visher and Kachnowski (2007) has a study size of only 92 participants, which impacts the statistical significance of results. The observed impact on employment is high for this study, but the small sample sizes call into question the reliability of results for the greater population. It can be observed that groups with higher study sizes typically show fewer effects of less magnitude. Sabol (2007) features treatment and comparison groups each with over 30,000 individuals. His results are insignificant for academic programs and negative for vocational programs, which goes against the majority of program evaluations. Negative outcomes can be expected in the absence of publication bias; individual observations included in the estimation of a pooled intervention effect are weighted with regard to study size.

The follow-up period also varies across studies. This refers to the period of time that researchers observed employment outcomes after release. A majority of studies recorded outcomes after a certain period of release; the most common duration is twelve months. In the case of multiple reported durations, the value closest to the group mode was chosen. A longer duration would not be chosen if it suffered from significant attrition not seen in a shorter duration. Some studies reported follow-up durations for outcomes measured on a certain date rather than after a certain period, e.g. participant outcomes were measured between 12 and 84 months after release. The recorded follow-up period would be the average, 48 months after release. These studies incorporate significantly more variability due to time since release, but can still provide valid estimations of effect. Authors such as Bohmert and Duwe (2012) control for this influence by incorporating a variable for months since release into their model. Follow-up period will be discussed in the meta-analysis to consider the influence of time released on post-release employment effects.

The methodological rating of included studies is also a significant consideration when preparing a meta-analysis, as the quality of component findings impacts the validity of cumulative results. Studies were rated as they fit the adapted Maryland Scientific Methods Rating Scale described under Data Collection. No level five studies were identified given the difficulty in completing randomized control trials of correctional education. Those studies that did feature random assignment into treatment and control groups still featured self-selection among participants or potential issues of high attrition, resulting in a level four rating. As such, the highest rating of any included study is level four, of which there are five individual studies. Level four studies also feature matched comparison groups on a number

of variables relating to baseline equivalence. This ensures that less influence is exerted by selection bias on program outcomes. Level three studies are the most commonly included, with nine studies meeting this standard. Also featuring a matched comparison group, level three studies have fewer variables establishing baseline equivalence between the two groups. There are also seven studies at a level two rating, meaning the comparability of treatment and comparison groups cannot be established. Selection bias is a higher concern in studies of this rating, but authors address limitations in the discussion of results. Studies lacking a comparison group were excluded from the meta-analysis.

Analysis

The population of interest for this meta-analysis is adult offenders released from correctional facilities in the United States during the period of 1980 to 2020. Individual studies focus on relevant subpopulations. It is anticipated that subpopulations will introduce significant heterogeneity in the effect size estimates. Between study heterogeneity is also expected given that program evaluations differ in methodology and outcome measurement. Although program evaluations are not identical, outcomes remain relevant to the entire population of formerly incarcerated individuals. Individual characteristics of former prisoners will vary, but a majority experience similar social and structural constraints upon release that impact employment outcomes. Previous meta-analyses have supported this perspective and likewise included studies with relevant subpopulations under a random effects model. External validity of this meta-analysis is deemed sufficient to the population of interest, based on the satisfaction of stringent inclusion criteria (Higgins et al. 2020)

A random effects estimation model was chosen to provide proper weights to effect sizes based on assumptions of heterogeneity. A fixed or random effects model can be implemented based on assumptions of heterogeneity. Fixed effects models assume all studies to be measuring the same underlying effect within the same population, and any variation in effect estimates is attributed to sampling error. Random effects models assume that each study measures a study-specific effect, sampling from a population that may not be the same between studies (Hedges & Vevea, 1998). The populations sampled by individual studies can be conceptualized as different subpopulations constituting the larger population of interest. Variation in random effects models can be attributed to within study sampling error or between-study heterogeneity. The present meta-analysis uses a random effects model, as it is expected that certain factors will influence the treatment effect.

Within the category of a random effect's models, there are several estimation methods to complete the meta-analysis. This analysis uses the Restricted Maximum Likelihood (REML) method to estimate the weight of each study's effect size within the pooled analysis. Study weight is a function of precision, such as standard error, and

heterogeneity, or variance from the mean effect size (Kelley & Kelley, 2012). Previous meta-analyses primarily used a DerSimonian-Laird estimation model, which uses the same inputs but estimates heterogeneity through a different method to determine study weights. Although DerSimonian-Laird is one of the most commonly used variance estimation methods, recent research has suggested this method can be negatively biased when faced with smaller study sizes (Langan et al. 2019). The REML method has gained popularity as an estimator used be researchers and has been suggested as better suited for studies with high expected heterogeneity. As such, REML was chosen for this meta-analysis as an update to previous research and a means to explore differences between the random effects models.

Intervention Effects Estimate

The estimation of intervention effects is a necessary prerequisite to commence meta-analysis. A common measure of effect is required for the comparison of individual studies measuring similar outcomes in unique subpopulations. Effect measures can vary depending on whether outcomes are reported as dichotomous or continuous values. The current analysis uses the odds ratio as the calculated intervention effect, a dichotomous measure. A dichotomous effect estimate was chosen, as this was the most common among included studies. When doing meta-analysis in STATA statistical software, outcome variables can be input for the calculation of effect sizes or pre-calculated effect sizes may be entered for the meta-analysis to run. Studies reported a variety of outcome variables, requiring the calculation of standard inputs for the meta-analysis. Effect sizes for the current meta-analysis were calculated in Microsoft Excel then entered into the STATA software.

Effect sizes are recorded as odds ratios for all included studies. The odds ratio is calculated based on Equation 1, described on page 38, or reported from the program evaluation. Although meta-analysis results will be interpreted as an odds ratio, this value is problematic for use in effect modeling. Odds ratios are not symmetrically distributed around the base value of one. Mesaures of standard error are insignificant when not based on a normal distribution of values. As such, the standard error of the odds ratio is a flawed input for analysis (Langan et al. 2019). Transformation of effect size to the log odds ratio is required, as this value is symmetrically distributed around zero. The log odds ratio standard error is then estimated based on values reported in the original findings. Procedures for calculating the log odds ratio standard error are discussed in Equations 2 and 3, page 39.

Table 4: Calculation of Effect Sizes					
Author(s)	Odds Ratio	Calculation Method	Log Odds Ratio	Log Odds Ratio Standard Error	Calculation Method
Batiuk et. al. 1997	2.6790	Reported in Findings	0.9860	0.4013	Equation 3 - reported p
Bohmert & Duwe, 2012	1.4757	Equation 1	0.3892	0.2033	Equation 2
Cho & Tyler, 2008	1.0504	Equation 1	0.0491	0.0420	Equation 2
Cho & Tyler, 2013	1.0581	Equation 1	0.0564	0.0372	Equation 2
Cronin, 2011	1.3793	Equation 1	0.3216	0.0365	Equation 2
Duwe & Clark, 2014	1.4791 1.1385	Equation 1	0.3914 0.1297	0.0946 0.1169	Equation 2
Duwe, 2015	1.5613	Equation 1	0.4455	0.2073	Equation 2
Hill et. al. 2017	0.9230	Equation 1	-0.0802	0.0469	Equation 2
Hull et. al. 2000	2.9650	Equation 1	1.0869	0.2249	Equation 2
Lichtenberger, 2007	1.0874	Equation 1	0.0838	0.0529	Equation 2
Lichtenberger et. al. 2009	1.3950	Equation 1	0.3329	0.0555	Equation 2
Nally et. al. 2012	1.3099	Equation 1	0.2699	0.1344	Equation 2
Sabol, 2007	1.0004 0.8900	Reported in Findings	0.0004 -0.1165	0.0002 0.0595	Equation 3 - estimated p
Saylor & Gaes, 1996	1.4816	Equation 1	0.3931	0.0750	Equation 2
Schumacker et. al. 1990	0.8382 1.3480	Equation 1	-0.1765 0.2986	0.2084 0.2523	Equation 2
Smith, 2005	0.8742	Equation 1	-0.1345	0.1423	Equation 2
Streurer et. al. 2001	0.7758	Equation 1	-0.2538	0.1131	Equation 2
Tyler & Kling, 2006	1.3378	Equation 1	0.2911	0.0501	Equation 2
Van Steele et. al. 1998	2.3554	Equation 1	0.8567	0.4119	Equation 2
Visher & Kachnowski, 2007	3.9170	Reported in Findings	1.3653	0.6966	Equation 3 - estimated p
Visher et. al. 2011	1.0140 1.0510	Reported in Findings	0.0139 0.0497	0.0366 0.0344	Equation 3 - reported p
			↑ Inputs for Stata Analysis ↑		

Table 4 shows the estimated odds ratio for all included studies; calculation method is indicated. The log odds ratio was calculated the same for all values, by taking the natural log transformation of the odds ratio. The log odds ratio standard error was estimated depending on the calculation method used in determining the odds ratio. These values were input in STATA to perform the meta-analysis. Estimation methods for the relevant effect sizes are discussed in further detail in the next section.

Odds Ratio

The majority of studies featured dichotomous outcomes, such as the percentage of individuals who found employment. This information can also be interpreted as the number of successes in the treatment group, those who found employment, and the number of failures in the treatment group who did not find employment. A similar set of values can be formed for the comparison group based on their post-release employment outcome. With this information, an odds ratio can be calculated that gives the relative likelihood of someone in the treatment group achieving an outcome compared to an individual in the comparison group. The odds ratio is calculated as the odds of an event (such as post-release employment) happening in the treatment group divided by the odds of that event happening for the comparison group. The formula for calculating the odds ratio comes from the number of successes and failures for both treatment and comparison groups.

Equation 1: Odds Ratio

$$OR = \frac{A/B}{C/D} = \frac{A*D}{B*C}$$

A = # of Successes in Treatment Group

B = # of Failures in Treatment Group

D = # of Failures in Comparison Group

C = # of Successes in Comparison Group

Of the studies included, seventeen reported dichotomous outcomes from which the odds ratio was calculated using Equation 1. The remaining four included studies reported their findings as a pre-calculated odds ratio. An odds ratio greater than one implies a positive effect from being in the treatment group. If the odds ratio is equal to one, then there is no apparent difference in outcomes between groups. An odds ratio less than one shows a negative effect from being in the treatment group. The majority of odds ratio calculated for this meta-analysis are slightly over 1; this indicates a moderate positive result for correctional education program participation on employment outcomes. Negative outcome odds ratios are similarly close to one, suggesting that program participation did not result in severe negative effects on post-release employment. There are four observations where the odds ratio exceeds two (refer to Table 4), which implies a very strong improvement in outcomes based on program participation. In the meta-analysis, study size will impact the weight given to these results within the analysis.

Log Odds Ratio and Standard Error

The log odds ratio was found by taking the natural log of the odds ratio that was previously recorded. This transformation of effect size allows for meta-analysis to take place using the log value, which is normally distributed around zero. The odds ratio does not have a symmetric distribution. A measure of standard error is also necessary to complete the

analysis; thus, the log standard error was calculated for all included studies. In the seventeen studies where dichotomous outcomes were reported and an odds ratio calculated, the following formula was used for calculating the log standard error (Cochrane, 2020):

Equation 2: Log (Odds Ratio) Standard Error

$$LogORSE = \sqrt{\frac{1}{A} + \frac{1}{B} + \frac{1}{C} + \frac{1}{D}}$$

A = # of Successes in Treatment Group
B = # of Failures in Treatment Group
D = # of Failures in Comparison Group
C = # of Successes in Comparison Group

Equation 2 could not be used for studies that did not report the number of successes and failures within the study groups. For those studies that reported an odds ratio in the result, some also reported a standard error. However, the standard error of the odds ratio is not sufficient to input in meta-analysis, and these values were not included. After the reported odds ratio was transformed to the log form, the log odds ratio standard error was calculated separately. Reported test statistics are needed for the estimation, such as an associated p-value. This value can this be used to find the relevant Z score based on assumptions of a normal distribution, which is satisfied by the log transformation. The following formula was used for calculating the log standard error for observations where a pre-computed odds ratio was reported:

Equation 3: Log (Odds Ratio) Standard Error

$$LogORSE = \frac{\log_e \frac{A*D}{B*C}}{Z}$$

Z = Z-value
A = # of Successes in Treatment Group
B = # of Failures in Treatment Group
D = # of Failures in Comparison Group
C = # of Successes in Comparison Group

The log odds ratio standard error can be estimated as the log odds ratio divided by the associated Z value. The Z-value is found by taking the two-sided p-value reported in a study's results and converting to a one-sided p-value by dividing by two. The corresponding Z score is then found from the standard normal distribution table. (Chang & Hoaglin, 2017) For example, the one-sided p-value for the findings of Batiuk et al. (1997) is 0.007, and the corresponding Z-value is 2.457. For two studies, a valid indicator for standard error was not included in the results. Established meta-analysis standards (Higgins et al. 2020) suggest that approximated standard errors can be used during meta-analysis and still receive accurate meta findings. For these studies, an estimated Z-value was used for calculating the standard error. The Z-value 1.960, associated with a standard 95% confidence interval, was substituted into the equation when a valid test statistic was not reported.

Meta-Analysis Results

After calculation of the log odds ratio and associated standard error for all studies to be included, excel data was imported into the STATA statistical program for analysis. Forrest plots provide a visual representation of the magnitude and direction of intervention effects. Results from the program-type comparison are discussed in regard to expectations of the signaling perspective. Method limitations will be discussed as they impact the reliability of results. Funnel plots provide indication of potential publication bias; trim-and-fill corrections determine support for the direction of effect.

Value Added to Previous Meta-Analyses

Previous meta-analyses focused on correctional education have provided valuable insight into the effectiveness of various programs to impact recidivism and employment outcomes. However, recidivism has dominated the discussion; further focus on post-release employment could potentially provide additional insights relevant to policy makers. This meta-analysis provides an updated estimation intervention effect for correctional education program participation. Included studies have an average publication year of 2006, which is five years newer than the most recent meta-analysis of a comparable size. Utilization of the Restricted Maximum Likelihood estimation model is an update to previous methods, backed by recent research (Langan et al. 2019). Program-type comparisons between academic and vocational interventions provide more insight into program effects, as relevant to discussions of signaling theory. Trim-and-fill publication bias corrections support the validity of results in the current meta-analysis.

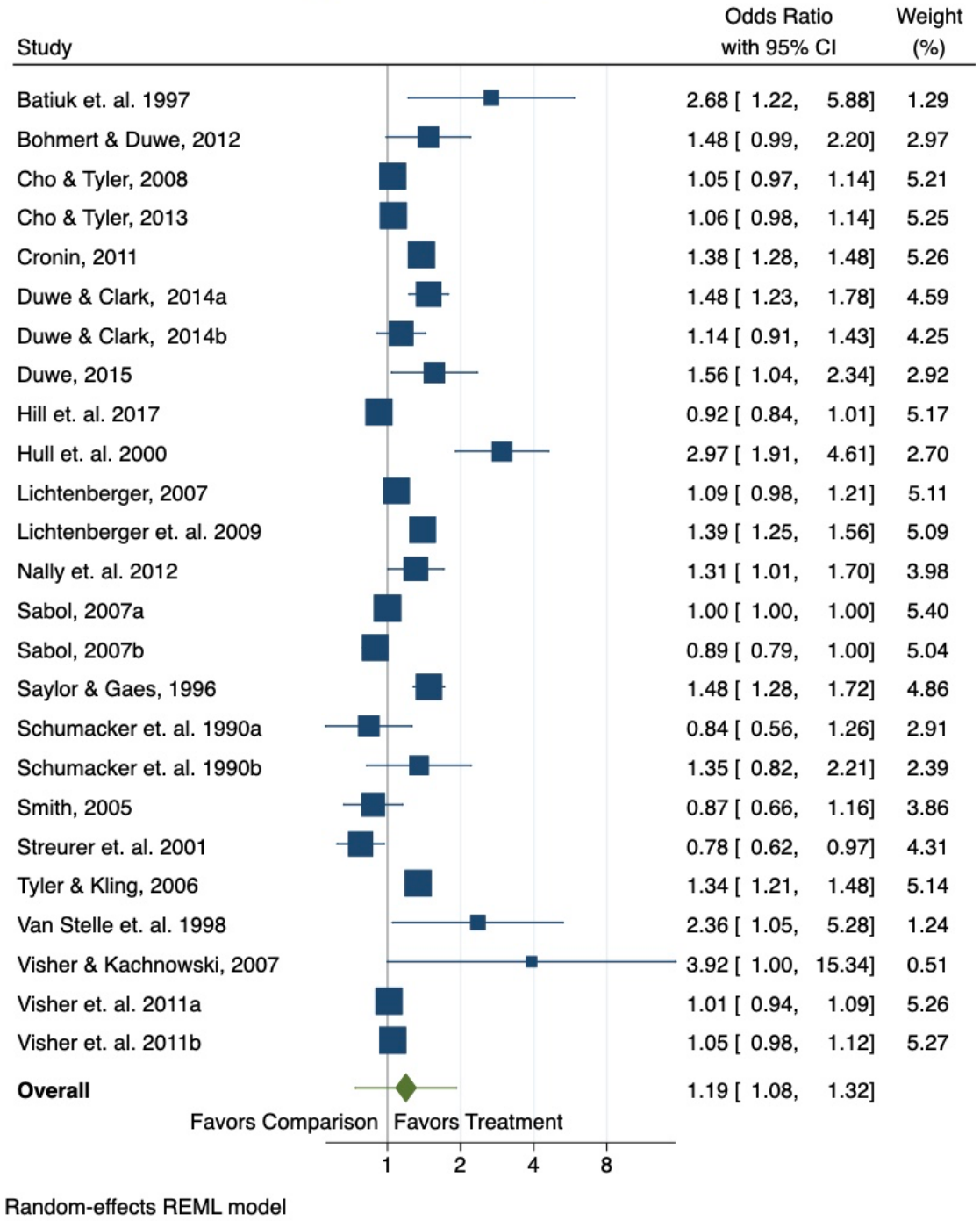
Correctional Education Programs

Within STATA, the standard error value is used to construct a 95% confidence interval for each effect size. These interval values, as seen in Figure 1 on the next page, were calculated based on the log odds ratio and then transformed back to the odds ratio format for ease of interpretation. An odds ratio of one represents no intervention effect; there is no observed difference in outcomes between treatment and comparison groups. An odds ratio greater than one represents a positive intervention effect. The prominent line on Figure 1 represents an odds ratio of one and the point where effect becomes positive or negative. Effect sizes to the left of this line favor the comparison group, meaning individuals in the treatment group had poorer outcomes. Effect sizes to the right of this line favor the treatment group and represent an improved outcome potentially attributed to participation.

The pooled meta-analysis results as displayed in Figure 1 show that the overall effect size to be calculated as an odds ratio of 1.19. This represents a positive correlation between participation in correctional education programs and post-release employment outcomes.

The pooled odds ratio can be interpreted as follows; an individual who participates in educational corrections programming is approximately 19% more likely to find post-release employment than a similar individual who does not participate. This finding supports Hypothesis 1, and the influence of correctional education programs on post-release employment outcomes.

Figure 1: Meta-Analysis Results



The green diamond on Figure 1 represents the overall effect size and associated standard error calculated for the pooled meta-analysis. Lines extending from either side represent the 95% confidence prediction interval of the overall effect size. The associated upper and lower

bounds of this interval are (0.74, 1.92). The prediction interval is not to be confused with the confidence interval based on standard error, values (1.08, 1.32) respectively. The confidence interval predicts the spread of the mean observation should more studies be added. The prediction interval is an estimation of effect size to be observed in future studies; it predicts the spread of individual observations that could be added. Modeling suggests with 95% confidence that a future program evaluation of correctional education programs with produce an effect size between 0.74 and 1.92. Additional program evaluations can improve the accuracy of this prediction interval in future meta-analyses.

Figure 2: Meta-Analysis Results Sorted by Study Size

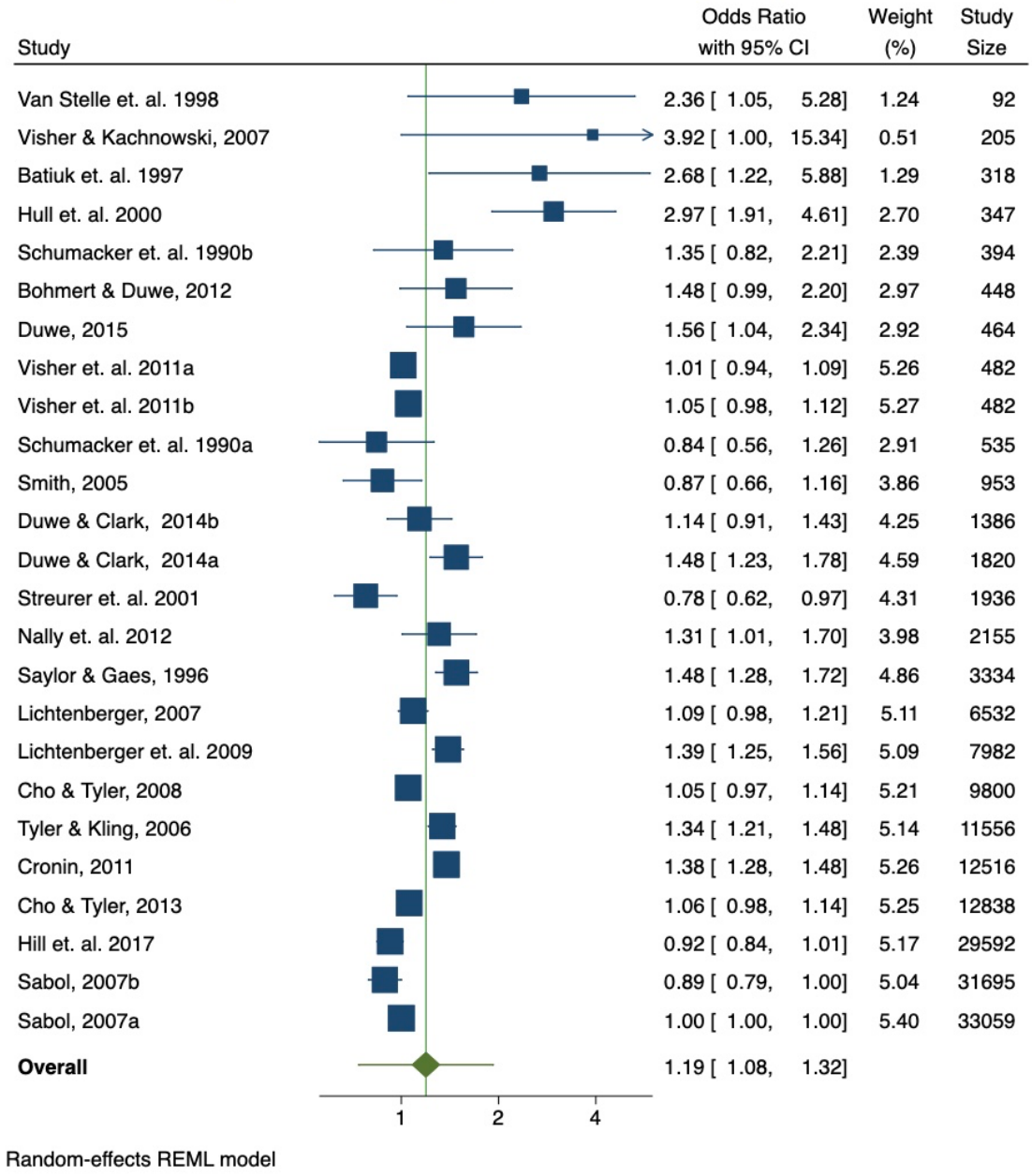


Figure 2 shows the observations sorted by study size. The weight associated with an observation rises with study size, given that this value factors into the standard error calculation. Assigned weight is also impacted by heterogeneity, such that effect sizes further

from the mean are given less prominence. It can be observed that the effect sizes of individual studies cluster near to the pooled effect size as study size increases. Studies with higher sample sizes can provide results of greater statistical significance, since the estimation of the average intervention effect is potentially more accurate. The observed trend of decreased deviation for the pooled value with increased study size provides support for internal validity of included studies. External validity of results is still dependent on the relevance of subpopulations included in these studies to the target population, such is the need for defined inclusion criteria.

Figure 3: Meta-Analysis Results Sorted by Follow-up Duration

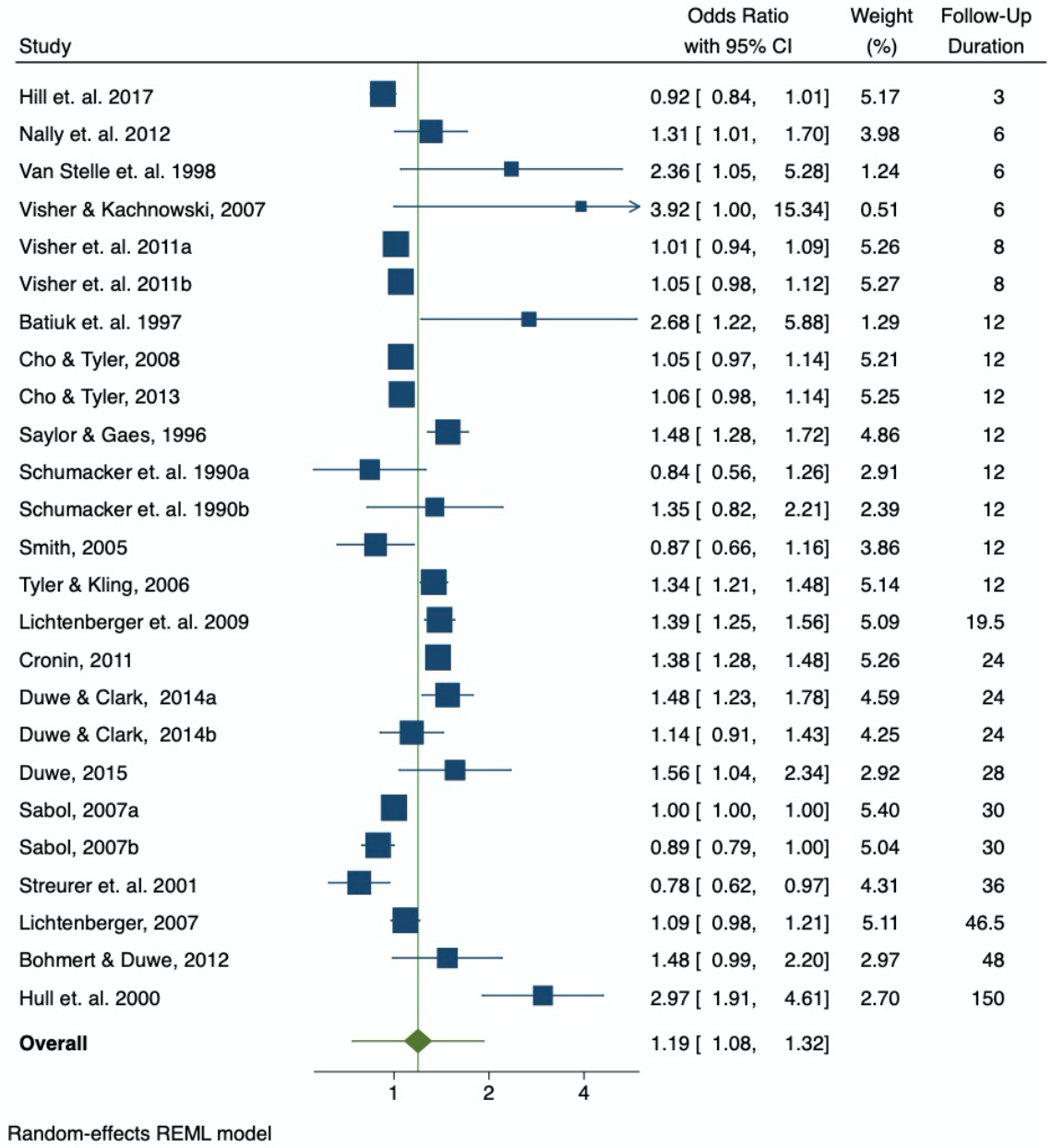


Figure 3 shows the studies listed by follow-up duration, starting with Hill et al. (2017) and the minimum included duration of three months. Hull et al. (2000) represents the longest follow-up period at approximately 150 months post release. An interesting trend appears in that

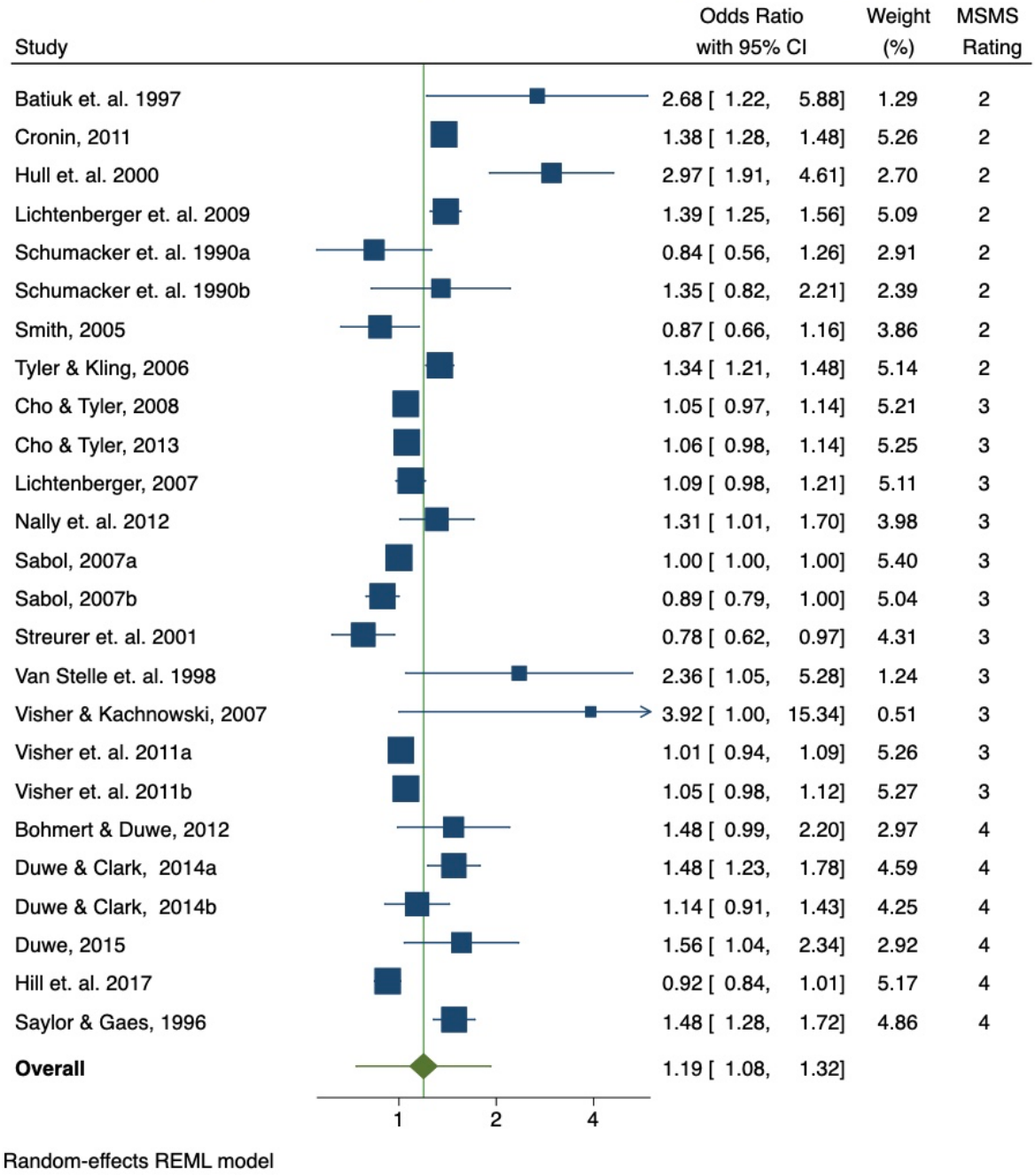
observations tend toward greater, positive effects at the shortest and longest durations. It is expected that programs evaluated closer to release have stronger effects, as the damaging labor market consequences of incarceration have been suggested as strongest in the period immediately after release (Schmitt & Warner, 2010). However, effects would be expected to become more moderate as time increases, given that signaling value fades in the time since attainment.

Among those studies featuring durations of less than twelve months, there is significance variance in the observed effect sizes. Heterogeneity of these studies is high, but there is an overlap of confidence intervals. This finding supports focus on an outcome duration equal to or greater than one year. It should be noted that the outcome measure in some studies can be influenced by an increased duration. For example, a study that measures employment status at the time of follow-up will be less influenced by duration than a study measuring at follow-up if an individual has ever been employed since release. The influence of time since release should be addressed by the authors within the included study; this is also a consideration when deciding methodological ratings. Studies ranging from Batiuk et al. (1997) to Tyler and Kling (2006) all have a follow-up duration of one year. Although some studies have larger deviations from the overall value and higher standard errors, this subgroup of studies is the most centered around the overall value of odds ratio 1.19. The similarity of study findings within the same duration implies that time since release does impact the observed effect size. This trend could potentially be explored in a later meta-analysis with additional studies sharing a same duration.

Studies of durations greater than one year initially remain centered around the overall value, then exhibit a pattern of decreasing effect size followed by increasing effect size at the longest durations, greater than forty-five months. The decline in effect size could potentially be attributed to the duration exceeding twenty-four months, as the greatest impact of correctional education is expected in the two years following release. The three studies exhibiting higher intervention effects for the longest durations are all significantly over two years. An extended study duration does allow for the influence of macroeconomic trends and other outside factors that can affect employment outcomes. Recidivism should also be considered, as those remaining out of prison for an extended duration possibly have other characteristics making them more likely to obtain and secure employment. As such, these observations could represent a positive employment effect present in later periods. The increase in observed effect size at these durations could potentially represent significant effects on long-term employment outcomes. This trend could be explored in a later meta-analysis with additional studies of longer duration.

Figure 4 on the next page lists the meta-analysis results sorted by their relevant ratings on the adapted version of the Maryland Scientific Methods Scale.

Figure 4: Meta-Analysis Results Sorted by MSMS Rating



No clear trend emerges when sorting studies by the methodical rating. Selection bias would be a concern if low rated studies showed significantly different results from those of high quality. This could signal that intervention effects are influenced by individual characteristics and self-selection into the treatment group. In the absence of this trend, validity in the current meta-analysis is supported. Studies rating at a level two for study quality more often find large effect sizes, but also show considerable standard error. This implies that when comparability between treatment and comparison groups is not established in reference to baseline equivalence, the intervention effect could potentially be influenced by other variables. Studies rating at a level three, ranging from Cho and Tyler (2008) to Visher et. al

(2011), appear to include a majority of observations with low standard error. The exceptions being Van Steele et al. (1998) and Visher and Kochanowski (2007); most studies also show an effect size near to the overall value. Again, this supports the validity of the calculated effect size as it relates to the population effect. Those studies rating at a level four, from Bohmert and Duwe (2012) down, can be observed as centering near the overall effect size. Well-matched comparison groups can provide a more accurate estimation of the true intervention effect. Additional studies of high quality would be valuable in a future meta-analysis to provide further validity to results.

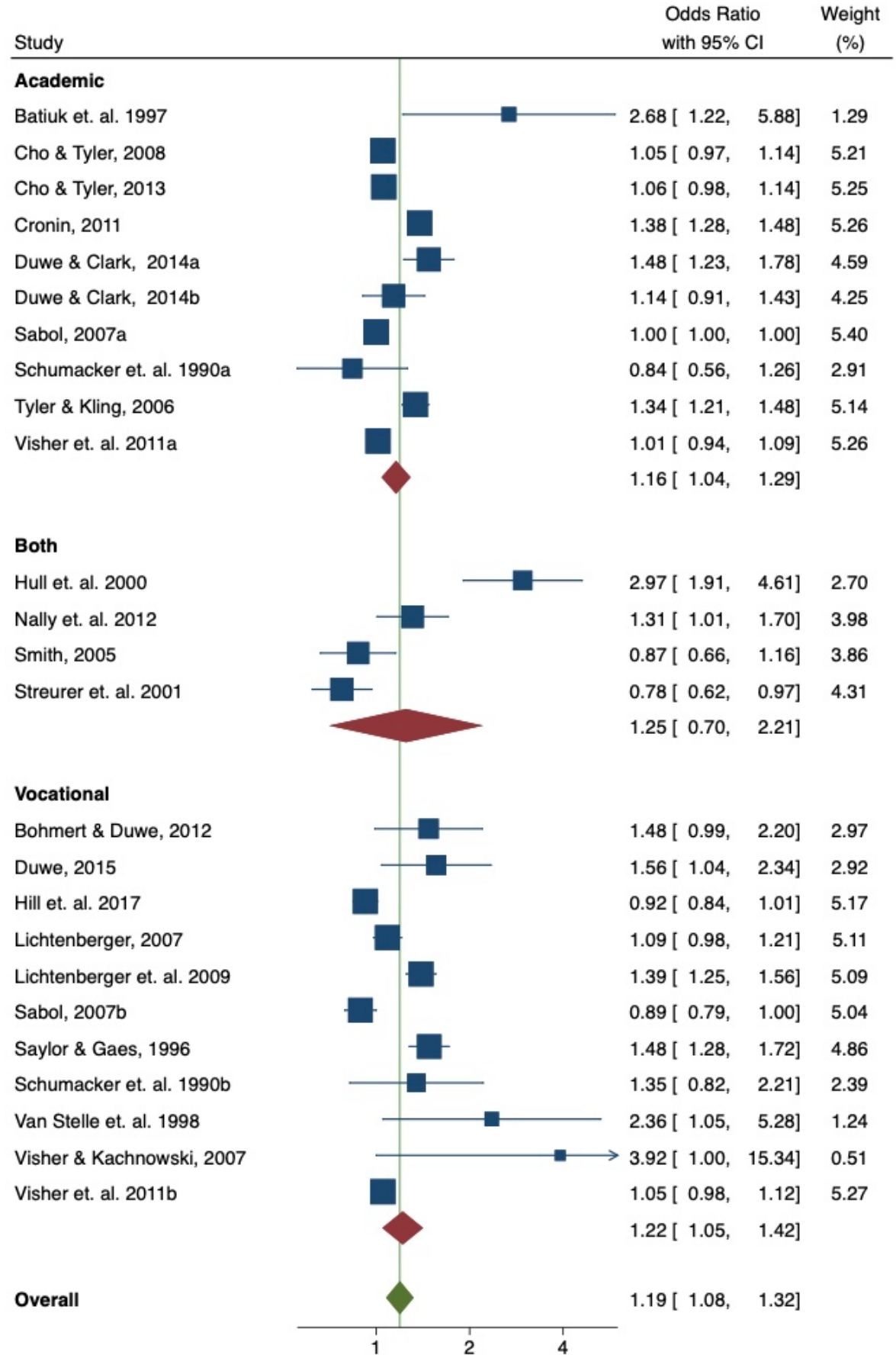
Program Type Comparisons

A goal of this meta-analysis was to evaluate the impact of correctional education programs as they pertain to policy decisions and potential research. Valuable insight can be gained by an analysis of intervention effect dependent on the type of programming completed. Correctional education program types considered for this analysis are classified as academic and vocational. Signaling theory suggests that programs of high rigor or high job relevance will have a greater signaling power to potential employers, resulting in more positive employment effects. The availability of current studies does not allow for an evaluation of program rigor; most studies included in this analysis did not report the intervention duration or requirements relative to similar interventions. Some indications of program rigor do exist, such as the increasing qualifications necessary of higher academic degrees. Considerations of program rigor present a potential opportunity for further research, but the current analysis will focus on the other variable indicated by signaling theory, job relevance.

Correctional education program types differ in their applicability to future employment positions. Relevance will depend on the employment position a formerly incarcerated individual might seek. However, vocational programs are aimed at marketable skill development and typically focus on competencies specific to a certain industry or trade. As such, vocational programs can be reasonably assumed as more relevant to potential employment positions, on average. The theoretical framework thus predicts that vocational program participation will have a stronger signaling value and result in a more significant, positive effect on post-release employment. This perspective can be tested through the available studies, with results meaningful to the stated research objectives.

Figure 5 on the next page shows meta-analysis results based on program-type subgroups. Observations are categorized as academic, vocational, or both depending on intervention attributes. Pooled results from the Both categories are not relevant to the comparison of program types. These observations are discussed only for the pooled intervention effect across program types.

Figure 5: Program Type Subgroup Meta-Analysis



Random-effects REML model

Figure 5 shows the forest plot of results for the program type meta-analysis. The Academic subgroup contains ten observations and reports an overall effect size of odds ratio 1.16. This is slightly below the effect size calculated for all studies of 1.19, but still represents a positive intervention effect. The vocational subgroup contains eleven observations and reports an effect size of odds ratio 1.22. This is slightly above the pooled effect size calculated for all studies, representing a stronger positive intervention effect.

In principle, these findings provide support for signaling theory - vocational programs with higher job relevance show a greater average effect on post-release employment. In practice, the difference between effect sizes is not significant enough to provide statistical evidence supporting the signaling perspective. Hypothesis 2 is supported that the significance of employment effects will be impacted by the type of correctional programming completed. However, the current meta-analysis is limited in its ability to differentiate program types at a more specific level. The categorical analysis of academic and vocational programs could represent an aggregation that overlooks relevant programming factors. Greater specificity in program types would allow for categories better matched in terms of rigor and occupational relevance. Additional evaluations at the program level could improve future meta-analyses, allowing for greater differentiation of estimated intervention effects and signaling value.

Within the program-type meta-analysis, a category of Both was also included. This refers to studies evaluating a combination of programs, such that the intervention could not be classified as purely academic or vocational. These values were included in the pooled meta-analysis of correctional education, as they provide observations relevant to the overall effect size. The four studies were separated in this subsequent program-type analysis to focus on differences in academic and vocational intervention effects. Of note, studies in this category have the highest program-type intervention effect estimate at odds ratio 1.25. This was unexpected, given that intervention effects are averaged for all correctional education programs. However, it can be observed that this estimation is skewed by one observation of high observed effect (Hull et al. 2017). The standard error of the pooled effect size is much greater for this category, resulting from few observations and high heterogeneity. As such, the pooled effect estimate for “Both” studies should be interpreted with caution; these observations are only considered within the pooled meta-analysis of all correctional education program.

Program-type findings support the positive intervention effects of both academic and vocational program participation, but differences in magnitude are not significant. Method limitations will be discussed in the next section as they influence meta-analysis results.

Method Limitations

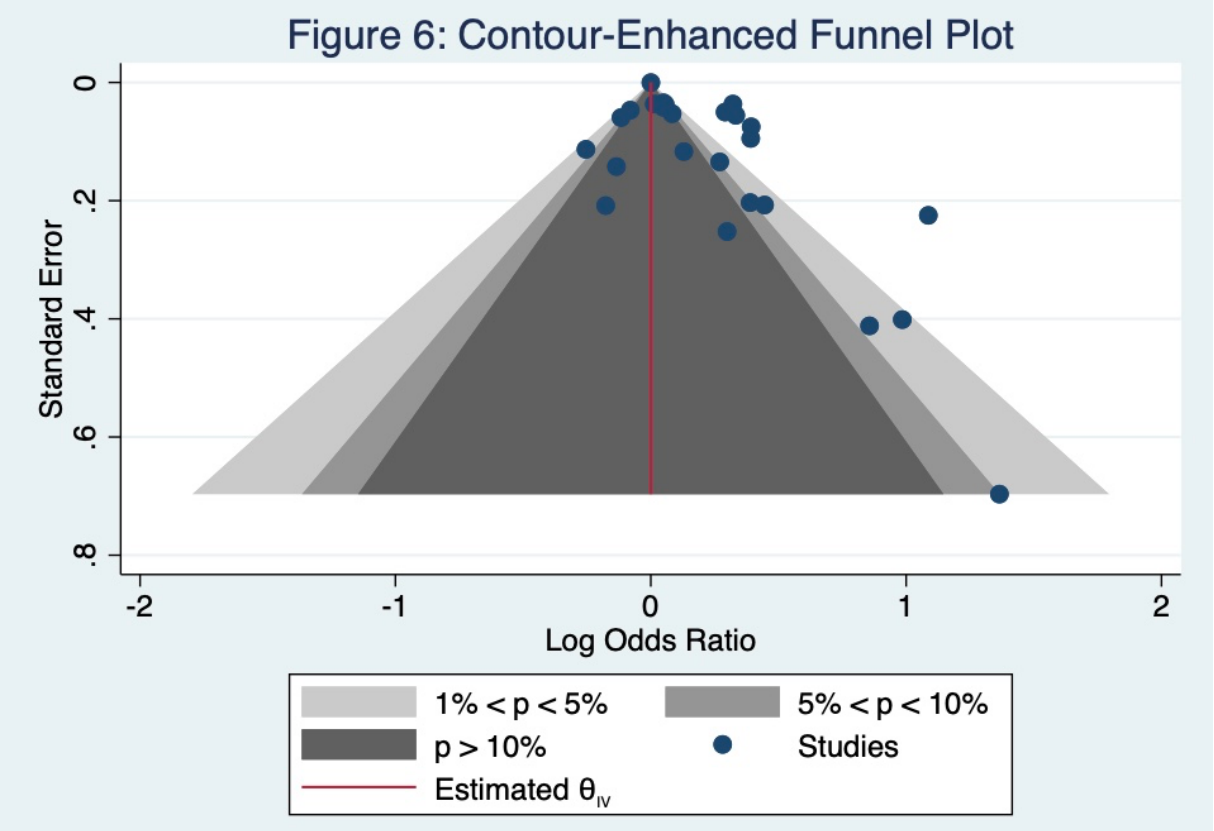
A potential limitation arises from the nature of meta-analyses; the strength of analysis is dependent on included studies. As such, meta-analysis findings and their predictive validity for the target population are limited by the availability and quality of scholarly research. Publication bias refers to the potential for missing studies in a meta-analysis that can result in biased effect size calculations. It is assumed that authors are more hesitant to publish results that go against expected outcomes; this can result in a scholarly body of work that exaggerates the magnitude of effect in the expected direction (Duval & Tweedie, 2000). In the presence of publication bias, this meta-analysis would overestimate the positive intervention effect of correctional education program participation on post-release employment. This is a significant concern for external validity, thus a contour-enhanced funnel plot will be created to check empirical support for bias. Trim and fill analysis will then be performed to estimate the pooled effect with publication bias corrections. External validity is further influenced by the relevance of included observations to the target population. Defined inclusion criteria and data collection procedures support the pooled effect size and publication bias correction. Similar considerations address potential limitations to the reliability of meta-analysis results.

Missing data at the level of individual studies is a relevant concern for the internal validity of this meta-analysis. Attrition can skew the results of a program evaluation, if included, these effect size observations will bias the meta-analysis findings. Individual study considerations for attrition are a factor in assessing methodological quality for inclusion, but attrition did not have a significant presence among included program evaluations. Analysis is done at the level of program participation through an intent-to-treat perspective; individuals who do not complete a program remain in the treatment group. Moreover, individual employment outcomes are commonly followed after release with data collected from probation officers, unemployment insurance claims, and other state regulated sources. As such, attrition is less prevalent when outcome data is not self-reported by study participants. Studies reporting attrition were analyzed on a case by case basis to determine if there was a threat to the validity of individual study results. Selection bias is another important consideration regarding the internal validity of component studies, since all treatment groups in correctional education program evaluations feature some degree of self-selection. Study authors should address concerns of selection bias in the formation of matched comparison groups, and this factors into evaluations of methodological quality.

Tests for Publication Bias

The validity of meta-analysis findings is subject to two major concerns of bias. Selection bias is considered at the level of the individual study and should be addresses by the study

authors. Considerations of selection bias are a deciding factor when ranking studies according to methodological rating scale. Publication bias is considered within the meta-analysis based on the findings of included studies. It is reasoned that study authors might be biased toward publishing results that support their position and the findings of peers. As such, it is possible that the scholarly body of work will be biased and result in a meta-analysis biased toward overestimating the observed intervention effect. Testing for publication bias is necessary to show reliability of meta-analysis results. Figure 6 shows a contour enhanced funnel plot of included studies, which provides insight on potential publication bias.



The funnel plot shown in Figure 6 provides evidence of publication bias in the positive direction. Assuming a normal distribution of the log odds ratio, studies should be distributed approximately equal around the red line representing the estimated overall effect size. A contour enhanced funnel plot is shaded based on significance levels for individual effect sizes. This implies that effects are skewed toward being positive, since the left-hand side of the funnel plot is missing observations in significant and non-significant areas. All studies with a negative log odds ratio fall near the overall effect size and within at least ten percent significance. In terms of publication bias, this could signal that results of negative outliers are not being published. Alternatively, negative results that fall outside of established confidence intervals could also be excluded. The evidence of publication bias suggests that the overall effect size might be an overestimation of the true population effect.

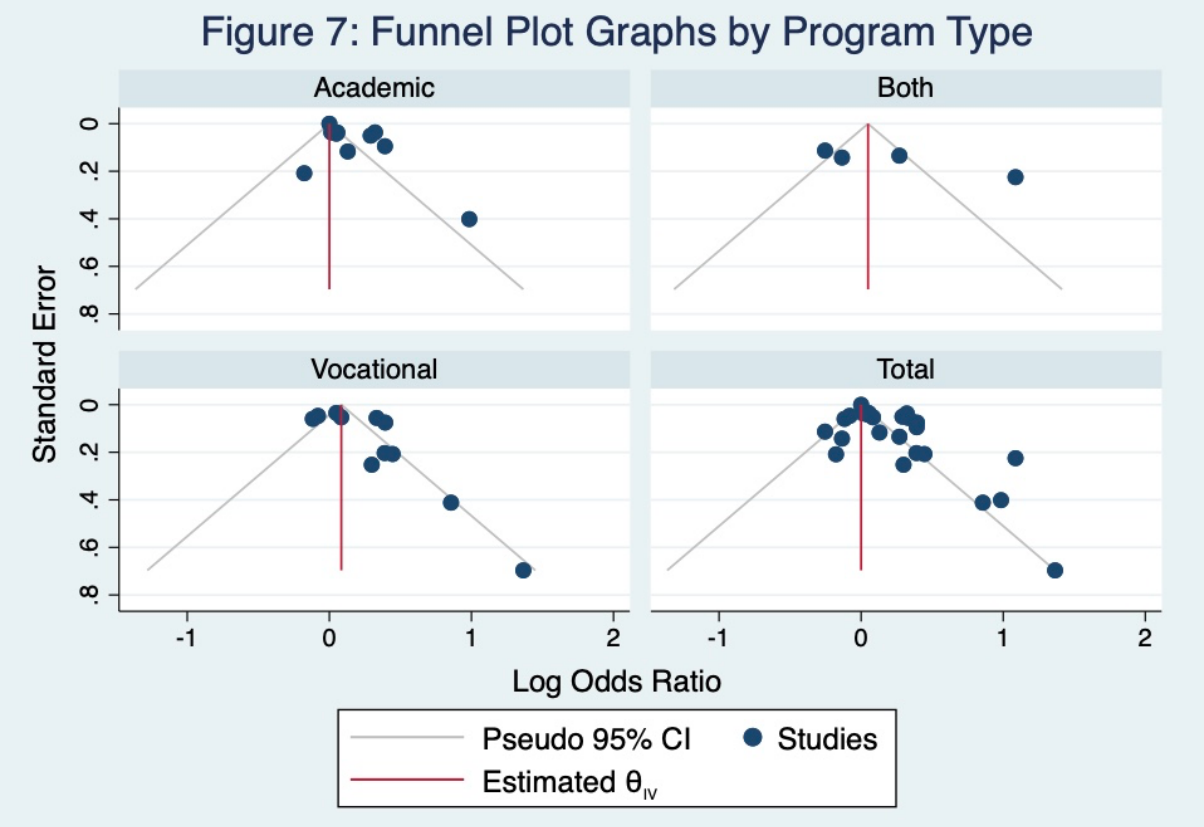


Figure 7 shows the funnel plots as separated by program type. As in the pooled funnel plot, we can observe evidence of positive bias in the publication of results for both Academic and Vocational programs. Also of interest is the distribution of effect sizes within the 95% confidence interval. Academic programs have more observations outside the confidence interval, but vocational programs exhibit similar potential biases. Intervention estimates for both categories could be potentially skewed by the inclusion of positive observations that overestimate the true effect.

Given evidence of publication bias within the meta-analysis, the trim and fill method provides one means toward estimating the impact of unpublished studies on the overall effect size (Shi & Lin, 2019). To trim the data means to remove those smaller studies that are resulting in the funnel plot asymmetry. After these values are trimmed, a new overall effect estimate is calculated to approximate the real center of the funnel. To fill the data then requires that the previously omitted small studies be added back to the observations. Also filled are the presumably missing counterparts of these omitted studies. Based on a standard distribution around the newly calculated real center of the funnel, negative observations are then imputed to balance the funnel plot. After all values for observed and imputed studies have been entered, a new overall effect size is calculated (Shi & Lin, 2019).

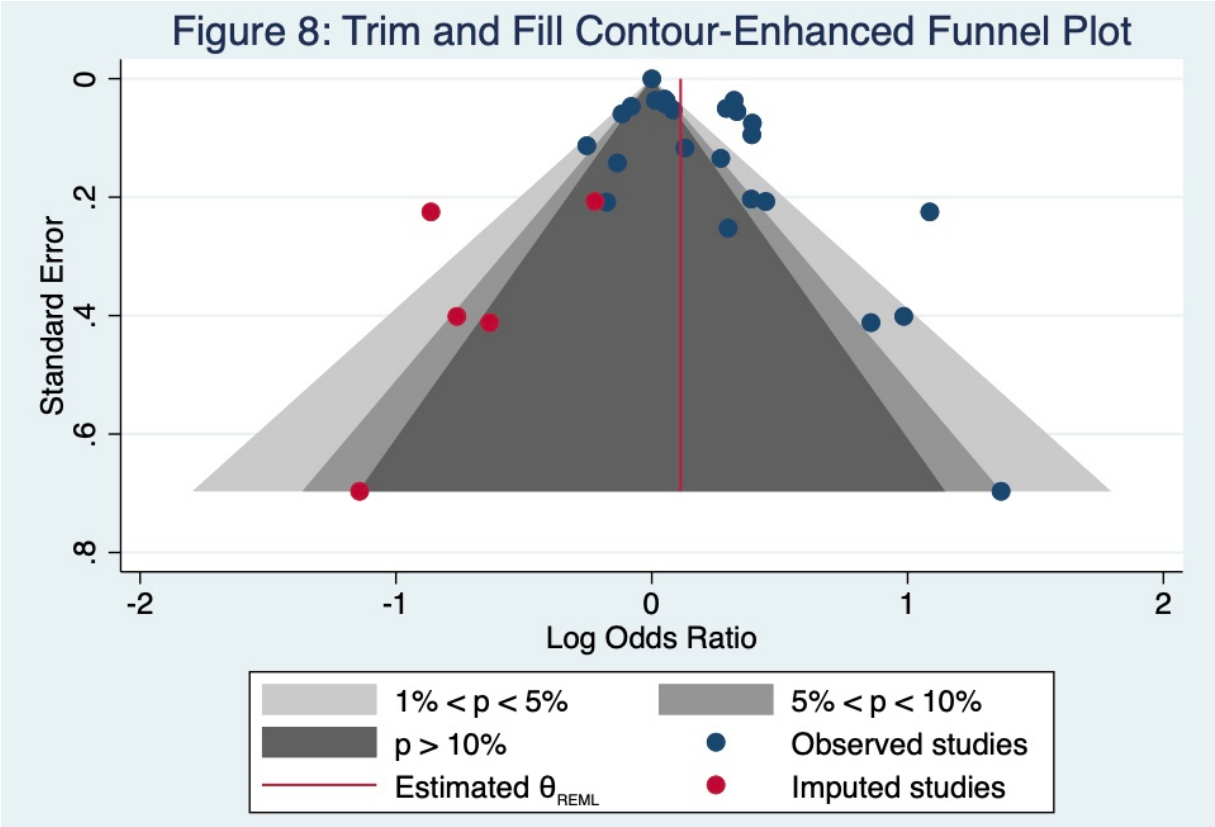


Figure 8 shows the contour enhanced funnel plot after trim and fill analysis. Five imputed effect sizes were added to control for estimated publication bias. The overall effect size for observed and imputed studies is equivalent to an odds ratio of 1.12. As expected, the effect size has been corrected for overestimation due to positive skewed publication bias. Although the estimated effect is less dramatic than the effect calculated for observed studies at 1.19, this finding still represents a significant, positive intervention effect. The number of studies to be imputed is low, such that heterogeneity and missing publications are not viewed as representative of bias in the current meta-analysis results.

Reliability and Validity of Results

Indicators of publication bias were identified in this meta-analysis, but trim-and-fill analysis supports the external validity of results. In the absence of publication bias, the direction of effect would remain the same. The magnitude of effect would remain within one standard deviation of the observed value. External validity is also supported by considerations of method quality. Studies with well-matched comparison groups do not observe significantly different intervention effects than those with unmatched comparison groups. All categories of study quality feature observations approximately distributed around the pooled effect size, with no clear trend emerging. Selection bias would be a concern if studies of low methodological ratings showed significantly different results from those of high quality. This would indicate that intervention effects are influenced by individual characteristics and self-

selection into the treatment group. In the absence of this trend, internal validity of component studies and the current meta-analysis is supported. The reliability of this analysis cannot be fully assessed until the next meta-analysis of correctional education programs; future publications will hopefully find results supporting those presented. Comparisons with previous meta-analyses in the field show a common direction of effect, supporting the positive impact of correctional education programs on post-release employment outcomes. Pooled intervention effects are reasonably similar in magnitude, further supporting the reliability of the current meta-analysis and previous publications.

Conclusion

An increase in national incarceration rate for the United States necessitates a focus on the experiences of formerly incarcerated individuals as they rejoin society. Post-release employment has been identified as a relevant outcome measure for understanding conditions of successful reintegration. Interventions designed to improve reintegration outcomes can thus be evaluated as they affect employment among the formerly incarcerated. Correctional education programs represent a valid intervention for the focus of this analysis, and program type comparisons allow for greater insight from intervention effect estimates. A meta-analysis was chosen to allow for aggregate program-type comparisons not possible at the level of an individual study. The estimation of pooled intervention effects is also pertinent to national policy decisions for incarceration and reintegration.

The preceding meta-analysis has provided evidence that correctional education program participation has an average intervention effect to improve post-release employment outcomes. An updated selection of program evaluations produced findings in line with previous meta-analyses in the field, supporting the reliability of results. The Restricted Maximum Likelihood estimation model was implemented as an update to previous methods. The pooled effect estimate, odds ratio of 1.19, provides insight into the research question and supports the predictions of the first hypothesis. Voluntary participation in correctional education programs is found to have positive effect on post-release employment among the formerly incarcerated. Individuals participating in educational programming are approximately 19 percent more likely to have a positive post-release employment outcome than incarcerated individuals who do not participate.

Results also support the theoretical framework of signaling perspective and predictions of hypothesis two. Correctional education program participation was suggested to improve employment outcomes through its influence on the perceptions of potential employers. Signaling value is mediated by considerations of program rigor and job relevance. Programs types that differ in these values would possess distinctive signal values, resulting in varying effects on post-release employment. Within this meta-analysis, academic and

vocational programs were compared for an observable influence of signaling value. Vocational programs feature higher relevance to potential employment positions, and were expected to have a stronger intervention effect that academic programs. The program-type analysis presents vocational programs as having a pooled intervention effect of odds ratio 1.22, which is greater than academic estimate of 1.16. Correctional education programs classified as vocational were found to have a stronger, positive effect on employment outcomes than academic programs. However, it should be noted that the statistical significance of the difference is limited; additional observations are needed in both program types to further the analysis.

The validity of meta-analysis findings is supported by the quality and relevance of included studies. Defined inclusion criteria and data collection procedures were specified to ensure the selection of adequate studies. With these processes satisfied, the subpopulations of included studies can be reasonably assumed to hold relevance to the target population of formerly incarcerated individuals in the United States. Publication bias was considered as it might affect the external validity of meta-analysis findings. Relevant funnel plots indicated the potential influence of publication bias, but results from trim-and-fill analysis suggest the magnitude and direction of effect would remain similar after publication bias corrections. As such, the findings of this meta-analysis can reasonably be considered as valid. Evidence for the positive influence of correctional educational program participation on post-release employment outcomes is strong. Additional research is needed to collect more evidence supporting signaling theory and differential effect of correctional education program types.

Policy Implications

Studies equating cost avoidance with recidivism outcomes have found inconclusive evidence supporting investments in correctional education programs (Council of Economic Advisers, 2018). A majority of previous research within the field has been focused on recidivism outcomes, but less scholarly work has been published about the employment outcomes of correctional education participants (Gaes, 2008; Davis et al. 2013). For correctional programs aimed at improving academic or vocational skills, employment outcomes can provide a more direct measure of intervention effect than recidivism. Although research has found a positive correlation between employment and recidivism outcomes, there are a number of mediating factors that could influence this relationship. Recidivism is a valuable outcome measure for any correctional investment, but post-release employment outcomes should also be considered by policy makers. Further focus should also be applied to which correctional education programs have the greatest influence. Additional focus on post-release employment outcomes could potentially provide better insights into the social and economic returns on investment for correctional education programs. Reports prepared for policy

makers should consider monetary effects outside of cost avoidance, such as those resulting from increased economic mobility amongst the formerly incarcerated.

Previous policy decisions at state and federal levels have decreased funding to correctional education programs. Although recent trends imply a move toward more supportive policies of incarceration and reintegration, sustained funding remains a major concern for program effectiveness. Trends are ever subject to political and macroeconomic conditions that could potentially change the dominant mindset regarding policies. Continued funding for program evaluations of correctional education is needed to build stronger evidence in support of the provision of resources. Future meta-analyses will be supported by the inclusion of additional studies. Program-type comparisons featuring greater specificity and more observations can potentially inform investment decisions to maximize the efficacy of programming investments. Additional studies would allow for a greater level of detail in the analysis and provide better indications as to what specific factors improve the post-release outcomes of the formerly incarcerated. The proliferation of high-quality scientific research is significant toward improving the standards of systematic reviews and meta-analyses. This evidence could potentially be significant in future policy decisions for incarceration and reintegration measures in the United States.

Potential for Further Research

As alluded to in previous sections, there are many opportunities for further research that could potentially advance the field. One particular area of improvement would be additional studies of high scientific quality, as the current scholarly body of work is limited in this regard. Studies of the highest scientific rigor are unlikely to be possible, given that randomized control trials cannot easily be designed for voluntary interventions. However, level four studies with well-matched treatment and comparison group that establish baseline equivalence provide results of high validity and reliability. More studies with this design will improve the accuracy of estimations of overall effect sizes. Meta-analysis findings could also be bolstered by additional observations allowing for program-type comparisons. Studies of all correctional education programs have significant heterogeneity in observed effect size. Research done at a more focused level should provide better indications of the true intervention effect. Research could also be advanced by more studies of longer duration. As shown in this meta-analysis, effect sizes tend to become moderate and approach the pooled value as the duration exceeds one year. However, studies with the longest durations of three or more years then showed stronger, positive effects. Additional exploration of follow-up duration as it impacts employment outcomes could help research and policymakers better understand the long-term employment effects of correctional education programs.

Regardless of the study-specific attributes, additional publications on will improve the accuracy of meta-analysis calculations, assuming they meet scientific quality standards. Studies of this nature will also improve the understanding of recidivism outcomes, as additional observations will allow for correlation analysis between employment and recidivism. Additional observations could also allow for analysis considering other variables such as macroeconomic conditions. The relevance of the 2008 financial crisis on labor market outcomes would be an interesting expansion for future research, but unfortunately requires a large body of studies preceding and following the recession that falls outside the scope of this analysis. The availability of studies is currently better served at analyzing differences in program type outcomes than differences due to the time of release. However, this would be a potential area for further exploration in the future if the scholarly body of work expands. The impact of macroeconomic constraints caused by COVID-19 could also be of potential interest. The durability of correctional education program effects during economic downturns is a relevant concern to researchers and policymakers.

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Appendix A: Extended Systematic Review

Notable Studies of Academic Correctional Programs

Cho and Tyler (2013)

In a study published by Cho and Tyler in 2013, the relationship between ABE participation and post-release outcomes was explored for a large dataset of Florida prisoners. Florida requires participation in ABE programs for any prisoner scoring below a ninth-grade level, with the exception of certain exempted classes. The comparison group was based on individuals who did not participate in any ABE programming, but the authors acknowledge that these individuals could be exempt or already above the required comprehension level. The authors also indicate that baseline characteristics are not particularly well matched between treatment and comparison groups, as non-participants feature average demographics deemed "less disadvantaged" than those seen among program participants.

Both considerations indicate that this study could potentially underestimate the impact of adult basic education on post-release outcomes, as the comparison group is inherently biased toward better outcomes. Despite this, the program evaluation finds a significant positive effect of ABE participation on post-release employment outcomes. Individuals who participated in programming were found to have higher average earnings and a greater likelihood of being employed in the post release period. Recidivism was not proven to be significantly related to program participation in either direction, an outcome that supports the selection of post-release employment as the primary outcome measure for this meta-analysis (Cho & Tyler, 2013)

Batiuk, Moke, and Rountree (1997)

Batiuk, Moke, and Rountree (1997) produced a significant analysis of post-secondary education by observing long-term follow-up data for 97 prisoners who completed an associate degree while incarcerated. Follow up data collected over a ten-year period is uncommon in program evaluations of correctional education, providing valuable insights on long term outcomes. The study design featured an unmatched comparison group, consisting of 223 randomly selected prisoners from the same prison who had not obtained an associate degree. Random assignment to the comparison group was combined with a limited set of covariates in the regression in order to control for variation in baseline characteristics. Although the use of regression controls does provide statistical significance, the authors did not consider the impact of selection bias in their analysis.

The study design remains important to the field, as it considers that employment might have a mediating effect on recidivism. The authors first analyzed employment and recidivism outcomes separately for participants, then created a model using recidivism as the

outcome while controlling for employment. Their results showed that post-secondary education has a positive effect on employment and also found evidence for the mediating effect of employment on recidivism, as recidivism outcomes became significant when controlling for employment status. Findings provide support for the use of employment outcomes as an indicator of program success.

Cronin (2011)

An analysis performed by Cronin in 2011 looked at the impact of GED preparation courses completed during incarceration for inmates of the Missouri State Department of Corrections. The treatment and comparison groups were large and support statistical validity in the sample; the treatment group comprises approximately 5,000 program participants, while the comparison group is roughly 7,500 individuals matched on a limited number of characteristics. The author reports the average inmate in Missouri to have roughly a tenth-grade education, which indicates former prisoners who do not complete educational programming will exit prison at a similar comprehension level. Completion of a GED can thus serve as a significant tool of differentiation to indicate higher education and skills levels.

Cronin (2011) finds that inmates who complete a GED are approximately thirteen percent more likely to find employment after release than those who have no program participation. However, while employment levels for the treatment group are higher than their matched comparison, the author also observes that employment rates for former prisoners who entered prison with a GED or higher exceed the treatment group. This indicates that program completion can be less important than the highest education level achieved for effecting employment outcomes. Higher levels of academic programming, such as post-secondary or vocational courses, could potentially have a greater effect on post-release employment than secondary education courses. This is supported by signaling theory, which suggests both program level and relevance to a potential employment position will mediate the effect of program completion on relevant outcome dimensions.

Duwe and Clark (2014)

Duwe and Clark (2014) completed an analysis comparing the efficacy of secondary and post-secondary education programs for post-release outcomes. The study followed prisoners released from the Minnesota Department of Corrections between 2007 and 2008. A focus on prisoners released during the same calendar year allows for comparability on macroeconomic conditions, and the study's completion within the past fifteen years provides findings relevant to modern conditions. Their results indicate that completion of secondary education courses has a significant positive effect on the likelihood to find employment after release. However, their results show no significant impact for recidivism of the other employment indicator, wages.

The findings of Duwe and Clark (2014) support positions held within this paper, such as recidivism being an imperfect indicator for educational program success. A lack of effect on wages indicates that attainment of a GED does not qualify formerly incarcerated individuals for many high-income positions. In line with signaling theory, we anticipate academic programs of higher rigor to have a stronger impact on post-release outcomes. Duwe and Clark observe that for post-secondary education, there is a significant improvement in wages, hours worked, and recidivism measures. Although the impact of secondary education can be comparatively less than other academic programs, the direction of effects these studies provide supports the effectiveness of educational programming.

Notable Studies of Vocational Correctional Programs

Visher and Kachnowski (2007)

Visher and Kachnowski (2007) collected comprehensive data on a group of inmates released from the Illinois State Correctional System who were returning to the Chicago area. This subset of data was part of a larger multi-state study, the "Returning Home" project, to understand the re-entry experiences of former prisoners. Initial study participants were selected based on responses to a survey completed while incarcerated on pre-prison experiences. Follow up information was then collected via one-on-one interviews at two durations after release; one to three months and four to eight months. The level of detail collected through interview data typically exceeds that of administrative data, allowing for numerous control variables in the analysis related to pre-prison characteristics. In a logistic regression analysis, Visher and Kachnowski find that participation in job training programs was positively related to employment outcomes at four to eight months after release. Individuals were more likely to be employed at the time of the follow-up interview, but no significant results were observed for number of months worked since release.

Findings suggest that job volatility could potentially be impacting the long-term employment outcomes of the formerly incarcerated. Although the authors do report outcomes based on participation in vocational training, it should be noted that this study is not explicitly a correctional education program evaluation. The main research goal was to investigate those factors contributing to successful employment of offenders who returned to their previous community after incarceration. Vocational education is considered as one factor relevant to a subset of study participants, but the level of control variables in treatment and comparison groups provides significant findings for program participation.

Lichtenberger (2007)

Lichtenberger (2007) evaluated the direct and indirect impacts of vocational programming, namely career and technical education (CTE), on post-release outcomes such

as recidivism and employment. The authors follow individuals released from Virginia correctional institutions during 2003, controlling for pre-existing differences due to personal characteristics. This allows for a treatment groups to be established on the basis of program completers and non-completers and provides relatively a well-matched comparison group for analysis. The author found that individuals who participated in CTE training were more likely to find post-release employment and acheive higher earnings that non-participants. This program evaluation only considered treatment participation from an "intent-to-treat" perspective.

As it relates to signaling theory, program participation is expected to improve employment outcomes by signaling positive attributes to potential employers. Findings support the positive effect of vocational program participation on employment. Lichtenberger also tests the mediating effect of employment on recidivism. The author observes that program completion does not have a significant impact on recidivism. However, program completion in conjunction with post-release employment has a significant positive effect. The author suggests that reductions in the likelihood of recidivism represent an indirect impact of vocational education. Post-release employment represents a direct outcome measure for assessing program participation.

Sabol (2007)

Sabol (2007) is a well-designed study that produced results at odds with the general direction of effect found in available literature. The primary research goal was to analyze the impact of local labor market conditions on post-release employment experiences; the author used a sample of over 34,000 inmates released from the Ohio Department of Rehabilitation and Corrections between 1999 and 2000. The impact of vocational or GED program participation was a secondary consideration for the author, but his results were surprisingly negative. His analysis showed no impact of obtaining a GED of post-release employment, but those who completed a vocational training program were actually less likely to be employed. His results also showed that vocational training had a negative effect on wages and employment duration among study participants.

To address the perverse nature of these findings, Sabol (2007b) released another analysis featuring a propensity score matching procedure to compare vocational program participants. Matched comparison groups were formed based on control variables recorded during the earlier analysis. This secondary analysis showed that an important confounder was employment before prison. Individuals with employment experience benefitted from vocational training, but other program completers did not see significant employment effects. Sabol acknowledged that these observations go against the majority of findings in the field, but he does point to other studies that have found insignificant results for GED completion (Tyler and Kling, 2007). A number of potential factors limiting post-release

employment for vocational program completers, such as a mismatch between available training and local employment opportunities, were also discussed. Studies that provide insignificant or negative results remain important for inclusion in the meta-analysis. Provided that they meet all relevant inclusion criteria, any study of sufficient scientific rigor should be analyzed.

Schumacker et al. (1990)

Other studies have likewise shown the significant impacts of vocational program participation on post-release outcomes, though findings can be reported with less certainty. Studies that rate lower for their scientific methods can still provide valuable observations to be considered for meta-analysis calculations, given that the authors employ statistical corrections or otherwise account for potential bias. Schumacker et al. (1990) presented a multi-state study completed within the American Midwest, which provides a unique dataset representative of multiple state penitentiary systems. The authors then looked at employment levels at the end of the first year after release, comparing those of academic and vocation programs participants to that of a comparison group. Although academic programs were not found to have a significant effect on recidivism or employment outcomes, vocational program participation resulted in an improvement to post-release employment. Groups were matched on few characteristics and featured relatively small sample sizes, but the study does meet the minimum methodological requirements. Previous evaluations of correctional education have also considered programs at an aggregate level, grouping academic and vocational programs together to focus on all educational interventions.

Streurer et al. (2001)

Streurer et al. (2001) present a comprehensive three-state study of recidivism and employment outcomes for participants in correctional education. The sample is relatively large, and authors also have significant information on background characteristics gathered through pre-release interviews and administrative data. However, the authors do not use a propensity score matching technique to create comparison groups, nor do they use statistical methods to control for characteristic differences between groups. Sample selection was attained by looking at all individuals released during a certain period, then dividing into education participants and non-participants. Streurer et al. does address contrast between treatment and control groups on notable characteristics, bit sufficient evidence is provided that the direction of effect would remain unchanged. The authors find substantial improvements for recidivism in all three states; employment outcomes were only reported for Maryland and Minnesota, but also improved for educational participation.

Insights from Previous Meta-Analyses

Wilson, Gallagher, and MacKenzie (2000)

The first major meta-analysis related to correctional programming was published by Lipton, Martinson, and Wilks in 1975. This research served as inspiration for other authors to analyze the effectiveness of correctional education through comprehensive summaries, systematic reviews, and further meta-analyses. Wilson, Gallagher, and Mackenzie conducted their meta-analysis at the University of Maryland in 2000 and only included studies published after 1975; a significant update to the previous analysis. The authors also sought to improve on a major limitation in the work of Lipton et al. (1975), where in the previous meta-analysis did not consider research quality across component studies. Wilson et al. utilized the scientific ratings score presented in "The Maryland Report" for analyzing the rigor of studies and significance of results (Sherman, Gottfredson, MacKenzie, Eck, Reuter, and Bushway, 1997).

The Maryland Scientific Methods Scale (MSMS) has a score range from one to five based on considerations of study design and reliability of results. A five represents a study of the highest quality, such as a randomized control trials, where in outcome differences for treatment and comparison groups can be assumed independent from baseline characteristics. Baseline characteristics refer to the attributes of individuals prior to joining a study that could potentially influence outcomes, such as demographics, education level, or previous criminal history. The authors applied a lower limit of two for any study to be included in their analysis, meaning an eligible study must feature treatment and control groups regardless of matching of degree of statistical controls. This scale is also used in the current analysis; thus, a more detailed discussion will be provided in later sections. The authors tested for impact of research quality by using the scale as a control variable within their analysis. For recidivism, a significant positive relationship was observed, and findings remained robust when controlled for MSMS rating. The authors also report a positive effect on employment, but they did not report exact outcomes as they did for recidivism.

Aos, Miller, and Drake (2006)

The Washington State Institute for Public Policy published this meta-analysis to provide a comprehensive review of adult correctional programs, based on evidence collected from rigorous program evaluations. The research goal was stated as providing Washington State policymakers with an accurate assessment of what correctional programming has a demonstrable effect on crime rates. This analysis only considers crime reduction outcomes, with a specific focus on reductions in recidivism rates, and thus was not listed in Table 1 with meta-analyses of employment outcomes. Although less relevant to the current analysis' primary outcome measure, the structure of their analysis has provided indicators of success

and failures in the methodology. They report findings by program-type at a relatively detailed level, and the significant difference in outcomes observed supports a continued focus on program types.

Researchers required brevity in the reporting of their results, as they were analyzing twenty-eight unique categories of interventions. The level of detail will be greater in an analysis focused on education programing, with program-type comparisons having more baseline similarities for all being in the same field. The authors also use the Maryland Scientific Methods Scale for rating research quality; they apply a lower limit of three for any study to be included in their analysis, meaning all studies have treatment and comparison groups matched or controlling for baseline characteristics to some extent. The influence of the ratings scale is also significant in their meta calculations, as effect sizes as discounted based on their assigned scientific quality. The authors also applied further discounts to short term studies and those deemed overly influenced by the researcher. As such, this meta-analysis reports relatively low average affect sizes for vocational and educational programming's effect on recidivism, but the direction of effect remains positive.

Davis et al. (2013)

The Second Chance Act of 2007 was aimed at improving the reintegration measures available to incarcerated individuals; one provision of this legislation had an explicit focus on improving correctional education offered to prisoners. In 2010 the Bureau of Justice Assistance, in conjunction with the Office of Vocational and Adult Education, awarded a grant to the RAND corporation to perform a comprehensive analysis on the effectiveness of existing education programs. The resulting meta-analysis was intended as a tool to judge whether current investments in correctional education are achieving the desired outcomes. Although the primary outcome of focus for this report is recidivism, post-release employment is given a separate meta-analysis from recidivism studies. This analysis contains less studies than the recidivism analysis, nineteen versus fifty-five, but still presents the most extensive meta-analysis to date that considers employment outcomes. The results of the RAND meta-analysis are positive for both recidivism and employment, but the significance of results between meta-analyses differs based on the component study quality.

The authors again used the Maryland Scientific Methods Scale to rate the research quality of studies, with a minimum rating of two being required. Effects sizes were not adjusted for quality ratings and the rating scale was not used as a control variable, but the authors did acknowledge the implications of study quality. Meta-analysis results were again computed with only studies of the highest quality to compare the direction and magnitude of results. Findings for post-release employment were viewed as less statistically significant due to study quality, since this meta-analysis featured less studies of the highest quality.

However, the results still show a positive effect that can be reasoned significant when component studies have employed methods to control for variation from baseline characteristics. The results of the RAND analysis are in line with those found by Wilson et al. (2000) suggesting that correctional education programs do improve post-release employment outcomes.

Bozick et al. (2018)

One of the most recent meta-analysis to be released in the field, Bozick et al. is an expansion on the RAND report previously produced by Davis et al. (2013). The authors update the existing meta-analysis to include studies published up until 2017, but the methodological structure and use of ratings scale remain the same. This report also considers employment outcomes through a separate meta-analysis, with twenty-one studies included. Some studies feature multiple effects size calculations, such that the authors included twenty-six effect size estimates in their analysis. This is the most extensive meta-analysis to date of program evaluations related to employment outcomes. As with the RAND report, treatment and comparison groups are created following an intent-to-treat approach. For those few studies that do report separate results for program participants and program completers, results are combined to create one treatment group for all who receive the intervention. As many studies do not report outcome separate based on completion, this method allows for greater comparison between available studies.

Both reports also calculated effect sizes as odds ratios, since dichotomous outcomes were more common among included studies. Studies with continuous values, such as average wages or weeks worked, were transformed to dichotomous outcomes via explained statistical procedures. Bozick et al. added additional program evaluation related to wage levels within their analysis, which is relevant for calculating an accurate direction of effect for post-release employment outcomes. The effects size calculation used in the RAND report and more recent publication of Bozick et al. has informed the method to be used for the current meta-analysis. Additional robust checks and a sensitivity analysis were also applied by Bozick et al. in their meta-analysis to ensure the validity of calculations. The current meta-analysis will attempt to incorporate successful attributes of previous analyses while providing a unique contribution to the academic discipline.

Appendix B: Data Collection Forms

Authors: Batiuk, Moke, and Rountree (1997)	
Title: Crime and Rehabilitation: Correctional Education as an Agent of Change	
Published: Justice Quarterly, 14:1, 167-180	
Intervention	
Description of intervention: Associate degree program offered by the Ohio State Department of Corrections	
Program level: Post-secondary Academic	
Program setting: State prisons in Ohio	
How was intervention status assessed? completion of an associate degree program	
Participants	
Study eligibility criteria: Males inmates who left a medium-security prison in Ohio between 1982 and 1983	
Participant characteristics: Recently released individuals who had earned an associate degree while incarcerated	
Description of comparison group: Inmates at the same prison that did not receive associate degrees but were released during the same period	
Study Attributes	
Treatment group: N_E = 95 inmates	Comparison group: N_C = 223 inmates
Matching Procedure: Individuals self-selected into the treatment group; the comparison group featured individuals randomly sampled from the release cohort, but the study does not report the total amount of releasees. As such, it is unknown whether the random sampling is representative. The authors show that treatment and comparison groups differ significantly on a number of baseline characteristics. They do address some of these variables (such as history of juvenile convictions, pre-arrest employment, and previous college education) within their analysis, but they do not control for or sufficiently consider the effect of the follow-up period / time since release	
Methodological Rating Scale (MSRS): 2	
Outcome Variable	
Outcome domain(s): Employment; Recidivism	
Relevant outcome metric: Employment status when completing parole or at the time of re-arrest during parole period	
Duration of outcome measurement: The exact time at which the postrelease employment variable is measured is determined by when and if the individual recidivated within the period of supervision *12 months	
Results	
Odds Ratio: 2.679	Standard Error: 1.190 *computed from p value
Notes: Typical period of supervision after release is twelve months, also most common duration of incl. studies	

Data Collection Form

Authors:
Bohmert & Duwe, 2011

Title:
Minnesota's Affordable Homes Program Evaluating the Effects of a Prison Work Program on Recidivism, Employment and Cost Avoidance

Published:
Criminal Justice Policy Review, XX(X), 1-25

Intervention

Description of intervention:
Affordable Homes Program (AHP) is a prison work crew that trains participants in carpentry and other vocational skills related to the home-building occupation

Program level:
Vocational education

Program setting:
Correctional facilities in Minnesota

How was intervention status assessed?
participation in AHP

Participants

Study eligibility criteria:
Individuals released from correctional facilities in Minnesota between 1998 and 2006

Participant characteristics:
Individuals who had participated in AHP between 1998 to 2005 and were released prior to 2006

Description of comparison group:
Individuals with similar characteristics that did not participate in AHP

Study Attributes

Treatment group:	Comparison group:
N_E = 224 inmates	N_C = 224 inmates

Matching Procedure:
The authors used a retrospective, quasi-experimental design in their comparison. Individuals in the treatment group were matched to individuals in the comparison group using a propensity score method based on twelve covariates. Including race, previous criminal history, offense type, and various release variables (sentence length, age at release, release year).

Methodological Rating Scale (MSRS):
4

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Obtained post-release employment

Duration of outcome measurement:
within 1 to 7 years after release

Results

Treatment group:	Comparison group:
# of successes = 161	# of successes = 142

Notes:
Authors further observe that positive effect of employment is stronger when controlling for industry type, as program participants are much more likely to be employed in the construction field than the comparison group.

Data Collection Form

Authors:
Cho & Tyler (2008)

Title:
Prison-Based Adult Basic Education (ABE) and Post-Release Labor Market Outcomes

Published:
Urban Institute - Reentry Roundtable on Education

Intervention

Description of intervention:
Adult Basic education courses offered by the Florida Department of Corrections (FDOC)

Program level:
Adult Basic Education (ABE)

Program setting:
State men's prisons in Florida

How was intervention status assessed?
having taken any ABE courses during prison spell

Participants

Study eligibility criteria:
Males who entered prison after October 1st, 1994 with forecasted release dates soon enough to allow for data collection

Participant characteristics:
Male ABE participants scoring below 9th grade proficiency who did not hold a high school diploma prior to entering prison

Description of comparison group:
Male inmates meeting eligibility requirements that did not participate in educational programming while in prison

Study Attributes

Treatment group:	Comparison group:
N_E = 3790 inmates (some enter prison >once) Total # observations = 3845 prison spells	N_C = 5822 inmates Total # observations = 5955 prison spells

Matching Procedure:
Groups are reasonably comparable based on baseline characteristics, such as gender, race and previous education level, but individuals are not matched within the groups based on propensity score.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Percent employed at time of follow-up

Duration of outcome measurement:
One year after release

Results

Treatment group:	Comparison group:
# of successes = 2276	# of successes = 3454

Notes:

Data Collection Form

Authors:
Cho and Tyler (2013)

Title:
Does prison-based Adult Basic Education improve post-release outcomes for male prisoners in Florida?

Published:
Crime & Delinquency, 59:7, 975-1005

Intervention

Description of intervention:
Florida Department of Corrections Adult Basic Education program

Program level:
Adult Basic Education

Program setting:
State prisons in Florida

How was intervention status assessed?
having completed or participated in ABE programming during incarceration

Participants

Study eligibility criteria:
Male inmates who entered the Florida state prison system between October 1994 and February 1999 who scored below 9th grade proficiency and didn't hold a high school diploma prior to prison

Participant characteristics:
Male ABE program completers; Male ABE program participants > the authors report separate results for program completers and non-completers, but this meta-analysis considers one treatment group based on any participation in programs

Description of comparison group:
Male inmates meeting eligibility requirements that did not participate in educational programming

Study Attributes

Treatment group:	Comparison group:
N_E = 5172 inmates Total # observations = 5267 prison spells	N_C = 7666 inmates Total # observations = 7810 prison spells

Matching Procedure:
Groups are reasonably comparable based on baseline characteristics, such as gender, race and previous education level, but individuals are not matched within the groups based on propensity score.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed one-year post prison release

Duration of outcome measurement:
within one year after release

Results

Treatment group:	Comparison group:
# of successes = 3265	# of successes = 4738

Notes:
No significant results found; Authors excluded inmates who were missing demographic information, were not initially assigned to a correctional institute, or were assigned to a private prison facility

Data Collection Form

Authors:
Cronin (2011)

Title:
The Path to Successful Re-entry: The Relationship Between Correctional Education, Employment and Recidivism

Published:
University of Missouri Institute of Public Policy

Intervention

Description of intervention:
Missouri Department of Corrections GED preparation programs

Program level:
GED Preparation

Program setting:
Correctional facilities in Missouri

How was intervention status assessed?
participation in a GED preparation program while incarcerated

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions in the state of Missouri between 2005 to 2008 (approximately 25,000 former inmates)

Participant characteristics:
Recently released individuals who had participated in a GED program, including those who had earned their GED in prison

Description of comparison group:
Recently released individuals who had entered prison without a GED and made no progress toward achieving the certification while incarcerated

Study Attributes

Treatment group:	Comparison group:
N_E = 5067 inmates	N_C = 7449 inmates

Matching Procedure:
Recently released inmates were divided into treatment and comparison groups based on GED participation. Approximately 12,000 inmates were excluded that had entered prison already holding a GED or higher certification. The groups are unmatched, but the author does use logistic regression models to control for observable characteristics.

Methodological Rating Scale (MSRS):
2

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed in a full-time job

Duration of outcome measurement:
within two years after release

Results

Treatment group:	Comparison group:
# of successes = 2722	# of successes = 3404

Notes:
Two groups (program participants and program completers) are combined to form one treatment group based on intent-to-treat

Data Collection Form

Authors:
Duwe and Clark (2014)

Title:
The effects of prison-based educational programming on recidivism and employment

Published:
The Prison Journal, 94:4, 454-478

Intervention

Description of intervention:
Academic programs offered by the Minnesota Department of Corrections

Program level:
Secondary Education (GED or Highschool Diploma); Post-secondary Education

Program setting:
State prisons in Minnesota

How was intervention status assessed?
obtaining a secondary / post-secondary degree while incarcerated

Participants

Study eligibility criteria:
Individuals released from Minnesota prisons between 2007 and 2008

Participant characteristics:
Ex-offenders who earned a secondary or post-secondary degree during incarceration

Description of comparison group:
Ex-offenders with similar characteristics and eligibility criteria who did not earn educational degrees while incarcerated

Study Attributes

Treatment group:	Comparison group:
N_E > Secondary = 910 Post-secondary = 693	N_C > Secondary = 910 Post-secondary = 693

Matching Procedure:
Propensity score matching was used to reduce observable selection bias; treatment and comparison groups are well matched on over 20 baseline characteristics

Methodological Rating Scale (MSRS):
4

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed in the state of Minnesota (Employment data collected from Minnesota Department of Employee and Economic Development; only considers employment in that state)

Duration of outcome measurement:
within two years of release

Results

Treatment group:	Comparison group:
# of successes (secondary) = 541 # of successes (post-secondary) = 492	# of successes (secondary) = 453 # of successes (post-secondary) = 473

Notes:

Data Collection Form

Authors:
Duwe (2015)

Title:
The Benefits of Keeping Idle Hands Busy: An Outcome Evaluation of a Prisoner Reentry Employment Program

Published:
Crime & Delinquency, 61:4, 559-586

Intervention

Description of intervention:
EMPLOY prisoner reentry employment program. Features prison work experience combined with pre-release job training sessions. Also features post-release increased supervision, but the programming does not provide job placement and is completed during incarceration

Program level:
Vocational

Program setting:
State prisons in Minnesota

How was intervention status assessed?
Completion of the EMPLOY program

Participants

Study eligibility criteria:
Adult inmates who left a Minnesota correctional facility between 2006 and 2008

Participant characteristics:
Recently released individuals who had completed the EMPLOY program

Description of comparison group:
Recently released individuals who were eligible but did not participate in the EMPLOY program

Study Attributes

Treatment group:	Comparison group:
N_E = 232 inmates	N_C = 232 inmates

Matching Procedure:
The study uses a quasi-experimental design and a propensity score matching procedure for creating matched treatment and comparison groups, controlling for 26 variables. The comparison group was drawn from an eligible cohort of 3,959 non-participants.

Methodological Rating Scale (MSRS):
4

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employment status at time of follow-up

Duration of outcome measurement:
Average follow-up period of 28 months

Results

Treatment group:	Comparison group:
# of successes = 176	# of successes = 155

Notes:
Treatment group includes all participants in the EMPLOY program; including program completers, participants, and drop-outs. Outcome measures were obtained for program drop-outs, so does not affect attrition for study participants. Subgroup analysis shows that program completers had stronger employment effects than participants, and successful participants had stronger effects than drop-outs.

Data Collection Form

Authors:
Hill, Scaggs, and Bales (2017)

Title:
Assessing the statewide impact of the Specter Vocational Program on reentry outcomes: A propensity score matching analysis

Published:
Journal of Offender Rehabilitation, 56:1, 61-86

Intervention

Description of intervention:
Workplace and Community Transition Training for Incarcerated Individuals, a vocational certification program offered by the Florida Department of Corrections

Program level:
Vocational Education

Program setting:
Correctional facilities in Florida

How was intervention status assessed?
obtaining a vocational certificate (program completers)

Participants

Study eligibility criteria:
Inmates released from a Florida prison between 2004 and 2011 (approximately 250,000 total)

Participant characteristics:
Recently released individuals who had successfully completed vocational training and received a certificate

Description of comparison group:
Recently released individuals who had not earned a vocational certificate (information was not provided for program participants / non-completers)

Study Attributes

Treatment group:	Comparison group:
N_E = 1950 inmates	N_C = 27642 inmates

Matching Procedure:
Quasi-experimental design. Propensity matching score procedure used to create a comparison group that was similar to treatment group on approximately 11 covariates including demographic variables and offense characteristics.

Methodological Rating Scale (MSRS):
4

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed during the first quarter after release

Duration of outcome measurement:
Three months after release

Results

Treatment group:	Comparison group:
# of successes = 971	# of successes = 14318

Notes:
Authors find a significant improvement in recidivism outcomes for the treatment group, but employment shows an insignificant negative effect. Treatment group participants were approximately 2% less likely to be employed upon release; authors suggest that a collective analysis of all vocational certificates might overlook employment outcomes specific to industry.

Data Collection Form

Authors:
Hull, Forrester, Brown, Jobe, and McCullen (2000)

Title:
Analysis of Recidivism Rates for Participants of the Academic / Vocational / Transition Education Programs Offered by the Virginia Department of Correctional Education

Published:
Journal of Correctional Education, 51:2, 256-261

Intervention

Description of intervention:
Virginia's Department of Correctional Education's academic and vocational programs

Program level:
Adult Basic Education (ABE), GED Preparation, and Vocational Education

Program setting:
State prisons in Virginia

How was intervention status assessed?
having participated in any education programming

Participants

Study eligibility criteria:
Inmates released from the Virginia Department of Corrections during the period 1979-1994

Participant characteristics:
Individuals who participated in any type of educational programming during incarceration

Description of comparison group:
Individuals released during the same period who did not complete or participate in any educational programs while in prison

Study Attributes

Treatment group:	Comparison group:
N_E = 164 inmates	N_C = 183 inmates

Matching Procedure:
3,000 inmate records were randomly selected from all individuals released during 1979-1994. Then information was gathered for recidivism and employment outcomes; employment status was only collected for individuals currently on parole who had not re-entered prison. Treatment and comparison groups were formed from the larger random sample but are not themselves random or matched on baseline characteristics.

Methodological Rating Scale (MSRS):
2

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed in Virginia for a period greater than 90 days

Duration of outcome measurement:
within 5 to 20 years after release (since individuals sampled were released over a 15-year period)

Results

Treatment group:	Comparison group:
# of successes = 112	# of successes = 77

Notes:

Data Collection Form

Authors:
Lichtenberger (2007)

Title:
The Impact of Vocational Programs on Post-Release Outcomes for Vocational Completers from the Fiscal Year 1999, 2000, 2001, 2002 Release Cohorts

Published:
Virginia Polytechnic Institute and State University

Intervention

Description of intervention:
Vocational education courses offered by the Virginia State Department of Corrections

Program level:
Vocational education

Program setting:
Correctional facilities in Virginia

How was intervention status assessed?
completion of vocational programming while incarcerated

Participants

Study eligibility criteria:
Individuals released from incarceration in the state of Virginia during the years from 1999-2002

Participant characteristics:
Individuals who completed a vocational education program while incarcerated

Description of comparison group:
Individuals with similar characteristics and meeting similar eligibility criteria that do not complete a vocational program

Study Attributes

Treatment group:	Comparison group:
N_E = 3266 inmates	N_C = 3266 inmates

Matching Procedure:
Individuals in the treatment group were matched to individuals in the comparison group using a propensity score method based on 10 variables. Treatment and comparison groups were formed for each release cohort, then combined when analyzing the entire sample. Although treatment and comparison groups are matched, the authors do not report on baseline characteristics and comparability cannot be verified.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed in Virginia for at least one quarter

Duration of outcome measurement:
within 1 to 6.75 years after release

Results

Treatment group:	Comparison group:
# of successes = 2336	# of successes = 2176

Notes:
Comparison group matched on marital status, offense type, custody type, race, gender, education level, time served, age at release, number of infractions, and release quarter

Data Collection Form

Authors:
Lichtenberger, O'Reilly, Miyazaki, and Kamulladeen (2009)

Title:
Direct and Indirect Impacts of Career and Technical Education on Post-Release Outcomes

Published:
Center for Assessment, Evaluation, and Educational Programming - Virginia Tech

Intervention

Description of intervention:
Career and Technical Education (CTE) program

Program level:
Vocational education

Program setting:
State prisons in Virginia

How was intervention status assessed?
having completed or participated in CTE programming during incarceration

Participants

Study eligibility criteria:
Individuals who exited the Virginia Department of Corrections during the 2003 release cohort

Participant characteristics:
CTE program completers; CTE program participants > the authors report separate results for program completers and non-completers, but this meta-analysis considers one treatment group based on any participation in programs

Description of comparison group:
Individuals released during the same period who were never enrolled in a CTE program

Study Attributes

Treatment group:	Comparison group:
N_E = 1804 inmates	N_E = 6178 inmates

Matching Procedure:
Treatment and comparison groups are not matched on any baseline characteristics; the comparison group contains any individual released during 2003 not involved in CTE. Authors present that groups can be reasonably assumed as comparable since all individuals are were incarcerated in the same state during the same period

Methodological Rating Scale (MSRS):
2

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employment (above the poverty level) in Virginia for at least one quarter

Duration of outcome measurement:
within 3.25 years after release

Results

Treatment group:	Comparison group:
# of successes = 1165	# of successes = 3500

Notes:

Data Collection Form

Authors:
Nally, Lockwood, Knutson, and Ho (2012)

Title:
An Evaluation of the Effect of Correctional Education Programs on Post-Release Recidivism and Employment: An Empirical Study in Indiana

Published:
Journal of Correctional Education, 63:1, 69-89

Intervention

Description of intervention:
Correctional education programs offered by the Indiana Department of Corrections

Program level:
Adult Basic Education, Secondary and Post-Secondary Education, Vocational Education

Program setting:
Correctional facilities in Indiana

How was intervention status assessed?
receipt of federal funding from U.S. Department of Education to participate in correctional education programs

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions between 2002 and 2009

Participant characteristics:
Individuals who had participated in a federally funded correctional education program before their most recent release

Description of comparison group:
Individuals released during 2005 who had not received federal funding for any education programs

Study Attributes

Treatment group:	Comparison group:
N_E = 1077 inmates	N_C = 1078 inmates

Matching Procedure:
The comparison group was formed from an eligible cohort of 6561 offenders released from Indiana correctional facilities during 2005. Individual characteristics such as race and education level were controlled for, then comparison groups members were randomly selected from those remaining eligible. The authors do take actions to control for selection bias, but it falls short of random sampling or a rigorous matched comparison group design.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employment sustainability > percent employed for at least four quarters during follow up period

Duration of outcome measurement:
within six quarters > the study period ran from 2008Q1 to 2009Q2

Results

Treatment group:	Comparison group:
# of successes = 142	# of successes = 112

Notes:
The authors observe that there is a significantly larger portion of individuals in comparison groups with quarterly income below $1,000. Implies that quality of employment is important indicator toward sustainability.

Data Collection Form

Authors:
Sabol (2007)

Title:
Local Labor-Market Conditions and Post-Prison Employment Experiences of Offenders Released from Ohio State Prisons

Published:
Included in "Barriers to Reentry? The Labor Market for Released Prisoners in Post-Industrial America"

Intervention

Description of intervention:
Ohio Department of Rehabilitation and Correction (ODRC) GED preparation program;
ODRC Vocational Training Certificate program

Program level:
GED Preparation; Vocational Education

Program setting:
Correctional facilities in Ohio

How was intervention status assessed?
Completion of a vocational certification or obtaining a GED

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions in Ohio during 1999 and 2000

Participant characteristics:
Recently released individuals who had obtained a GED or completed vocational certification during incarceration

Description of comparison group:
Recently released individuals who had not completed a GED or vocational programming during their incarceration

Study Attributes

Treatment group:	Comparison group:
N_E > GED Preparation = 2386 Vocational = 1022	N_C = 30673 inmates

Matching Procedure:
Quasi-experimental design without random assignment or matched comparison groups. Authors do control for a number of baseline characteristics within their analysis such as criminal history, offense types, educational level, race, etc.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Ever employed during the follow-up period

Duration of outcome measurement:
within 2 to 3 years after release

Results

Odds ratio:	Standard Error:
GED Preparation = 1.00 Vocational = 0.89	GED Preparation = Vocational =

Notes:

Data Collection Form

Authors:
Saylor & Gaes (1997)

Title:
PREP: Training Inmates through Industrial Work Participation, and Vocational and Apprenticeship Instruction

Published:
Corrections Management Quarterly, 1(2)

Intervention

Description of intervention:
The Post-Release Employment Project (PREP) provides vocational programming, such as certification courses or apprenticeship training, and industrial work experience

Program level:
Vocational Education

Program setting:
Correctional facilities at the federal level (exact locations not reported)

How was intervention status assessed?
Participation in PREP during the individual's most recent incarceration

Participants

Study eligibility criteria:
Individuals released from adult federal correctional institutions between 1983 and 1987

Participant characteristics:
Individuals who had participated in PREP programming

Description of comparison group:
Individuals released during the same calendar quarter who had not participated in any form of PREP

Study Attributes

Treatment group:	Comparison group:
N_E = 1503 inmates	N_C = 1831 inmates

Matching Procedure:
Individuals self-selected into the treatment group by electing for voluntary participation in PREP programming. The entire release cohort for the study period was approximately 7,000 former prisoners. After dividing the treatment group, comparison group members were selected from the remaining eligibility cohort using a statistical matching procedure designed to model the training program selection process. Characteristics such as demographics, education history, criminal history, and employment history were all accounted for in the matching procedure. The comparison group is larger than the treatment group to include all individuals with similar characteristics.

Methodological Rating Scale (MSRS):
4

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employment status

Duration of outcome measurement:
at the end of the first year after release

Results

Treatment group:	Comparison group:
# of successes = 1078	# of successes = 1155

Notes:

Data Collection Form

Authors:
Schumacker, Anderson, and Anderson (1990)

Title:
Vocational and Academic Indicators of Parole Success

Published:
Journal of Correctional Education, 41:1, 8-13

Intervention

Description of intervention:
Academic and vocational programs at midwestern correctional facilities

Program level:
Adult Basic Education, GED Preparation; Vocational Education

Program setting:
Correctional facilities in midwestern states (19 correctional facilities in total)

How was intervention status assessed?
academic or vocational program participation during current prison sentence

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions during May, June, or July of 1986

Participant characteristics:
Recently released individuals who had completed academic or vocational programming

Description of comparison group:
Recently released individuals who had not completed academic or vocational programming during their most recent incarceration

Study Attributes

Treatment group:	Comparison group:
N_E > Vocational = 107; Academic = 248	N_C = 287 inmates

Matching Procedure:
Eligible releasees were randomly selected to be studied; random samples were taken proportional to the number of releasees each month to provide representative groups

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed at the end of their first year after release

Duration of outcome measurement:
one year after release

Results

Treatment group:	Comparison group:
# of successes (Vocational) = 32 # of successes (Academic) = 52	# of successes = 69

Notes:
Random selection was used in creating treatment and control groups, but selection bias (in the case of voluntary program participation) is still a concern

Data Collection Form

Authors:
Smith (2005)

Title:
Pennsylvania Department of Corrections Education Outcome Study

Published:
Correctional Education Association

Intervention

Description of intervention:
Pennsylvania Department of Corrections Education Program

Program level:
ABE, GED Preparation, Secondary & Postsecondary Education, Vocational Education

Program setting:
State prisons in Pennsylvania

How was intervention status assessed?
participation in correctional education programs during incarcerations

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions between 2001 and 2003

Participant characteristics:
Recently released individuals who had participated in academic or vocational programming

Description of comparison group:
Recently released individuals (from the same release cohort) who had not participated in academic or vocational programming during incarceration

Study Attributes

Treatment group:	Comparison group:
N_E = 660 inmates	N_C = 293 inmates

Matching Procedure:
Inmates self-selected into treatment and comparison groups, as participation in correctional programming was voluntary. The authors used a release cohort method to form treatment and comparison groups, which assumed that the treatment group does not systematically differ from the comparison group on important variables. Author acknowledges this limitation, but doesn't attempt to match groups for baseline characteristics.

Methodological Rating Scale (MSRS):
2

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Ever employed in Pennsylvania

Duration of outcome measurement:
within one year of release

Results

Treatment group:	Comparison group:
# of successes = 368	# of successes = 173

Notes:
The author looks at post-release employment outcomes depending on program type, but a comparison group is only used when reporting results for all correctional education participants in aggregate.

Data Collection Form

Authors:
Steurer, Smith, and Tracy (2001)

Title:
Office of Correction Education (OCE) and Correctional Education Association (CEA) Three State Recidivism Study

Published:
United States Department of Education

Intervention

Description of intervention:
Correctional education (CE) programs offered in state prisons

Program level:
Adult Basic Education, Post-secondary Education, and Vocational Education

Program setting:
Correctional facilities in Maryland, Minnesota, and Ohio

How was intervention status assessed?
participation in a CE program during incarceration

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions in Maryland, Minnesota, and Ohio during late 1997 and early 1998

Participant characteristics:
Recently released individuals who had completed academic or vocational programming

Description of comparison group:
All other inmates released in the same time period that had not completed academic or vocational programming during their incarceration

Study Attributes

Treatment group:	Comparison group:
N_E = 849 inmates	N_C = 1087 inmates

Matching Procedure:
Quasi-experimental. Each state prison system provided information on approximately 1,000 individuals about to released (3,200 inmates total in the sample). From these release cohorts, treatment and internal control groups were formed based on educational participation. Although groups are similar in some baseline characteristics, they are not matched. The authors do provide evidence that the groups are reasonably comparable through analysis of demographic variables

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Ever employed in Maryland or Minnesota since release (only two of three states included in the study reported employment outcomes)

Duration of outcome measurement:
within 3 years after release

Results

Treatment group:	Comparison group:
# of successes = 656	# of successes = 885

Notes:

Data Collection Form

Authors:
Tyler and Kling (2006)

Title:
Prison Based Education and Re-Entry into the Mainstream Labor Market

Published:
Journal of Offender Rehabilitation, 56:1, 61-86

Intervention

Description of intervention:
Workplace and Community Transition Training for Incarcerated Individuals, a vocational certification program offered by the Florida Department of Corrections

Program level:
General Education Development (GED) programs

Program setting:
Correctional facilities in Florida

How was intervention status assessed?
Completion of a GED program, including earning of the credential

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions

Participant characteristics:
Recently released individuals who had entered prison without a GED and completed the credentials while incarcerated

Description of comparison group:
Uncredentialed offenders who either did not participate or did not complete a GED related education program during incarceration

Study Attributes

Treatment group:	Comparison group:
N_E = 1967 inmates	N_C = 10989 inmates

Matching Procedure:
Individuals self-select into the treatment group, and the comparison group contains all individuals released during the same period who did not participate in GED programming. The authors collect information on a set of co-variates, but do not form a matched comparison group

Methodological Rating Scale (MSRS):
2

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
percent employed

Duration of outcome measurement:
within one year after release

Results

Treatment group:	Comparison group:
# of successes = 865	# of successes = 3548

Notes:

Data Collection Form

Authors:
Van Steele, Moberg, and Welnetz (1998)

Title:
Wisconsin Department of Corrections Specialized Training and Employment Project (STEP) Outcome Evaluation Report

Published:
University of Wisconsin - Madison Medical School, Department of Preventative Medicine, Center for Health Policy and Program Evaluation

Intervention

Description of intervention:
The Specialized Training and Employment Project (STEP) features a six-month institutional component of prison work experience and comprehensive employment focused curriculum. Program also features pre-parole planning and more intensive supervision and support after release, but it is not a job placement program.

Program level:
Vocational

Program setting:
Correctional facilities in Wisconsin

How was intervention status assessed?
Completion of the STEP program

Participants

Study eligibility criteria:
Individuals released from adult correctional institutions between 1993 and 1998

Participant characteristics:
STEP program graduates released during the study period

Description of comparison group:
Inmates released on regular parole during the study period; no participation in PREP pre-release programming while incarcerated

Study Attributes

Treatment group:	Comparison group:
$N_E = 112$	$N_C = 37$

Matching Procedure:
Individuals who met eligibility criteria and indicated interest were randomly assigned into treatment or control groups. Although random assignment limits selection bias, the study features small sample sizes and significant attrition.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employed since release

Duration of outcome measurement:
within 6 months after release

Results

Treatment group:	Comparison group:
# of successes = 89	# of successes = 23

Notes
The measured outcome of being employed since release (reported for results) is different than employment at time of follow-up, also reported

Data Collection Form

Authors:
Visher and Kachnowski (2007)

Title:
Finding Work on the Outside: Results from the 'Returning Home' Project in Chicago

Published:
Included in "Barriers to Reentry? The Labor Market for Released Prisoners in Post-Industrial America"

Intervention

Description of intervention:
Illinois Department of Corrections vocational training program

Program level:
Vocational Education

Program setting:
State prisons in Illinois

How was intervention status assessed?
participation in job training during prison

Participants

Study eligibility criteria:
Mail prisoners serving at least one year in an Illinois prison who were within 30 to 90 days of release when the study commenced

Participant characteristics:
Male ex-offenders who had completed job training and vocational programming during their incarceration

Description of comparison group:
Males released during the same period who had not completed any vocational programs

Study Attributes

Treatment group:	Comparison group:
N_E = 19 inmates	N_C = 186 inmates

Matching Procedure:
Researchers attempted to choose participants for the study that would be representative of all state releasees during that year (in terms of release reason, offense type, time served, age, race), but individuals did have to self-select into study participation. Treatment and comparison groups are not matched or controlled for baseline characteristics in the analysis.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Employment status at the time of follow-up

Duration of outcome measurement:
within 4 to 8 months after release

Results

Odds Ratio:	Standard Error:
3.917	3.659 *estimate from SE of log Odd Ratio

Notes:
Small treatment group is one limitation, authors acknowledge this. Main goal of the study was to observe the employment experiences representative of all ex-offenders re-entering the labor market; not to evaluate the effectiveness of correctional education programs

Data Collection Form

Authors:
Visher, Debus-Sherill, and Yahner (2011)

Title:
Employment After Prison: A Longitudinal Study of Former Prisoners

Published:
Justice Quarterly, 28:5, 698-718

Intervention

Description of intervention:
Academic and vocational education programs offered in state correctional institutions

Program level:
Adult Basic Education, Ged Preparation, Secondary & Post-secondary Education; Vocational Education

Program setting:
State prisons in Illinois, Ohio, and Texas

How was intervention status assessed?
completion of academic / vocational programming

Participants

Study eligibility criteria:
Male prisoners who served at least one year in state prison and upon release will return to the city / county areas of Chicago (Illinois), Cleveland (Ohio), and Houston (Texas)

Participant characteristics:
Recently released individuals who had completed academic or vocational programming

Description of comparison group:
Recently released individuals who had not completed academic or vocational programming during their most recent incarceration

Study Attributes

Treatment group:	Comparison group:
N_E > Academic = 121 (.205 x 740 full sample) Vocational = 121 (.205 x 740)	N_C = 361 inmates *approximate

Matching Procedure:
Inmates self-selected into treatment and comparison groups, which are unmatched. However, the authors do control for a number of observable characteristics in their analysis. Variables include age, race, academic and employment history prior to incarceration, offense type, family relationships, and others.

Methodological Rating Scale (MSRS):
3

Outcome Variable

Outcome domain(s):
Employment

Relevant outcome metric:
Percent of post-release period that an individual was employed (continuous metric)

Duration of outcome measurement:
within 8 months after release

Results

Odds ratio:	Standard Error:
Academic > 1.014 Vocational > 1.051	Academic > 0.037 Vocational > 0.035

Notes:
Authors report findings as odds ratio with standard error; values taken from original publication

Appendix C: Studies Excluded

*only studies meeting three eligibility criteria listed

Citation	Eligible Intervention	Eligible Participants	Eligible Study Attibutes	Eligible Outcome Variable
Lattimore, P. K., Witte, A. D., & Baker, J. R. (1990). Experimental Assessment of the Effect of Vocational Training On Youthful Property Offenders. Evaluation Review, 14(2), 115–133. https://doi.org/10.1177/0193841X9001400201	yes	yes	yes	no
Clark, D. (1991). Analysis of Return Rates of the Inmate College Program Participants. New York State Unpublished Study.	yes	yes	yes	no
Adams, K., Bennett, K. J., Flanagan, T. J., Marquart, J. W., Cuvelier, S. J., Fritsch, E., Gerber, J., Longmire, D. R., & Burton, V. S. (1994). A Large-Scale Multidimensional Test of the Effect of Prison Education Programs on Offenders' Behavior. The Prison Journal, 74(4), 433–449. https://doi.org/10.1177/0032855594074004004	yes	yes	yes	no
Visian, J., Burke, L., & Vivian, J. (2001). The Effect of College Programming on Recidivism Rates at the Hampden County House of Correction: A 5-Year Study. *Journal of Correctional Education, 52* (4), 160-162. http://www.jstor.org/stable/23292189	yes	yes	yes	no
Allen, R. (2006). An Economic Analysis of Prison Education Programs and Recidivism. Emory Univeristy Department of Economics.	yes	yes	yes	no
Holloway, J., & Moke, P. (1986). Post Secondary Correctional Education: An Evaluation of Parolee Performance.	yes	yes	no	yes
Gordon, H., & Weldon, B. (2003). The Impact of Career and Technical Education Programs on Adult Offenders: Learning Behind Bars. *Journal of Correctional Education, 54* (4), 200-209. Retrieved September 13, 2020, from http://www.jstor.org/stable/23292175	yes	yes	yes	no
Anderson, D. B., Schumacker, R. E., & Anderson, S. L. (1991). Releasee characteristics and parole success. Journal of Offender Rehabilitation, 17(1-2), 133–145. https://doi.org/10.1300/J076v17n01_10	yes	yes	no	yes
Piehl, A.M. (1994). Learning while doing time. Kennedy School Working Paper #R94-25. Cambridge, MA: John F. Kennedy School of Government, Harvard University.	yes	yes	yes	no
Kelso, C. E. (1996). A study of the recidivism of Garrett Heyns Education Center graduates released between 1985-1991. *Journal of Northwest Center for the Study of Correctional Education* , 1(1), 43-46.	yes	yes	yes	no
Markley, H., Flynn, K., & Bercaw-Dooen, S. (1983). Offender skills training and employment success: an evaluation of outcomes.	yes	yes	no	yes
Turner, S., & Petersilia, J. (1996). Work Release in Washington: Effects on Recidivism and Corrections Costs. The Prison Journal, 76(2), 138–164. https://doi.org/10.1177/0032855596076002003	yes	yes	yes	no
Coffey, B. B. (1983). The effectiveness of vocational education in Kentucky's correctional institutions: as measured by employment status and recidivism, Lexington, KY: [s.n.].	yes	yes	no	yes
Lanaghan, P. (1998), The Impact of Receiving a General Equivalency Diploma while Incarcerated on the Rate of Recidivism. Master of Science in Education Project, Franciscan University of Steubenville. ERIC Data Base.	yes	yes	yes	no
Zgoba, K. M., Haugebrook, S., & Jenkins, K. (2008). The Influence of GED Obtainment on Inmate Release Outcome. Criminal Justice and Behavior, 35(3), 375–387. https://doi.org/10.1177/0093854807311853	yes	yes	yes	no
Paul Knepper (1990) Selective Participation, Effectiveness, and Prison College Programs, *Journal of Offender Counseling Services Rehabilitation* , 14:2, 109-135, DOI: 10.1300/J264v14n02_08	yes	yes	yes	no
Jenkins, H. D .. Steurer, S.J. a Pendry, J. (1995). A post-release follow -up of correctional Education program completers released in 1990-1991. *Journal of Correctional Education* , 46(1), 20-24.	yes	yes	no	yes
Ryan, T., & Desuta, J. (2000). A Comparison of Recidivism Rates for Operation Outward Reach (OOR) Participants and Control Groups of Non-Participants for the Years 1990 Through 1994. *Journal of Correctional Education, 51* (4), 316-319. Retrieved September 13, 2020, from http://www.jstor.org/stable/41971949	yes	yes	yes	no
Downes, E. A., Monaco, K. R., and Schreiber, S. O. (1989). Evaluating the effects of vocational education on inmates: a research model and preliminary results. The yearbook of correctional education, Institute for the Humanities, Simon Fraser University; and the Correctional Education Association, 249–262.	yes	yes	no	yes

Citation	Eligible Intervention	Eligible Participants	Eligible Study Attibutes	Eligible Outcome Variable
Winterfield, L., Coggeshall, M., Burke-Storer, M, Correa, V., and Tidd, S. (2009). The Effects of Postsecondary Correctional Education: Final Report. The Urban Institute: Justice Policy Center, Washington, D.C.	yes	yes	yes	no
Cook, P., Kang, S., Braga, A., Ludwig, J., & O'Brien, M. (2015). An Experimental Evaluation of a Comprehensive Employment-Oriented Prisoner Re-entry Program. *Journal of Quantitative Criminology, 31* (3), 355-382. Retrieved September 3, 2020, from http://www.jstor.org/stable/44504769	no	yes	yes	yes
Nuttall, J., Hollmen, L., & Staley, E. (2003). The Effect of Earning a GED on Recidivism Rates. *Journal of Correctional Education, 54* (3), 90-94. Retrieved September 4, 2020, from http://www.jstor.org/stable/41971144	yes	yes	yes	no
Stewart, D. (2005). An evaluation of basic skills training for prisoners, Research, Development and Statistics Directorate, Findings No 260, London: Home Office.	yes	yes	no	yes
Harer, M. (1995). Recidivism Among Federal Prisoners Released in 1987. *Journal of Correctional Education, 46* (3), 98-128. Retrieved September 13, 2020, from http://www.jstor.org/stable/23291861	yes	yes	yes	no
Anderson, S.V. (1995). Evaluation of the Impact of Correctional Education Programs on Recdivism. Ohio Department of Rehabilitation and Correction, Office of Management and Information Systems, Bureau of Planning and Evaluation.	yes	yes	yes	no
Lockwood, D. (1991). Can college courses in prison cut crime after release? A review of follow-up studies of prison higher education and recidivism. *AJCJ* 15, 134–152. https://doi.org/10.1007/BF02885623	yes	yes	yes	no
Dickman, C. (1987). Academic Program Participation and Prisoner Outcomes. Michigan Department of Corrections, Facilities Research and Evaluation Unit.	yes	yes	no	yes
Batiuk, M. E., Lahm, K. F., Mckeever, M., Wilcox, N., & Wilcox, P. (2005). Disentangling the effects of correctional education: Are current policies misguided? An event history analysis. Criminal Justice, 5(1), 55–74. https://doi.org/10.1177/1466802505050979	yes	yes	yes	no
Brewster, D. R., & Sharp, S. F. (2002). Educational Programs and Recidivism in Oklahoma: Another Look. The Prison Journal, 82(3), 314–334. https://doi.org/10.1177/003288550208200302	yes	yes	yes	no
O'Neil, M. (1990). Correctional Higher Education: Reduced Recidivism? *Journal of Correctional Education, 41* (1), 28-31. Retrieved September 13, 2020, from http://www.jstor.org/stable/41970810	yes	yes	yes	no
Wolf, J. G. and Sylves, D. (1981). The Impact of Higher Education Opportunity Programs: Post Prison Experience of Disadvantaged Students: A Preliminary Follow Up of HOEP Ex-Offenders.	yes	yes	no	yes
Callan, V., Gardner, J., & National Centre for Vocational Education Research (Australia). (2005). *Vocational education and training provision and recidivism in Queensland correctional institutions* . Adelaide, S. Aust: NCVER	yes	yes	no	yes
Langenbach, M., North, M., Aagaard, L., & Chown, W. (1990). Televised Instruction in Oklahoma Prisons: A Study of Recidivism and Disciplinary Actions. *Journal of Correctional Education, 41* (2), 87-94. Retrieved September 13, 2020, from http://www.jstor.org/stable/41971591	yes	yes	yes	no
Pompoco, A., Wooldredge, J., Lugo, M., Sullivan, C. and Latessa, E.J. (2017), Reducing Inmate Misconduct and Prison Returns with Facility Education Programs. Criminology & Public Policy, 16: 515-547. doi:10.1111/1745-9133.12290	yes	yes	yes	no
Duwe, G., & McNeeley, S. (2020). The Effects of Prison Labor on Institutional Misconduct, Postprison Employment, and Recidivism. *Corrections, 5* , 108 - 89.	no	yes	yes	yes
Farabee, D., Zhang, S.X. & Wright, B. (2014). An experimental evaluation of a nationally recognized employment-focused offender reentry program. *J Exp Criminol* 10, 309–322. https://doi.org/10.1007/s11292-014-9201-z	no	yes	yes	yes
Davis, L. M. and Tolbert, M.C. (2019). Evaluation of North Carolina's Pathways from Prison to Postsecondary Education Program. Santa Monica, CA: RAND Corporation. https://www.rand.org/pubs/research_reports/RR2957.html.	no	yes	yes	yes
Meyer, S. J., & Randel, B. (2013). The Impact of an Associate's Degree Program for Incarcerated Students: A Randomized Trial of the Correctional Education Association College of the Air Program. Community College Review, 41(3), 223–248.	yes	yes	yes	no

Citation	Eligible Intervention	Eligible Participants	Eligible Study Attibutes	Eligible Outcome Variable
Shippen, M. (2008). A Pilot Study of the Efficacy of Two Adult Basic Literacy Programs for Incarcerated Males. *Journal of Correctional Education, 59* (4), 339-347. Retrieved September 13, 2020, from http://www.jstor.org/stable/23282599	yes	yes	yes	no
Young, D., & Mattucci, R. (2006). Enhancing the Vocational Skills of Incarcerated Women Through a Plumbing Maintenance Program. *Journal of Correctional Education, 57* (2), 126-140. Retrieved September 13, 2020, from http://www.jstor.org/stable/23282704	yes	yes	yes	no
Messemer, J.E. & Valentine, T. (2004). The learning gains of male inmates participating in a basic skills program. Adult Basic Education, 14, 67-89.	yes	yes	yes	no
Jensen, E. L., Williams, C. J., & Kane, S. L. (2020). Do In-Prison Correctional Programs Affect Postrelease Employment and Earnings? International Journal of Offender Therapy and Comparative Criminology, 64(6–7), 674–690. https://doi.org/10.1177/0306624X19883972	no	yes	yes	yes
Kim, R.H. and Clark, D. (2013). The effect of prison-based college education programs on recidivism: Propensity Score Matching Approach. Journal of Criminal Justice, 41(3), 196-204.	yes	yes	yes	no
Lichtenberger, E. J., & Onyewu, N. (2005). Virginia Department of Correctional Education's Incarcerated Youth Offender Program: A historical report (No. 9). Virginia Department of Correctional Education. Richmond, Virginia	yes	no	yes	yes
Valentine, E.J., Redcross, C. (2015). Transitional jobs after release from prison: effects on employment and recidivism. *IZA J Labor Policy* 4, 16. https://doi.org/10.1186/s40173-015-0043-8	no	yes	yes	yes
Duwe, G. and Clark, V. (2017). The Predictors of Post-Release Employment for Minnesota Prisoners.	yes	yes	no	yes
Duwe, G. (2015). An Outcome Evaluation of a Prison Work Release Program: Estimating Its Effects on Recidivism, Employment, and Cost Avoidance. Criminal Justice Policy Review, 26(6), 531–554. https://doi.org/10.1177/0887403414524590	no	yes	yes	yes
Bales, W., Clark, C., Scaggs, S., Ensley, D., Coltharp, P., Singer, A., & Blomberg, T. (2016). An assessment of the effectiveness of prison work release programs on post-release recidivism and employment (Unpublished report). Tallahassee: Florida Department of Corrections and Florida State University. Retrieved from https://www.ncjrs.gov/pdffiles1/nij/grants/249845.pdf	no	yes	yes	yes
Jung,H. (2014),. Do Prison Work-Release Programs Improve Subsequent Labor Market Outcomes? Evidence from the Adult Transition Centers in Illinois, Journal of Offender Rehabilitation, 53:5, 384-402. DOI: 10.1080/10509674.2014.922158	no	yes	yes	yes
Jung, H., & LaLonde, R. J. (2019). Prison Work-Release Programs and Incarcerated Women's Labor Market Outcomes. The Prison Journal, 99(5), 535–558. https://doi.org/10.1177/0032885519875009	no	yes	yes	yes
Cantora, A. (2015). Navigating the job search after incarceration: the experiences of work-release participants, Criminal Justice Studies, 28:2, 141-160, DOI: 10.1080/1478601X.2014.947032	yes	yes	yes	no
Smith, C. J., Bechtel, J., Patrick, A., Smith, R. R., & Wilson-Gentry, L. (2006). *Correctional industries preparing inmates for re-entry: Recidivism & post-release employment* . (Report No. 214608). Washington, DC: U.S. Department of Justice.	no	yes	yes	yes
Cox, R. (2016). "The Effect of Private Sector Work Opportunities in Prison on Labor Market Outcomes of the Formerly Incarcerated," Journal of Labor Research, Springer, vol. 37(4), pages 412-440.	no	yes	yes	yes
D'Amico, R. and Kim, H. (2018). Evaluation of Seven Second Chance Act Adult Demonstration Programs: Impact Findings at 30 Months. National Institute of Justice.	no	yes	yes	yes
Fabelo, T. (2002). Impact of Prison Education on Community Reintegration of Inmates: The Texas Case. Journal of Correctional Education, 52(3), 106-110.	yes	yes	no	yes
Armstrong, G., Giever, D., & Lee, D. (2012). Evaluation of the windham school district correctional education programs. Retrieved from http://www.windhamschooldistrict.org/reports/WSD_Rider6_Response.pdf	yes	yes	no	yes
Rukus, J., Eassey, J.M. & Baldwin, J.M. (2016). Working Through Work Release: An Analysis of Factors Associated with the Successful Completion of Work Release. *American Journal of Criminal Justice*. 41, 539–564. https://doi.org/10.1007/s12103-015-9309-3	no	yes	yes	yes