

Does providing inmates with education improve postrelease outcomes? A meta-analysis of correctional education programs in the United States

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Abstract

Objectives Our study addresses the question: Does providing inmates with education while incarcerated reduce their chances of recidivism and improve their postrelease employment prospects?

Methods We aggregated 37 years of research (1980–2017) on correctional education and applied meta-analytic techniques. As the basis for our meta-analysis, we identified a total of 57 studies that used recidivism as an outcome and 21 studies that used employment as an outcome. We then applied random-effects regression across the effect sizes abstracted from each of these studies.

Findings When focusing on studies with the highest caliber research designs, we found that inmates participating in correctional education programs were 28% less likely to recidivate when compared with inmates who did not participate in correctional education programs. However, we found that inmates receiving correctional education were as likely to obtain postrelease employment as inmates not receiving correctional education.

Conclusion Our meta-analysis demonstrates the value in providing inmates with educational opportunities while they serve their sentences if the goal of the program is to reduce recidivism.

Keywords Correctional education · Recidivism · Meta-analysis

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Introduction

A recent National Research Council report, “The Growth of Incarceration in the United States,” highlighted the causes and consequences of the massive growth in incarceration in the USA over the last four decades (Travis et al. 2014). Despite the many negative effects of prison sentences on a number of outcomes for offenders, including impaired physical and mental health (Bonta and Gendreau 1990; Goff et al. 2007; Schnittker and John 2007), reduced odds of employment and lower earnings (Berman 1973; Sabol 2007; Sabol and Lynch 2003; Western 2006), as well as adverse consequences for offenders’ families and children, their communities, and the country as a whole (Clear et al. 2003; Murray et al. 2009; Pettit 2012; Uggen et al. 2006; Wildeman et al. 2013), one bright spot was the finding that participating in education programs while incarcerated can have benefits that extend beyond the prison walls and can potentially attenuate the negative effects listed above (Travis et al. 2014). This is particularly promising in the context of current efforts to reform sentencing and incarceration policies in the USA, as academic/vocational education in prisons represents one of the most widespread rehabilitation programmatic tools available: As of 2004, (the latest Survey of Inmates in State and Federal prisons) about 27% of inmates participated in prison education programs (Travis et al. 2014).

The Second Chance Act of 2007 reauthorized “the grant program for reentry of offenders into the community in the Omnibus Crime Control and Safe Streets Act of 1968, to improve reentry planning and implementation, and for other purposes” (Second Chance Act of 2007, Sec. 1). With this renewed focus at the national level on preparing offenders for reentry, it is imperative to provide policy makers and correctional practitioners with a detailed examination of the effectiveness of the largest correctional rehabilitation programming component in US prisons and jails. This paper addresses this need and summarizes the results of the largest and most recent comprehensive meta-analysis of academic and vocational education programs administered in a jail or prison in the USA. Specifically, our study addresses the question: Does providing inmates with education while incarcerated reduce their chances of recidivism and improve their postrelease employment prospects?

Selecting studies that were published or released between January 1, 1980, and December 31, 2017 and using a rating system to select and control for the level of methodological rigor of each study, we estimated the odds of recidivism and postrelease employment for inmates who participated in academic and vocational education programs relative to inmates who did not. When focusing on studies with the highest caliber research designs, we found that inmates participating in correctional education programs were 28% less likely to recidivate when compared with inmates who did not participate in correctional education programs. However, we found that inmates receiving correctional education were as likely to obtain postrelease employment as inmates not receiving correctional education. In what follows, we outline why policy makers and researchers might theoretically expect correctional education to improve postrelease outcomes, followed by a review of previous efforts to empirically identify the relationship between correctional education and postrelease outcomes. Building on these theories and findings, we then describe our meta-analytic approach and present our results.

Background

Correctional education as a model to improve postrelease outcomes

Research over the past 20 years has highlighted the risk, need, and responsivity (RNR) model for effective correctional programming. Based on a number of meta-analyses, effective programs have been identified as those that serve higher *risk* individuals, address criminogenic *needs*, and are *responsive* to the learning styles of individuals (Andrews and Dowden 2007; Bonta and Andrews 2007). Risk and criminogenic need factors include the “big four”—a history of antisocial behavior, antisocial personality pattern, antisocial cognitions, and antisocial associates; the “moderate four” include family/marital circumstances, school/work, leisure/recreation, and substance abuse (Andrews and Bonta 2010). Criminogenic needs are “dynamic” risk factors that if reduced decrease the chances of criminal involvement (Andrews and Bonta 2010). Interventions that target criminogenic needs have shown better recidivism outcomes than those that do not, especially those that target antisocial personality patterns, antisocial cognitions, and antisocial associates (see for example Aos et al. 2006). How treatment occurs (*responsivity*) is the third component of the model. Meta-analyses of correctional interventions consistently point to the effectiveness of cognitive–behavioral approaches in reduction of offender recidivism (Andrews et al. 1990a, b; Landenberger and Lipsey 2005; Lipsey 2009; Lipsey and Wilson 1993).

Within the RNR framework, correctional education holds the promise of reducing recidivism, as it directly impacts one of the identified criminogenic needs. Before we discuss possible mechanisms for change, it is instructive to note the important role that correctional education holds in the correctional environment. Most prisons offer basic and secondary education programs, which assists the many inmates with relatively lower literacy rates (Greenberg et al. 2007). Although data on postsecondary education is limited, a survey conducted by the Institute for Higher Education Policy suggested that the vast majority also provide vocational and academic postsecondary education programs (Gorgol and Sponsler 2011). However, 6% of the incarcerated population participated in these programs, the vast majority of which were vocational or certificate programs (Gorgol and Sponsler 2011). Prisons offer numerous vocational, now more commonly referred to as correctional technical education, programs. For example, the California Department of Corrections and Rehabilitation offers 20 career and technical education programs in the building trade and construction, energy and utilities, finance and business, public service, manufacturing and product development, and transportation. The Bureau of Justice Statistics surveys of adult inmates suggest that slightly more than a quarter participate in either academic or career and technical education programs while serving their sentence in state prisons (Turner 2018).

Correctional education may help reduce recidivism and improve labor market opportunities in several ways, although as criminologists have pointed out, surprisingly little attention has been paid to the theoretical mechanisms linking education provided in prison with postrelease outcomes (MacKenzie 2006). Though we are unable to directly test such mechanisms in our present meta-analysis (which relies on using data

from past studies), we briefly describe them here as a framework for conceptualizing the role and benefits of education programs in the justice system.

Cognitive and moral development are seen as central to changing offender behavior through education, providing inmates with knowledge and challenges that give them important skills as well as expand their sense of purpose and life goals. Duguid (1982) argued that education should change an offender's perception of reality by improving and expanding cognitive development, moral development, and sociopolitical development.¹ Most criminals, he maintained, were at a cognitive-developmental state typical of adolescents in which they were unable to see alternative solutions to problems, unable to express empathy, and unable to understand the long-term consequences of their present actions. This, coupled with an authoritarian cognitive style—characterized by rigidity and intolerance of ambiguity—leads to criminal behavior.

In acquiring new bodies of knowledge via academic courses, inmates can potentially gain the theoretical context that can expedite their transition to more mature developmental states wherein they have an opportunity to deepen their intellectual capacities and expand their understanding of the consequences of their behaviors. Changing behaviors, however, requires more than providing facts or information; it requires emphasizing problem-solving strategies, challenging offenders to a “style of thought that involves greater subtlety and complexity than they are used to” (Duguid 1982, p. 59). Behavior, though, is more than a cognitive operation; morals reflect beliefs and values that guide one's life (Duguid 1982). Classic psychological writings of Piaget (1997) and Kohlberg (1963) help inform the moral component. Educational curricula can assist by providing course content that helps develop moral reasoning (Arbuthnot 1984; Arbuthnot and Gordon 1983), which in turn should attenuate the impulse to engage in criminal behavior postrelease. Duguid's (1982) analysis resonates with current language of RNR. Education may also affect executive cognitive functions that in turn reduce the impulse to reoffend. For example, education may attenuate crime because it improves an offender's ability to use and process information (MacKenzie 2006). The “desistance paradigm” maintains that correctional programs must make sense to clients and provide them with the opportunity for leading better lives (Maruna and LeBel 2010). Attaining educational degrees may help offenders change their identity and self-concept, providing motivation to lead better lives and desist from crime. Regardless of whether they are academic or vocational in nature, educational programs connect inmates with teachers in a supportive, nurturing environment, which is paramount to effective inmate rehabilitation per criminological ideas about the role of social support (Cullen 1994). Additionally, educational programs leading to degrees can help shore up deficiencies on resumes, which can in turn improve offenders' chances of passing basic screening hurdles when turning in job applications.

Vocational education (or career and technical education, as it is commonly referred) may address cognitive changes similar to academic education, but it is primarily designed to impart occupation-specific skills that local employers value when making hiring decisions. With such skills in hand, inmates who received vocational education should have an expanded set of jobs to apply for when released. Therefore, we expect exposure to vocational courses when in prison should be associated with higher rates of

¹ Duguid (1982) provides limited discussion of sociopolitical development; we do not include this last component in our discussion here.

employment postrelease, which—with stronger connections to the formal economy—should lead to reductions in recidivism. Some studies have shown that prison job programs lead to employment after prison (Gerber and Fritsch 1995), but these programs—which often focus on a limited range of tasks that can be undertaken in a correctional environment—often lack the in-depth training that employers require. Such training is central to most vocational programs, particularly those that lead to licenses and certifications.

Vocational education is expected to reduce reoffending because it is intended to expedite the transition to employment, which in turn provides a productive alternative to crime. The link between employment and crime, however, has shown conflicting findings. For example, some researchers have found that the acquisition of stable employment in adulthood—a productive, socially normative role—redirects behavior and energy toward one's family, and community, and consequently, away from crime (Laub and Sampson 2003; Uggen 2000). However, meta-analyses of ex-offender employment programs have shown no impact on recidivism (Bushway and Reuter 2002; Visser et al. 2005). Our current meta-analysis, which focuses specifically on vocational education (distinct from employment programs), will help shed new light on the role that occupationally focused courses can play in shaping postrelease outcomes.

“Nothing works” and the case for a reappraisal of correctional education

The first major systematic inquiry into the effectiveness of correctional education in the USA was undertaken by Douglas Lipton, Robert Martinson, and Judith Wilks, who in 1975 published a review of 231 evaluations of a broad range of prisoner rehabilitation programs spanning 1945 to 1967. Their review included a small subset of evaluations of what they classified as “skill-development programs,” which consisted of academic and vocational training programs. Conducted before rigorous meta-analysis techniques were fully developed and commonplace, Lipton and his colleagues instead descriptively summarized the findings of these studies. Only three of the eight studies of skill-development programs they reviewed that used recidivism as an outcome found that correctional educational was beneficial to participants (i.e., significant associations with lower rates of recidivism). Neither of the two studies of skill-development programs they reviewed that used employment as an outcome showed positive benefits to participants. Based on these results, they concluded that correctional education was not an effective strategy for rehabilitating prisoners.

As the first systematic review of prisoner rehabilitation of its time, it was influential to the field not only for its comprehensiveness but for the interpretations of the findings, which became a lasting fixture of the policy discourse on corrections. Prior to the study's formal release, Robert Martinson, the second author, previewed the findings in a commentary “What Works? Questions and Answers About Prison Reform,” published in the magazine *The Public Interest*. In it, Martinson wrote: “it can safely be said that they [the studies included in their review] provide us with no clear evidence that education or skill development programs have been successful.” Martinson's article casts doubt on the effectiveness of educational programming within correctional facilities and generated the provocative conclusion that “nothing works” in prisoner rehabilitation. Though never actually written in the report, the phrase “nothing works”

became synonymous with Lipton et al.'s review, and as a result, federal and state-sponsored initiatives to address the needs of prisoners were viewed with skepticism.

Lipton et al.'s study, along with Martinson's corresponding summary, spurred efforts to improve existing academic and vocational programs and to create new approaches to educating prisoners. Over time, researchers evaluated these newer programs with improved research designs and statistical techniques. However, it was not until 2000 that this growing body of research was systematically evaluated as a whole. Conducted by David Wilson, Catherine Gallagher, and Doris MacKenzie (2000) at the University of Maryland, this updated stocktaking of the field included 33 studies of correctional education published after 1975—a time period that broadly covered the post-Lipton study era. Unlike Lipton et al.'s systematic review, which simply summarized the findings in terms of the number of studies that yielded a statistically significant positive/negative relationship with recidivism, Wilson and his colleagues used formal meta-analytic techniques, which average findings of multiple studies into a single parameter of program or “treatment group” efficacy, accounting for both the size of the samples used in the studies and the quality of their research design. In averaging across studies, they showed that participation in academic programs while incarcerated was associated with an average reduction in recidivism of about 11 percentage points. Academic program participation was also associated with a greater likelihood of employment, although they did not quantify the relationship in terms of a percentage increase/decrease in the same way they did for recidivism. Wilson et al.'s findings, based on more recent studies and more rigorous methods of analysis, called into question Martinson's claim that “nothing works.”

Six years later, in 2006, a pair of additional meta-analyses were conducted (Aos et al. 2006; Mackenzie 2006) that corroborated Wilson et al.'s findings. The first was undertaken by Doris MacKenzie, a co-author of the Wilson study, who updated their original meta-analysis to include a handful of newer studies and to limit the sample to only those studies published after 1980. The second was undertaken by Steve Aos, Marna Miller, and Elizabeth Drake of the Washington State Institute for Public Policy, who conducted a meta-analysis of 17 studies of academic programs and four studies of vocational programs published after 1970. There were six common studies across both of these more recent meta-analyses, including one of the very few random control trials of correctional education, which found that inmates randomly assigned to participate in correctional education in a medium-security Canadian prison were significantly less likely to return to prison than their peers who were randomly assigned to control conditions (Linden et al. 1984).² Both of these most recent meta-analyses found that inmates participating in correctional education—including both academic as well as vocational programs—had lower rates of recidivism than their peers who did not participate in correctional education.

² Despite the empirical rigor of this study, it is excluded from our own meta-analysis as our focus is solely on correctional education programs administered in the USA.

Advancing the field: distinct contributions of our meta-analysis

As with the meta-analyses described above, our study aims to understand whether the body of relevant research to date supports the proposition that correctional education programs can help to successfully prepare offenders for community reintegration upon release. Following the lead of Wilson and colleagues, MacKenzie, and Aos and colleagues, we use meta-analytic techniques to synthesize the effects of correctional education programs administered to adults across multiple studies. In doing so, our goal is to build on the contributions of their work, while extending them in a number of key ways, which we describe in turn. First, as with previous meta-analyses, our focus is largely on recidivism because it is the outcome most often used in the literature, and the ability to avoid recidivism is arguably one of the most important markers of successful rehabilitation. However, we also examine whether participating in a correctional education program is associated with an increase in labor force participation. Employment is a particularly important outcome as many of the programs we reviewed were explicitly designed to provide inmates with occupational skills that they could transfer to “civilian jobs” following their release. Further, acquiring steady employment following release from prison has been shown to be an important factor in getting ex-offenders on the “right track” and, in turn, reducing their odds of returning to crime (Laub and Sampson 2003; Uggen 2000).

Second, one major limitation of the extant research on correctional education is the dearth of studies that use experimental designs, making it difficult to establish a causal relationship between program participation and the outcome of interest. Studies that lack experimental designs are susceptible to selection bias, whereby inmates who elect to participate in educational programs may differ in unmeasured ways from inmates who elect not to participate in those programs. The previous meta-analyses discussed thus far have included studies that employed quasi-experimental designs—a number of which had treatment and comparison groups that were dissimilar on several key characteristics. Therefore, their findings and conclusions may be affected by selection bias. To address this concern, we pay special attention to studies that used either experimental designs or quasi-experimental designs where the treatment and comparison groups were similar on baseline characteristics. As a result, our study provides the most scientifically defensible evidence of correctional education to date.

Finally, a defining feature of our review is that it is the most comprehensive, including a total of 57 studies of correctional educational programs in the USA (compared with 33 studies reviewed by Wilson and colleagues, 22 reviewed by MacKenzie, and 21 reviewed by Aos and colleagues). Our review also focuses specifically on academic and vocational training programs, whereas some of these other reviews also included life skills training/reentry programs and work placement programs and, thus, diluting the estimation of effects that are uniquely attributable to education programs. Before our review, the meta-analysis with the most current coverage was Aos et al. (2006), which included studies published through 2005, whereas our meta-analysis incorporates studies published through December 2017.

Methods

Sample

Our meta-analysis is part of a larger project conducted by the RAND Corporation under contract with the U.S. Department of Justice's Bureau of Justice Assistance as part of the Second Chance Act. In 2010, the Department was determining funding allocations and technical assistance to an array of correctional rehabilitation programs. To inform this planning process, RAND was asked to objectively evaluate the empirical evidence to date on the effectiveness of educational programs administered to prisoners. To accomplish this, we undertook a multimethod study that included interviews, surveys, a systematic review of existing literature, and a meta-analysis, with findings from these analyses published in research reports for the Bureau of Justice Assistance (Davis et al. 2013, 2014). The present paper reflects an update and an extension to these originally published reports.

We constructed our sample of studies for our meta-analysis by first searching an expansive range of sources, including relevant research databases³; a "gray literature" search of online repositories maintained by research organizations, think tanks, and universities⁴; and a bibliography scan of all major literature reviews, systematic reviews, thematic policy overviews, and the existing meta-analyses of inmate rehabilitation programs described in the previous section. Our comprehensive approach was intended to capture both published and unpublished research, including conference presentations and working papers of studies that have not made their way through formal publication channels at the time of our project.⁵ This search produced 1728 documents, of which 281 were identified as primary empirical studies on rehabilitation programs in prisons that potentially included education as a component. The other 1447 documents included commentaries, newspaper articles, brochures, instructional manuals, historical records, and statistical summaries (e.g., reports of numbers of inmates receiving rehabilitative services).

We screened the 281 primary empirical studies to assess whether they met three eligibility criteria for inclusion in our analysis. First, the study needed to evaluate an educational program administered in a jail or prison in the USA published (or released) between January 1, 1980, and December 31, 2017. We define an educational program as one that includes an academic or vocational curriculum taught by an instructor, designed to lead to the attainment of a degree, license, or certification. The instruction

³ Databases included the Education Resources Information Center (ERIC), Education Abstracts Criminal Justice Abstracts, National Criminal Justice Reference Service Abstracts, Academic Search Elite, EconLit, Sociological Abstracts, Google Scholar, and the Rutgers Library of Criminal Justice Grey Literature Database.

⁴ Online repositories included the Vera Institute of Justice, Urban Institute, Washington State Institute for Public Policy, American Institutes for Research, Mathematica Policy Research, John Jay College of Criminal Justice Re-entry Institute, Justice Policy Institute, Center for Law and Social Policy (CLASP), Juvenile Justice Educational Enhancement Program (JJEPP), RTI International, and Manpower Demonstration Research Corporation (MDRC).

⁵ In cases where multiple versions of the same paper were identified, such as when a conference presentation later becomes a peer-reviewed article, we used the most recent version of the study. In a few cases, there were multiple studies by the same author(s) that used variations of the same sample. In those cases, we chose the version of the study that had the broadest sample (e.g., all prisoners released between 1990 and 1995 rather than all prisoners released between 1990 and 1992).

needed to occur during incarceration; postrelease/parolee-focused programs were not eligible. Second, the study needed to measure the effectiveness of the program using either recidivism or postrelease employment as an outcome. Finally, it needed to have a treatment group that included inmates who participated in or completed the correctional education program and a comparison group that included inmates who did not. Each study was reviewed independently by two members of our research team and refereed by a third member in cases where the original assessments diverged. After screening for these three criteria, we identified a final sample for our analysis that included 57 studies that used recidivism as an outcome and 21 studies that used employment as an outcome. We list the studies used in the recidivism meta-analysis in Appendix 1 and the studies used in the employment meta-analysis in Appendix 2.

Definition of treatment

For purposes of our meta-analysis, we define the treatment group in our pool of studies as inmates who participated in and/or completed a correctional education program and the comparison group as those inmates who did not participate in and/or complete the correctional education program. Some studies included more refined groups based on treatment dosage and program completion. For example, Cronin's study of GED programs in Missouri (2011) identified four groups of inmates: (1) inmates who came to prison without a GED and did not make any progress; (2) inmates who came to prison without a GED, made progress toward obtaining GED, but did not earn a GED; (3) inmates who earned their GED in prison; and (4) inmates who came to prison with a GED or more. In this and in similar instances, we followed an intent-to-treat approach, where every inmate who was assigned to the treatment group is included as a member of the treatment group, regardless of whether they received the full dosage of the treatment through completion. Accordingly, in Cronin (2011), we coded groups 2 and 3 as the treatment group and group 1 as the comparison group. Using this convention, our analysis compares all inmates without any exposure to a GED program (comparison group) to inmates who were exposed to any amount of correctional education while incarcerated, regardless of whether they completed the program (treatment group). For each treatment group in each study, we determined whether the program to which they were exposed was academic or vocational in nature. For academic programs, we attempted to further differentiate Adult Basic Education programs, high school diploma/GED programs, and postsecondary education programs. It is important to note that we only classify programs as vocational education if they involve a formal curriculum and if they supply credits toward some type of recognized degree or credential. Therefore, our measure of vocational programming does not include activities such as work programs (where inmates are assigned to jobs to perform while serving their sentence) or to job preparation courses (where inmates learn how to write a resume, prepare for a job interview, etc.).

We apply an intent-to-treat approach as our analysis is geared toward policy makers who are making decisions regarding the efficacy of their investments into correctional education programming. By including inmates in the treatment who enrolled in correctional education but withdrew, we are providing a realistic appraisal of the *total effect* of administering education in a correctional setting. In applying an intent-to-treat approach, our analysis provides an estimate of the effects of offering correctional

education at the institutional level, rather than the effects of correctional educational only on those who persisted through the program (which could introduce bias via a type I error as “persisters” are likely a select group characterized by motivation and academic potential).⁶

Definition of outcomes

In our meta-analysis, we examine two postrelease outcomes: recidivism and employment. In our pool of 57 studies that used recidivism as an outcome, recidivism is defined a number of ways, including reoffending, rearrest, reconviction, reincarceration, technical parole violation, and successful completion of parole. The majority used reincarceration as the outcome measure ($n = 40$). Additionally, studies varied in the time period through which they followed the study participants after release from prison, ranging from 6 months to over 10 years. The most frequently used time periods were 1 year ($n = 14$) and 3 years ($n = 13$). When there were multiple outcomes or time periods used in the analysis, we gave preference to reincarceration (as this represents the modal definition of recidivism) and recidivism within 1 year of release or as close as possible to 1 year (as this represents the modal time period used by the authors of the studies). When these were unavailable, we used whatever definition or time period was reported by the author(s) so that we could include as many studies as possible.⁷

Like recidivism, employment is defined a number of ways, including having ever worked part-time since release, having ever worked full-time since release, employed for a specified number of weeks since release, and employment status (i.e., employed or not employed) at a particular time point. In our pool of 21 eligible studies, the most common measure of employment used by the study's author(s) was a binary variable indicating whether the former inmate had ever worked full- or part-time since release ($n = 12$). In places where there were other metrics used, such as wages or weeks worked, we transformed the associated effect size so it would be functionally equivalent to a binary outcome indicating employment status. In terms of time period, studies ranged from examining a cohort of former inmates in the community for 3 months since release from prison to following them for 20 years since release from prison. The most frequently used time period in the 18 eligible studies was 1 year ($n = 8$). When there were multiple

⁶ Intent-to-treat analysis most closely reflects a practical program implementation scenario because it incorporates noncompliance and protocol deviations, which are common features of many prisoner rehabilitation programs. Additionally, intent-to-treat analysis maintains the initial balance of inmate characteristics generated from the original assignment to treatment or control in cases where there is assignment (Gupta 2011).

⁷ Our aggregation of multiple types of recidivism and time periods is based on the assumption that the estimated effect of correctional education is not contingent on the measurement strategy or specification used by the researcher. We tested this assumption by sampling studies that reported the effects of correctional education on recidivism using consistent definitions and time periods, and estimated our models on these limited subsamples with consistent metrics. We found that the effect of correctional education did not differ across the definition of recidivism (e.g., reincarceration, rearrest, parole failure) or time period used (e.g., 6 months since release from prison, 1 year since release from prison, 10 years since release from prison). This gives us confidence that the findings from our meta-analysis are robust and apply to a range of postrelease settings, circumstances, and outcomes. It is worth noting that the previous meta-analyses faced similar limitations due to variation in metrics reported by the study authors; our aggregation approach is in line with how the previous meta-analyses empirically dealt with this limitation. Without this aggregation approach, it would be impossible to apply meta-analytic methods to the study of correctional education due to the heterogeneity in measurement approaches.

outcomes and time periods used, we gave preference to employment within 1 year of release or as close as possible to 1 year (as this represents the modal time period used by the authors of the studies). However, as with our approach in our analysis of recidivism, we used whatever definition or time period was reported by the author.

Determination of study quality

Many correctional education programs are voluntary, which presents analytical challenges to researchers who study their effectiveness as well as to policy makers who rely on strong empirical evidence to guide their decisions. Inmates who choose to participate in educational programs may differ in unmeasured ways from inmates who elect not to participate in those programs. For instance, they may be more motivated, academically included, and/or be more proactive about planning for their futures. Therefore, differences in outcomes detected between program participants and nonparticipants may reflect pretreatment attributes of the inmates who participated in the programs and not the true effects of the programs themselves. This is commonly referred to as selection bias.

To attenuate the threat of selection bias from our meta-analysis, we rated the quality of evidence in each of our studies based on how well the study's design mitigated pretreatment differences (both measured and unmeasured) between the treatment and comparison groups. To do so, we used the Maryland Scientific Methods Scale (the Maryland SMS), a well-regarded rating scheme of research designs in the social sciences developed by criminologists at the University of Maryland (Farrington et al. 2006; Sherman et al. 1997). The Maryland SMS uses a five-level ranking scheme from level 1 (lowest level of rigor) to level 5 (highest level of rigor) and distinguishes between studies that are experimental (level 5) and studies that are quasi-experimental (levels 2 through 4). Experimental studies are defined as those that randomly assign participants to treatment and control groups, whereas quasi-experimental studies are those that employ both a treatment and comparison group, but in which group membership is not randomly assigned. Among the quasi-experimental studies, the Maryland SMS further classifies them according to the quality of statistical controls they use.

Studies from most to least rigorous are classified as follows. Level 5 indicates a well-executed randomized controlled trial (RCT). Level 4 indicates a quasi-experimental design with very similar treatment and comparison groups. To qualify for level 4, the treatment and comparison groups must be matched within 1/20th of a standard deviation at baseline on at least age, prior offenses, baseline educational level, and time to data collection. Level 3 indicates a quasi-experimental design with somewhat dissimilar treatment and comparison groups, but reasonable controls for differences. To qualify for level 3, the treatment and comparison groups must be matched on one to two variables (within 1/20th of a standard deviation at baseline) other than gender, and/or include statistical controls for at least some baseline differences between groups other than gender. We did not consider gender a relevant baseline characteristic for matching as the lion's share of studies focused solely on male inmates.⁸

⁸ It is not possible to discern the total number of studies that include female inmates in their samples due to inconsistencies in reporting. For a more detailed discussion of women's participation in correctional education, see Rose (2004).

Table 1 Distribution of studies and effect sizes

M a r y l a n d Scientific Methods Scale	Recidivism analysis		Employment analysis	
	<i>n</i>	<i>k</i>	<i>n</i>	<i>k</i>
5	2	2	0	0
4	9	14	3	4
3	21	30	10	12
2	26	35	8	10
1	NA	NA	NA	NA
Total sample	57	81	21	26

Note. Studies receiving a level 1 on the Maryland Scientific Methods Scale do not include any type of comparison group, and therefore, there was no way to calculate an effect size estimate. They were excluded from our analysis by design. The *n* column in the “recidivism analysis” column does not sum to 57 because one study (Piehl 1995) contributes two effect sizes at different rating levels

n, number of studies; *k*, number of effect size estimates

Level 2 indicates a quasi-experimental design with somewhat dissimilar treatment and comparison groups and with limited and/or no controls for differences. Level 1 indicates a study with no separate comparison group.

In our initial document review, we screened out studies that did not have a comparison group, and so our meta-analysis is only based on studies that have at least a level 2 rating. In our sample of studies that use recidivism as an outcome, the modal study quality ranking is level 2 ($n = 26$). In our sample of studies that use employment as an outcome, the modal study quality ranking is level 3 ($n = 10$). While we present our findings for studies across the different levels of the Maryland SMS, to provide the most scientifically defensible evidence on the potential efficacy of correctional education, we privilege those that receive a level 4 or level 5 rating.

Analytic approach

As shown in Table 1, we identified and reviewed 57 studies that used recidivism as an outcome that were eligible for inclusion into our meta-analysis and 21 studies that used employment as an outcome that were eligible for inclusion into our meta-analysis. For analytic purposes, our unit of analysis is the effect size (*k*) and not the individual study (*n*). An effect size is the statistic reported in the study that indicates the magnitude of the difference on the outcome of interest between the treatment group and the comparison group. The number of effect sizes exceeds the number of studies because a study could contain multiple treatment and comparison groups and thus contribute multiple comparisons of interest. For example, a study making a single comparison of recidivism rates between a treatment group receiving GED coursework and a comparison group receiving no GED coursework would contribute only one effect size to our meta-analysis. However, a study comparing the recidivism rates of two treatment groups—one receiving GED coursework and one receiving vocational certification training—with the recidivism rate of a comparison group receiving no form of correctional education would contribute two effect sizes to our meta-analysis. Our recidivism

analysis is based on 81 effect sizes from 57 studies, and our employment analysis is based on 26 effect sizes from 21 studies.

We transformed all our effect size estimates into odds ratios. For our purposes, the odds ratio is calculated as the odds of recidivating (or working) among treatment group members divided by the odds of recidivating (or working) among comparison group members. Odds ratios greater than 1 indicate that the treatment group had a higher rate of recidivism (or postrelease employment), and odds ratios less than 1 indicate that the comparison group had a higher rate of recidivism (or postrelease employment). An odds ratio of 1 indicates that there is no difference between the treatment group and the comparison group. These odds ratios form the data points for our meta-analysis.

We conducted our meta-analysis using random-effects regression, which is appropriate when there is substantial heterogeneity in effect size estimates across different populations (e.g., minimum-security inmates in California in 1985, medium-security inmates in Connecticut in 2003) represented in our inclusive review of correctional education programs.⁹ We use a DerSimonian-Laird estimator to pool results across the multiple effect sizes. This estimator weights each study's effect size estimate by the precision (e.g., the inverse of the standard error), and the heterogeneity of effect sizes (e.g., gives greater weight to those studies that are closer to the mean), and then produces a pooled effect size and standard error. This pooled effect size in our meta-analysis provides an estimate of the relationship between participation in correctional education and our two outcomes across the population of eligible studies. Because of the nested nature of our data (e.g., multiple effect sizes within the same study), the assumption of independent observations is violated, which may result in artificially narrow standard errors.¹⁰ To assess this, as a sensitivity analysis, we computed robust standard errors using robust hierarchical meta-analysis (Hedges et al. 2010). Our results were consistent regardless of the estimation strategy. For each of our two outcomes, we first estimate an overall pooled effect size across all the studies. We then compute pooled effect sizes across the different levels of the Maryland SMS and separately for academic and vocational programs.

Findings

Estimated effects on recidivism

In Table 2, we report our pooled estimate for all 81 effect sizes from all 57 studies. This includes studies across the levels of the Maryland SMS and, as such, includes studies that vary in their ability to attenuate selection bias. When aggregating across all the

⁹ Random-effects models were also the estimation method used in three major meta-analyses published to date (Wilson et al. 2000; MacKenzie 2006; Aos et al. 2006).

¹⁰ We computed robust standard errors for meta-regression using the ROBUMETA command available in Stata (Hedberg 2011). This was necessary only for our analysis of recidivism, as there was not sufficient nesting in the pool of eligible studies of employment to permit this computation. The results were not contingent on the method for estimating the standard errors; tests of significance reflect unadjusted standard errors.

Table 2 Estimates of the effect of correctional education participation on the odds of recidivating overall and by levels of the Maryland Scientific Methods Scale

	Odds ratio	95% confidence interval	<i>n</i>	<i>k</i>
Total sample	0.68*	0.64, 0.73	57	81
Levels of the Maryland Scientific Methods Scale				
Level 5	0.61*	0.44, 0.85	2	2
Levels 4 and 5	0.72*	0.61, 0.84	11	16
Levels 3, 4, and 5	0.72*	0.65, 0.80	32	46
Levels 2, 3, 4, and 5	0.68*	0.64, 0.73	57	81

n, number of studies; *k*, number of effect size estimates

* $p < 0.05$

studies in our sample, the pooled odds ratio is 0.68 and significant at $p < 0.05$. This indicates that across 37 years of empirical studies on the effects of correctional education with analyses ranging in methodological quality and rigor, on average, the odds of recidivating among inmates participating in correctional education programs are 68% of the odds of recidivating among inmates not participating in correctional education programs. Put another way, inmates participating in correctional education programs are 32% less likely to recidivate when compared with inmates who did not participate in correctional education programs. To graphically illustrate how the individual studies contribute to this aggregated estimate, we present a forest plot in Appendix 3 that documents the direction and magnitude of all 81 effect sizes.

As we have noted, many studies have limitations in their research designs that preclude them from ruling out selection bias as an explanation for the observed differences between the treatment and the comparison group. Therefore, although we find across the full sample of studies that participation in correctional education is associated with a reduction in the odds of recidivism following release, we also examine whether this pattern is maintained when we restrict our sample to studies with the strongest and most scientifically defensible research designs by recalculating the odds ratio for studies that fall at different levels of the Maryland SMS (shown in the bottom panel of Table 2).¹¹

Level 5 is the highest level of rigor and consists of experimental studies that employ randomized control designs. Our meta-analysis includes two studies with two corresponding effect sizes at this level, and both studies evaluated the Sandhills Vocational Delivery System Experiment in North Carolina (Lattimore et al. 1988, 1990). The odds ratio for these two studies is 0.61 ($p < 0.05$, 95% confidence interval [CI] = 0.44, 0.85), indicating that the odds of recidivating among treatment group members in these experimental studies are 61% of the odds of recidivating among comparison group members.

¹¹ Note that the last row, which includes the pooled effect size for levels 2, 3, 4, and 5, is the same as the pooled effect size for the total sample because they both are based on all 57 studies.

Although level 5 on the Maryland SMS reflects the most stringent research design, the estimate is less informative because it is based on only one program and, hence, is restricted in its broader applicability to the array of correctional education programs in operation. To incorporate a broader range of programs while maintaining a high degree of methodological rigor, we focus on level 4 and level 5 studies combined. Level 4 consists of quasi-experimental studies where the treatment and control groups are reasonably matched on a number of key observable characteristics. Among those eligible for the recidivism meta-analysis, nine studies receive a level 4 rating: Duwe and Clark's (2014) study of secondary and postsecondary education programs offered by the Minnesota Department of Corrections; Harer's (1995) study of federal prison education programs (including Adult Basic Education, GED, postsecondary education including college courses and vocational training); Kim and Clark's (2013) study of postsecondary education programs offered by the New York State Department of Corrections and Community Supervision; Hill et al.'s (2017) study of a vocational certification program offered by the Florida Department of Corrections; Langenbach et al.'s (1990) study of televised postsecondary instruction in Oklahoma state prisons; Lockwood et al.'s (2012) study of Indiana Department of Corrections' education programs (including Adult Basic Education, GED, postsecondary education including college courses and vocational training); Pompoco et al.'s (2017) study of academic and vocational programming offered by the Ohio Department of Rehabilitation and Corrections; Saylor and Gaes' (1997) study of the Post Release Employment Project vocational training program administered in federal prisons; and Winterfield et al.'s (2009) study of prison postsecondary education in Indiana, Massachusetts, and New Mexico.

When we combine these nine level 4 studies with the two level 5 studies of the Sandhills Vocational Delivery System Experiment in North Carolina, our aggregated odds ratio is 0.72 ($p < 0.05$, 95% confidence interval = 0.61 to 0.84), indicating that the odds of recidivating among treatment group members in the most rigorous quasi-experimental studies are 28% lower than the odds of recidivating among comparison group members. That we obtain odds ratios that are of similar magnitude when restricting our analysis to the studies with the most rigorous research design suggests that the overall effect observed among our full sample of 57 studies is not driven by lower-level studies that are potentially subject to selection bias.

Because the odds of an outcome, in our case, recidivating, can be a less-intuitive metric to grasp, we also calculated the risk difference, which is the absolute reduction in recidivism rates between those who received correctional education and those who did not. We used rearrest rates and reincarceration rates from Langan and Levin's (2002) study for the Bureau of Justice Statistics and reincarceration rates from a more recent study conducted by the Pew Charitable Trusts (Pew Center on the States 2011). We base our calculation on our odds ratio for those studies meeting a level 4 or level 5 rating on the Maryland SMS, as these represent our best estimate of the causal effect of correctional education on recidivism using an array of programs. Recidivism rates from the aforementioned published studies indicate that between 43.3 and 51.8% of former prisoners were reincarcerated within 3 years of release, and two thirds were rearrested within 3 years of release. If we apply the recidivism

rates estimated by Langan and Levin (2002) for the Bureau of Justice Statistics, we find that correctional education would be expected to reduce 3-year rearrest and reincarceration rates by 8.6 and 9.0 percentage points, respectively.

Next, we calculate odds ratios for four types of correctional education programs, shown in Table 3: Adult Basic Education (ABE) programs, high school/GED programs, postsecondary education programs, and vocational education programs. A limitation in interpreting these odds ratios is that studies varied in how they classified their programs. For example, some studies focused exclusively on a particular vocational program in which participants were exposed only to an occupationally focused curriculum, whereas other studies focused on broader correctional education programs that included vocational courses taken alongside a set of academic courses. A study of the latter type would therefore be included in the vocational education category as well as in one of the other program categories. Consequently, the independent effects of the vocational and academic components would remain inseparable because the studies do not generally disaggregate the effects of each component or report on individual-level dosage and outcomes in a way that would allow our analysis to disaggregate the effects. Because of the overlap in curricular exposure and the lack of specificity in dosage, the odds ratios for the different program types cannot be compared directly with one another.

The results suggest that participation in a correctional education program—regardless of the type of program—is associated with a reduction in recidivism. All four of the odds ratios for program type are less than 1 and are statistically significant at $p < 0.05$. Although different programs serve inmates with different needs and skill sets—e.g., postsecondary education programs are typically administered to the most academically advanced inmates and ABE programs are typically administered to inmates with low levels of academic attainment—the findings here suggest that correctional education may be an effective way to prevent recidivism for prisoners across the spectrum of ability and academic preparedness. These disaggregated findings, however, are based on all studies and not just those at level 4 and level 5. Therefore, the findings for different types of educational programs may be driven by characteristics of the program participants rather than direct, causal effects of the programs themselves.

Table 3 Estimates of the effect of correctional education participation on the odds of recidivating by program type

Program type	Odds ratio	95% confidence interval	<i>n</i>	<i>k</i>
Adult Basic Education	0.69*	0.59, 0.80	13	19
High school diploma/GED	0.75*	0.65, 0.79	22	28
Postsecondary education	0.52*	0.42, 0.63	19	24
Vocational education	0.68*	0.62, 0.75	34	42

n, number of studies; *k*, number of effect size estimates

* $p < 0.05$

Estimated effects on employment

Next, we conduct parallel analyses with our sample of 21 studies that include employment as an outcome. In Table 4, we report our pooled estimate for all 26 effect sizes from each of these studies. When aggregating across all the studies in our sample, the pooled odds ratio is 1.12 and significant at $p < 0.05$. This indicates that across 32 years of empirical studies on the effects of correctional education with analyses ranging in methodological quality and rigor, on average, the odds of obtaining postrelease employment among inmates receiving correctional education are 12% higher than the odds of obtaining postrelease employment among inmates not receiving correctional education. To graphically illustrate how the individual studies contribute to this aggregated estimate, we present a forest plot in Appendix 3 that documents the direction and magnitude of all 26 effect sizes.

As with our analysis of recidivism, it is possible that the findings for employment favorable to correctional education programs may be driven by selection bias, wherein motivated, work-oriented inmates are selected (either by their own choice or by correctional program administrators) to enroll in educational programs. Therefore, the observed differences in employment between the treatment and comparison groups may reflect underlying differences in the types of inmates that participate in correctional education and not the causal effect of the program itself.

To provide a better estimate of the potential causal relationship between program participation and employment, we recalculated the odds ratio for studies that fall at different levels of the Maryland SMS scale (shown in the bottom panel of Table 4). There are no studies that use employment as an outcome that receive a level 5 rating. In other words, there are no experimental studies of the effects of correctional education on employment that use randomized control designs. Among those eligible for the employment meta-analysis, three studies receive a level 4 rating: Duwe and Clark's (2014) study of secondary and postsecondary education programs offered by the Minnesota Department of Corrections; Hill et al.'s (2017) study of a vocational certification program offered by the Florida Department of Corrections; and Saylor

Table 4 Estimates of the effect of correctional education participation on the odds of postrelease employment overall and by levels of the Maryland Scientific Methods Scale

	Odds ratio	95% confidence interval	<i>n</i>	<i>k</i>
Total sample	1.12*	1.07, 1.18	21	26
Levels of the Maryland Scientific Methods Scale				
Level 5	NA	NA	NA	NA
Levels 4 and 5	1.27	0.96, 1.67	3	4
Levels 3, 4, and 5	1.05*	1.01, 1.10	13	16
Levels 2, 3, 4, and 5	1.12*	1.07, 1.18	21	26

n, number of studies; *k*, number of effect size estimates

* $p < 0.05$

and Gaes' (1997) study of the Post Release Employment Project vocational training program administered in federal prisons.

When we combine the four effect sizes from these three level 4 studies, our odds ratio is 1.27 but it does *not* reach conventional thresholds of statistical significance. When looking at the three studies individually, Saylor and Gaes (1997) found positive effects of correctional education participation on postrelease employment, while Hill and her colleagues (2017) found null effects for program participation. Duwe and Clark (2014), on the other hand, showed mixed effects: they found that participation in a secondary degree program was associated with an increase in the probability of postrelease employment, but participation in a postsecondary degree program was not. That two of the three most rigorous studies found null effects and that the odds ratio for these three level 4 studies was not significant, we cannot rule out selection bias as a potential explanation for the positive effect detected when aggregating the effect sizes from all 21 studies. There indeed is an association between participation in correctional education and employment, but our findings here suggest that this relationship may not be a causal one.

Finally, we disaggregated the 22 effect sizes by type of program. Recall that in our analysis of recidivism, we calculated odds ratios for ABE, high school/GED, and postsecondary education programs separately. Because of small sample sizes here, we combined these three programs into a single measure of “academic programs” for ease of interpretation and comparison. The pooled effect sizes are shown in Table 5. We find that both odds ratios for program type are greater than 1 and are statistically significant at $p < 0.05$ —suggesting that both academic and vocationally focused programs may be effective at preparing inmates for the labor market. However, as these are largely based on lower quality studies, the relationships here may be driven by selection bias and may not reflect a direct, causal effect of the programs themselves.

Sensitivity analyses

One limitation of the meta-analyses is that studies that fail to produce statistically significant results have a more difficult time getting published in journals—leading to publication bias or “the file drawer problem” (i.e., studies that find no program effects remain in file drawers and are not widely distributed). This publication bias may skew the findings in favor of successful programs. We attempted to limit the threat of publication bias by searching an array of sources in the literature to procure official program evaluation reports not published in journals, working papers, research briefs, theses, and dissertations.

Table 5 Estimates of the effect of correctional education participation on the odds of obtaining employment by program type

Program type	Odds ratio	95% confidence interval	<i>n</i>	<i>k</i>
Vocational education	1.22*	1.05, 1.42	10	10
Academic education	1.10*	1.03, 1.17	14	16

n, number of studies; *k*, number of effect size estimates

* $p < 0.05$

To assess whether our results are contingent on the studies that we were able to procure, we perform two diagnostic tests. Our first diagnostic test assesses whether studies with positive results have a higher probability of publication—that is, whether we can find evidence of publication bias. We use the Egger regression test of nonsymmetry for both our recidivism and employment analyses (Egger et al. 1997). Both yield a significant test statistic of $p < 0.05$. This significant finding suggests that there may be some evidence of upward publication bias—in other words, showing too large an impact on recidivism reduction or employment. However, inspection of standard funnel plots (not shown, but available upon request from the authors) typically used in conjunction with Egger regression tests of nonsymmetry when assessing publication bias suggests that the addition of potentially missing studies with smaller effects sizes or null effects would not change the substantive conclusion of either of our meta-analyses.

A second diagnostic test we perform is a “leave-one-out” analysis to assess the risk that one large study with an extreme result may bias the results of the analysis. In this test, the data are reanalyzed leaving out studies one at a time, until all studies have been excluded individually. This analysis determines the extent to which our results are reliant on one study, and whether our conclusions will be changed with the exclusion of a particular effect. Our leave-one-out analyses (not shown, but available upon request from the authors) indicate that our results are highly stable (e.g., the results did not change when any particular study was excluded), and not dependent on any particular study.

Conclusion

In the summer of 2015, President Obama announced that his administration would reinstate Pell grants (which are used to defray the cost of college) to a limited number of inmates seeking college degrees—the first time that incarcerated individuals could receive Pell grants since Congress denied their access to the program in 1994. This executive action reinvigorated public policy discussions regarding the role of corrections in American society and the potential means by which prisoners can be effectively rehabilitated. If public funds are to be used to provide educational opportunities to prisoners (per Obama’s 2015 order), will such opportunities ultimately produce positive outcomes? To inform ongoing policy discussions regarding the most effective approaches to rehabilitating prisoners, our study answers the question: Does providing inmates with education while incarcerated reduce their chances of recidivism and improve their postrelease employment prospects?

In aggregating the findings from 57 studies published or released between January 1, 1980, and December 31, 2017, we find that inmates participating in correctional education programs are 32% less likely to recidivate when compared with inmates who did not participate in correctional education programs. This finding is robust when limiting our analysis to the studies that have the most rigorous designs and are thus less affected by selection bias. Specifically, we find that when restricting our sample to 11 studies that apply the most rigorous research designs, inmates participating in correctional education programs are 28% less likely to recidivate when compared with inmates who did not participate in correctional education programs. Additionally, this finding holds for all forms of education—including Adult Basic Education courses,

GED/high school courses, vocational college courses, and college courses. This suggests that investments across an array of educational programs can be beneficial in correctional settings that house individuals with heterogeneous educational backgrounds and needs. Our findings complement the results published by Wilson et al. (2000), Aos et al. (2006), and MacKenzie (2006) and provide further support (with a more rigorous empirical foundation) to the assertion that correctional education participants have lower rates of recidivism than nonparticipants.

Though recidivism is the most commonly used metric to gauge the effectiveness of prisoner rehabilitation, a number of studies focus on employment as an indicator of successful community reintegration. In our aggregating across 21 studies, we find that the odds of obtaining postrelease employment among inmates receiving correctional education are 12% higher than the odds of obtaining postrelease employment among inmates not receiving correctional education. This effect holds for both traditional academic programs as well as for vocational education programs. However, when we restrict our analysis to the three studies that have the highest quality research designs, we find the relationship is null: those in correctional education programs while incarcerated are no more or less likely to find employment following their release than are those who did not participate in correctional education programs. That we find null effects when restricting our sample to the studies with the highest caliber research designs suggests that selection bias might be driving the positive effect that we detect when aggregating across all studies. Given the increasing focus on making inmates employable so that they can quickly find jobs in the formal economy, we caution that the evidence on correctional education's ability to accomplish this goal is inconclusive.

Despite the rich empirical contributions of our meta-analysis, many questions about the role of education in the corrections system remain unanswered, namely: How much correctional education is needed to produce positive effects (i.e., the requisite "dosage") and what instructional strategies are most/least effective when teaching prisoners? Regarding dosage, for example, is it sufficient that an inmate receives 10 h of academic instruction a week or is 15 h of academic instruction required to reduce recidivism? Such questions of dosage are especially salient now, when many correctional education programs have experienced significant budget cuts. On average, the studies we reviewed lacked specific information about the dosage of the program, such as the overall program duration, the number and grade level of the courses in which inmates were enrolled, how many hours per day or week inmates were exposed to formal class instruction, and how many hours per day or week inmates worked on assignments outside the classroom. In many of the studies, particularly those that were secondary analyses of administrative data sets, respondents were categorized simply as correctional education participants and nonparticipants, which undoubtedly masked critical variation in exposure to the program among participants. Therefore, we are unable to ascertain the minimal requisite dosage to support successful postrelease transitions.

Regarding the identification of effective instructional practices, in collecting and coding the studies we found that many of the studies did not provide sufficient detail on the characteristics of the program, such as the structure of the curriculum, the training and certifications of the teachers, the instructional methods used by the teachers, the student–teacher ratio in classrooms, and supplemental access to textbooks and

technology. Thus, from a meta-analytic approach, we are unable to offer empirically supported recommendations regarding what aspects of correctional education are most or least effective. This is a significant limitation as the field remains at an impasse in developing an evidence base that can directly inform practitioners.

Lastly, and perhaps most importantly, the field of correctional education research is largely comprised studies that are of poor quality by modern scientific standards. There is a dearth of experimental studies that employ randomization: Only two studies in our analysis of recidivism used random assignment and none of the studies in our analysis of employment used random assignment. The lion's share of studies on correctional education uses comparison groups that are dissimilar with the treatment group and/or have poor controls for those differences. This is unfortunate. Given the large federal and state investment in these programs, it is imperative that social scientists provide the best quality evidence in the form of rigorous, scientifically defensible research. While we are confident in the way the direction of the effects trend in supporting our conclusions—especially at level 4 and level 5 in our analysis of recidivism—we implore researchers to continue to vigorously pursue these questions with random assignment and high-quality propensity score matching techniques. We view our current meta-analysis not as a definitive conclusion on the efficacy of correctional education, but as a check on the “current pulse of the field” in an effort to improve it.

Despite these limitations, our meta-analysis demonstrates the potential value in providing inmates with educational opportunities while they serve their sentences. Our findings support a growing empirical base that questions the now much dated claim that “nothing works” in prisoner rehabilitation. Indeed, our study shows that efforts to support successful reintegration into community postrelease would benefit from including educational programming during incarceration. However, correctional education may not be sufficient on its own to improve the employment prospects of prisoners. More high-quality research is needed to determine how much education is necessary to produce positive outcomes and to determine which types of instructional practices can be of most benefit to inmates.

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Appendix 1

Table 6 Studies included in the meta-analysis of recidivism

Study	Program description	Treatment group	Comparison group
Kenneth Adams, Katherine J. Bennett, Timothy J. Flanagan, James W. Marquart, Steven J. Cuvelier, Eric Fritsch, Jurg Gerber, Dennis R. Longmire, and Velmer S. Burton, Jr. 1994. A large-scale multi-dimensional test	Academic and vocational programming offered by the Windham School System	Academic $n = 5051$ Vocational $n = 422$	$n = 8001$
		Academic and vocational $n = 1359$	

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
of the effect of prison education programs on offenders' behavior. <i>The Prison Journal</i> 74(4):433–449.			
Allen, Robert. 2006. An economic analysis of prison education programs and recidivism. Emory University, Department of Economics.	Correctional education programs that include Adult Basic Education, GED, adult continuing education, and postsecondary education choices	Academic $n = 15,915$ Vocational $n = 10,784$	$n = 7090$
Anderson, Dennis B. 1982. The relationship between correctional education and parole success. <i>Journal of Offender Counseling, Services and Rehabilitation</i> 5(3/4):13–25.	Vienna Illinois Correctional Center vocational and academic program	$n = 122$	$n = 116$
Anderson, Dennis B., R. E. Schumacker, and S. L. Anderson. 1991. Release characteristics and parole success. <i>Journal of Offender Rehabilitation</i> 17(1–2):133–45.	Correctional education programs in midwestern states, including academic and vocational components	$n = 473$	$n = 287$
Stephen V. Anderson, Evaluation of the impact of correctional education programs on recidivism, Columbus, Ohio: Ohio Department of Rehabilitation and Correction, Office of Management Information Systems, Bureau of Planning and Evaluation, 1995.	Ohio Penal System Education Programs. These programs include Adult Basic Education, vocational education, GED preparation/high school diploma, and postsecondary education. Each program lasted at least 90 days and led to the completion of a degree/certificate.	$n = 3969$	$n = 14,099$
Mary Ellen Batiuk, Karen F. Lahm, Matthew McKeever, Norma Wilcox, and Pamela Wilcox, "Disentangling the effects of correctional education: are current policies misguided? An event history analysis," <i>Criminal Justice</i> , Vol. 5, No. 1, 2005, pp. 55–74.	Ohio Department of Corrections education programs, including high school, GED preparation, vocational education, and postsecondary education	High school $n = 49$ GED $n = 321$ Postsecondary $n = 194$ Vocational $n = 117$	$n = 292$
Fredrick Stoll Blackburn, The relationship between recidivism and participation in a Community College Associate of Arts Degree Program for incarcerated offenders, thesis, Virginia Polytechnic Institute and State University, 1981.	Hagerstown Junior College associate's degree program	$n = 189$	$n = 189$
Blackhawk Technical College, RECAP (Rock County Education and Criminal Addictions Program) Program Manual, Prepared to Be of Assistance in	Rock County Education and Criminal Addictions Program (RECAP). The program included structured vocational and literacy instruction, work experience,	$n = 150$	$n = 52$

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
Program Replication, Janesville, WI, 1996.	community service, and alcohol and drug rehabilitation.		
Dennis R. Brewster and Susan F. Sharp, "Educational programs and recidivism in Oklahoma: another look," <i>The Prison Journal</i> , Vol. 82, No. 3, September 2002, pp. 314–334.	Oklahoma Department of Corrections GED program and vocational/technical program	Academic $n = 1043$ Vocational $n = 805$	Academic $n = 4703$ Vocational $n = 11,008$
James K. Bueche Jr. 2014. Adult offender recidivism rates: how effective is pre-release and vocational education programming and what demographic factors contribute to an offenders return to prison. Doctoral dissertation, Louisiana State University and Agricultural and Mechanical College.	Vocational education programs offered by the Louisiana Department of Public Safety and Corrections	$n = 404$	$n = 808$
Lisa Ouime Burke and James E. Vivian, "The effect of college programming on recidivism rates at the Hampden County House of Correction: a 5-year study," <i>Journal of Correctional Education</i> , Vol. 52, No. 4, December 2001, pp. 160–162.	A three-credit college course program at Hampden County Correctional Center	$n = 32$	$n = 32$
T. C. Castellano, I. Soderstrom, C. L. Ringel, et al., Implementation and impact of Illinois' PreStart Program: a final report, Chicago, IL: Illinois Criminal Justice Information Authority, Publication No.: 96-039, 1996.	The PreStart Program consisted of two phases, with Phase I focused on pre release education and Phase II consisting of post release assistance.	$n = 428$	$n = 249$
Rosa Minhyo Cho and John H. Tyler. 2013. Does prison-based Adult Basic Education improve postrelease outcomes for male prisoners in Florida? <i>Crime & Delinquency</i> 59(7):975–1005.	Adult Basic Education programs offered by the Florida Department of Corrections.	$n = 2267$	$n = 7666$
D. D. Clark, Analysis of return rates of the Inmate College Program Participants, Albany, NY: New York State Department of Correctional Services, 1991.	Inmate College Program resulting in a certificate, associate's, bachelor's, and/or master's degree	$n = 356$	$n = 630$
Betsy Bramlett Coffey, The effectiveness of vocational education in Kentucky's correctional institutions: as measured by employment status and recidivism, Ph.D. dissertation, University of Kentucky, 1983.	Kentucky's Institutional Vocational Education programs. Men completed training in one of the following areas: welding, small engines, auto body, electrical, building trades, masonry, meat cutting, air conditioning, radio/TV, upholstery, printing,	$n = 116$	$n = 116$

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
Jake Cronin, The path to successful reentry: the relationship between correctional education, employment and recidivism, Columbia, MO: University of Missouri Institute of Public Policy, Report 15-2011, September 2011.	plumbing, or drafting. Women were offered either nurse's aide training or one course in business and office education (typing or filing). Missouri Department of Corrections GED preparation programs	<i>n</i> = 5067	<i>n</i> = 7449
Steven Davis and Bill Chown, Recidivism among offenders incarcerated by the Oklahoma Department of Corrections who received vocational-technical training: a survival data analysis of offenders released January 1982 through July 1986, Oklahoma City: Oklahoma State Department of Corrections, November 1986.	Oklahoma Department of Corrections Vocational-Technical Training. The program includes training in auto body repair, auto mechanics, machine tools, air conditioning and refrigeration, building trades, farm machinery repair, heavy equipment, diesel mechanics, welding, masonry, carpentry, parts clerkmanship, plumbing, and small engine repair.	<i>n</i> = 2372	<i>n</i> = 9851
C. Dickman, Academic program participation and prisoner outcomes, Lansing, MI: Michigan Department of Corrections, Facilities Research and Evaluation Unit, 1987.	Michigan Department of Corrections academic programs, including Adult Basic Education (ABE) and GED preparation. The ABE sequence involved completing the remedial reading program, which included participating in self-paced "Education Development Lab." Inmates in the GED curriculum participated in an advanced version of the Education Development Lab, with supplemental competency-based reading, math, and English instruction.	<i>n</i> = 274	<i>n</i> = 322
E. Downes, K. Monaco, and S. Schreiber, "Evaluating the effects of vocational education on inmates: a research model and preliminary results," in S. Duguid, ed., The Yearbook of Correctional Education, British Columbia, Canada: Simon Fraser University, 1989, pp. 249–262.	Santa Fe Community College (SFCC) vocational education programs. These programs include training to find employment, good work habits, and positive social or interpersonal skills. The programs last, at most, 1 year, with open entry and open exit.	<i>n</i> = 66	<i>n</i> = 66
Grant Duwe and Valerie Clark. 2014. The effects of prison-based educational programming on	Secondary and postsecondary education programs offered by	Secondary <i>n</i> = 910	Secondary <i>n</i> = 910

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
recidivism and employment. <i>The Prison Journal</i> 94(4):454–478.	the Minnesota Department of Corrections.	Postsecondary <i>n</i> = 693	Postsecondary <i>n</i> = 693
Carl Clifford Gaiter, An evaluation of the Texas Department of Corrections' Junior College Program, master's thesis, Monroe, LA: Northeast Louisiana State University, 1980.	Texas Department of Corrections Junior College Program	<i>n</i> = 26	<i>n</i> = 357
Howard R. D. Gordon and Bracie Weldon, "The impact of career and technical education programs on adult offenders: learning behind bars," <i>Journal of Correctional Education</i> , Vol. 54, No. 4, December 2003, pp. 200–209.	Huntsville Correctional Center education program	GED and vocational <i>n</i> = 24 Vocational <i>n</i> = 169	<i>n</i> = 96
Miles D. Hazer, Prison education program participation and recidivism: a test of the normalization hypothesis, Washington, DC: Federal Bureau of Prisons, Office of Research and Evaluation 1995.	Federal prison education programs including Adult Basic Education, GED, postsecondary education including college courses and vocational training, and social skills courses (e.g., parenting).	<i>n</i> = 183	<i>n</i> = 436
Leslie Hill, Samuel J.A. Scaggs, and William D. Bales. 2017. Assessing the statewide impact of the Specter Vocational Program on reentry outcomes: a propensity score matching analysis. <i>Journal of Offender Rehabilitation</i> 56(11.61-86).	Workplace and Community Transition Training for Incarcerated Individuals, a vocational certification program offered by the Florida Department of Corrections	<i>n</i> = 1950	<i>n</i> = 27,642
Jerry Holloway and Paul Moke, Post secondary correctional education: an evaluation of parolee performance, Wilmington, OH: Wilmington College, 1986.	Lebanon Correctional Institution's Associate's Degree Program. The program consisted of full-time enrollment in Business Administration, Computer Science, Human Resources, or Industrial Technology courses leading to an associate's degree.	<i>n</i> = 95	<i>n</i> = 116
Kim A. Hull, Stewart Forrester, James Brown, David Jobe, and Charles McCullen, "Analysis of recidivism rates for participants of the academic/vocational/transition education programs offered by the Virginia Department of Correctional Education," <i>Journal of Correctional Education</i> , Vol. 51, No. 2, June 2000, pp. 256–261.	Virginia Department of Correctional Education academic and vocational programs. The academic program included Adult Basic Education and GED preparation. The vocational education program provided instruction in 36 trade areas.	Academic <i>n</i> = 920 Vocational <i>n</i> = 775	<i>n</i> = 1307
		<i>n</i> = 348	<i>n</i> = 563

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
Candace Marie Johnson, The effects of prison labor programs on post-release employment and recidivism, Ph.D. thesis, Florida State University, 1984.	Florida Department of Corrections Vocational Education programs. This program included appliance repair, automotive and engine, carpentry and construction, electricity and electronics, food service, mechanical drafting, horticulture, machine shop, and other trades.		
Kansas Department of Corrections, Offender programs evaluation, Volume V, April 2003.	Kansas Department of Corrections vocational education program. The program teaches cognitive skills to prepare inmates to enter the job market, as well as positive work habits and attitudes	$n = 2350$	$n = 1374$
Charles E. Kelso, "A study of the recidivism of Garrett Heyns Education Center graduates released between 1985 and 1991," <i>Journal from the Northwest Center for the Study of Correctional Education</i> , Vol. 1, No.1, 1996, pp. 25–44.	Academic and vocational programs at the Garrett Heyns Education Center in Washington	Academic $n = 88$ Vocational $n = 59$	$n = 7856$
Ryang Hui Kim and David Clark. 2013. The effects of prison-based college education programs on recidivism: propensity score matching approach. <i>Journal of Criminal Justice</i> 41:196–204.	Postsecondary education programs offered by the New York State Department of Corrections and Community Supervision	$n = 340$	$n = 340$
Michael Langenbach et al., "Televised instruction in Oklahoma prisons: a study of recidivism and disciplinary actions," <i>Journal of Correctional Education</i> , Vol. 41, No. 2, June 1990, pp. 87–94.	Televised instructional system (TIS), which is a college coursework program providing 60 credit hours toward an associate's in art degree	$n = 360$	$n = 360$
Pamela K. Lattimore, K., Ann D. Witte, and Joanna R. Baker, Sandhills Vocational Delivery System Experiment: an examination of correctional program implementation and effectiveness, Washington, DC: National Institute of Justice, 1988.	The Sandhills Vocational Delivery System Experiment (VDS). The program includes a phase of evaluation, testing, and counseling, then training in basic educational for reading, writing, and math, substance abuse counseling, and living skills.	$n = 196$	$n = 222$
Pamela K. Lattimore, Ann Dryden Witte, and Joanna R. Baker, "Experimental assessment of the effect of vocational training on youthful property offenders," <i>Evaluation Review</i> , Vol. 14, No. 2, April 1990, pp. 115–133.	The Sandhills Vocational Delivery System Experiment (VDS). The program includes a phase of evaluation, testing, and counseling, then training in basic educational for reading, writing, and math, substance abuse counseling, and living skills.	$n = 138$	$n = 109$

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
Eric J. Lichtenberger, The impact of vocational programs on post-release outcomes for vocational completers from the fiscal year 1999, 2000, 2001 and 2002 release cohorts, Richmond, VA: Virginia Polytechnic Institute and State University, 2007.	Virginia Department of Corrections vocational education program	$n = 3266$	$n = 3266$
Eric J. Lichtenberger, "Measuring the effects of the level of participation in prison-based career and technical education programs on recidivism," working paper, 2011.	Career and Technical Education (CTE) program at correctional facilities in Virginia	$n = 1428$	$n = 1428$
Eric J. Lichtenberger, Patrick A. O'Reilly, Yasuo Miyazaki, and Rosemaliza M. Kamulladeen, Direct and indirect impacts of career and technical education on post-release outcomes, Blacksburg, VA: Center for Assessment, Evaluation, and Educational Programming, Virginia.	Career and Technical Education (CTE) program at correctional facilities in Virginia.	$n = 812$	$n = 6178$
D. Lockwood, "Prison higher education and recidivism: a program evaluation," in S. Duguid, ed., The yearbook of correctional education, British Columbia, Canada: Simon Fraser University, 1991, pp. 187–201.	Prison College Program in New York. Inmates study the core courses of a liberal arts curriculum and can choose majors. There are also two 1-year certificate programs: juvenile justice and a bilingual sequence of courses for Spanish-speaking inmates.	$n = 92$	$n = 92$
Houston Markley, Kevin Flynn, and Sharon Bercaw-Dooen, "Offender skills training and employment success: an evaluation of outcomes," <i>Corrective and Social Psychiatry and Journal of Behavior Technology, Methods and Therapy</i> , Vol. 29, No. 1, 1983, pp. 1–11.	The Maricopa County Detention Center Job Skills Program	$n = 101$	$n = 101$
Maryland Department of Public Safety and Correctional Services, Offender recidivism report, Baltimore, MD, 1988.	Maryland Department of Public Safety and Correctional Services vocational apprenticeship program. The program includes full-time vocational and academic training and is conducted at state-use industries or institutional food services departments. Students receive academic training by enrolling in classroom	$n = 47$	$n = 4007$

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
	instruction provided by local community colleges. Apprentices also receive job placement assistance.		
C. McGee, The positive impact of corrections education on recidivism and employment, Springfield, IL: Illinois Department of Corrections, School District 428; and Illinois Council on Vocational Education, 1997.	Illinois Department of Corrections academic and vocational programs	$n = 754$	$n = 771$
John M. Nally, Susan R. Lockwood, Taiping Ho, and Katie Knutson, "The effect of correctional education on postrelease employment and recidivism: a 5-year follow-up study in the state of Indiana," working paper, 2011.	Indiana Department of Corrections education programs, including Adult Basic Education, GED preparation, postsecondary college courses, and postsecondary job-oriented certificate programs	$n = 1077$	$n = 1078$
New York State Department of Correctional Services, Overview of department follow-up research on return rates of participants in major programs, Albany, NY, 1992.	New York State Department of Correctional Services education programs. The department offered a range of academic education programs for inmates without high school diplomas, culminating in the high school equivalency test preparation program and subsequent college course taking.	GED $n = 4226$ Postsecondary $n = 356$	GED $n = 11,294$ Postsecondary $n = 630$
John Nuttall, Linda Hollmen, and E. Michele Staley, "The effect of earning a GED on recidivism rates," <i>Journal of Correctional Education</i> , Vol. 54, No. 3, September 2003, pp. 90–94.	GED Program in New York State Department of Corrections facilities	$n = 2330$	$n = 9419$
Marian O'Neil, "Correctional higher education: reduced recidivism?" <i>Journal of Correctional Education</i> , Vol. 41, No. 1, March 1990, pp. 28–31.	A postsecondary education program offered by the Alexander City Junior College's Prison College Extension program	$n = 129$	$n = 129$
Anne Morrison Piehl, Learning while doing time, Cambridge, MA: Malcolm Wiener Center for Social Policy, John F. Kennedy School of Government, Harvard University, 1994.	Wisconsin Department of Corrections Educational and Vocational programs. These programs include Adult Basic Education, high school equivalency, literacy, programs for inmates with learning disabilities, programs for high school degrees, college courses, study release, and training in 50 vocational subjects.	Academic $n = 212$ Vocational $n = 219$	Academic $n = 450$ Vocational $n = 95$

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
Amanda Pompoco, John Woodredge, Melissa Lugo, Carrie Sullivan, and Edward J. Latessa. 2017. Reducing inmate misconduct and prison returns with facility education programs. <i>Criminology & Public Policy</i> 16(2): 515–547.	Academic and vocational programming offered by the Ohio Department of Rehabilitation and Corrections	Vocational $n = 1731$ GED $n = 3308$ Postsecondary $n = 928$	Vocational $n = 1731$ GED $n = 3308$ Postsecondary $n = 928$
Thomas P. Ryan and Joseph F. Desuta, “A comparison of recidivism rates for Operation Outward Reach (OOR) participants and control groups of non-participants for the years 1990 through 1994,” <i>Journal of Correctional Education</i> , Vol. 51, No. 4, December 2000, pp. 316–319.	Operation Outward Reach provided inmates with vocational training through participation in community-based construction projects in areas such as carpentry and masonry	$n = 323$	$n = 319$
William G. Saylor and Gerald G. Gaes, “Prep: training inmates through industrial work participation, and vocational and apprenticeship,” <i>Corrections Management Quarterly</i> , Vol. 1, No. 2, 1997.	Post-Release Employment Project (PREP) involving industrial work, vocational instruction, and/or apprenticeship training in prison	$n = 1502$	$n = 1829$
Randall E. Schumacker et al., “Vocational and academic indicators of parole success,” <i>Journal of Correctional Education</i> , Vol. 41, No. 1, March 1990, pp. 8–13.	Academic and vocational programs at midwestern correctional facilities	Academic $n = 248$ Vocational $n = 107$ Academic and vocational $n = 118$	$n = 287$
Linda G. Smith, Pennsylvania Department of Corrections Education Outcome Study, Lanham, MD: Correctional Education Association, May 2005.	Pennsylvania Department of Corrections education programs, including academic, vocational, and nontraditional education programs	ABE $n = 50$ GED $n = 30$ Vocational $n = 35$ Multiple $n = 178$	$n = 173$
Stephen J. Steurer, Linda G. Smith, and Alice Tracy, Education reduces crime: three-state recidivism study, Lanham, MD: Correctional Education Association, 2003.	Maryland, Minnesota, and Ohio correctional education programs, including academic and vocational components	Maryland $n = 261$ Minnesota $n = 560$ Ohio $n = 524$	Maryland $n = 579$ Minnesota $n = 465$ Ohio $n = 710$
Maria Elena Torre and Michelle Fine, “Bar none: extending affirmative action to higher education in prison,” <i>Journal of Social Issues</i> , Vol. 61, No. 3, September 2005, pp. 569–594.	Bedford Hills Correctional Facility College Program	$n = 274$	$n = 2031$
Kit R. Van Stelle, Julie R. Lidbury, and D. Paul Moberg, Specialized	Specialized Training and Employment Project (STEP),	$n = 234$	$n = 42$

Table 6 (continued)

Study	Program description	Treatment group	Comparison group
Training and Employment Project (STEP) Wisconsin Department of Corrections, October 1, 1993 through September 30, 1995: final evaluation report, University of Wisconsin—Madison Medical School, Department of Preventive Medicine, Center for Health Policy and Program Evaluation, 1995.	which has a 6-month institutional component including a comprehensive curriculum, a concurrent work assignment in the institution, parole planning, and employment readiness training.		
Washington State Department of Corrections, Evaluation of the Work Ethic Camp, 1998.	Work ethic camp, which is a 24-h total confinement program that includes basic academic skills training, creating resumes, interviewing, workplace behavior.	$n = 438$	$n = 479$
Wayne A. Wheeler. 2012. Career and technical education's impact on the predictor race for African American prisoners in South Carolina. Doctoral dissertation, University of Georgia.	Career and technical education programs offered by the South Carolina Department of Corrections	$n = 1685$	$n = 14,654$
Laura Winterfield, Mark Coggeshall, Michelle Burke-Storer, Vanessa Correa, and Simon Tidd, The effects of postsecondary correctional education: final report, Washington, DC: Urban Institute, May 2009.	Prison-based postsecondary education programs at Central New Mexico Correctional Facility, the New Mexico Women's Correctional Facility, the Westville Correctional Facility (Indiana), and the Coffeewood Correctional Center (Virginia)	Indiana $n = 328$ Massachusetts $n = 133$ New Mexico $n = 353$	Indiana $n = 1068$ Massachusetts $n = 185$ New Mexico $n = 13,219$
Kristen Zgoba, Sabrina Haugebrook, and Krista Jenkins, "The influence of GED obtainment on inmate release outcomes," <i>Criminal Justice and Behavior</i> , Vol. 35, No. 3, 2008, pp. 375–387.	New Jersey Department of Corrections' GED program	$n = 250$	$n = 153$

Appendix 2

Table 7 Studies included in the meta-analysis of employment

Study	Program description	Treatment group	Comparison group
Blackhawk Technical Coll Janesville W. I., Recap (Rock County Education and Criminal Addictions Program) Program Manual Prepared to Be of Assistance in Program Replication, 1996.	Rock County Education and Criminal Addictions Program (RECAP)	$n = 96$	$n = 27$
Cho, Rosa and John H. Tyler, “Prison-based adult basic education (ABE) and post-release labor market outcomes,” Reentry Roundta- ble on Education, John Jay College of Criminal Justice, New York, April, Vol. 1, 2008.	Florida Department of Corrections’ Adult Basic Education program	$n = 3790$	$n = 5822$
Rosa Minhyo Cho and John H. Tyler. 2013. Does prison-based Adult Basic Education im- prove postrelease outcomes for male prisoners in Florida? <i>Crime & Delinquency</i> 59(7):975–1005.	Florida Department of Corrections’ Adult Basic Education program	$n = 2267$	$n = 7666$
Coffey, Betsy Bramlett, The effectiveness of vocational education in Kentucky’s correctional institutions: as measured by employment status and recidivism, Lexington, KY: [s.n.], 1983.	Kentucky’s Institutional Vocational Programs	$n = 116$	$n = 116$
Cronin, Jake. the Path to successful reentry: the relationship between correctional education, employment and recidivism. University of Missouri, Institute of Public Policy, 2011.	Missouri Department of Corrections’ GED preparation programs	$n = 5067$	$n = 7449$
Dickman, C., Academic Program Participation and Prisoner Outcomes, Lansing, MI: Michigan Department of Corrections Facilities Research and Evaluation Unit, 1987.	Michigan Department of Corrections’ academic programs, including Adult Basic Education (ABE) and GED preparation	$n = 255$	$n = 315$
Downes, Elizabeth Ann, Kathryn Rabold Monaco, and Sheila Ortego Schreiber, “Evaluating the effects of vocational education on inmates: a	Santa Fe Community College (SFCC) vocational education program, which included training to find employment,	$n = 66$	$n = 66$

Table 7 (continued)

Study	Program description	Treatment group	Comparison group
research model and preliminary results,” in <i>The yearbook of correctional education</i> , Duguid, Stephen, ed. Burnaby, BC, Canada; and Laurel, MD: Institute for the Humanities, Simon Fraser University; and the Correctional Education Association, 1989, pp. 249–262.	good work habits, and positive social or interpersonal skills		
Grant Duwe and Valerie Clark. 2014. The effects of prison-based educational programming on recidivism and employment. <i>The Prison Journal</i> 94(4):454–478.	Secondary and postsecondary education programs offered by the Minnesota Department of Corrections	Secondary $n = 910$ Postsecondary $n = 693$	Secondary $n = 910$ Postsecondary $n = 693$
Leslie Hill, Samuel J.A. Scaggs, and William D. Bales. 2017. Assessing the statewide impact of the Specter Vocational Program on reentry outcomes: a propensity score matching analysis. <i>Journal of Offender Rehabilitation</i> 56(1):61–86.	Workplace and Community Transition Training for Incarcerated Individuals, a vocational certification program offered by the Florida Department of Corrections	$n = 1950$	$n = 27,642$
Holloway, Jerry and Paul Moke. Post secondary correctional education: an evaluation of parolee performance, 1986.	Lebanon Correctional Institution’s Associate’s Degree Program	$n = 95$	$n = 116$
Hull, Kim A., Stewart Forrester, James Brown, David Jobe, and Charles McCullen, “analysis of recidivism rates for participants of the academic/vocational/transition education programs offered by the Virginia	Virginia’s Department of Correctional Education’s academic and vocational programs	$n = 164$	$n = 183$
Eric J. Lichtenberger, Patrick A. O’Reilly, Yasuo Miyazaki	Career and Technical Education (CTE) program at correctional facilities in Virginia	$n = 1804$	$n = 6178$
Lichtenberger, Eric J., The impact of vocational programs on post-release outcomes for vocational completers from the fiscal year 1999, 2000, 2001 and 2002 release cohorts, Richmond, VA: Center for Assessment, Evaluation, and Educational Programming Virginia Tech, 2007.	Virginia Department of Corrections’ vocational education program	$n = 3266$	$n = 3266$
Lichtenberger, Eric J., The impact of vocational programs on		$n = 3266$	$n = 3266$

Table 7 (continued)

Study	Program description	Treatment group	Comparison group
post-release outcomes for vocational completers from the fiscal year 1999, 2000, 2001 and 2002 release cohorts, Richmond, VA: Center for Assessment, Evaluation, and Educational	Virginia Department of Corrections' vocational education program		
Saylor, W. G., and G. G. Gaes. "Prep: training inmates through industrial work participation, and vocational and apprenticeship." <i>Corrections Management Quarterly</i> , Vol. 1, No. 2, 1996	Post-Release Employment Project (PREP) involving industrial work, vocational instruction, and/or apprenticeship training in prison	$n = 1503$	$n = 1831$
Sabol, W.J., "Local labor-market conditions and post-prison employment experiences of offenders released from Ohio state prisons," in <i>Barriers to reentry? The labor market for released prisoners in post-industrial America</i> , 2007, pp. 257–303	Ohio Department of Rehabilitation and Correction (ODRC) vocational training certificate and GED programs	GED $n = 2386$ Vocational $n = 1022$	$n = 30,673$
Schumacker, Randall E. and et al., "Vocational and academic indicators of parole success," <i>Journal of Correctional Education</i> , Vol. 41, No. 1, 1990, pp. 8–13.	Academic and vocational programs at midwestern correctional facilities	Vocational $n = 107$ Vocational/academic $n = 118$ Academic $n = 248$	$n = 287$
Smith, Linda G., "Pennsylvania Department of Corrections Education Outcome Study," Lanham, MD: Correctional Education Association, 2005.	Pennsylvania Department of Corrections' education programs, including academic, vocational, and nontraditional education programs	$n = 660$	$n = 293$
Steurer, Stephen J., Linda G. Smith, and Alice Tracy, <i>Oce/Cea three-state recidivism study</i> , Lanham, MD: Correctional Education Association, September 30, 2001.	Maryland and Minnesota correctional education programs including academic and vocational components	$n = 849$	$n = 1087$
Van Stelle, Kit R., Julie R. Lidbury, and D. Paul Moberg, <i>Specialized Training & Employment Project Wisconsin Department of Corrections: Final Evaluation Report</i> , 1995.	Specialized Training and Employment Project (STEP), which has a 6-month institutional component including a comprehensive curriculum, a concurrent work assignment in the institution, preparole planning, and employment readiness training	$n = 112$	$n = 37$
Visher, C.A. and V. Kachnowski, "Finding work on the outside:		$n = 19$	$n = 186$

Table 7 (continued)

Study	Program description	Treatment group	Comparison group
results from the 'returning home' project in Chicago," in <i>Barriers to reentry? The labor market for released prisoners in post-industrial America, 2007</i> .	Illinois Department of Corrections' vocational program		
Visher, Christy A., Sara A. Debus-Sherrill, and Jennifer Yahner, "Employment after prison: a longitudinal study of former prisoners," <i>JQ: Justice Quarterly</i> , Vol. 28, No. 5, 2011, pp. 698–718.	Academic education and job training programs in Illinois, Ohio, and Texas prisons	Academic $n = 121$ Vocational $n = 121$	$n = 361$

Appendix 3

Forest plots

In this appendix, we present two forest plots: one for the recidivism analysis and one for the employment analysis. Each row in the plot corresponds to an effect size, labeled on the left with the corresponding first author of the study and the year of publication. Studies with multiple effect sizes are listed multiple times with a capital letter to differentiate among them. The black box represents the effect size estimate for the study, and the “whiskers” extend to the range of 95% confidence intervals. The box and whiskers for each effect size are plotted in relation to the dashed line down the center of the graph, which indicates an odds ratio of 1. Effect sizes to the right of this line indicate that the treatment group had a higher odds of recidivating (or being employed), and effect sizes to the left of this line indicate that the comparison group had a higher odds of recidivating (or being employed). If the whiskers for the corresponding box do not cross this dashed line, then the study yielded a significant difference between the treatment and comparison group for that particular effect size at the conventional level of $p < 0.05$. Conversely, if the whiskers for the corresponding box cross this dashed line, then there is no significant difference detected between the treatment and the comparison group for that particular effect size at the conventional level of $p < 0.05$.

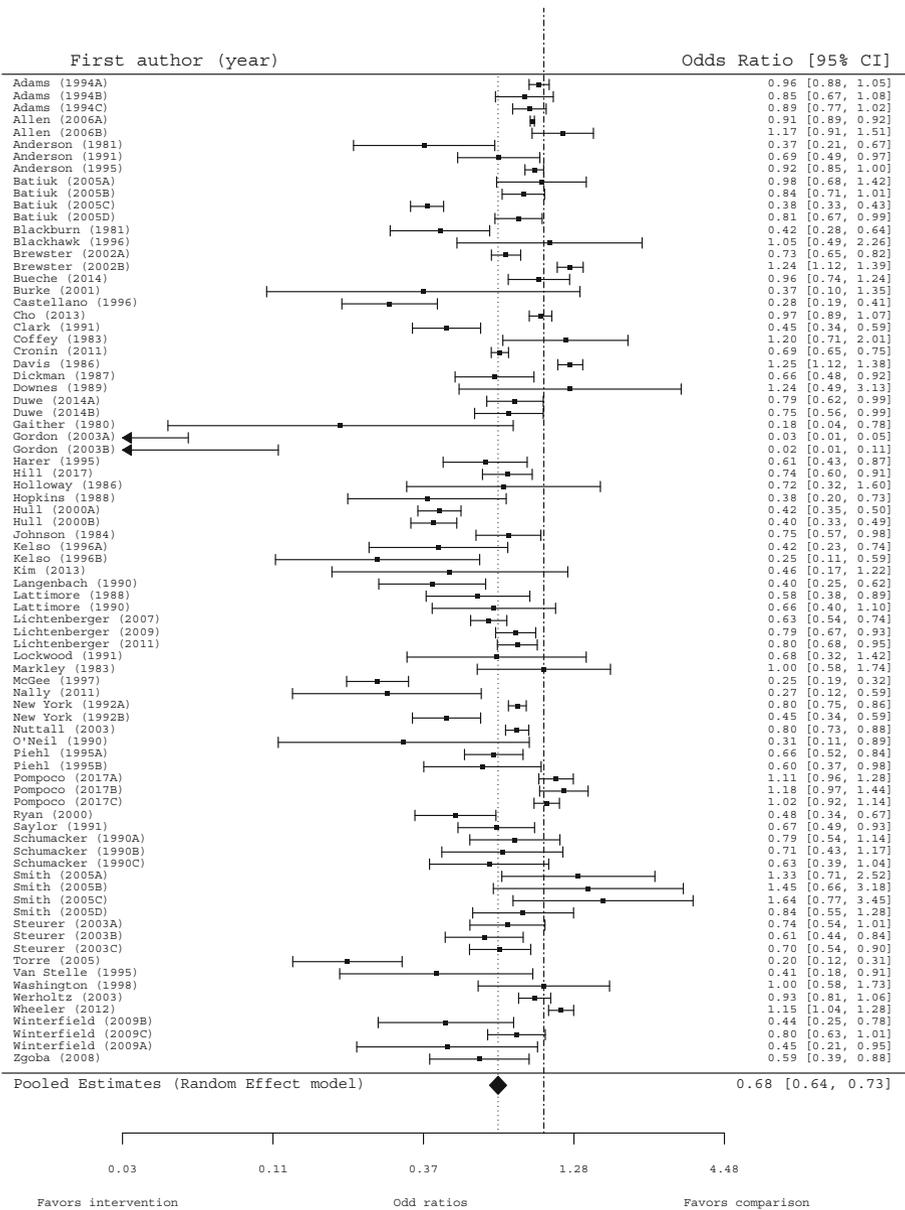


Fig. 1 Recidivism analysis forest plot

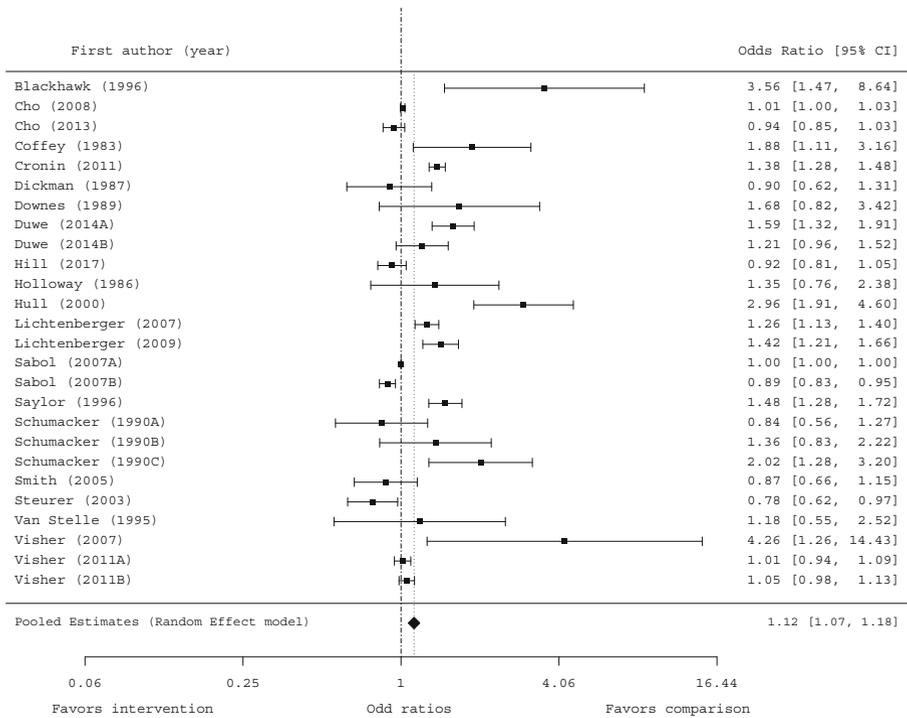


Fig. 2 Employment analysis forest plot

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