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The Effects of Vocational Education on Recidivism and Employment Among Individuals Released Before and During the COVID-19 Pandemic

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Abstract

Prior research shows employment is an important component of desistance, but there is mixed evidence regarding the effectiveness of prison-based education programs. Therefore, this study examines whether participation in vocational education programs while incarcerated improves recidivism and post-release employment outcomes. In addition, the study controls for the timing of release to examine whether recidivism and employment outcomes varied during the COVID-19 pandemic. Observable selection bias was reduced by using propensity score matching to create similar treatment and comparison groups. After matching, there were no differences in any outcome between those who obtained vocational certificates and the comparison group. The results demonstrate the importance of accounting for selection bias in evaluations of education and employment programs. It is recommended that career-focused educational programs incorporate the risk-needs-responsivity model and the continuum of care principle, build relationships with community employers, and assist with practical barriers to employment.

Keywords

prison programming, vocational programs, recidivism, post-release employment, reentry

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Introduction

The literature on reentry to the community after release from prison confirms that recidivism is lower among those who find stable, high-quality employment (Berg & Huebner, 2011; La Vigne et al., 2004; Lockwood et al., 2012; Uggen, 2000; Verweij et al., 2021; Visher & Courtney, 2007; Visher et al., 2011). The relationship between employment and desistance is especially salient when individuals work in "career jobs" rather than "survival jobs" (Bucklen & Zajac, 2009; Niebuhr & Orrick, 2020; Uggen, 1999) . Despite the importance of obtaining employment soon after release from prison, releasees face difficulty in finding work (Uggen & Staff, 2001; Visher & Courtney, 2007) . Those who have been incarcerated are often not well educated and lack job training and vocational skills (Coates, 2016; Duwe, 2018a; Petersilia, 2003; Visher et al., 2011); importantly, many incarcerated people are released with similar educational and vocational deficits as they had when they were incarcerated (Crayton & Neusteter, 2008; Solomon et al., 2004). Given the importance of education for obtaining employment, prison-based education and career training may be a key component of successful reentry.

Accordingly, many correctional agencies have implemented programs that focus on education and vocational training, with a handful of single studies that examined such programs showing some success (see Clark, 2015; Davis et al., 2013; Drake et al., 2009; Duwe, 2015a, 2015b; Duwe & Clark, 2014, 2017; Duwe & McNeeley, 2020; McNeeley, 2018, 2022; Saylor & Gaes, 1992; Towne et al., 2022). However, other evaluations of employment programming among justice-involved people have shown null results (Cook et al., 2015; Northcutt Bohmert & Duwe, 2012) . More notably, systematic reviews (Newton et al., 2018; Nur & Nguyen, 2022; Visher et al., 2005) found no reduction in recidivism or increase in employment. These authors suggest that program inconsistency and methodological issues render it difficult to determine at this time whether vocational programming improves post-release outcomes. Much of the past work on educational programming has examined career-focused education alongside other education or other vocational programs. As a result, the unique effect of vocational education on reentry success is not well understood.

Importantly, there have been few evaluations that correct for differences in those who self-select into educational programming. Prior research suggests program participation varies by a number of personal characteristics such as gender, age, time served, criminal history, offense type prison visitation, other treatment participation (e.g., Butler et al., 2022; Duwe, 2015a; McNeeley, 2021, 2022). However, only a handful of studies have attempted to account for self-selection (see Jonas-van Dijk et al., 2020). A review of experimental research on employment-focused programs suggested the overall link between employment and recidivism may be a result of selection into employment by a subgroup of highly motivated individuals (Muhlhausen, 2015).

Therefore, this study uses propensity score matching (PSM) to account for observable selection bias before examining recidivism and employment outcomes for those who obtained vocational certificates, diplomas, or licenses while incarcerated. In

particular, the study examines individuals released from Minnesota state prisons between January 1, 2019 and December 31, 2020. Given the disruption in the job market (e.g., Petrosky-Nadeau & Valletta, 2020; Sahin et al., 2020) and potential changes to policing and community corrections (e.g., Ashby, 2020; Mohler et al., 2020; Viglione et al., 2020) that occurred during the COVID-19 pandemic, it is important to assess the extent to which vocational programs may have assisted releasees in obtaining employment and/or desisting from crime during the pandemic. By accounting for changes in recidivism and employment outcomes due to the pandemic, the results will inform future research examining post-release outcomes during this time period.

Vocational Programming in Minnesota

Vocational programs are offered in all Minnesota Department of Corrections (MnDOC) facilities. These programs result in post-secondary certificates or diplomas that are industry-recognized and certified. For example, the National Center for Construction Education and Research certifies the Cabinetry, Cabinet Making, Dry Wall, and Painting/Decorating programs, while the Minnesota Board of Cosmetologist Examiners and the Minnesota Barber Board awards licenses to graduates of the Cosmetology and Barber programs. As there is a need to address "soft skills" related to employment, all vocational programs include Career and Employability Skills training. All instructors hold up-to-date credentials issued by the Minnesota Correctional Education Center (MCEC). In 2018, 578 individuals obtained a vocational certificate, diploma, or license (MnDOC, 2019).

Vocational programs are post-secondary, in that incarcerated people are required to have a high school diploma or GED prior to enrollment. Further eligibility is determined on a case-by-case basis by considering an individual's educational achievement, facility discipline, work history, employability after release, and other relevant factors. Priority is given to those with less than 5 years of incarceration remaining on their sentence, both due to limited resources and because programming is most successful when completion occurs closer to release from prison (Duwe, 2018b).

Research Methods

Data and Sample

This study used a retrospective quasi-experimental design to test whether vocational education improved recidivism and employment outcomes. Specifically, completers released from prison between 2019 and 2020 were compared to a matched comparison group of non-participants released during the same time period. When an individual was released more than once during that period, only their first release was examined. A total of 928 individuals who completed vocational programs were released in 2019 or 2020. Because of limited resources as well as a lack of hard eligibility criteria that can be used to reduce the comparison pool, 6,941 non-participants who were released between 2019 and 2020 would have been eligible for vocational education.

Pre-incarceration employment data were not available; therefore, the Level of Service/Case Management Inventory (LSCMI) education/employment domain score was used as a proxy to control for employment history. However, some incarcerated people did not receive an assessment before their release. After excluding those with missing LSCMI data, there were 6,711 individuals in the sample, including 706 vocational program completers and 6,005 who were eligible but did not participate.

Dependent Variables

Recidivism was measured as a (1) rearrest, (2) reconviction, (3) reincarceration in an MCF for a new offense, and (4) revocation of supervised release following an individual's first release from prison. Rearrest and reconviction data were obtained from the Bureau of Criminal Apprehension, while reincarceration and revocation data were obtained from the Correctional Operations Management System maintained by MnDOC. The study tracked recidivism through January 31, 2022, resulting in a follow-up period between 1 and 3 years. Data on post-release employment were obtained from the Minnesota Department of Employee and Economic Development (DEED). Post-release employment was measured four different ways: a binary measure of whether releasees obtained employment after their release from prison, the total number of hours an individual was employed following their release from prison, the total wages reported during their period of time in the community after they were released from prison, and their hourly wages. While it would be of interest to determine whether individuals obtained jobs that fit the career or vocation they studied, we were unfortunately unable to examine this using the DEED data.

Independent Variables

The independent variable of interest compared individuals who obtained vocational certificates, diplomas, or licenses while incarcerated with those who were eligible but did not complete such programming. Participation in vocational programs was measured as "1" for participants and as "0" for non-participants.

The following control variables were included in the analyses: LSCMI, LSCMI education and employment domain score, gender,[1] race/ethnicity, age at release, marital status, county of commitment, number of prior convictions, number of prior supervision failures, number of institutional discipline convictions, number of visits received, length of stay in months, offense type (person, sexual, drug, property, DWI, or other), number of other prison-based programs the individual participated in, and type of post-release supervision (standard supervision, intensive supervision, early release program such as work release or the Challenge Incarceration Program (see Duwe & Kerschner, 2008), or discharge with no supervision). Finally, the study controlled for whether the individual was released during the COVID-19 pandemic. This was operationalized using the date that the governor declared a peacetime emergency, which allowed the state government to pass public health measures in an attempt to reduce the spread of COVID-19 (March 13, 2020).

Propensity Score Matching

PSM is often used in program evaluations to help achieve balance between treatment and control groups and account for observable selection bias. PSM estimates the conditional probability of selection to a treatment based on observed covariates (Rosenbaum & Rubin, 1985) . These estimates, known as "propensity scores," are created through a logistic regression model predicting program completion. Propensity scores are then used to match those who entered treatment with similar individuals who did not. Table 1 presents the logistic regression model predicting vocational program completion. Consistent with prior research on self-selection (e.g., Butler et al., 2022; Duwe, 2015a; McNeeley, 2021, 2022), several of the control variables were significantly related to completing a vocational certificate or diploma. Completion was more likely among White ($b=-0.131$, $p<.01$) and younger individuals ($b=-0.012$, $p<.001$), those with more prior convictions ($b=0.007$, $p<.001$), those committed for release violations ($b=-0.329$, $p<.001$), those who had been in prison longer ($b=0.008$, $p<.001$), those who completed other treatment programs ($b=0.091$, $p<.01$), and those who received more visits ($b=0.001$, $p<.001$).

After obtaining propensity scores on the 6,711 individuals included in the propensity score model, participants were matched within a caliper (i.e., range of propensity scores) of 0.01 using a "greedy" matching procedure with a without-replacement method. Matches were obtained for 652 vocational participants, resulting in a final sample of 1,304. Table 2 presents the degree to which PSM reduced observable selection bias. The bias measure shown in the table represents the standardized mean difference between the treatment and comparison groups. Bias values over 20 are considered unbalanced (Rosenbaum & Rubin, 1985). Before matching there were three unbalanced covariates based on the bias value (length of stay, number of effective programs completed, and visitation); six additional covariates showed significantly different means based on the t-test provided in Table 2 (gender, LSCMI and LSCMI education/employment domain, property offense, new commitment, and discipline). After matching, all the covariates for the matched sample had bias values below 20 and nonsignificant *t*-values.

Analysis Plan

Cox regression was used to analyze recidivism. Cox regression utilizes time-dependent data, which are important in determining not only whether people recidivate, but also when they recidivate. Cox regression uses both "status" and "time" variables to estimate the impact of the independent variables on recidivism. The "status" variable measures whether or not the individual was rearrested, reconvicted, reincarcerated, or returned to prison following a revocation of supervised release. The "time" variable measures the amount of time from the date of release until (1) the date of the first recidivism event, (2) January 31, 2022, for those who did not recidivate, or (3) their date of death, for those who did not recidivate and were known to have died before the end of the follow-up period. The DEED data do not provide the dates when people

Table 1. Logistic Regression Model for Vocational Education Selection.

Predictor	Predictor description	Coefficient	*SE*
Minority	Minority = 1, Non-Hispanic White = 0	−.131**	0.047
Male	Male = 1, Female = 0	.145	0.076
Age	Age in years at time of release from prison	−.012***	0.003
Married	1 = married, 0 = not married	−.055	0.076
LSCMI	Most recent LSCMI score before release	−.003	0.005
LSCMI domain score	Education/employment domain score from most recent LSCMI	−.015	0.013
Prior convictions	Number of prior felony convictions	.007***	0.002
Prior supervision failures	Number of prior supervision failures	−.017	0.014
Sex offense	1 = sex offense, 0 = not sex offense	−.060	0.090
Property offense	1 = property offense, 0 = not property offense	−.073	0.076
Drug offense	1 = drug offense, 0 = not drug offense	.067	0.061
DWI offense	1 = DWI offense, 0 = not DWI offense	−.062	0.092
Other offense	1 = miscellaneous offense type, 0 = not miscellaneous	−.018	0.070
Metro county	1 = committed from Twin Cities Metro area	.019	0.049
New commitment	1 = committed for new sentence, 0 = release return	−.329***	0.052
Length of stay	Length of prison stay in months	.008***	0.001
Effective programs	Number of effective programs	.091**	0.032
Visitation	Number of visits received	.001***	0.0002
Discipline	Number of convictions for a rule violation	−.002	0.003
Constant		−.901***	0.165
N		6,711	
Log-likelihood		−2,056.377	
Pseudo R^2		.0506	

*$p < .05$. **$p < .01$. ***$p < .001$.

obtained employment. Therefore, the post-release employment analysis relied on multivariate logistic regression. Because of the skewed distribution of the measures of total hours worked, hourly wages, and total wages earned, generalized linear models (GLM) with a gamma distribution and a log link were used to examine these outcomes.

Table 2. Propensity Score Matching and Covariate Balance.

Variable	Sample	Treatment mean	Control mean	Bias	Bias reduction (%)	*t*-test *p* value
Propensity score	Total	0.133	0.094	47.3		<.001***
	Matched	0.123	0.123	−0.0	99.9	.993
Minority	Total	0.411	0.448	−7.5		.067
	Matched	0.410	0.408	0.3	95.9	.955
Male	Total	0.911	0.877	11.0		.011*
	Matched	0.913	0.934	−7.0	36.6	.145
Age	Total	35.898	36.607	−7.5		.077
	Matched	35.750	35.175	6.1	18.9	.238
Married	Total	0.093	0.093	0.0		.993
	Matched	0.092	0.087	1.6	−4,319.8	.771
LSCMI	Total	24.970	25.897	−12.8		.001**
	Matched	25.103	25.141	−0.5	95.9	.926
LSCMI domain score	Total	4.301	4.589	−11.5		.004**
	Matched	4.336	4.287	2.0	82.9	.728
Prior convictions	Total	18.386	17.872	4.3		.280
	Matched	18.521	19.140	−5.1	−20.3	.377
Prior supervision failures	Total	1.724	1.828	−5.9		.133
	Matched	1.742	1.738	0.3	95.6	.961
Sex offense	Total	0.090	0.081	3.5		.380
	Matched	0.090	0.087	1.1	68.8	.846
Property offense	Total	0.111	0.141	−8.8		.038*
	Matched	0.114	0.100	4.2	52.9	.420
Drug offense	Total	0.291	0.271	4.4		.277
	Matched	0.294	0.307	−2.7	38.0	.629
DWI offense	Total	0.083	0.081	0.7		.860
	Matched	0.084	0.072	4.5	−524.5	.410
Other offense	Total	0.142	0.147	−1.6		.698
	Matched	0.144	0.141	0.9	45.4	.874
Metro county	Total	0.690	0.683	1.4		.735
	Matched	0.692	0.692	0.0	100.0	1.00
New commitment	Total	0.646	0.712	−14.1		<.001***
	Matched	0.641	0.630	2.3	83.6	.687
Length of stay	Total	26.155	15.173	37.4		<.001***
	Matched	22.724	20.666	7.0	81.3	.096
Effective programs	Total	0.694	0.542	20.3		<.001***
	Matched	0.689	0.679	1.2	94.0	.829
Visitation	Total	41.087	14.560	28.5		<.001***
	Matched	32.601	29.486	3.3	88.3	.510
Discipline	Total	3.083	2.076	12.1		<.001***
	Matched	2.491	2.517	−0.3	97.4	.947

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Recidivism and Employment Outcomes by Vocational Completion.

	Unmatched sample			Matched sample		
	Treatment	Control	Statistic	Treatment	Control	Statistic
Recidivism						
Rearrest	52.3%	57.2%	$\chi^2 = 5.874$*	53.2%	56.4%	$\chi^2 = 1.366$
Reconviction	34.6%	39.4%	$\chi^2 = 5.802$*	35.3%	38.7%	$\chi^2 = 1.593$
Reincarceration	13.0%	13.1%	$\chi^2 = 0.017$	13.2%	14.4%	$\chi^2 = 0.412$
Revocation	23.3%	23.8%	$\chi^2 = 0.068$	23.5%	24.2%	$\chi^2 = 0.106$
Employment						
Employed	67.3%	58.3%	$\chi^2 = 19.963$*	67.3%	62.6%	$\chi^2 = 3.237$
Hours worked	630.58	484.46	$t = 4.599$*	626.61	564.22	$t = 1.435$
Hourly wages	11.62	10.46	$t = 1.242$	11.605	10.426	$t = 2.053$*
Total wages	11,663.31	8,759.53	$t = 4.516$*	11,572.05	10,170.71	$t = 1.536$
N	664	6,047		652	652	

*$p < .05$.

Results

Table 3 shows the rates of recidivism and finding employment, as well as average hours worked, hourly wages, and total wages, for the treatment and comparison groups. When comparing the unmatched sample, individuals who obtained vocational certificates, diplomas, or licenses fared significantly better on rearrest and reconviction as well as all four employment outcomes, although there was no difference in returns to prison for either a new felony sentence or a supervised release revocation. However, when comparing the matched groups, vocational completers had somewhat lower rates of recidivism, a somewhat higher rate of employment, and somewhat higher averages for hours worked and wages—but only one of these differences was statistically significant. Individuals who obtained vocational certificates or diplomas had average hourly wages that were about $1.20 higher than those in the matched comparison group ($t = 2.053$, $p < .05$).

To control for factors associated with release from prison as well as account for how quickly after release an individual recidivated, multivariate Cox regression models predicting recidivism are presented in Table 4. None of the types of recidivism examined here were significantly related to vocational education completion. However, the results show release type was significantly related to recidivism. Compared to those on standard supervision, individuals participating in an early release program were 33% less likely to rearrested and 42% less likely to be reconvicted, but 77% more likely to have their supervised release revoked. Those released on intensive supervision were 28% more likely to be rearrested and nearly three times more likely to return to prison due to a revocation of supervised release. Those discharged with no supervision were about twice as likely to be rearrested, 93% more likely to be reconvicted, and about 2.5 times more likely to be reincarcerated for a new offense than were those released on standard supervision. Finally, those released during the COVID-19

Table 4. Cox Regression Models Predicting Recidivism.

	Rearrest	Reconviction	Reincarceration	Revocation
Vocational completer	0.93 (0.08)	0.96 (0.09)	0.96 (0.15)	0.91 (0.12)
Program release	0.67 (0.10)***	0.58 (0.14)***	0.78 (0.23)	1.77 (0.15)***
Discharge	2.26 (0.14)***	1.93 (0.16)***	3.57 (0.22)***	—
ISR	1.28 (0.10)*	1.16 (0.12)	1.37 (0.19)	3.82 (0.13)***
COVID-19	0.76 (0.09)**	0.88 (0.13)	0.84 (0.22)	0.59 (0.14)***

Note. Hazard ratios are presented with standard errors in parentheses.
*$p < .05$. **$p < .01$. ***$p < .001$.

pandemic were 24% less likely to be rearrested and 41% less likely to return to prison due to supervised release revocation than those released before the pandemic.

Table 5 shows multivariate results for the employment outcomes. The first column presents the logistic regression model predicting employment in the first year after release. Those who completed vocational programs were not significantly more or less likely to obtain employment. The other three columns present GLMs predicting total hours worked, average hourly wage, and total wages earned in the first year after release from prison. None of these outcomes were significantly related to vocational program completion. Release type was significantly related to employment outcomes; compared to those on standard supervision, those participating in early release programs were about four times more likely to be employed, those on ISR were 57% more likely to be employed, and those discharged with no supervision were 47% less likely to be employed. Total hours worked, hourly wage, and total wages earned were all higher among those participating in early release programs and lower among those discharged with no supervision. Finally, those released during the COVID-19 pandemic were 32% less likely to obtain employment in the first year after release from prison than those released before the pandemic, but were not significantly different in terms of hours worked or wages earned.

To check whether the results presented above were an artifact of different outcomes across different vocational programs, programs were categorized into the following groups: barbering and cosmetology, construction (cabinetmaking, carpentry, drywall installation, floor covering, masonry, painting and decorating, and welding), manufacturing (heavy equipment operator, machine tool technology, manufacturing skills, and print production), mechanical design and drafting, business management, and computer careers. The supplemental analyses presented in Table 6 compare individuals who completed each type of program to the comparison group of non-completers, with individuals who completed other types of programs excluded. These models included all control variables; however, to ease presentation, the table only shows the results for program completion. Only two significant results were found. First, those who completed programming in Computer Careers were 35% less likely to experience supervised release revocation than the comparison group ($p < .05$). Second, those who

Table 5. Logistic Regression Model and GLM Predicting Employment Outcomes.

	Employed	Total hours	Hourly wage	Total wages
	OR (*SE*)	*b* (*SE*)	*b* (*SE*)	*b* (*SE*)
Vocational completer	1.16 (0.12)	0.06 (0.08)	0.09 (0.06)	0.10 (0.10)
Program release	5.14 (0.19)***	0.74 (0.10)***	0.45 (0.07)***	0.76 (0.12)***
Discharge	0.53 (0.25)*	−0.92 (0.18)***	−0.33 (0.13)**	−0.81 (0.21)***
ISR	1.57 (0.16)**	−0.01 (0.11)	0.13 (0.07)	−0.09 (0.13)
COVID-19	0.69 (0.13)**	0.01 (0.09)	−0.03 (0.06)	0.06 (0.10)
Constant	1.38 (0.11)**	6.16 (0.07)***	2.24 (0.05)***	9.04 (0.09)***

*$p < .05$. **$p < .01$. ***$p < .001$.

completed programming in Mechanical Design and Drafting had higher hourly wages than those who did not complete any vocational programming ($b = 0.69$, $p < .05$).

Finally, supplemental analyses (available upon request) separately examined models among those released before the COVID-19 pandemic and among those released during the pandemic. The null relationships between vocational programming and the recidivism and employment outcomes were observed for those released during both time periods.

Discussion

This study examined whether completing vocational education programs while in prison improves recidivism or employment outcomes after release from prison. Two specific programs showed very limited success: those who studied computer careers were less likely to return to prison due to a violation of supervised release and those who studied mechanical design and drafting had higher hourly wages. But overall, after using propensity score matching to create a similar comparison group, vocational education was not related to better outcomes in terms of either recidivism or employment. The results demonstrate the importance of accounting for selection bias when evaluating education and employment programs (see Muhlhausen, 2015). The comparison of the unmatched treatment and comparison groups showed that people who completed vocational programs fared better. However, when comparing completers to a similar control group—as was done after matching—there were no significant difference in several outcomes measuring employment and recidivism. It is possible that those who complete vocational education tend to be highly motivated individuals who could have fared well without these programs.

The lack of significant findings after matching is perhaps not surprising given the results from Table 2 showed individuals who selected into vocational training were distinct from those who did not in ways that are known to be related to better outcomes. For example, they had lower risk for recidivism based on the LSCMI, had

Table 6. Outcomes for Specific Career Tech Programs.

	Rearrest	Reconviction	Reincarceration	Revocation	Employed	Total hours	Hourly wage	Total wages
Barber/cosmetology ($n = 7$)	0.51 (0.71)	0.47 (1.01)	0.00 (179.13)	0.00 (147.25)	2.03 (1.12)	−0.23 (0.28)	0.17 (0.38)	−0.45 (0.70)
Construction ($n = 274$)	1.08 (0.09)	1.10 (0.11)	0.94 (0.19)	0.94 (0.15)	1.09 (0.16)	0.03 (0.11)	0.02 (0.07)	0.04 (0.13)
Manufacturing ($n = 108$)	0.92 (0.15)	1.12 (0.18)	1.36 (0.26)	0.68 (0.23)	1.10 (0.24)	−0.03 (0.16)	0.07 (0.10)	0.05 (0.19)
Mechanical design and drafting ($n = 12$)	0.39 (0.58)	0.21 (1.00)	0.74 (1.01)	0.69 (0.71)	1.15 (0.64)	0.23 (0.44)	0.69 (0.30)*	0.44 (0.53)
Business management ($n = 30$)	0.93 (0.26)	0.82 (0.32)	1.39 (0.42)	0.86 (0.39)	1.29 (0.42)	0.23 (0.28)	0.26 (0.19)	0.36 (0.34)
Computer careers ($n = 221$)	0.81 (0.11)	0.81 (0.14)	0.82 (0.23)	0.65 (0.17)*	1.23 (0.18)	0.09 (0.12)	0.07 (0.08)	0.15 (0.14)

*$p < .05$.

lower education/employment needs, were more likely to complete other treatment programs, and were more likely to receive visits. According to the risk-needs-responsivity model (Andrews et al., 1990, 2006; Lowenkamp et al., 2006), greater recidivism-reducing benefits could be observed if recruitment efforts were targeted toward those with the highest risk of recidivism who also have high employment and education needs. At the same time, education and employment are considered a moderate criminogenic need rather than one of the "Big Four" (Andrews & Bonta, 2010); as such, individuals who have more pressing criminogenic needs such as anti-social attitudes should be encouraged to prioritize programming that addresses those above education or employment programming (see Latessa, 2011). Similarly, individuals with high education needs may need to prioritize more basic education programming.

Additionally, it is possible that learning a job skill or obtaining a license in a particular field while incarcerated may not be sufficient to help formerly-incarcerated people when reentering the community. First, correctional programs are most successful when they establish a continuum of care in which participation begins in the facility and continues into the community (Miller & Miller, 2010; Ndrecka, 2014; Pullman et al., 2006). Second, this type of programming may not address some of the issues that lead to difficulty with employment after release from prison. Employment programs likely have greater effects on reentry if they address other aspects of obtaining employment, such as resume writing, interview skills, and attitudes unfavorable toward employment (Duwe & Clark, 2017; Varghese, 2013; Varghese et al., 2021), as well as practical barriers to employment such as transportation, supplies, and interview-appropriate clothing (McNeeley, 2022). Third, some successful employment programs—such as Minnesota's EMPLOY (see Duwe, 2015b; McNeeley, 2022)—actively work to connect formerly-incarcerated people in the program with potential employers willing to hire individuals with criminal histories.

Importantly, the study also suggests some outcomes differed during the COVID-19 pandemic. Those who were released during the pandemic were less likely to be rearrested and experience supervised release revocation than those who were released in the year or so before the start of the pandemic. Societal changes due to the pandemic may have reduced opportunity for criminal or otherwise antisocial behavior. At both the individual and community level, crime is lower when people spend less unstructured leisure time outside the home (Cohen & Felson, 1979; Osgood & Anderson, 2004); consistently, crime reductions during the COVID-19 pandemic were observed in several US cities (Abrams, 2021; Ashby, 2020; Campadelli et al., 2020; Mohler et al., 2020). On the other hand, changes in criminal justice operations could also explain these results; police limited proactive and reactive activities which often lead to arrests during the pandemic (Ashby, 2020; Mohler et al., 2020). Community corrections practices also changed dramatically during the pandemic, with some agencies no longer meeting with all clients, some agencies reporting a lower frequency of meetings, and most agencies processing fewer violations for noncompliant behavior (e.g., Viglione et al., 2020). Unfortunately, this study could not differentiate between these possible mechanisms.

The results also showed lower rates of post-release employment during the COVID-19 pandemic. This was expected due to the disruption in the service and retail industries that occurred during the pandemic (Suneson, 2020), as these are industries that often employ formerly-incarcerated people (e.g., Nally et al., 2014). In addition, some individuals may have chosen not to work in order to avoid exposure to COVID-19, especially if they or their loved ones had health concerns that made them vulnerable. Employment outcomes for individuals released from prison may have improved once vaccination became possible as well as when restrictions were lifted. Scholars interested in reentry should continue to examine specific barriers to reentry that returning individuals experienced during the pandemic and continue to experience as the pandemic evolves.

Some limitations of the study must be noted. First, some of the careers covered in these programs (such as barbers and cosmetologists, construction-related work) may lend themselves to under the table work, working as an independent contractor, or becoming self-employed. In these cases, their employment may not have been reported to DEED through the unemployment insurance program. Therefore, individuals in the sample could have been engaged in legitimate work but not represented in the DEED employment data examined here, and it is possible this could be more likely among those who completed programming. Second, this study was unable to account for the dosage of the program, as some vocational training programs may have different lengths or intensities and an individual's length of time studying is not examined here. Similarly, an individual's skill or proficiency level is not captured beyond a binary measure of completion; therefore, individual differences in the success of the training may not be captured in this study. Future research should incorporate these issues while examining how specific vocational programs relate to post-release outcomes. Finally, future research should explore how correctional programming leads to desistance, rather than simply measuring whether there are reductions in official measures of reoffending (see Rocque, 2021). Notably, the current study follows recent recommendations to incorporate the process of desistance into measurements of post-release outcomes by accounting for the timing of recidivism rather than relying on a binary measure (National Academies of Sciences Engineering and Medicine, 2022).

In conclusion, after accounting for selection bias by using PSM, individuals who obtained vocational certificates, diplomas, or licenses had similar outcomes in terms of recidivism and employment as those who did not. Instead of directly affecting recidivism or employment, these programs may have helped motivated individuals who were already likely to succeed meet their career goals. Educational programs meant to improve employment outcomes should prioritize high-risk individuals with high employment needs to the extent this is possible without forgoing other rehabilitative programming, incorporate the continuum of care principle, build relationships with community employers, and address practical barriers to finding work. Further, given the recent increase in telework (e.g., Mouratidis & Papagiannakis, 2021) and the slightly better outcomes among those who studied computer careers or mechanical drafting and design while incarcerated, it could be beneficial to expand training in areas that lend themselves to remote office work. Finally, the results

showing differences before and during the COVID-19 pandemic suggest there may be significant historical threats to validity when comparing individuals released at different time periods. Future research should consider the timing of a person's release, as COVID-19 reduction strategies in place at that time might affect their outcomes.

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Note

1. Because some prior work suggests education may have a stronger relationship with recidivism among women (e.g., Uggen & Kruttschnitt, 1998), supplemental analyses (available upon request) were conducted using a subsample of women. The results were similar to those for the full sample.

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