Post-Secondary Correctional Education and Recidivism: A Meta-Analysis of Research Conducted 1990-1999

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Abstract

The relationship of post-secondary correctional education (PSCE) and recidivism has been widely studied with various, idiosyncratic results. A meta-analysis of ten years of existing studies was conducted to synthesize a portion of the past research. This study demonstrates, using relevant studies reported from 1990 – 1999, that there is a positive correlation (+.31) between PSCE and recidivism reduction. These results are statistically significant. Four subsets, or moderator analyses, were also positively related to recidivism reduction and statistically significant. These included (1) PSCE program completers versus completers and participants; (2) reincarceration only as the recidivism construct; (3) length of recidivism measure; and (4) studies using control groups to negate possible selection bias. It is hoped that this information will increase interest, justification, and funding of future PSCE programs.

Introduction

Many individual studies have been conducted with various and situation-specific results leaving PSCE's measurable efficacy subject to critique (Clarke & Harrison, 1992; Gerber & Fritsch, 1995; Gregg, 1995; Jancic, 1998; Jenkins, Steurer & Pendery, 1995; Ryan & Mauldin, 1994; Tracy, 1995; Windham School System, 1994). Recent and future changes in federal and state funding of PSCE make it imperative that the effects be documented in a more comprehensive and conclusive manner.

This study was conducted to gather evidence as to whether or not higher education in prison is related to recidivism rates. Meta-analysis was used to synthesize research results from much of the available data on Post-Secondary Correctional Education's (PSCE) relationship to recidivism. The individual studies

used were published or reported between the years 1990 and 1999 and selected using the criteria explained in the Methods section. By conducting a meta-analysis of a substantial portion of recent research, specific issues such as design flaws, unique variables and small sample sizes, were reduced or negated. In this way, the best of the available data were compiled (Cooper, 1989; Rosenthal, 1991).

In an effort to measure change, the specific meta-analysis procedure used goes beyond the indication of significance/non-significance of an individual study and coalesces the relationships of many studies. This research adds to the knowledge base by clarifying and organizing the research that has been done, and delineating the areas where subsequent research will be most informative (Olkin, 1990).

Meta-analysis is particularly valuable for policy-oriented research, that which holds social, institutional and organizational impact as its premise. Combining results from a number of experiments has a long history in the hard sciences, and due to the problems providing definitive conclusions from single social or behavioral studies, a synthesis of multiple studies is often necessary. Meta-analysis applies quantitative methods in combining results from different analytic studies. Although not a statistical method per se, it is oriented toward research synthesis that uses many techniques of measurement and data analysis (Wachter & Straf, 1990). In simpler terms, it can provide the comprehensive numerical data so desired in policy formulation. It is assumed that this research will inform politicians, corrections administrators and educators as to the relevance of PSCE and, hopefully, have a beneficial influence on those leaders tasked with allocating funds and providing widespread opportunities for Post-Secondary Correctional Education.

Review of the Literature

In a study of correctional education program completers released in 1990-1991, Jenkins, Steurer and Pendry (1995) found that "the higher the level of educational attainment while incarcerated, the more likely the releasee was to have obtained employment upon release...The success of the college graduates is especially notable" (p. 21). Taylor's 1992 literature review of several decades, found much evidence of PSCE's effectiveness in substantially lowering recidivism rates for inmates. He states that higher education is particularly effective in this reduction as well as having beneficial effects on post-release employment, and institutional discipline, and that these programs were cost effective and provided a substantial return-on-investment for society. A recent study

shows that inmates with at least two years of college have a 10% re-arrest rate, compared to a national re-arrest rate of approximately 60%. (Center on Crime, Communities, and Culture, 1997). Frolander-Ulf & Yates (2001) stated that "nearly all studies show that the more schooling an imprisoned person receives, the less likely he or she is to get in trouble upon release" (p. 2). Although this assertion makes logical sense, it is difficult to draw definite conclusions based upon specific studies or small-scale syntheses. The unfortunate reality is that each study is seen as idiosyncratic, typically not consisting of control groups, and is therefore deemed somewhat anecdotal.

A few large-scale meta-analyses on education and recidivism have been completed. In 1992, Palmer published a book integrating and discussing the findings from 32 meta-analyses and literature reviews from 1975-1989. He focused mainly on juvenile delinquents in institutional and community-based settings with at least adequate research designs and analyses. He concluded that there was "little doubt that many programs worked, and not just with one or two types of offenders and programs" (p. 76).

In a 1995 review of research on adult academic and vocational correctional education (1980-1991), Gerber & Fristch found that participation in PSCE was likely to produce benefits for inmates and society due to a clear and consistent correlation between collegiate studies and recidivism. Wells (2000) explored relationships between several educational variables, not just post-secondary, and the post-release behaviors. His findings support a positive relationship (negative correlation) between education, social bonding, and recidivism.

A very recent and comprehensive study published in September of 2001, was conducted for the U. S. Department of Education, Office of Correctional Education by the Correctional Education Association (Steurer, Smith & Tracy). This was a three-state, longitudinal study (Ohio, Maryland and Minnesota) with data on about 3,200 inmates released in late 1997 and early 1998. Although participation in education programs while incarcerated was the major variable, over 500 variables were collected on each participant and the design framework included internal control groups. Re-arrest, reconviction and re-incarceration were measured for three years. The rates of these recidivism constructs were significantly lower for education participants. The types of education programs attended typically included Adult Basic Education, high school, GED preparation, Life Skills, vocational training, and post-secondary education. The recidivism data were not dis-aggregated for distinct types of education, therefore, no specific data on the impact of post-secondary correctional education on recidivism was reported. Although the Three-State Recidivism Study is extremely

valuable in terms of depth, breadth and findings, post-secondary correctional education is more difficult to justify and procure funding, so comprehensive data showing its particular importance is also needed.

Research Design

Meta-analysis is a set of statistical procedures that are used to quantitatively aggregate the results from many studies for the purpose of integrating the findings (Glass, 1976). It is a powerful and common approach to summarizing empirical research. The main reason to use this technique is to generate an overall correlation as to the existence of a relationship. Combining correlations from many studies in a meta-analysis synthesizes the results so that overall conclusions can be drawn (Cooper, 1989). Meta-analytic procedures also give the ability to investigate relationships not investigated in the original primary studies and find trends too subtle to identify with narrative reviews. Meta-analysis is a more standardized and objective means of integrating results from multiple primary studies (Arthur, Bennett, & Huffcutt, 2001).

Meta-analysis is based on the concept of sampling error theory. Sampling error is the difference between a sample and the population from which the sample is drawn. The sampling error indicates that the relationship of the study subjects is a combination of the true size of the relationship in the population plus an error component. The logic behind meta-analysis is that each individual study represents one sample from a given population and each study sample is likely to differ from the population by a sampling error. Because sampling errors tend to form a normal distribution, it follows that all of the sampling errors in one direction (of the studies in the meta-analysis) will be balanced by the sampling errors in the other direction. The direction of each sampling error of each study correlation refers to its relative strength or weakness in relation to the actual population (Arthur, Bennett, & Huffcutt, 2001).

Meta-analysis is advantageous for research areas that are well-established and have a large number of primary studies; it can provide information on general trends and the consistency of relationships and effect sizes across situations. Many readers of this study will also be interested in the data showing the statistical significance outcome.

According to Hunter and Schmidt (1990), because meta-analytic results theoretically represent population parameters, it is conceptually illogical to apply significance tests to meta-analytic results. Significance tests are tests of inferences from a sample to a population, however, meta-analytic results estimate population relationships (Arthur, Bennett, & Huffcutt, 2001). Meta-analysis

avoids the common pitfall of low power in primary research, which may be responsible for contradictory results. Hedges and Olkin (1985) feel that an inferential test of significance on meta-analytic results would reintroduce this same problem. Although meta-analytic data is a better estimate of the population relationship, it is not an exact population measure. Because it is as estimate of the population, this researcher believes that a significance test is warranted and essential. Meta-analysis, therefore, is complimented by significance testing, which will be performed.

The three most common and popular approaches to meta-analysis are the Hunter and Schmidt, Glass, and Hedges and Olkin procedures. As the Hunter and Schmidt approach uses the common metric rs for correlational studies, it is most appropriate for the correlational segment of this study. This approach, referred to as validity generalization, also corrects summary statistics for the influence of statistical artifacts. These corrections provide a more accurate estimate of the true size of a relationship and the variance of this relationship (Arthur, Bennett, & Huffcutt, 2001). The SAS (SAS Institute, 1990) programming code PROC MEANS procedure was used to perform the data computations. Conducting meta-analysis using SAS (Arthur, Bennett, & Huffcutt, 2001), is the primary resource and guide used in this process.

Inclusion Criteria

The primary goal was to gather all possible studies using published articles, dissertations, and any unpublished research discovered through literature reviews and requests of information from the Correctional Education Association. The time frame includes articles published and reports finalized between 1990-1999. This means that much of the actual data may come from the 1980s. The decision was made to select studies based on the dates of the documents rather than the dates of the data.

The first criterion was that the study includes Post-Secondary Correctional Education (PSCE). For the purposes of this research, this is defined as any type of education beyond high school, or its equivalency, that has inmates of prisons or jails for students. This includes vocational, academic, undergraduate, graduate, certificate and/or degree programs. In several studies, it was difficult to ascertain whether the vocational training offered was secondary or post-secondary. Those in question were not included.

The second criterion was that recidivism rates of education participants were measured. Recidivism can be defined as a tendency to relapse into criminal behavior. These are measured by looking at rates of re-arrest, re-conviction

and re-incarceration, with re-arrest rates being highest (re-arrest does not equal guilt). Recidivism is operationally defined by each study used, typically by re-incarceration. Unfortunately, there is no universally accepted operational definition. Time spans after release vary from study to study with the shortest being one year. There is also no centralized data source of those who recidivate. Given this, most correctional facilities report vague recidivism rates of the general prison population between 60 and 70 percent (Werner, 1990).

Both correlational and quasi-experimental studies were collected as sufficient equations are available to transform data into a single statistic (correlation).

Selecting the final set of studies

Each article acquired was reviewed for consideration of inclusion in the meta-analysis. Several decision rules were used to determine the studies that would be included in the meta-analysis. A primary decision involves the choice of separating, or aggregating, multiple data points (correlations). One unfortunate finding was that several of the studies used the same cohorts. In these cases, the initial cohort analysis was used. Duplicate cohort studies were not included, thereby preserving the independence of data points.

Studies needed to include an overall recidivism rate, usually determined by state statistics, institutional statistics, or SIRs (Statistical Information on Recidivism). SIRs are numerical values calculated using indicators of risk levels such as marital status, type of offense, number of offenses, and age at first arrest, etc. These do not predict individual behavior but can be used for group prediction and analysis. (Duguid, Hawkey & Knights, 1998). Studies that did not include some form of overall recidivism rates for comparison were not included.

A few studies used control groups as well as overall statistics for their analysis. Those studies containing both were included, and a separate, smaller meta-analysis was conducted specifically with the studies with control groups. Studies needed to include specific data for those inmates participating in post-secondary correctional education. Several studies included these inmates but combined their data with inmates receiving Adult Basic Education (ABE), General Equivalency Degree (GED) work, or secondary education. If data were unable to be separated, the study was eliminated.

Finally, to be included in the meta-analysis, a study needed to have sufficient information that allowed for the computation of a Chi-square or variance estimate. This data would, in turn, be converted into correlations for purposes

of conducting the meta-analysis. According to Wachter and Straf, "it is commonplace for those attempting meta-analyses to find too little information given in published papers or reports to allow computation of effect sizes or proper coding of features of design"(1990, p. xvii). Several studies reported insufficient information.

Data Collection

The following study characteristics were extracted from the studies: N, PSCE (type of courses, i.e. academic or vocational, and amount, i.e. minimum number of classes taken or degree completed), recidivism construct (re-incarceration, re-arrest etc.), and recidivism length (the length of follow-up for checking each releasee for recidivism). Variances (r2), correlation coefficients (r), and effect sizes (f2) (McNeil, Newman & Kelly, 1996), were calculated for each study. Due to limited resources and the unavailability of labor, multiple raters did not code the studies. Therefore inter-rater reliability was not measured.

Statistical Treatment

Calculation of summary statistics

The mean and the variance of the study coefficients are the first meta-analysis statistics calculated. These are sample-weighted so that studies with larger sample sizes are given more weight than those based on smaller samples.

This sample-weighted mean r is then a reasonable estimate of the true strength of the effect in the population. This, however, is only the initial phase of a meta-analysis. Several other tests must be run to substantiate and explain the findings.

Testing for and detecting outliers

An outlier is a datum that seems to be inconsistent with other data due to errors in transcription, computation, or an unusual research subject or characteristic. The effect of outliers is often a notable increase in observed variance and a distortion of the mean (Arthur, et al, 2001). Although most discussions on outliers refer to a single data point, in the case of a meta-analysis, the concern is the study outlier. Detecting outliers in meta-analytic data sets is very important. The basic purpose of meta-analysis is to negate or lessen the effects of statistical artifacts. An outlier among the data may cause an incorrect assumption of a moderator causing residual variance. This outlier could alter the conclusions of a meta-analysis.

Chi-square test for variation across studies

Although a matter of debate, particularly by Hunter and Schmidt (1990), a chi-square test was run to test if the observed variance in the studies is greater than expected by chance. This is a test for homogeneity and can be used to test for moderators. If the chi-square is significant, there may be true variation across the studies, or it may be the result of the operation of moderator variables. Therefore, if the chi-square is significant, it does support a positive relationship between post-secondary correctional education and the reduction of recidivism in this study.

Confidence Intervals

Confidence intervals estimate the extent that sampling error remains in the summary statistics. It is a range of values that the mean size is likely to be if other studies were taken from the population (Arthur, et. al, 2001). Depending on the outcome of the chi-square (significant implies that a participant in PSCE is less likely to recidivate than a non-participant) one of two computations for the standard error of the mean correlation around correlation estimates will be used. Once again, it should be noted that this meta-analysis is not testing for causation, it is a correlation which tests for relationships.

Selecting and testing for potential moderators

A moderator is a variable that affects the relationship between the independent and dependent variables. It can account for, or helps explain, more variance than would otherwise be the case. Since the possibility of moderators exist, individual subsets of the studies in the overall meta-analysis will be tested for their influence. A moderator variable is typically identified by a corrected variance that has a lower average in the subsets than for the data as a whole, and a corrected mean r that varies from subset to subset. Three theoretical moderators have been identified by the researcher and are discussed in the results section. Subset 4 is not so much a test for moderators as it is a separate meta-analysis.

Three studies were quasi-experimental and included control groups. In their reports, comparison data from general statistics as well as the control group, were included. For each of these studies, two sets of data were produced: one using the general recidivism rate for that state or institution and another using the control group recidivism rate. The first set was included in the primary meta-analysis and a second, smaller meta-analysis was run on the second set of data (Subset 4). It is hypothesized that the control group meta-

analysis will control for limitations such as selection bias, and will possibly show less of a relationship between PSCE and recidivism reduction.

Limitations

There are several known limitations of this study that are beyond the control of the researcher. First, the relatively few (15) studies appropriate and available for this 10-year meta-analysis were a disappointment to the researcher. Initial searches and reviews had indicated that a larger sample would fit the criteria. As noted earlier, several factors contributed to this limitation. Many studies that included post-secondary correctional education in their investigation of recidivism did not separate the data between secondary and post-secondary. Several studies failed to note the population and statistics they were using for comparison purposes. Other studies reported relationships but did not supply the necessary data for inclusion.

Recidivism is only measured when it occurs within the same state as the inmate was originally incarcerated and is therefore a conservative estimate of actual behavior. At this point, a national database is either not available, or is not used, by states in tracking their releasees. However, it should be noted that this was the case for virtually all the studies included in the meta-analysis, and is therefore less problematic than if this was not the case.

Selection bias and lack of matched control groups are issues in any study of corrections education. Also, relatively few studies looked at the inmates' achievement in the PSCE programs (grades, attendance, motivation, et.) in reference to recidivism. Differences in PSCE participation and recidivism construct and length also exist but may be tested as possible moderators.

Meta-analysis as a technique is also subject to several limitations. As with any research, the results are only as good as the input. The assumption is made, when selecting the final set of studies for inclusion, that rigor and accuracy of reporting are present. The fact that much research of any kind that fails to show significance is often relegated to the file drawer of the primary researcher is also a limitation to meta-analysis.

Although several possible moderators will be examined, there is the very real possibility of unknown or unidentified moderators. Perhaps if this research becomes widely distributed, other ideas will be suggested. It is also possible that the researchers of the original 15 studies may have input or suggestions as well.

The choice of specific data analysis was a subjective decision. This researcher chose the Arthur, Bennett & Huffcutt (2001) guided text of the Hunter

and Schmidt (1990) approach using the SAS PROC MEANS based on recommendations from several respected statisticians. The decision to choose a meta-analysis of correlations, rather than effect sizes, was also a matter of judgment. As always when using correlational data, there is the danger of implying causation. It is hoped that emphasis on the relational quality of the constructs of this meta-analysis was both obvious and ubiquitous, so that an unintentional implication of causation was not inferred by the reader.

Results

Due to the selection process used in the final set of studies, only 15 studies were deemed appropriate for a meta-analysis of post-secondary correctional education and recidivism for the 1990-1999 time frame. Data extracted from each study included: N, PSCE (type of courses, i.e. academic or vocational, and amount, i.e. minimum number of classes taken or degree completed), recidivism construct (re-incarceration, re-arrest etc.), and recidivism length (the length of follow-up for checking each releasee for recidivism)(see Table 1). Numerical data was also extracted and converted, if necessary into correlation, variance and effect size statistics (see Table 1). In subset 4, a smaller meta-analysis, the same calculations were conducted on the three studies with control groups, using the control group recidivism rate rather than the institutional rate. Sample sizes were also adjusted according to the size of the treatment and control groups (see Table 2). A total of 15 studies were included with a total sample size of 7320 subjects.

The sample-weighted mean correlation for the meta-analysis of post-secondary correctional education and recidivism was +.31 (see Table 3). This correlation refers to the hypothesis that participation is PSCE is related to lowering the recidivism of inmates after their release from prison. A chi-square test was found to be significant at $p < .01$. In addition, 95% confidence intervals for the sample-weighted mean r were placed around the correlation and were found to range from 0.29 to 0.33. Frequency data were also calculated and shown in Table 4. Frequencies were calculated by adding the numbers of recidivists, both with PSCE and without, in each study included. Percentages were then calculated with the overall N of each meta-analysis or subset. For the overall meta-analysis, inmates who participated in PSCE recidivated 22% and those not participating in PSCE had a recidivism rate of 41%.

Moderator Analysis

Three other subsets of data were meta-analyzed on the SAS PROC MEANS. The

Table 1. Study Characteristics and Calculations

#	N	Type of PSCE	Recidivism		r2	r	f2
			Construct	Length			
1	654	> 2 College courses	Reincarceration	3 Years	.060	.25	.06
2	60	CE Associate or Bachelors Degree	Reincarceration	3 Years	.260	.71	.35
3	95	CE Associate Degree	Reincarceration	10 Years	.180	.42	.22
4	46	Completed College or Vocational Program	Parole status (Unsat or sat)	1 Year	.077	.28	.08
5	760	PS Academic, Vocational Training, or both	Parole Violation Reincarceration	1 Year	.116	.34	.13
6	92	60 or more PSCE credits	Rearrest	2 Years	.026	.16	.03
7	356	Inmate college program success	Reincarceration	>1 Year	.045	.46	.05
8	3500	PSCE Academic & Vocational	Reincarceration	1 Year	.070	.27	.08
9	129	Participation in PSCE	Reincarceration	1-3 Yrs.	.160	.40	.19
10	360	Some Televised PSCE	Reincarceration	5 Years	.136	.37	.16
11	700	At least 2 PCSE courses	Reincarceration	Various	.180	.42	.22
12	84	Some PSCE	Rearrest or Parole Revoked	3 Years	.054	.23	.06
13	93	PSCE degree or Vocational certificate	Reincarceration	1-12 Yrs.	.267	.52	.36
14	312	PSCE Associate Degree or Vocational Certificate	Reincarceration	1-5 Years	.110	.33	.12
15	79	Telecom College courses	Reincarceration	3 Years	.010	-.10	.01

Note: N= Number of inmates participating in the study, r2 = variance, r = correlation, f2 = effect size.

first subset (1) included only those studies (6) that used completion of a PSCE program as the criterion for inclusion in the study. It was hypothesized that lower recidivism rates might be more strongly correlated with inmates who had completed programs rather than just participating. Several studies included relatively little participation (for example, at least 2 courses) as a criterion. The sample-weighted mean r was indeed stronger at 0.43 and was statistically significant at the .02 probability level such that people who completed PSCE programs were more likely to reduce their recidivism than non-participants or participants that did not necessarily complete a program (see Table 3). Numbers and percentages of releasees that recidivated are noted in Table 4. With a total sample size of 6338, 19% of those who completed a PSCE program recidivated compared to 38% of those who had not completed a PSCE program.

Table 2. Study Characteristics and Calculations of Control Group Subset 4

#	N	Type of PSCE	Recidivism		r2	r	f2
			Construct	Length			
9a	258	PSCE Participation	Reincarceration	1-3 Yrs.	.040	.40	.04
11a	700	> 2 Courses PSCE	Reincarceration	Various	.027	.17	.03
12a	1174	Some PSCE	Rearrest/Parole Revoked	3 Years	.060	.24	.06

Note: N= Number of inmates participating in the study, r2 = variance, r = correlation, f2 = effect size.

Subset 2 included only those studies that used re-incarceration as the recidivism construct. It was hypothesized that the more stringent construct (larger percentages of ex-convicts are re-arrested or violate parole than are actually re-incarcerated) would be a more appropriate measure. Re-arrest does not imply guilt, therefore may not be an accurate measure of recidivism. Surprisingly, the sample-weighted mean r for this group of 11 studies was identical to the overall study at 0.31 in the same direction. It was also significant at

Table 3. Meta-Analysis Results for PSCE and Recidivism

Meta-Analysis	Studies Included	K	Total Sample Size	Sample-weighted Mean r	Var.	SD	Chi-Square	Sig. at level	95% Conf. Inter.
Overall	All 15 Studies	15	7320	0.31	.007	.08	62.72	p<.01	.29 - .33
Sub-set 1	Completed PSCE	6	962	0.43	.010	.10	14.58	p<.02	.38 - .48
Sub-set 2	Reincarceration	11	6338	0.31	.007	.08	54.30	p<.01	.29 - .33
Sub-set 3	< 3 Years Recidivism	10	5760	0.29	.005	.07	34.29	p<.01	.27 - .31
Sub-set 4	Control Grp. Studies	3	2132	0.24	.005	.07	11.98	p<.01	.20 - .28

Note: There is overlap between the subsets so total K's and Sample sizes will not equal the overall numbers. Sample-weighted Mean r indicates the positive correlation between PSCE and non-recidivism. K= number of studies included in meta-analysis set; Var. = variance; SD = standard deviation; Sig. = significant; Conf. Inter = confidence interval. Subset 1 -Completed PSCE Program =(rather than only participated); Subset 2 – Recidivism is tallied by reincarceration only; Subset 3 – recidivism is only measure for 3 year or less, as opposed to up to 12 years; Subset 4 is the Control groups study including the 3 studies that were quasi-experimental.

Table 4. PSCE and Recidivism Frequency Table

	Study	K	N	Recidivism			
				With PSCE		Without PSCE	
				#	%	#	%
Overall	All 15 Studies	15	7320	1637	22%	2983	41%
Subset 1	Completed PSCE Program (rather than only participated)	6	962	181	19%	369	38%
Subset 2	Recidivism = Reincarceration Only	11	6338	1560	25%	2863	45%
Subset 3	< Three Years Recidivism (rather than 1-12 years	10	5760	1281	22%	2196	38%
Subset 4	Studies with Control Groups (quasi-experimental)	3	2132	444	21%	736	35%

Note: Frequencies (# and %) will not add to 100% or N size. Those subjects with and without PSCE who did not recidivate are not shown. PSCE = post-secondary correctional education.

the .01 probability level (see Table 3). There were differences in actual percentages of recidivism, however, both PSCE participants and non-participants had higher recidivism rates than the overall study. 25% of PSCE participants were reincarcerated, whereas 45% of those with no PSCE were reincarcerated as shown in Table 4.

Subset 3 included only those studies that measured recidivism length for 3 years or less. It was hypothesized that the longer the measure, the more likely the chance of finding recidivism. Ten studies were included and the sample-weighted mean r was actually lower at 0.29 (see Table 3) but still showed a positive relationship between PSCE and lowered recidivism. This statistic was significant at the .01 probability level.

The percentage of PSCE participants who recidivated in 3 years or less after release was 22% and the percentage for non-PSCE participants in the same time frame was 38% (see Table 4).

Subset 4 included the three studies that were quasi-experimental and had control groups. As mentioned earlier, different descriptive statistics were calcu-

lated using the control group data for each study rather than institutional or state figures (see Table 2). The sample-weighted mean r was 0.24 and was statistically significant at the .01 probability level as shown in Table 3. Control group comparisons, in these studies, helps to control for selection bias, a primary concern and confounding effect of most PSCE and recidivism studies. It is felt that inmates that choose PSCE would be more likely to become law-abiding upon release, with or without PSCE. This small meta-analysis shows that, even with the use of control groups, PSCE has a positive relationship with the reduction of recidivism. Frequency data for this subset are shown in Table 4. PSCE participants recidivated at a rate of 22%, whereas the control groups who did not have PSCE recidivated at a rate of 35%.

Testing for Outliers

The Sample-Adjusted Meta-Analytic Deviancy Statistic (SAMD) was run on the data using SAS PROC MEANS. Two studies fall outside two standard deviations of the mean SAMD statistic, study 8 and study 15. In examining study 8, it is possible that its relatively large sample size (3500) is a contributing factor in its SAMD statistic's deviation from the mean SAMD. In the process of sample-weighting, a N that is considerably larger than the other studies will have its correlation carry more weight. Study (8) has a lower (.27) than average or mean correlation coefficient (.35). When comparing a non-sample-weighted mean of .35 to the meta-analytic mean of .31, it seems likely that this study, with its large sample size, and lower-than-mean-r of .27 may be responsible for lowering the results of the meta-analysis. However, the overall results are still significant when including this possible outlier. If removed, the sample-weighted mean r would be greater, and therefore, the case could be made that the inclusion of study 8 is resulting in an underestimation of the correlation of PSCE and recidivism. Given the relatively small number of studies available for this meta-analysis and the importance of such a large sample size in study 8, this researcher has made the judgment to include it in the meta-analysis. Had this study resulted in an overestimation of the correlation, a different decision may have been warranted.

Study 15 was the only study that met the inclusion criteria for the meta-analysis that showed a negative correlation between PSCE and recidivism reduction. Given that it falls more than two standard deviations from the mean SAMD statistic, one could make the case that it is an outlier. However, studies with unexpected or undesirable outcomes often are not published and therefore not included in meta-analyses. This particular study was, indeed, an

unpublished paper that had been presented at a conference. This researcher felt that it was necessary to include it in all relevant analysis as a nod to any possibly remaining or undiscovered disappointing PSCE/recidivism research.

Results Summary

As displayed in Table 5, the meta-analysis of post-secondary correctional education and recidivism research conducted between 1990 and 1999 has a correlation of 0.31, which is statistically significant. This means that PSCE is correlated with lower rates of recidivism as defined by the study. There were consistent findings in each of the four subsets, or moderator analyses, and they were also found to be statistically significant.

Conclusions

Overall Meta-analysis

The meta-analysis of research available on PSCE and recidivism research reported between 1990 and 1999 showed a positive correlation between participation in post-secondary correctional education and the reduction of recidivism. Although the correlation was moderate at .31, the results are statistically significant and support the research hypothesis. In a recent, larger meta-analysis of all correctional education, Wells (2000) found a more than moderately strong effect size (.54) from a meta-analysis of 124 studies from 1987-2000. His research included pre-and post-secondary education. The current study can be viewed as a more specific look at a similar hypothesis with post-secondary education as the predictor (or independent) variable. Neither study found it methodologically necessary to correct for statistical artifacts.

A Sample-Adjusted Meta-Analytic Deviancy (SAMD) statistic was calculated for the studies in this overall meta-analysis. Two studies fell more than two

Table 5. Meta-Analysis Results for PSCE and Recidivism Summary

Meta-Analysis	Studies Included	Sample-Weighted Mean r	Significant?	Level
Overall	All 15 Studies	0.31	Yes	p<.01
Subset 1	Complete PSCE Program	0.43	Yes	p<.02
Subset 2	Reincarceration Only	0.31	Yes	p<.01
Subset 3	< Three Years Recidivism	0.29	Yes	p<.01
Subset 4	Studies with Control Group	0.24	Yes	p<.01

Note: Sample-weighted Mean r indicates the positive correlation between PSCE and non-recidivism.

standard deviations away from the mean SAMD, however, it was decided that both should be retained. The first, study 8, had a relatively larger sample size (3500) and a lower than average correlation. Because a meta-analysis correlation is sample-weighted, the results from this individual study carried more weight than studies with smaller sample sizes. However, due to its size and importance, and the fact that its correlation was smaller than the mean, it could possibly cause an underestimation of the relationship between PSCE and recidivism reduction rather than an inflated result.

The second study to fall more than two standard deviations from the mean SAMD, study 15, was the only study that met inclusion criteria with a negative correlation between PSCE and recidivism reduction. It was kept in the analyses to provide a more accurate account of research, both available and unavailable. Such subjective judgments and trade-offs are typical in meta-analyses in some research areas. Unlike the hard sciences, which routinely throw out 5 - 20% of their upper and lower data sets, the social and behavioral sciences do not necessarily adhere to this standard (Hedges, 1985). Arthur, et al (2001) caution that removal of extreme studies be done on a limited basis. They recommend, instead, that moderators be investigated. Outliers should only be eliminated if it can be strongly justified. If the outlier had caused a possibly overestimation of the results, a different decision about its retention may have been made.

Several issues or constructs were identified as containing possible moderator variables. Four subset meta-analyses were performed in an effort to investigate the possible effect of their existence. Below are the descriptions, rationale, and results of the hypothesized moderator subsets.

Subset 1

Of the 15 studies in the overall meta-analysis, 6 included only those inmates who completed a PSCE program. Nine studies included inmates who had participated in some sort of PSCE, including one study with a minimum of two courses required for inclusion. It was hypothesized that program completers would have a greater reduction in recidivism that those who had only participated. If PSCE was positively related to recidivism reduction, wouldn't more PSCE and/or a complete PSCE have a stronger relationship?

The 6 studies using program completion as the criterion were analyzed with the SAS PROC MEANS program. The result was a positive correlation of .43, and was statistically significant. Although 6 studies is a small set, the results do indicate that PSCE completion is a stronger predictor criterion than PSCE participation alone. It should be noted that the studies using participa-

tion as a criterion, may also include program completers (in other words, participation does not imply lack of completion, the two are not mutually exclusive) thereby strengthening their relationship as well. The results of this small meta-analysis indicate that the amount of PSCE education received may be a moderator variable in the findings of the overall study.

It is also important to examine what makes an inmate a program completer. These inmates also may have succeeded because they were more motivated and/or competent than those who do not complete programs (Gerber & Fritsch, 1995). Subset 4 partially addresses this concern.

Subset 2

Eleven of the 15 studies used the construct – reincarceration – to assess recidivism. The remaining 4 studies included re-arrest and/or parole revocation or violation as criteria. It was felt by the researcher that reincarceration was a more accurate measure of recidivism than other constructs. For example, a releasee may be re-arrested and subsequently have charges dropped or be found not guilt in a trial. Using re-arrest as a recidivism construct prematurely, and perhaps falsely, implies a return to criminal activity. Therefore, re-arrest frequency data may include subjects that did not actually recidivate.

The myriad of deeds, that could cause a releasee to be labeled with a parole violation or to have parole revoked, is also not necessarily criminal. Parolees are subject to stricter rules than the average citizen and counting a parole violation as a return to criminal behavior may be problematic. Therefore a meta-analysis was run on the 11 studies using only reincarceration as the recidivism construct. The result was a positive correlation of .31, and was statistically significant. This is the same correlation as the overall meta-analysis so the hypothesis that using the recidivism construct of reincarceration would yield a greater reduction in recidivism rates was not confirmed. In the overall meta-analysis, the recidivism construct does not appear to be impacted by a moderator variable.

Subset 3

Ten of the 15 studies measured recidivism for 3 years or less after release. The remaining 5 used longer, or inconsistent, follow-up measures when assessing recidivism. It was hypothesized that, the longer you look for recidivism, the more you will find. It was also speculated that, after 3 years, it would be difficult to make the case that education or the lack thereof, while incarcerated, would have as critical an impact. A meta-analysis was run on the 10 three-

years-or-less studies, with a positive correlation of .29, and was statistically significant. It is interesting to note, however, that the correlation is slightly weaker than that of the overall study. This would indicate that recidivism length may be effectively measured within 3 years of release. This may be related to the fact that two-thirds of inmates who are rearrested are rearrested within 12 months of their release (Butterfield, 2002). While this study cannot make the assertion that it is unnecessary to go beyond three years when studying recidivism, the length of follow-up does not appear to be a moderator variable in the overall study.

Subset 4

Three studies included control groups as part of their research design. Selection bias is one of the primary arguments against positive finding in treatment programs, including education, with inmates. The recent OCE/CEA (2000) Three State study sought to correct alleged sampling bias in previous studies of inmate education. The researchers collected data on the backgrounds and attitudes of inmates, to ensure that access to education programs was the key difference among the groups being studied (Schmidt, 2002). Recidivism rates were significantly lowered with the re-incarceration rate reduced by 29% (Steurer, Smith & Tracy, 2001).

The three studies in this smaller meta-analysis (subset 4) all included control groups in a quasi-experimental design. These control groups were chosen on criteria deemed relevant to selection of, and participation in PSCE programs. A meta-analysis was run on the three and resulted in a positive correlation of .24, which was statistically significant. The lower correlation is not surprising given that the PSCE participants were being compared to groups with similar demographics (age, education level, attitudes, prior convictions, etc. depending on the specific study) rather than the institution or state prison population as a whole. The finding that the correlation is positive and statistically significant helps to offset the blanket dismissal of PSCE and recidivism research using selection bias as the dominant variable. Selection bias may, however, be a moderator variable in the overall meta-analysis.

Suggested Further Research

The findings of Subset 1 indicate that further study needs to be done when looking at PSCE participants and recidivism. It makes common sense that a program completer might have a better chance at success out of prison than a non-completer. Since each inmate has a different sentence, and arrives at a dif-

ferent time, many more logistical factors impact an inmate's participation than a traditional student. Therefore, research needs to be done to identify specific program components that seem to have the most benefit. This would enable inmates with short sentences to be exposed to the most significant aspects and therefore enable many more participants to become completers in one way or another.

A related debate surrounds what types of education are best for inmates. Current trends are away from traditional college courses held in prison, and moving toward an education component specifically designed for prisoners. Since traditional college includes problem-solving and critical thinking skills, a more global worldview, and an understanding of society, are programs that focus on literacy, mathematics, occupational factors, good behaviors, attitudes, and discipline, only (for example), enough to enable an inmate to make qualitative changes and achieve legitimate success in life?

Distance learning is a relatively new development that may allow an increase in PSCE while keeping costs low (Garmon, 2002). The personal, interactive capabilities as well as the wide range of media and technological advances make it a much more class-like than televised instruction or computer-based courses. As with the prior suggestions, research would need to be done to ascertain which aspects of an education are best suited for this method of delivery.

Although a return to the pre-1994 funding of PSCE would improve and expand PSCE's role and impact enormously, it is doubtful that this will occur. Alternative funding is in place in some areas and some grants are available for those inmates under 26 years old. More alternatives need to be found. One source of growth may be to increase the role of community colleges. These institutions have made their reputations by serving thousands of people (annually) looking for a second chance in life (Garmon, 2002). Most mission statements of higher education institutions include some kind of commitment to the community. Educational partnerships with correctional institutions are worth consideration and investigation in line with that mission. (Welsh, 2002).

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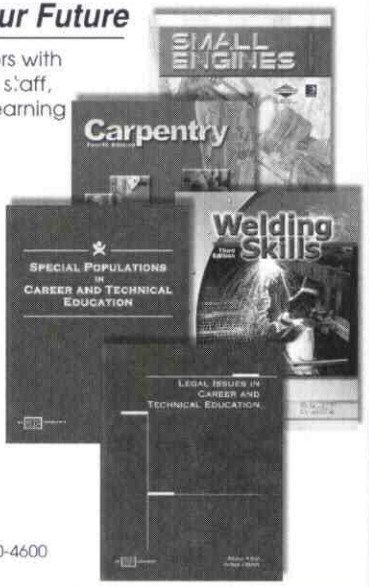

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