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EXPERIMENTAL ASSESSMENT OF THE EFFECT OF VOCATIONAL  
TRAINING ON YOUTHFUL PROPERTY OFFENDERS

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This evaluation was possible only because of the cooperation and efforts of many individuals in the North Carolina Department of Correction, Department of Natural Resources and Community Development, and the Employment Security Commission. The support of the North Carolina Job Training Council (formerly the NC Employment and Training Council) and the administrators of the agencies it comprises was also essential to the completion of this work. Initial funding for the evaluation was provided by the University of North Carolina, the NC Department of Correction, and the NC Department of Natural Resources and Community Development. Completion of the evaluation was made possible by the generous support of the National Institute of Justice. This research was supported in part by NIJ grant 85-IJ-CX0061. Points of view are those of the authors and do not necessarily represent the official position of the US Department of Justice or the National Bureau of Economic Research. This paper is part of NBER's research program in Labor Studies.

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ABSTRACT

In this paper we report results that suggest that carefully integrated and implemented vocational training and re-entry programs for youthful property offenders can reduce the rate at which such individuals are arrested after release. This result is important since most evaluations of programs for such offenders show no significant effects. The question has been "Why have programs rarely been shown to have significant effects on the behavior of offenders?". Our results suggest that the major reasons may be that programs evaluated to date have been weak and implementation poor. Even with substantial backing from correctional management only 16 percent of the experimental group participated in all aspects of the Vocational Delivery System (VDS). Members of the experimental group were most likely to participate in early aspects of the VDS (e.g., a three-week evaluation of vocational interests and aptitudes) than in later elements (e.g., work with the Employment Security Commission to find a job). Even with relatively weak implementation, the experimental group subjects were significantly less likely to be arrested than control group subjects.

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## 1.0 INTRODUCTION

Efforts to identify correctional programs which have positive effects on post-release behavior have, for the most part, proved futile.<sup>1</sup> This "nothing works" result was reported by Martinson in 1974. Subsequently, the National Academy of Sciences' Panel on Research on Rehabilitative Techniques concurred with Martinson's conclusion stating, "The entire body of research appears to justify only the conclusion that we do not now know of any program or method of rehabilitation that could be guaranteed to reduce the criminal activity of released offenders" (Sechrest, White and Brown 1979, p. 3). The Panel further stated, however, that the conclusion that "nothing works" was premature, pointing out that much of the research on rehabilitative techniques focused on weak or poorly defined programs, implemented to an unknown degree, which were evaluated using inadequate research designs (Sechrest, White and Brown 1979).

While researchers accept that a strong treatment may succeed while a diluted version of the same treatment may not, deficiency of treatment has seldom been suggested when offender rehabilitation programs fail. As noted by Sechrest and Redner (1979, p. 23), "When it has been concluded that some form of treatment does not work for rehabilitation of criminal offenders, few objections have been raised that the treatment may not have been strong enough." Related to treatment strength is the issue of treatment

integrity or implementation. This issue points to differences that will occur between the program as prescribed and the program as implemented. Only by measuring the delivery of the program is it possible to know what was provided and how well. The costs of failing to monitor program delivery are (at least) two-fold. First, as Rezmovic (1984, p. 187) has suggested, "evaluators have too often found themselves at a loss to explain why a particular intervention did or did not produce the expected effects." Secondly, and perhaps most importantly, since programs are implemented to address serious social problems, conclusions about the ineffectiveness of programs broadly specified as "counseling" or "vocational training" may preclude development of innovative programs which if implemented in a strong form would be effective (see, for example, Sechrest & Redner 1979).

The delivery of programs is ultimately the responsibility of administrators, case managers, teachers and counsellors. However, researchers should provide careful descriptions of programs and develop ways of measuring their implementation. The strongest evaluative methodology is the "true experiment," with random assignment of individuals to treatment and control groups. Additionally, researchers should be careful to develop samples of sufficient size to assure that tests have sufficient statistical power (see Cohen 1977 for a discussion). The power of any statistical test is a function not only of sample size and significance level but also of how effective the treatment is.

Thus, for inmate programs designed to affect recidivism, the degree to which the program deters post-release criminal behavior (the program's effect size) is a critical factor in the ability of statistical tests to reveal significant differences in outcomes when they exist. For a given sample size and significance level, the smaller the effect of the program, the lower the power of the statistical test. Given the apparent intractability of criminal behavior, it appears naive to assume that any program, even if fully delivered, will have a large effect on the behavior of a criminal population. Further, few prison treatments are likely to be characterized by 100 percent delivery and receptivity (response). Programs which are only partly implemented result in dilution of the treatment and, ceteris paribus, reduce the power of any statistical test. With an a priori assumption of "small effect," large samples and an acceptance of critical levels for significance tests other than 0.05 (e.g., 0.1 or even 0.2) may be appropriate.

In this paper, we examine the implementation and effectiveness of a vocational rehabilitation program offered at two NC prisons for 18-to-22-year-old males. Conceived by the NC Department of Correction (DOC) to improve the post-release employment prospects of inmates, the Sandhills Vocational Delivery System (VDS) integrated training and employment services provided by a variety of agencies into one program.<sup>2</sup> A theoretical basis for the effectiveness of the VDS is found in economic models of criminal

behavior which suggest that improved potential to earn legal wages will reduce participation in crime.<sup>3</sup> The elements of the VDS were explicitly defined by the DOC and other relevant state agencies prior to initiation of the evaluation. Further, these elements were ostensibly "in place" prior to initiation of the evaluation, suggesting that implementation would require "only" the "linking" of the elements into a comprehensive program which would be provided to selected subjects. Thus, the VDS was a prison program with a theoretical basis for efficacy and one for which implementation was a potentially less formidable problem than would be the case for a "new" program. Finally, it was believed that constrained prison resources would preclude all inmates from participating in the VDS program, providing an opportunity to examine program effectiveness using a random-assignment experimental design.

To briefly summarize our results, we found that the VDS program was only partly implemented, although those participating in the program were more likely than control group members to complete vocational training and other programs. Further, VDS participants were less likely to be arrested following release from prison. We feel that our findings underscore the importance of the following issues for rehabilitation researchers: (1) monitoring program delivery to determine the extent of program implementation; and (2) assuring adequate samples to accommodate

the issue of power in relation to what may be a small, but nonetheless important, effect size.

In the next section, we briefly describe the VDS program and the evaluation design. Subsequently, we characterize our study groups. In section 4.0, we examine program delivery and effectiveness. In section 5.0, we present results of analyses of post-release arrest. The final section presents our summary and conclusions.

## 2.0 THE VDS PROGRAM AND EVALUATION DESIGN

The VDS program was offered at North Carolina's Cameron Morrison and Sandhills Youth Centers (CMYC and SYC). CMYC houses about 400 medium- and minimum-custody inmates; SYC houses about 200 minimum-custody inmates, including those transferred to SYC from CMYC when they achieve minimum-custody status. In 1982, a committee composed of representatives of agencies who provide inmate services developed a protocol for the VDS program.<sup>4</sup> The protocol suggested that the VDS include (1) working individually with inmates to identify vocational interests and aptitudes, (2) developing individual plans of study for improving vocational skills, (3) providing the identified training as well as other needed services, and (4) helping inmates secure post-release employment. This simple list represents a complex program requiring employees within the two prisons to coordinate among

themselves and with employees of other agencies. The following paragraph describes the processing of a VDS participant as envisioned by the protocol.

Upon arrival at CMYC and assignment to the VDS program, the inmate meets with an Evaluator who administers a battery of tests to determine the inmate's vocational interests and aptitudes. The Evaluator discusses results of the tests (for example, "Construction is a good post-release employment option.") with the inmate and his Case Manager who will develop the inmate's correctional plan. The Case Manager and the inmate discuss construction employment opportunities with a Job Development Specialist (responsible for pre-release employment assistance) and the Employment Security Commission (ESC) Offender Specialist who will assist the inmate in finding a job once he is released. If post-release construction employment prospects appear good for the inmate, the Case Manager schedules appropriate vocational training on the inmate's correctional plan along with other activities such as academic programs, self-improvement and life-enrichment activities (e.g., Alcoholics Anonymous and Explorers), and work assignments (e.g., prison laundry). The Case Manager(s) then work(s) with the inmate, course instructors, and others to facilitate the inmate's completion of the activities on his correctional plan. As an added incentive for the inmate to complete the plan, a parole contract (called a MAPP) is negotiated between the inmate and a Parole Officer that specifies a



parole date contingent upon the inmate completing his correctional plan. The specified parole date facilitates post-release employment placement since the Job Development Specialist and the ESC Offender Specialist can provide potential employers with an accurate availability date. Prior to release, the inmate meets with his Job Development Specialist and ESC Offender Specialist to discuss employment prospects; he also completes Community Re-entry Training (CRT), a program developed at SYC to teach coping skills such as how to conduct a job interview. Following release, the inmate either begins the job identified prior to his release or continues to work with the Offender Specialist until suitable employment is found.

As the above description suggests, the VDS protocol required a variety of state agencies to integrate provided services into a comprehensive program directed at improving the post-release employability and employment of inmates. In addition to approving the protocol, the state agencies agreed to use an evaluation plan that required that inmates be selected at random to participate in the VDS program or normal prison activities. The complete evaluation design is described in the following paragraphs.

The VDS evaluation used a true experimental design which randomly assigned subjects to experimental and control groups which would differ by their exposure to the VDS program.<sup>5</sup> Criteria for

selecting inmates for the evaluation were developed in concert with prison administrators. The criteria were designed to select a group which the labor market and criminological literatures suggest was likely to benefit from an employment-oriented program such as the VDS. The selection criteria identified individuals as "eligibles" for random assignment those who had (1) committed income-producing offenses; (2) IQ's greater than or equal to 70; (3) good health; (4) an expected in-state release; and (5) an expected stay at CMYC/SYC of 8 months to 3 years.<sup>6</sup> Inmates arrived weekly at CMYC and were screened by the Dorm Intake Supervisor to identify those meeting the criteria. These inmates were then randomly assigned to either the experimental or control group.<sup>7</sup> Enrollment of subjects in the evaluation began in June 1983 and continued through May 1986. During this period, 591 subjects were enrolled in the VDS project, including 295 experimental group members (E's) and 296 control group members (C's). Program participation data were available for the period June 1983 through July 6, 1986. As of that date, 154 E's and 130 C's had been released.<sup>8</sup>

The VDS program and the random assignment specified the treatment of E's and C's. The differences in treatment are shown in Table 1. With the exception of evaluation, community re-entry training (CRT), and job development services, treatment of the two groups differed by the availability of programs and services. For example, if classroom space was available for all inmates, the

training provided to experimental and control group members would be approximately the same. Thus, a priori, the evaluation design did not require that the C's receive no treatment--only that they be treated routinely (for example, assigned to the first available vocational training or to a prison job).

### 3.0 SUBJECTS

The experimental and control groups were indistinguishable on a variety of socio-demographic, employment history, and criminality measures.<sup>9</sup> The "typical" CMYC/SYC study participant was single (92 percent) with no dependents (82 percent), white (53 percent), and from an urban area (61 percent). He had a poverty/subsistence level background (72 percent) and an IQ of 100. He was 20 years of age when enrolled in the study, had completed the ninth grade, and scored at the 5th or 6th grade level on the WRAT tests of reading, spelling, and arithmetic skills. He was most likely to be employed (56 percent) when he was arrested for the crime which sent him to prison, working in either construction or manufacturing for a wage of \$4.63 an hour. He had an unstable (or no) work history (74 percent) and was unskilled (70 percent). The enrollment incarceration was his first in NC prisons (63 percent) and he was sentenced to 61.5 months for breaking and entering (75 percent). Finally, he was likely to occasionally or frequently use drugs (self report; 37 percent occasionally, 45 percent frequently). The two groups

differed on two measures of alcohol use. E's were more likely to be (self-report) occasional or frequent users of alcohol than were C's (94 versus 87 percent, respectively). Further, E's were more likely than C's to have been intoxicated at the time of their commitment offense (32 versus 21 percent, respectively).

The profile of the subjects released before July 6, 1986, is consistent with the description provided above, although there was a small but statistically significant difference in the means for the WRAT arithmetic score (grade level of 5.6 versus 5.2 for the C's and E's, respectively). Additionally, the mean sentence for released subjects was 52.5 months (rather than 61.5). Fifty-five percent were paroled, 29 percent were conditionally released, and 16 percent were unconditionally discharged after serving an average of approximately 18 months. The released E's and C's did not differ on these incarceration and release measures.

The Director of the DOC's Division of Prisons made the decision in early 1983 to implement the VDS program and provide the VDS to randomly selected inmates. Concurrently, the Administrator of CMYC decided to develop a computerized case management system to be used by CMYC and SYC to monitor inmate progress. This system operated from June 1983 through July 6, 1986 and provided the data for examination of VDS implementation discussed in the next section.

#### 4.0 TREATMENT IMPLEMENTATION AND EFFECTIVENESS

Implementation of the program required staff members at CMYC and SYC to ensure that all members of the experimental group received the services, programs, and training prescribed by the protocol and summarized in Table 1. Additionally, they were to treat members of the control group in a routine fashion. This design had two implications. First, given the limited resources (e.g., classroom space) of the two prisons, it was expected that most E's would receive most services, while few C's would receive most services (specifically, vocational training). Secondly, the activity participation data would identify the extent to which members of both groups participated in programs and would provide a measure of how well the VDS program was implemented. In other words, implementation would be examined vis-a-vis changes in the customary treatment of inmates. Data detailing completion of vocational training would be available and provide a proxy for the efficacy of the VDS in improving vocational skills.

##### 4.1 VDS IMPLEMENTATION: PROVIDING SERVICES

In this section, we examine VDS implementation by considering whether the VDS elements (Table 1) were provided to the E's and whether this group received more of the "priority" services than the C's. We consider whether specific services, such as the

evaluation, were provided and whether scheduled activities, such as vocational training, were initiated.

Recall that the first element of the VDS was the evaluation of the inmate's vocational aptitudes and interests. As can be seen in Table 2, 85 percent of the E's met with an evaluator. Although the VDS protocol required that results of the evaluation be discussed with Case Managers, CMYC personnel involved in the program suggested that cooperation on the development of the correctional plan was dependent to some extent on the identity of the inmate's case manager. Thus, while most VDS participants were evaluated, they were less likely to receive the "integrated services" foreseen by the program.

The correctional plan is used by prison staff to schedule and track an inmate's activities while he is at CMYC and SYC and, thus, is required for all inmates. Participation in vocational, academic, self-improvement and life-enrichment programs are included in the plan, along with administrative actions such as custody-level reviews. The plan includes, for each activity, recommended and actual start dates, end date, reason for ending the activity (e.g., completed, reassigned to another activity), and, for some activities, grade at completion. To determine whether an inmate had a correctional plan, the data were examined to identify whether each inmate had any scheduled activities (including administrative). Our results (see Table 2) suggest

that only 75 to 80 percent of the evaluation subjects had a correctional plan. Thus, the data suggest that 20 to 25 percent of both groups participated in no activities.

The VDS program was designed to increase participants' vocational skills through training. Thus, all E's should have been scheduled for a vocational program. (We already know this objective was not met since 21 percent of the E's weren't scheduled for any activities.) As programs are potentially available for all inmates, C's could also be scheduled for classes although there was no requirement (routine treatment). Table 2 shows the percentage of each group who were scheduled for one or more vocational, academic and other programs.<sup>10</sup> As can be seen, we found E's were slightly more likely to be scheduled for vocational classes; 65 percent of E's and 55 percent of C's were scheduled for one or more vocational programs. There was no difference between the two groups with respect to the scheduling of academic and other programs; about two-thirds and three-quarters of each group were scheduled for academic and other programs, respectively.

Experimental subjects were to receive priority for available classroom space. Thus, if class space was limited and the VDS protocol was followed, significantly more E's than C's should have begun classes. As can be seen in Table 2, this result is what occurred. Nearly two-thirds of the E's began one or more

vocational programs, compared with only 46 percent of the C's. On average, the E's began 88 percent of scheduled vocational programs, compared with 77 percent for C's (t-statistic = 2.1654, 114.1 degrees of freedom). Members of each group were equally likely to have begun academic programs. Table 2 also shows that although members of both groups were equally likely to have begun at least one other program, the E's were more likely to have begun five or more.

Community re-entry training (CRT) was designed by SYC staff to provide inmates skills for "getting along" in the "free" world. CRT is provided to inmates at SYC shortly before release and was an integral part of the VDS program. As such, all E's should have been scheduled for CRT. As can be seen in Table 2, only 49 percent of this group was scheduled for this program and only 36 percent began the CRT class. However, these percentages are significantly higher than comparable percentages (9 and 5 percent, respectively) for control group members.

The Mutual Agreement Parole Program (MAPP) administered by the DOC Department of Adult Probation and Parole provides a contract for parole between the DOC and an inmate. MAPP contracts (or, simply, MAPPs) were to be developed and implemented for all eligible VDS participants; members of the control group were to be treated routinely. More E's than C's should have had and completed MAPPs. This did not occur. We find insignificant



differences between the control and experimental groups in the development and implementation of MAPP contracts (see Table 2).

The final element of the VDS program involved assisting VDS participants in finding a job. Data were not available to assess quantitatively the extent to which this part of the VDS was implemented. The Job Development Specialists and ESC Offender Specialists providing these services suggested, however, that this assistance was provided to "most" E's who were transferred to SYC from CMYC. No C's received these services.<sup>11</sup>

Table 3 provides a summary of the VDS services scheduled for and begun by members of both groups. Included in this summary are the four elements for which we had quantitative information, specifically evaluation, participation in CRT, initiation of a MAPP contract, and vocational training. As can be seen, only 20 percent of the E's (31 of 154) were scheduled for these four VDS activities, while only 16 percent (24 of 154) actually began these activities. On the other hand, most E's (152 of 154) received at least one VDS element. Ordinal scores of 0.5, 1.0, 3.0, and 5.0 were assigned to evaluation, CRT, MAPP, and vocational training, respectively, and the means of these scores for the two groups were calculated. The result for activities scheduled was 5.6 (sd = 3.1) and 4.3 (sd = 3.0) for the E's and C's, respectively. Thus, the E's were scheduled to receive significantly more services than the C's (t-statistic = 3.6333, 282 df).

Similarly, the E's began significantly more services (mean = 5.4, sd = 3.1) compared with the C's (mean = 3.8, sd = 3.1) (t-statistic = 4.2554, 282 df). We are evaluating a partially implemented program which did, however, succeed in significantly altering the treatment of inmates assigned to the experimental group.

Finally, we considered whether the VDS program was better implemented as prison staff experience with the program grew. As vocational programs are integral to the VDS, we focused on this program element. The E's and C's were assigned to quarterly cohorts based on their dates of enrollment in the study. To assess the dynamics of implementation, we will examine the percentage of experimental subjects scheduled for and beginning vocational classes. Implementation will be judged more complete when we observe higher percentages. Figure 1 suggests that the VDS was better implemented as time passed, reaching a peak in the second quarter of the second year of operation and declining somewhat thereafter.

#### 4.2 VDS EFFECTIVENESS: IMPROVING SKILLS

The first hypothesized effect of the VDS is that it will improve the vocational skills of participants. The results presented in Table 4 indicate that the E's were significantly more likely to complete and complete successfully programs than were the C's. Thirty-five percent of the E's and 23 percent of the C's com-

pleted one or more vocational programs. Thirty-one percent of the E's and 17 percent of the C's successfully completed one or more vocational programs. Those beginning programs were enrolled in them for an average of approximately 7 months; there was no difference in the training time of the C's and E's who began programs.

As also shown in Table 4, members of each group were equally likely to complete academic programs, but the E's were significantly more likely to complete the programs with successful grades. Not surprisingly, the E's were significantly more likely to (successfully) complete the CRT, but less than 30 (18) percent did so.

These results suggest that more members of the experimental group received training and other services than members of the control group and that the VDS was effective in increasing the likelihood of a participant completing a vocational program, albeit at a level far below what was expected (or hoped).

#### 5.0 VDS EFFECTIVENESS: REDUCING POST-RELEASE ARREST

Although relatively few members of the experimental group received all VDS services, there were significant differences in the services received by the two groups (e.g., with respect to vocational program completion). In this section, we present

results suggesting that the VDS program even in its diluted form had positive effects on the post-release recidivism of participants. The measure of recidivism used is arrest following release. We consider both the prevalence of and the length of time until arrest.

Arrest data were acquired from NC's Police Information Network August 19, 1987. Data were acquired for 247 (138 E's and 109 C's) of the 284 subjects.<sup>12</sup> The subjects had been released an average of approximately two years at the time the data were acquired.<sup>13</sup> There was no significant difference in the average length of the followup period for the two groups.

Forty percent of the subjects (100 of 247) were arrested following release, but a higher percentage of C's were arrested than E's. Specifically, 46 percent of the control group compared with 36 percent of the E's were arrested following release. These proportions differ at the 0.10 level of significance (one-tailed test).<sup>14</sup>

We next examined whether the time until arrest differed for the two groups. If arrest is considered a "failure" and no arrest "survival" then failure-time or survival analysis can be used to compare the distributions of time until arrest for the two groups (see Kalbfleisch and Prentice 1980 for a discussion of survival analysis; see Schmidt and Witte 1984 and 1988 for survival models

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The VDS program was offered at North Carolina's Cameron Morrison and Sandhills Youth Centers (CMYC and SYC). CMYC houses about 400 medium- and minimum-custody inmates; SYC houses about 200 minimum-custody inmates, including those transferred to SYC from CMYC when they achieve minimum-custody status. In 1982, a committee composed of representatives of agencies who provide inmate services developed a protocol for the VDS program.<sup>4</sup> The protocol suggested that the VDS include (1) working individually with inmates to identify vocational interests and aptitudes, (2) developing individual plans of study for improving vocational skills, (3) providing the identified training as well as other needed services, and (4) helping inmates secure post-release employment. This simple list represents a complex program requiring employees within the two prisons to coordinate among

themselves and with employees of other agencies. The following paragraph describes the processing of a VDS participant as envisioned by the protocol.

Upon arrival at CMYC and assignment to the VDS program, the inmate meets with an Evaluator who administers a battery of tests to determine the inmate's vocational interests and aptitudes. The Evaluator discusses results of the tests (for example, "Construction is a good post-release employment option.") with the inmate and his Case Manager who will develop the inmate's correctional plan. The Case Manager and the inmate discuss construction employment opportunities with a Job Development Specialist (responsible for pre-release employment assistance) and the Employment Security Commission (ESC) Offender Specialist who will assist the inmate in finding a job once he is released. If post-release construction employment prospects appear good for the inmate, the Case Manager schedules appropriate vocational training on the inmate's correctional plan along with other activities such as academic programs, self-improvement and life-enrichment activities (e.g., Alcoholics Anonymous and Explorers), and work assignments (e.g., prison laundry). The Case Manager(s) then work(s) with the inmate, course instructors, and others to facilitate the inmate's completion of the activities on his correctional plan. As an added incentive for the inmate to complete the plan, a parole contract (called a MAPP) is negotiated between the inmate and a Parole Officer that specifies a

parole date contingent upon the inmate completing his correctional plan. The specified parole date facilitates post-release employment placement since the Job Development Specialist and the ESC Offender Specialist can provide potential employers with an accurate availability date. Prior to release, the inmate meets with his Job Development Specialist and ESC Offender Specialist to discuss employment prospects; he also completes Community Re-entry Training (CRT), a program developed at SYC to teach coping skills such as how to conduct a job interview. Following release, the inmate either begins the job identified prior to his release or continues to work with the Offender Specialist until suitable employment is found.

As the above description suggests, the VDS protocol required a variety of state agencies to integrate provided services into a comprehensive program directed at improving the post-release employability and employment of inmates. In addition to approving the protocol, the state agencies agreed to use an evaluation plan that required that inmates be selected at random to participate in the VDS program or normal prison activities. The complete evaluation design is described in the following paragraphs.

The VDS evaluation used a true experimental design which randomly assigned subjects to experimental and control groups which would differ by their exposure to the VDS program.<sup>5</sup> Criteria for

selecting inmates for the evaluation were developed in concert with prison administrators. The criteria were designed to select a group which the labor market and criminological literatures suggest was likely to benefit from an employment-oriented program such as the VDS. The selection criteria identified individuals as "eligibles" for random assignment those who had (1) committed income-producing offenses; (2) IQ's greater than or equal to 70; (3) good health; (4) an expected in-state release; and (5) an expected stay at CMYC/SYC of 8 months to 3 years.<sup>6</sup> Inmates arrived weekly at CMYC and were screened by the Dorm Intake Supervisor to identify those meeting the criteria. These inmates were then randomly assigned to either the experimental or control group.<sup>7</sup> Enrollment of subjects in the evaluation began in June 1983 and continued through May 1986. During this period, 591 subjects were enrolled in the VDS project, including 295 experimental group members (E's) and 296 control group members (C's). Program participation data were available for the period June 1983 through July 6, 1986. As of that date, 154 E's and 130 C's had been released.<sup>8</sup>

The VDS program and the random assignment specified the treatment of E's and C's. The differences in treatment are shown in Table 1. With the exception of evaluation, community re-entry training (CRT), and job development services, treatment of the two groups differed by the availability of programs and services. For example, if classroom space was available for all inmates, the



training provided to experimental and control group members would be approximately the same. Thus, a priori, the evaluation design did not require that the C's receive no treatment--only that they be treated routinely (for example, assigned to the first available vocational training or to a prison job).

### 3.0 SUBJECTS

The experimental and control groups were indistinguishable on a variety of socio-demographic, employment history, and criminality measures.<sup>9</sup> The "typical" CMYC/SYC study participant was single (92 percent) with no dependents (82 percent), white (53 percent), and from an urban area (61 percent). He had a poverty/subsistence level background (72 percent) and an IQ of 100. He was 20 years of age when enrolled in the study, had completed the ninth grade, and scored at the 5th or 6th grade level on the WRAT tests of reading, spelling, and arithmetic skills. He was most likely to be employed (56 percent) when he was arrested for the crime which sent him to prison, working in either construction or manufacturing for a wage of \$4.63 an hour. He had an unstable (or no) work history (74 percent) and was unskilled (70 percent). The enrollment incarceration was his first in NC prisons (63 percent) and he was sentenced to 61.5 months for breaking and entering (75 percent). Finally, he was likely to occasionally or frequently use drugs (self report; 37 percent occasionally, 45 percent frequently). The two groups

differed on two measures of alcohol use. E's were more likely to be (self-report) occasional or frequent users of alcohol than were C's (94 versus 87 percent, respectively). Further, E's were more likely than C's to have been intoxicated at the time of their commitment offense (32 versus 21 percent, respectively).

The profile of the subjects released before July 6, 1986, is consistent with the description provided above, although there was a small but statistically significant difference in the means for the WRAT arithmetic score (grade level of 5.6 versus 5.2 for the C's and E's, respectively). Additionally, the mean sentence for released subjects was 52.5 months (rather than 61.5). Fifty-five percent were paroled, 29 percent were conditionally released, and 16 percent were unconditionally discharged after serving an average of approximately 18 months. The released E's and C's did not differ on these incarceration and release measures.

The Director of the DOC's Division of Prisons made the decision in early 1983 to implement the VDS program and provide the VDS to randomly selected inmates. Concurrently, the Administrator of CMYC decided to develop a computerized case management system to be used by CMYC and SYC to monitor inmate progress. This system operated from June 1983 through July 6, 1986 and provided the data for examination of VDS implementation discussed in the next section.

#### 4.0 TREATMENT IMPLEMENTATION AND EFFECTIVENESS

Implementation of the program required staff members at CMYC and SYC to ensure that all members of the experimental group received the services, programs, and training prescribed by the protocol and summarized in Table 1. Additionally, they were to treat members of the control group in a routine fashion. This design had two implications. First, given the limited resources (e.g., classroom space) of the two prisons, it was expected that most E's would receive most services, while few C's would receive most services (specifically, vocational training). Secondly, the activity participation data would identify the extent to which members of both groups participated in programs and would provide a measure of how well the VDS program was implemented. In other words, implementation would be examined vis-a-vis changes in the customary treatment of inmates. Data detailing completion of vocational training would be available and provide a proxy for the efficacy of the VDS in improving vocational skills.

##### 4.1 VDS IMPLEMENTATION: PROVIDING SERVICES

In this section, we examine VDS implementation by considering whether the VDS elements (Table 1) were provided to the E's and whether this group received more of the "priority" services than the C's. We consider whether specific services, such as the

evaluation, were provided and whether scheduled activities, such as vocational training, were initiated.

Recall that the first element of the VDS was the evaluation of the inmate's vocational aptitudes and interests. As can be seen in Table 2, 85 percent of the E's met with an evaluator. Although the VDS protocol required that results of the evaluation be discussed with Case Managers, CMYC personnel involved in the program suggested that cooperation on the development of the correctional plan was dependent to some extent on the identity of the inmate's case manager. Thus, while most VDS participants were evaluated, they were less likely to receive the "integrated services" foreseen by the program.

The correctional plan is used by prison staff to schedule and track an inmate's activities while he is at CMYC and SYC and, thus, is required for all inmates. Participation in vocational, academic, self-improvement and life-enrichment programs are included in the plan, along with administrative actions such as custody-level reviews. The plan includes, for each activity, recommended and actual start dates, end date, reason for ending the activity (e.g., completed, reassigned to another activity), and, for some activities, grade at completion. To determine whether an inmate had a correctional plan, the data were examined to identify whether each inmate had any scheduled activities (including administrative). Our results (see Table 2) suggest

that only 75 to 80 percent of the evaluation subjects had a correctional plan. Thus, the data suggest that 20 to 25 percent of both groups participated in no activities.

The VDS program was designed to increase participants' vocational skills through training. Thus, all E's should have been scheduled for a vocational program. (We already know this objective was not met since 21 percent of the E's weren't scheduled for any activities.) As programs are potentially available for all inmates, C's could also be scheduled for classes although there was no requirement (routine treatment). Table 2 shows the percentage of each group who were scheduled for one or more vocational, academic and other programs.<sup>10</sup> As can be seen, we found E's were slightly more likely to be scheduled for vocational classes; 65 percent of E's and 55 percent of C's were scheduled for one or more vocational programs. There was no difference between the two groups with respect to the scheduling of academic and other programs; about two-thirds and three-quarters of each group were scheduled for academic and other programs, respectively.

Experimental subjects were to receive priority for available classroom space. Thus, if class space was limited and the VDS protocol was followed, significantly more E's than C's should have begun classes. As can be seen in Table 2, this result is what occurred. Nearly two-thirds of the E's began one or more

vocational programs, compared with only 46 percent of the C's. On average, the E's began 88 percent of scheduled vocational programs, compared with 77 percent for C's (t-statistic = 2.1654, 114.1 degrees of freedom). Members of each group were equally likely to have begun academic programs. Table 2 also shows that although members of both groups were equally likely to have begun at least one other program, the E's were more likely to have begun five or more.

Community re-entry training (CRT) was designed by SYC staff to provide inmates skills for "getting along" in the "free" world. CRT is provided to inmates at SYC shortly before release and was an integral part of the VDS program. As such, all E's should have been scheduled for CRT. As can be seen in Table 2, only 49 percent of this group was scheduled for this program and only 36 percent began the CRT class. However, these percentages are significantly higher than comparable percentages (9 and 5 percent, respectively) for control group members.

The Mutual Agreement Parole Program (MAPP) administered by the DOC Department of Adult Probation and Parole provides a contract for parole between the DOC and an inmate. MAPP contracts (or, simply, MAPPs) were to be developed and implemented for all eligible VDS participants; members of the control group were to be treated routinely. More E's than C's should have had and completed MAPPs. This did not occur. We find insignificant

differences between the control and experimental groups in the development and implementation of MAPP contracts (see Table 2).

The final element of the VDS program involved assisting VDS participants in finding a job. Data were not available to assess quantitatively the extent to which this part of the VDS was implemented. The Job Development Specialists and ESC Offender Specialists providing these services suggested, however, that this assistance was provided to "most" E's who were transferred to SYC from CMYC. No C's received these services.<sup>11</sup>

Table 3 provides a summary of the VDS services scheduled for and begun by members of both groups. Included in this summary are the four elements for which we had quantitative information, specifically evaluation, participation in CRT, initiation of a MAPP contract, and vocational training. As can be seen, only 20 percent of the E's (31 of 154) were scheduled for these four VDS activities, while only 16 percent (24 of 154) actually began these activities. On the other hand, most E's (152 of 154) received at least one VDS element. Ordinal scores of 0.5, 1.0, 3.0, and 5.0 were assigned to evaluation, CRT, MAPP, and vocational training, respectively, and the means of these scores for the two groups were calculated. The result for activities scheduled was 5.6 (sd = 3.1) and 4.3 (sd = 3.0) for the E's and C's, respectively. Thus, the E's were scheduled to receive significantly more services than the C's (t-statistic = 3.6333, 282 df).

Similarly, the E's began significantly more services (mean = 5.4, sd = 3.1) compared with the C's (mean = 3.8, sd = 3.1) (t-statistic = 4.2554, 282 df). We are evaluating a partially implemented program which did, however, succeed in significantly altering the treatment of inmates assigned to the experimental group.

Finally, we considered whether the VDS program was better implemented as prison staff experience with the program grew. As vocational programs are integral to the VDS, we focused on this program element. The E's and C's were assigned to quarterly cohorts based on their dates of enrollment in the study. To assess the dynamics of implementation, we will examine the percentage of experimental subjects scheduled for and beginning vocational classes. Implementation will be judged more complete when we observe higher percentages. Figure 1 suggests that the VDS was better implemented as time passed, reaching a peak in the second quarter of the second year of operation and declining somewhat thereafter.

#### 4.2 VDS EFFECTIVENESS: IMPROVING SKILLS

The first hypothesized effect of the VDS is that it will improve the vocational skills of participants. The results presented in Table 4 indicate that the E's were significantly more likely to complete and complete successfully programs than were the C's. Thirty-five percent of the E's and 23 percent of the C's com-



pleted one or more vocational programs. Thirty-one percent of the E's and 17 percent of the C's successfully completed one or more vocational programs. Those beginning programs were enrolled in them for an average of approximately 7 months; there was no difference in the training time of the C's and E's who began programs.

As also shown in Table 4, members of each group were equally likely to complete academic programs, but the E's were significantly more likely to complete the programs with successful grades. Not surprisingly, the E's were significantly more likely to (successfully) complete the CRT, but less than 30 (18) percent did so.

These results suggest that more members of the experimental group received training and other services than members of the control group and that the VDS was effective in increasing the likelihood of a participant completing a vocational program, albeit at a level far below what was expected (or hoped).

#### 5.0 VDS EFFECTIVENESS: REDUCING POST-RELEASE ARREST

Although relatively few members of the experimental group received all VDS services, there were significant differences in the services received by the two groups (e.g., with respect to vocational program completion). In this section, we present

results suggesting that the VDS program even in its diluted form had positive effects on the post-release recidivism of participants. The measure of recidivism used is arrest following release. We consider both the prevalence of and the length of time until arrest.

Arrest data were acquired from NC's Police Information Network August 19, 1987. Data were acquired for 247 (138 E's and 109 C's) of the 284 subjects.<sup>12</sup> The subjects had been released an average of approximately two years at the time the data were acquired.<sup>13</sup> There was no significant difference in the average length of the followup period for the two groups.

Forty percent of the subjects (100 of 247) were arrested following release, but a higher percentage of C's were arrested than E's. Specifically, 46 percent of the control group compared with 36 percent of the E's were arrested following release. These proportions differ at the 0.10 level of significance (one-tailed test).<sup>14</sup>

We next examined whether the time until arrest differed for the two groups. If arrest is considered a "failure" and no arrest "survival" then failure-time or survival analysis can be used to compare the distributions of time until arrest for the two groups (see Kalbfleisch and Prentice 1980 for a discussion of survival analysis; see Schmidt and Witte 1984 and 1988 for survival models

of recidivism). Figure 2 shows the estimated survival functions for the E's and C's.<sup>15</sup> As can be seen, the probability of being arrest-free on or before some time  $t_i$  is higher for the experimentals for all but the shortest followup periods. For example, the probability of being arrest-free one year after release is 0.75 for experimental group members and 0.67 for control group members.

There were few arrests for individuals who "survived" for more than 20 months (no C's and 3 E's were arrested after having been free for more than 20 months; 49 E's and 35 C's had been free without an arrest for 20 months or more). This is clearly illustrated in Figure 2 which shows that the probability of surviving stabilizes for both groups after about 600 days. This "steady state" probability level was 0.60 for the E's and 0.50 for the C's. The log-rank test statistic comparing these two functions was 7.6447 (variance = 24.2074). Thus, the two curves are not distinguishable at normally accepted significance levels ( $X^2_1$  statistic = 2.414, p-value = 0.12). However, given the weak implementation of the program and the fact that the test statistic is nearly significant, our results provide support for the contention that the VDS, even partially implemented, tends to lower the rate at which young men are arrested.

Finally, vocational program completion did auger well for post-release arrest. Of those who completed a vocational program (n =

70), 30 percent were arrested, compared with 45 percent of those who did not complete a program (n = 177). This difference is statistically significant (z-statistic = 3.9651). The log-rank test comparing the survival functions of those who did and did not complete a vocational training program was also significant at the 0.10 level (log-rank statistic = 8.01381, variance = 20.4744;  $X^2_1 = 3.1366$ ). This result may, of course, simply reflect a selectivity bias (i.e., those who complete programs are demonstrating a characteristic that is correlated with positive post-release behavior). Although we can not refute this possibility, we were unable to find a basis in our data for such a bias. There were no significant differences between those completing and not completing programs on any of our socio-demographic and criminality measures. Further, since the variable reflects program completion and not program success, inmate motivation is less of a factor. Thirdly, most individuals who did not complete a program were transferred to another facility. Transfers appear to have been independent of the experiment and in response to DOC and facility operational considerations.<sup>16</sup> Finally, members of both groups were equally likely to complete programs once they began programs. About 56 percent of E's and 50 percent of C's who began programs actually completed them.

## 6.0 SUMMARY AND CONCLUSIONS

In this paper, we provided evidence on the extent to which two NC prisons (in concert with other State agencies) implemented a vocational rehabilitation program for young property offenders. The standards for VDS implementation we considered were whether VDS participants (1) were scheduled for and (2) began the activities prescribed by the VDS protocol. We judged these to be minimal standards for a program, the completion of which requires subject cooperation. By these standards, the VDS was less than fully implemented since only 16 percent of the E's began the four activities for which we had quantitative data (i.e., received the evaluation, initiated discussion of a MAPP contract, and began CRT and a vocational program; see Table 3).

Most E's, however, received some services. Further, there were significant differences in the treatments received by the two study groups, with E's more likely to receive the VDS services than C's.

Given these differences in treatment, we then considered the effectiveness of the VDS (as implemented) in increasing vocational skills and reducing post-release recidivism. Members of the experimental group were more likely to complete vocational training programs and, thus, assumably to be better skilled at release than members of the control group.

Finally, we believe that the results presented here provide evidence that a stronger (better implemented) version of the VDS program could prove effective in reducing the post-release criminal behavior of young property offenders. Specifically, we found that although the VDS was not fully implemented, there is only about a one-in-ten chance that the better post-release arrest record of the experimental group is due to chance. There was 10-percentage point difference in the proportions of the experimental and control groups arrested following release from prison. Given the relatively weak implementation of the program, this difference which is significant at the 0.10 level is highly suggestive of the efficacy of the VDS program.

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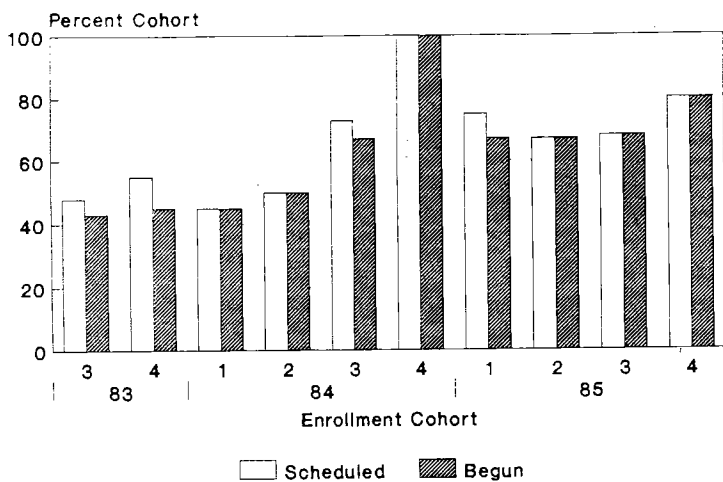
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1. Reviews of this literature are given by Lipton, Martinson and Wilks 1975, Greenberg 1977, and Fienberg and Grambsch 1979. A more recent presentation of the "Martinson conclusion" was offered by Englander 1983; a response is in Lattimore and Witte 1985.
2. The Department of Correction was joined in the development and delivery of the VDS by the Department of Community Colleges, the Division of Vocational Rehabilitation of the Department of Human Resources, and the Employment Security Commission.
3. The economic model of criminal behavior was first proposed by Gary Becker (1968). Subsequent work in this area has been contributed by Ehrlich (1973, 1977), Block and Heineke (1975) and Witte (1980), among others.
4. See the "Special Report by the Correctional Programs Committee to the North Carolina Employment and Training Council Concerning Program Evaluation at Sandhills Youth Complex," Raleigh, NC, February 1983.
5. An external comparison group was also randomly identified. Members of this group were not sent to CMYC/SYC and thus received "no" VDS services, although some elements such as vocational training are also available at other NC prisons. This paper focuses on the two groups who were assigned to CMYC and SYC; individuals interested in results pertaining to this external comparison group are referred to Lattimore, Witte and Baker (1988).
6. The first of these criteria was established as it seemed economically motivated offenders would be most amenable to the VDS program. The second, third and fourth were seen as measures which would enhance the post-release employability of offenders. Additionally, an expected in-state release was adopted as a criterion so that in-state data bases could be used. The final criteria was established to assure that the offender would be an CMYC/SYC long enough to receive the full VDS program, but not so long that release would occur long after completion of the program.
7. Identification of amenable and random assignment to the two study groups was done by the intake dormitory supervisor at CMYC. New arrivals were processed weekly. Individuals meeting the selection criteria were listed alphabetically by last name; the first individual listed was assigned to the experimental group, the second to the control group, and so forth. The next week, the first individual was assigned to the control group, the second to the experimental group, and so forth. Examination of weekly enrollments suggests that this procedure was followed.

8. There is a statistically significant difference in the number of each group released as of July 6, 1986 ( $X^2 = 3.7496$ ) which we attribute to chance. The two groups were indistinguishable with respect to the length of time incarcerated at enrollment (t-statistic = 0.7153, 245.9 df) and the total time spent in prison (t-statistic = 0.5095, 282 df).
9. Unless otherwise noted, all significance levels were set at 0.05; two-tailed tests were used for comparisons of subject characteristics and one-tailed tests, where appropriate, were used for outcome effects.
10. Fourteen vocational programs were offered at one or both facilities during some or all of the period under consideration; these programs included those in construction trades (7 programs), mechanics (2 programs), metal working, graphic arts (2 programs), food services, and office management. Academic programs included pre- and post-GED classes, as well as study release at a nearby community college. Other programs included substance abuse counselling, Jaycees, Yokefellows, "lifeskills" training, community re-entry training, and a variety of other enrichment activities.
11. The Offender Specialists reported the following problems with this part of the VDS: (1) training-related employment was often difficult to find; (2) many clients simply took the first available job (particularly if their parole was conditioned on employment); (3) the amount of training (about 6 months) was often judged by employers to be insufficient for placement in related employment; and (4) meeting with inmates prior to their release (to facilitate trust and cooperation) was often not possible for the Specialists from the western part of the state (about 250 miles from SYC).
12. Data were not acquired for 27 subjects because either (1) an FBI number for the subject was not on the DOC's files or (2) the number did not generate a match.
13. The length of followup was from 411 days to 1530 days. One E was released one week after the evaluation began; only 5 subjects, 3 E's and 2 C's, were released in 1983--i.e., in the first 7 months of the study.
14. The test statistic is 1.5325. The one-tailed z-test of differences between proportions is a more powerful test (0.61 at a 0.10 significance level) than the "equivalent"  $X^2_1$  test (power = 0.48).
15. The survival functions were estimated by the life table method. See Kalbfleisch and Prentice 1980.

16. VDS participants were supposed to complete vocational programs prior to transfer from CMYC/SYC. We found no difference in the percentage of each group who terminated programs due to reassignment (to another program within the prisons) or transfer (to another prison). About 25 percent of both groups were reassigned from one or more vocational programs; 31 percent of the C's and 34 percent of the E's were transferred to another prison prior to completing program(s). Further, anecdotal evidence from the prisons suggest that this aspect of the VDS was not implemented.



**FIGURE 1.** Trends in VDS Implementation and Effectiveness. The figure shows the trends in percent of enrollment cohort scheduled for and beginning one or more vocational program. Entries are for experimental (VDS participant) subjects.

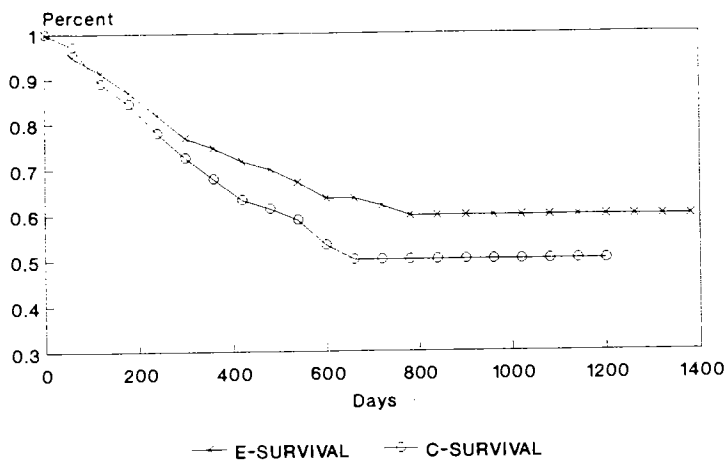


FIGURE 2. Survival distributions for the experimental and control groups. Time is time until first arrest following release.

TABLE 1. TREATMENT OF EXPERIMENTAL AND CONTROL GROUP SUBJECTS

PROGRAM ELEMENT	EXPERIMENTALS	CONTROLS
1.Evaluation	3-week test to assess vocational aptitudes interests	Interest inventory only
2.Correctional Plan	Developed by Case Mgr. w/Evaluator & others Intensive monitoring to assure compliance	Developed by Case Manager Routine monitoring
3.Program Placement (Vocational)	Priority	Routine
4.MAPP Contract	Receive	Routine
5.CRT Program	Receive	Do not receive
6.Job Development	Receive	Do not receive

TABLE 2. MEASURES OF VDS PROGRAM IMPLEMENTATION<sup>1</sup>

PROGRAM ELEMENT	E	C	X <sup>2</sup> Statistic <sup>2</sup>
1. Evaluation			
3-week evaluation interest inventory	131 (85%)	53 (41%)	NA
2. Correctional Plan	121 (79%)	98 (75%)	0.245
3. Program Placement			
<u>Vocational Programs</u>			
Scheduled >= 1	100 (65%)	72 (55%)	2.692*
Began >= 1	96 (62%)	60 (46%)	7.458***
<u>Academic Programs</u>			
Scheduled >= 1	102 (66%)	86 (66%)	0.012
Began >= 1	96 (62%)	77 (59%)	0.170
<u>Other Programs</u>			
Scheduled >= 1	118 (77%)	96 (74%)	0.162
Began >= 1	112 (73%)	89 (68%)	0.431
Began >= 5	87 (56%)	44 (34%)	23.723***
4. MAPP Contract			
Initiated	76 (49%)	54 (42%)	1.433
Completed	49 (32%)	30 (23%)	2.265
5. CRT			
Scheduled	76 (49%)	12 ( 9%)	51.199***
Began	55 (36%)	7 ( 5%)	36.243***
6. Job Development	Some	None	NA
Total Number Subjects	154	130	

1. Entries are number of subjects (percent of group).

2. NA = not appropriate. Degrees of freedom = 1 for all tests except "Other programs begun >= 5" (5 df).

\* Significant at the 0.10 level.

\*\* Significant at the 0.05 level.

\*\*\*Significant at the 0.01 level.

Table 3. VDS PROGRAM PARTICIPATION<sup>1</sup>

Program Element	Scheduled		Began	
	E	C	E	C
None	2	19	2	16
Evaluation Only	22	16	26	18
CRT Only	0	0	0	0
CRT + Evaluation	4	1	1	1
MAPP Only	6	13	6	15
MAPP + Evaluation	14	5	16	7
MAPP + CRT	1	2	1	1
MAPP + CRT + Evaluation	5	2	6	2
VP Only	6	26	7	20
VP + Evaluation	13	13	22	11
VP + CRT	3	1	2	0
VP + CRT + Evaluation	28	0	18	0
VP + MAPP	1	11	2	12
VP + MAPP + Evaluation	14	15	18	14
VP + MAPP + CRT	4	5	3	3
VP + MAPP + CRT + Evaluation	31	1	24	0
Total Number of Subjects	154	130	154	130

1. Entries are number of subjects. Evaluation is different for the two groups as shown in Table 1.



Table 4. PROGRAM COMPLETION AND SUCCESS<sup>1</sup>

PROGRAM	E	C	X <sup>2</sup> Statistic
<u>Vocational Programs</u>			
Completed >= 1	54 (34%)	30 (23%)	4.864**
Successful >= 1	47 (31%)	22 (17%)	7.085***
<u>Academic Programs</u>			
Completed >= 1	37 (24%)	29 (22%)	0.040
Successful >= 1	22 (14%)	10 ( 8%)	3.065*
<u>Other Programs</u>			
Completed >= 1	102 (66%)	80 (62%)	0.487
Completed >= 3	63 (41%)	24 (18%)	20.318***
<u>CRT</u>			
Completed	44 (29%)	2 ( 2%)	37.952***
Successful	28 (18%)	1 ( 1%)	23.312***
Total Number Subjects	154	130	

1. Entries are number of subjects (percent of group).

\* Significant at the 0.10 level.

\*\* Significant at the 0.05 level.

\*\*\*Significant at the 0.01 level.