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What is This?

THE LONG AND WINDING ROAD TO DESISTANCE FROM CRIME FOR DRUG-INVOLVED OFFENDERS: THE LONG-TERM INFLUENCE OF TC TREATMENT ON RE-ARREST

STEVEN S. MARTIN, DANIEL J. O'CONNELL, RAYMOND PATERNOSTER, RONET D. BACHMAN

Earlier research by Inciardi and colleagues established the long-term positive effects of a therapeutic community (TC) continuum of treatment for drug-involved offenders. Using data from his original longitudinal study and archival records of criminal justice re-arrest and recidivism, this paper extends these analyses to examine the effects of TC treatment on the long-term success of offenders, up to 18 years after release from prison. Multivariate trajectory analysis is used to examine patterns of re-arrest and desistance among a sample of 1363 clients followed up in person for five years and subsequently with record checks through state and NCIC criminal justice systems. Results indicate significant reductions in new arrests for those who received TC treatment in each of the five trajectories modeled for patterns of persistence and desistance. Discussion centers on the strengths of the relationships in each modeled trajectory and the implications for long-term understanding of drug offenders and criminal behavior.

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INTRODUCTION

The linkages between drug abuse and crime have been well documented, and several decades of field-based research have provided a general understanding of various aspects of the drugs/crime connection (Anglin & Perrochet, 1998; Inciardi, 1979; Inciardi & Martin, 1993; Inciardi & Pottieger, 1998; Inciardi & Surratt, 2001; Johnson et al., 1985; Nurco, 1998). Together, the overall findings suggest that, while the use of illegal drugs does not necessarily initiate criminal careers, drug use does intensify and perpetuate criminal activity.

A concomitant of drug-related criminality and the "war on drugs" since the 1980s has been the increased numbers of drug-involved offenders coming to the attention of the criminal justice system. In 2008, about 2.3 million people were in prison or jail in the United States, and another 5 million people under probation or parole supervision, with the majority previously incarcerated at some time (West, Sabol, & Cooper, 2009). Estimates suggest that at least two-thirds of the over 700,000 inmates who leave U.S. prisons each year had substance abuse or dependence problems prior to custody (Karberg & James, 2005; Mumola, 1999). Thus, the treatment and transition of drug-involved inmates back to the community is a critical issue for public health and public safety.

It is also clear that both drug use and recidivism are "relapsing" conditions for most offenders – typically involving more than one period of drug use and recovery and more than one brush with the law and incarceration (Leukefeld, Tims, & Farabee, 2002; Rawlings & Yates, 2001; Springer, McNeece, & Arnold, 2003). For a few offenders, one "dose" of treatment and/or incarceration is sufficient for achieving full recovery. For many others, though still a minority, the pattern of relapse is only ended by disease, death, or long-term incarceration. Many offenders, however, experience a confluence of treatment, social support, maturation, and/or health warnings that eventually result in a subsidence or cessation of drug use, and less or no new involvement with the criminal justice system.

There has been much discussion and some evidence pointing to the role of factors such as aging out, the adoption of normative roles (family, employment), and the provision of resources (education, job training) in the likelihood of decreased drug involvement and criminal desistance (Giordano et al., 2002; Laub & Sampson, 2003; Sampson & Laub, 2003). Yet most of these studies of long-term desistance looked at earlier cohorts of offenders, predominantly white, and less drug involved than those of recent offender cohorts. However, there is evidence for the success of treatment programs, particularly therapeutic community (TC) models within the correctional system for producing reasonably long-term effects in both drug use and criminal desistance with more current cohorts of offenders – those with higher

minority status, less opportunities, and particularly opportunities circumscribed by their substance use involvement.

THERAPEUTIC COMMUNITY TREATMENT

Numerous drug abuse clinicians and researchers have expressed the opinion that the "therapeutic community," commonly referred to as the "TC," is perhaps the most viable form of treatment for drug-involved offenders, particularly for those whose criminality has resulted in incarceration (Inciardi, Martin, & Surratt, 2001; Leukefeld & Tims, 1988, 1992; Tims, De Leon, & Jainchill, 1994). Drug-involved offenders who come to the attention of state and federal prison systems are typically those with long arrest histories and patterns of chronic substance abuse, and the intensive nature of the TC regimen tends to be best suited for their long-term treatment needs (De Leon, 2000). Moreover, the therapeutic community is especially efficacious in a correctional institution because the TC is a total treatment environment isolated from the rest of the prison population—separated from the drugs, the violence, and other aspects of prison life that tend to militate against rehabilitation. The primary clinical staff members in such programs are typically former substance abusers who themselves underwent treatment in therapeutic communities. The treatment perspective in the TC is that drug abuse is a disorder of the whole person; that the problem is the person and not the drug; that addiction is a symptom and not the essence of the disorder; and that the primary goal is to change the negative patterns of behavior, thinking, and feeling that predispose drug use (De Leon, 1994; 1997; 2000).

Evidence from within several state systems has showed significant effects of therapeutic treatment on clients three years after release from prison (Knight, Simpson, & Hiller 1999; Martin, Butzin, Saum, & Inciardi, 1999; Wexler, Melnick, Lowe, & Peters, 1999). Participation in treatment during the period of transition from prison back to the community has been shown to be particularly effective (Butzin, Martin, & Inciardi, 2002; 2005; Wexler et al., 1999). Two studies have extended these examinations to five years after release in examinations of data from California (Prendergast et al., 2004), showing some effects on re-incarceration for those who participated most frequently in treatment within prison, and Delaware (Inciardi, Martin, & Butzin, 2004), showing benefits in reducing drug use and new arrests for those who participated most frequently in work release treatment.

Although the effectiveness of substance abuse treatment for criminal justice clients has been established for one year, three years, even five years, there is less certainty as to why and how treatment works, as well as to the decay of treatment effects over time. For example, treatment retention has been found to be associated with treatment success for most kinds of programs (Anglin & Hser, 1990; De Leon, 1988; Gerstein & Harwood, 1990; Simpson, 1979; 1981; Simpson, Joe, & Brown,

1997). Work on "treatment careers" by Anglin and his associates (Anglin, Hser, & Grella, 1997; Grella, Hser, & Hsieh, 2003; Hser et al., 1997) suggests that the theoretical explication of treatment outcomes also requires an understanding of the history of treatment clients. In particular, the favorable consequences of increased time in treatment can come not only from retention in one program but also from repeated exposure to programs over time. Studying measures of repeated dose and exposure is an important area of study in examining long-term effects of treatment among offender populations.

A major emphasis of current research strategies is to understand how treatment client characteristics — not only demographic characteristics, as in the studies of desistance in earlier cohorts, but psychosocial histories and current psychosocial status — affect the criminal career process. In this paper we are beginning the report on subsequent analyses on the very long-term effects of TC treatment and other factors in the criminal history of drug involved offenders. This is the first of a series of analyses and reports that take advantage of existing data from a large longitudinal treatment evaluation study of drug-involved offenders completed by Inciardi and colleagues through five years of follow up analyses. With support from the National Institute of Justice, we are continuing his work by identifying long-term patterns or "trajectories" of recidivism, desistance, and relapse in this large, mixed race and gender sample first identified in the 1990s. In the initial phase of the project we are estimating and plotting trajectories of criminal involvement over a period of 14–18 years after release from prison using criminal and drug involvement histories on the cohort up to the present. The new follow up data are drawn from the criminal justice records of the state of Delaware on subsequent criminal history, supplemented by checks for cases not in the Delaware system using the National Crime Information Center (NCIC) and records checks requested from adjacent states. The criminal justice records data include the period both before and after the subjects' recruitment into the longitudinal study and comprise a period from 1969 through 2010. The availability of these data is making it possible to describe patterns of criminal and drug involvement as a function of previous drug treatment, demographic characteristics, and ensuing life events. In the second phase of the project we are utilizing the identified trajectories to create a sampling framework identifying different types of offending patterns: desisters, persisters, episodic, maturational, and potentially others. Subjects are being sampled from each trajectory of interest (oversampling women), and a total of 300 in-depth semi-structured follow-up interviews will be completed including updated life calendar data as well as retrospective and current information on mental and physical health and other related attitude and behaviors. These data will be used to assess existing theories and new hypotheses on the putative causes of identified criminal offending

patterns. In this first report, we are pursing a more modest goal of reporting on the persistence positive effects of treatment on this sample.

METHODS

The initial data for this study come from a longitudinal analysis of drug involved clients being released from the Delaware correctional system between 1991 and 1996. The study was initiated under a competitive R01 award from the National Institute on Drug Abuse (James A. Inciardi, PI) and completed with support from a subsequent Merit Award to Dr. Inciardi. The total period of support was almost 15 years (1991–2004), and the study completed a five year follow up on the clients recruited during 1991–1996. In the Delaware correctional system, those reaching eligibility for work release status were classified based upon criminal history and correctional counselor interviews. As such, work release TC program assignments were made by treatment and correctional staff. Those classified as approved for work release with a recommendation for drug treatment between 1991 and 1996 comprise the present sample (N = 1,363). However, because the number of those so classified exceeded the capacity of the treatment programs during that period, those eligible were assigned to either treatment, or to regular work release—depending upon the availability of a treatment opening at the time of assignment. As such, a "no treatment" group was available for comparison. Additional comparisons of treatment graduates with and without aftercare were possible because the aftercare component was not operational until 1994, whereas the other stages of treatment had been implemented several years earlier. Once aftercare was fully established, all graduates were expected to participate.

The original research protocol under the NIDA R01 and subsequent Merit award included baseline and multiple follow-up interviews with all treatment and comparison clients, as well as HIV and urine testing at each contact. The research complied fully with the special protections for prisoners as research subjects (Protection of Human Respondents, Code of Federal Regulations, 45 CFR 46). The baseline interview was completed in prison prior to an inmate's transfer to work release. The first follow-up occurred 6 months hence, corresponding with graduation from the work release TC (for the treatment groups) or completion of regular work release (for the comparison group). Subsequent personal interviews were conducted 18, 42, and 60 months after baseline. Treatment dropouts were also followed. Interviews at baseline and each subsequent follow-up were lengthy, representing 700 variables per administration, including data on basic demographics, living situations, criminal history, drug use history, treatment history, sexual behavior and attitudes, HIV risks, self-esteem, sensation seeking, and physical and mental health. Previous use of a series of illegal drugs was measured on an ordinal scale ranging from 0 (no use) to 6 (use more than once a day) in the 6 months prior to incarceration. The

data collection instruments include much of the Addiction Severity Index, and Risk Behavior Assessment developed by the National Institute on Drug Abuse. These data provide a rich basis for the subsequent analyses we plan, which will include more elaborate specifications of the covariates predicting to and better specifying the alternate trajectories modeled. It is important to note that these instruments were administered by the researchers after client selection and not as part of the client recruitment process. Follow-up surveys elicit detailed event history information on the intervening periods.

Participation in the research project was voluntary, and research subjects were paid up to $50 at each of the testing intervals—$25 for completing the questionnaire and $25 for giving a urine sample. More than 97% of those interviewed provided a urine specimen, data that will be used in subsequent analyses. Of the original cohort of 1,363, 10% ($N = 137$) were deceased at the most recent follow-up but can still be included in these analyses though censored at their death date. Of the respondents, a surprising few could not be found in the subsequent arrest databases. The effective sample for the analyses reported here is 1,250 (see Table 1). These 1,250 participants with arrest histories are 80% male and 20% female and 73% African-American and 37% Other (mostly White with a small group of Hispanics). The sample includes 335 cases assigned randomly to the comparison group and 915 who received treatment in the Delaware therapeutic communities. The data used in this paper make use of the entire baseline and the cases where arrest histories could be found in official records. It is worth noting that the face to face follow ups at 18, 42 and 60 months produced good response rates ranging from 85% to about 70% of the baseline sample.

TABLE 1. DESCRIPTION OF 1991–1996 DELAWARE DRUG INVOLVED PRISON RELEASEE SAMPLE

		Comparison Group	TC Treatment Group	Total
Gender				
	Male	272 (81%)	734 (80%)	1006 (80%)
	Female	63 (19%)	181 (20 %)	244 (20%)
Race				
	White	101 (30%)	250 (27%)	351 (27 %)
	African American	234 (70%)	665 (73%)	899 (73 %)
Total		335 (27%)	915 (73%)	1250

MODELING STRATEGY

The dependent variable for the analyses in this first report of the long-term follow up of the Delaware sample is arrest. As noted earlier, arrest and incarceration data were compiled by the Delaware Statistical Analysis Center, which records all arrests and imprisonments in the state of Delaware. These data were augmented by data from the National Crime Information Center in order to account for arrests outside the state of Delaware. Each arrest is recorded as well as the date of the arrest. These data were collapsed by year, creating a count of arrests for each year. Incarceration data indicated the entrance and exit date from prison for each sentence. These were recomputed to create a variable indicating the number of days free per year, which was used to account for time free on the streets. We estimate a semi-parametric group-based model for the annual number of arrests over the 41 year time period 1969–2010. The models were estimated with the SAS program PROJ TRAJ (see Nagin, 2005). Since we have an annual count of the number of arrests for each year, we estimated a zero-inflated Poison model, corrected for exposure time (the proportion of days each year the person was not incarcerated). This procedure accounts for the fact that a new arrest was unlikely to occur during a period of incarceration. The basic group-based model is a trajectory that is defined by a polynomial function of age or time. The probability distribution for the Poison count model for each of the *j* groups is:

$$p^j(y_{it}) = \frac{\lambda_{jit}^{y_{it}} e^{-\lambda_{jit}}}{y_{it}}! \qquad (y_{it}=0,1,2,...). \tag{1.0}$$

With link function:

$$\ln(\lambda_t^j) = \beta_0^j + \beta_1^j age_{it} + \beta_2^j age_{it}^2 + \beta_3^j age_{it}^3 + \alpha^j treatment_t \tag{2.0}$$

The zero-inflated Poison (*ZIP*) is an elaboration of the basic Poison count model, which takes into account that the regular Poison frequently underestimates the probability of zero counts, a common occurrence in offender data. Models were estimated beginning with a two group model up to an eight group model. The selection as to the final model was based upon the Bayesian Information Criterion (*BIC*), with the recommended solution being the model with the largest *BIC* score (Nagin, 2005). At times, however, the *BIC* score continues to increase as more groups are added. In this case, model selection is based on less formal considerations of parsimony and comprehensibility (Occam's razor).

In this first report of findings from the long-term follow up, our main substantive interest is not in the number of offending groups that can be extracted from these arrest data, but in examining the extent to which being in the KEY/CREST

therapeutic community drug treatment program affected the long-term offending trajectories of participants. To do this, we treated participation in the TC drug treatment program as a time-varying covariate in the trajectories. The effect of the treatment, then, is the effect of drug treatment within each of the identified offending groups. By embedding the effect of treatment *within* each trajectory group, we ensure that the developmental history of offending is similar for those within a given group—some of whom were and some were not exposed to the TC drug treatment while in custody. Modeled this way, we can determine what the effect of treatment is—does it increase or decrease the pattern of arrests subsequent to treatment—and whether it varies by trajectory group, that is, whether or not there is a treatment by developmental trajectory of offending interaction. If we consider drug treatment as a time-varying covariate, the estimated trajectory model becomes:

$$\lambda_i^j) = \beta_0^j + \beta_1^j age_{it} + \beta_2^j age_{it}^2 + \beta_3^j age_{it}^3 + \alpha^j treatment_t \qquad (2.0)$$

where treatment measures each person's participation in a drug treatment program at time *t* and equals 1 for all years subsequent to treatment and 0 in prior years. The values of the estimated parameter α can be interpreted as any other regression parameter—the change in the outcome variable associated with a one unit change in the explanatory variables. The super script *j* for the treatment variable is a reminder that the effect of treatment by design is the within-trajectory group effect of drug treatment. With the model specified this way, our coefficients can tell us whether participation in treatment changes (increases or decreases) the subsequent trajectory of arrests. In other words, participation in treatment can be considered as a "turning point" (Laub & Sampson, 2003; Sampson & Laub, 1993) in an individual's long-term trajectory of offending. This model specification assumes that the effect of drug treatment is incremental and not dramatic—that it modestly deflects the direction of the offending trajectory but does not fundamentally alter which offending group a person is in. If we conceive of the effect of treatment as so large in magnitude that it substantially alters the long-term behavior pattern of a person, likely to put him into a new trajectory group, then another model specification must be employed. We think participation in drug treatment while in prison has a smaller and more modest effect on long-term arrests.

We modified the trajectory model one additional way. Although respondents were randomly assigned into treatment or non-treatment while in prison, their arrest trajectory could be affected by factors prior to the measurement of arrests. To consider this, we added two time-stable covariates to the model, which conceivably could influence the probability of group membership—race and gender. These covariates act in effect as risk factors for trajectory group membership. The model

estimates the relationship of each of these covariates with the probability of group membership simultaneously with the estimation of the trajectories. The parameter coefficients tell us whether and by how much race and gender affect the probability of group membership controlling for each other. The specification for our trajectory model now becomes:

$$\ln(\lambda_t^j) = \beta_0^j + \beta_1^j age_{it} + \beta_2^j age_{it}^2 + \beta_3^j age_{it}^3 + \alpha^j treatment_t + \pi_j gender + \pi_j race \qquad (3.0)$$

where the π's reflect the effect of gender and race on the probability of membership in trajectory group *j*. In subsequent analyses, the number of covariates modeled will be expanded.

Results

We began our analyses by estimating a semi-parametric group-based model for the arrest data. The participants in this study were released from what we have called their "baseline" incarceration during the years 1991-1996. The baseline incarceration is the period of incarceration during which they were eligible for participation in the KEY/CREST program and for which they were randomly selected either to participate or not. For each of the 1,250 to-be-released men and women, we have a count of the number of arrests for each year over the period 1969-2010. Recall that we have a binary variable that is switched "off" (with a code of 0) for all years before treatment and switched "on (with a code of 1)" for each subsequent year after treatment. The specific substantive question we address is whether participating in the TC drug treatment program affected each person's long-term offending trajectory.

The first issue we address in this analysis is the number of groups identified in the data. Models were estimated from two to eight groups, and the results are reported in Table 2. An examination of each model's Bayesian Information Criterion (BIC) is not informative here as a guide to model selection since with each successive group identified, the BIC continues to increase. In this case Nagin (2005) argues that criteria other than formal model fit should be employed such as parsimony and comprehensibility. From the possible models, we selected the five group model as the best representation, both empirically and conceptually.

The trajectories from the five group model are shown in Figure 1. Group 1, which consists of about 18% of the total number of persons in the sample, is a "High Rising" group that shows a steady increase in arrests for about fifteen years from 0 annually to two per year where the trajectory stabilizes and then slowly declines to about one and one-half arrests per year by the end of the time period. Group 2, consisting of about 31% of the sample, is a "Stable Low Level" group that moves from zero to a maximum of less than one arrest per year before declining to a level that is not

TABLE 2. MODEL FIT ESTIMATES FOR TWO GROUP TO EIGHT GROUP MODEL

No. of Groups	BIC (N=1,231)
2	-49,292.98
3	-47,585.56
4	-46,652.84
5	-46,324.15
6	-45,782.75
7	-45,517.81
8	-45,236.91

FIGURE 1. FIVE GROUP TRAJECTORY MODEL OF ARRESTS

Arrests

Time

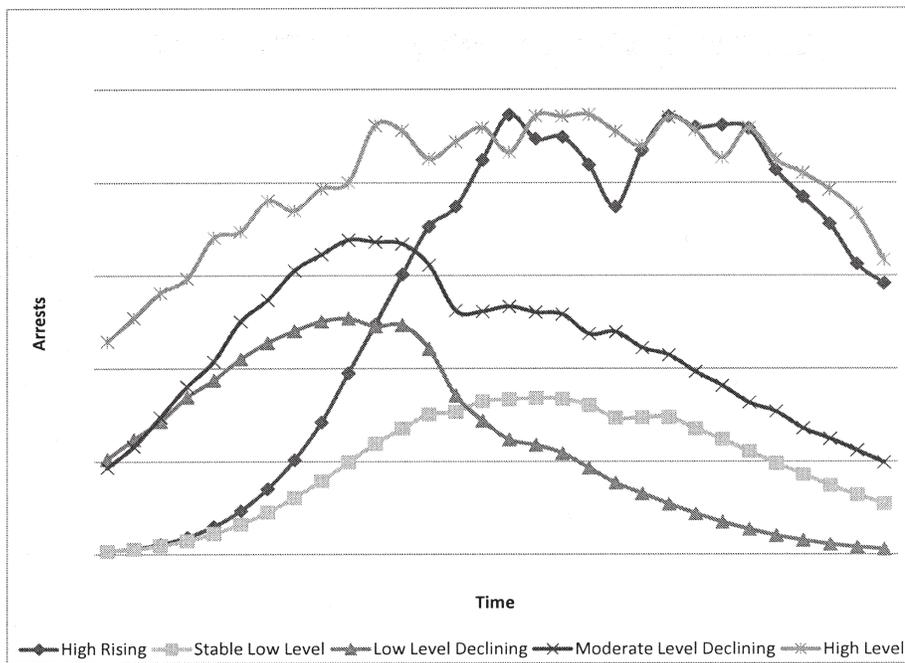◆ High Rising ▦ Stable Low Level ▲ Low Level Declining ✕ Moderate Level Declining ✳ High Level

Table 3. The Impact of TC Drug Treatment on Long-Term Trajectories of Arrest

Variable	Coefficient Estimate	z-Score
Group 1		
Intercept	-14.0264	-15.740
Time	1.1851	11.793
Time^2	-.0281	-7.626
Time^3	.0002	4.442
Drug Treatment	-.1836	-4.423
Group 2		
Intercept	-13.7061	-13.758
Time	1.1890	10.254
Time^2	-.0319	-7.384
Time^3	.0003	4.805
Drug Treatment	-.1125	-2.270
Group 3		
Intercept	-4.4984	-5.739
Time	.4868	4.319
Time^2	-.0128	-2.496
Time^3	.0000	.502
Drug Treatment	-.9797	-10.323
Group 4		
Intercept	-5.3610	-11.548
Time	.5944	9.836
Time^2	-.0173	-6.970
Time^3	.0000	4.361
Drug Treatment	-.4785	-11.506
Group 5		
Intercept	-1.2706	-2.802
Time	.1312	2.156
Time^2	.0001	.287
Time^3	-.0001	-1.990
Drug Treatment	-.2360	-4.636

much different from zero. Group 3, approximately 17% of the total, consists of a "Low Level Declining" group that begins offending at a rate of about .5 per year, rising steadily to a little over 1 per year before declining over a long time period to zero. Group 4 (about 24% of the total, consists of "Moderate Level Decliners" who start offending at the same rate as Group 3, but increase to a higher level that declines only slightly over time. Group 5 consists of the "High Level" offenders who make up the smallest percent of the total (less than 10%). These offenders start at the highest rate of offending and reach the same peak as Group 1 at about the midpoint of the time series, then staying at that rate until the end. Groups 1 and 5

can best be considered as a group of "persistent" offenders, and Groups 2, 3, and 4 as "desisting" offenders.

We think the five group model adequately captures the important characteristics of the long-term arrest patterns of these offenders. The difference between the five and six group model is that Group 2 in the five group model is split into two groups in the six group model. That potential additional group consists of a stable group of very low rate offenders that starts out at zero, increases to a maximum of only .5 offenses per year before declining to zero at the end of the time series. We do not think that this sixth group adds additional insight to the overall picture, and so we stopped at a five group model. It should be noted, however, that the substantive findings about the effect of the drug treatment program are identical in the five and six group models.

Table 3 reports the parameter estimates for the time coefficients and the time-varying covariate, involvement in the TC drug treatment program. Recall that our specification of the model conceives the effect of drug treatment on long-term patterns of arrest to be modest and gradual, which will be reflected in a shift or alteration of the trajectory for a given group, but not a dramatic movement into a new trajectory group. Further, by looking at the within-trajectory group effect of treatment, we are essentially controlling for the effect of the developmental history of arrests prior to involvement in drug treatment.

The first thing to notice is that the coefficient estimate for drug treatment is negative and significantly different from zero in each of the five trajectory groups. In other words, within each of the modeled trajectory groups, involvement in the TC drug treatment while incarcerated leads to a significant decline in arrests compared with those with the same developmental history of arrests but who were not in TC drug treatment program. Given their prior developmental history, then, participation in TC drug treatment reduced subsequent arrests in all groups during our 12-18 year follow up window. The second thing to notice is that the effect of the TC drug treatment program was not uniform across the groups. Being involved in the TC drug treatment program was particularly likely to reduce the subsequent number of arrests for those in Groups 3 and 4, both groups we have characterized as desisters. Persons in these two groups started offending at a low rate, increasing their rate of offending to the second highest level at one point before declining to zero for Group 3 and about .5 arrests per year for Group 4. Participation in the TC drug treatment program had a significant effect in the two groups of persisting offenders as well, Groups 1 and 5, but of much smaller magnitude than observed with Groups 3 and 4. Those who were high rate offenders from the middle of the time series to the end did not desist from crime, but the number of arrests they had was significantly reduced if they were in the TC drug treatment program. Interestingly, among the

TABLE 4. THE EFFECT OF GENDER AND RACE ON THE PROBABILITY OF GROUP MEMBERSHIP
(GROUP 1—HIGH RISING IS THE REFERENCE GROUP)

Group		Coefficient Estimate		z-score	
Group 2					
	Intercept	-.435		-.989	
	Gender		.891		4.044
	Race		-.069		-.349
Group 3					
	Intercept	.069		.136	
	Gender		-.068		-.244
	Race		-.027		-.123
Group 4					
	Intercept	.603		1.257	
	Gender		-.340		-1.279
	Race		.033		.158
Group 5					
	Intercept	.069		.106	
	Gender		-.787		-1.984
	Race		.100		.374

group of offenders that we referred to as Group 3, the Stable Low Level Offenders, the crime reducing effect of drug treatment was the weakest, though still statistically significant. Even among these low level offenders who eventually offended at a near zero level, participation in the TC drug treatment did significantly reduce the number of subsequent arrests.

Finally, Table 4 reports the relationship between gender and race and the probability of group membership. Recall that this specification is a multinomial and that Group 1, the High Rising Group is the reference category. Compared with membership in the High Rising Group, female subjects were significantly more likely to be in Group 2, the group of Low Level offenders, and somewhat less likely to be in Group 5 the group of High Level offenders. Relative to the group of offenders that started at zero and reached the highest levels of offending, females were significantly more likely to be in the low level offending group and somewhat less likely to be in the group that was persistently high in offending (Group 5). As opposed to gender, race had no effect on the probability of membership in any of the groups.

DISCUSSION

The most compelling and encouraging finding from these first analyses is the persistent, significant and quite strong effect of participation in TC Treatment leading to reduced criminal involvement, as measured by new arrests in the following 12-18 years in all five groups that were modelled. This effect is present controlling for gender and ethnicity. And the effect appears strongest among the desisters, as would be most expected. What is more surprising is the significant effect of TC treatment participation in reducing arrests even among those with persistent patterns of new arrests.

The fact that the positive impact of treatment is present in these initial analyses bodes well for our planned subsequent studies of the factors that strengthen and attenuate the relationship. In the earlier analyses, reporting outcomes at three and five years, the effects of TC treatment became even stronger in a more complex multivariate model controlling for previous drug use history, education, and even prior treatment experience (Inciardi, Martin, & Butzin, 2004; Martin et al., 1994).

Subsequent analyses will also focus extensively on the measure of TC treatment involvement. The measure used here for the trajectory estimates is a simple dichotomy of "participated in TC Treatment or did not." The next group of analyses will focus on the continuum of TC treatment model that underlies much of Inciardi's work in the field. In the published analyses cited earlier from the three and five year outcome studies, the effects of treatment were much stronger based on the stages of treatment completed, particularly for those who completed the full continuum of: 1) in prison, 2) work release, and 3) aftercare treatment, each treatment stage corresponding to the sentencing structure in place. Additional variants on treatment effects to be examined in coming analyses will include the impact of other treatment such as group counseling and AA/NA (effects were not large in the earlier three and five year analyses). Finally, indicators for length of time in treatment will be examined as well as the impact of incomplete "doses" of the TC program (e.g., early and late dropouts).

Future studies will also make use of the data from the life history interviews now being conducted with a subset of the sample from different criminal arrest trajectories to investigate in more detail how TC treatment affected change in subjects' lives. The continued analysis and elaboration on the quantitative longitudinal data on change, combined with the more in-depth qualitative analysis of the process of change, will not only further our understanding of the efficacy of the TC model James Inciardi helped develop, it will also be a testimony to the thorough, mixed model approach he took in his work.

REFERENCE LIST

Anglin, M.D., & Hser, Y.
1990   Treatment of drug abuse. In M. Tonry & J. Q. Wilson, (Eds.), *Drugs and crime*, (pp. 393–460). Chicago: University of Chicago Press.
Anglin, M. D., Hser, Y., & Grella, C.E.
1997   Drug addiction and treatment careers among clients in the Drug Abuse Treatment Outcome Study (DATOS). *Psychology of Addictive Behaviors, 11,* 308–323.
Anglin, M.D., & Perrochet, B.
1998   Drug use and crime: A historical review of research conducted by the UCLA drug abuse research center. *Substance Use & Misuse, 33*, 1871–1914.
Butzin, C.A., Martin, S.S. & Inciardi, J. A.
2002   Evaluating component effects of a prison-based treatment continuum. *Journal of Substance Abuse Treatment, 22,* 63–69.
Butzin, C.A., Martin, S.S., & Inciardi, J. A.
2005   Treatment during transition from prison to community and subsequent illicit drug use. *Journal of Substance Abuse Treatment, 28,* 351–358.
De Leon, G.
1988   Legal pressures in therapeutic communities. *Journal of Drug Issues, 18,* 625–640.
De Leon, G.
1994   Therapeutic communities. In M. Galanter, & H. D. Kleber (Eds.), *Textbook of substance abuse treatment* (pp. 391-414). Washington DC: Psychiatirc Press.
De Leon, G.
1997   *The therapeutic communities for special populations and special settings*. Westport, CT: Greenwood Publishing.
De Leon, G.
2000   *The therapeutic community: Theory, model, and method*. New York: Springer Publishing Co.
Gerstein, D. R. & Harwood, H. J.
1990   *Treating drug problems*, Washington, D.C.: National Academy Press.

Giordano, P.C., Cernkovich, S.A. & Rudolph, J. L.
2002   Gender crime and desistance: Toward a theory of cognitive transformation. *American Journal of Sociology, 107*(4), 990–1064.

Grella, C. E., Hser, Y. I., & Hsieh, S.
2003   Predictors of drug treatment re-entry following relapse to cocaine use in DATOS. *Journal of Substance Abuse Treatment, 25,* 145–154.

Hser, Y., Anglin, M.D., Grella, C., Longshore, D., & Prendergast, M. L.
1997   Drug treatment careers: A conceptual framework and existing research findings. *Journal of Substance Abuse Treatment, 14,* 543–558.

Inciardi, J. A.
1979   Heroin use and street crime. *Crime and Delinquency, July*, 335–346.

Inciardi. J.A., & Martin, S.S.
1993   Drug abuse treatment in criminal justice settings. *Journal of Drug Issues*, *23,* 1–6.

Inciardi, J. A., Martin, S.S. & Butzin, C.A.
2004   Five-year outcomes of therapeutic community treatment of drug involved offenders after release from prison. *Crime and Delinquency, 50*(2), 88–107.

Inciardi, J. A., Martin, S.S., Butzin, C.A., Hooper, R .M., & Harrison, L. D.
1997   An effective model of prison-based treatment for drug-involved offenders. *Journal of Drug Issues, 27,* 261–278.

Inciardi, J. A., Martin, S. S., & Butzin, C. A.
2004   Five-year outcomes of therapeutic community treatment of drug involved offenders after release from prison. *Crime and Delinquency, 50,* 88–107.

Inciardi, J. A., Martin, S.S. & Surratt, H. L.
2001   Therapeutic communities in prisons and work release: Effective modalities for drug-involved offenders. In B. Rowlings and R. Yates (Eds.) Therapeutic Communities for the Treatment of Drug Users. 241–256. London: Jessica Kingsley Publishers.

Inciardi, J. A., & Pottieger, A.
1998   Drug use and street crime in Miami: An (almost) twenty-year retrospective. *Substance Use & Misuse, 33,* 1839–1870.

Inciardi, J.A. & Surratt, H.L.
2001   Drug use, street crime, and sex-trading among cocaine-dependent women: Implications for public health and criminal justice policy. *Journal of Psychoactive Drugs, 33*(4), 379–389.

Johnson, B. D., Goldstein, P. J., Preble, E., Schmeidler, J., Lipton, D. S., Spunt, B., & Miller, T.
1985   *Taking care of business: The economics of crime by heroin abusers.* Lexington, MA: Lexington.

Karberg, J. C., & James, D. J.
2005   Substance dependence, abuse and treatment of jail inmates 2002. Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics.

Knight, K., Simpson, D. D., & Hiller, M. L.
1999   Three-year reincarceration outcomes for in-prison therapeutic community treatment in Texas. *Prison Journal, 79*(3), 337–351.

Laub, J. H. & Sampson, R. J.
2003   *Shared beginnings, divergent Lives: Delinquent boys to age 70.* Cambridge, MA: Harvard University Press.

Leukefeld, C. G., & Tims, F.M. (Eds.).
1988   *Compulsory treatment of drug abuse: Research and clinical practice: Research monograph No. 86.* Rockville, MD: National Institute on Drug Abuse.

Leukefeld, C. G., & Tims, F.M. (Eds.).
1992   *Drug abuse treatment in prison and jails: Research monograph No. 118.* Rockville, MD: National Institute on Drug Abuse.

Leukefeld, C. G., Tims, F., & Farabee, D. (Eds.)
2002.   *Treatment of drug offenders: Policies and issues.* New York: Springer Publishing.

Martin, S.S., Butzin, C.A., Saum, C., & Inciardi, J. A.
1999   Three-year outcomes of therapeutic community treatment for drug-involved offenders in Delaware: From prison to work release to aftercare. *Prison Journal, 79(3)*, 294–320.

Mumola, C. J.
1999   *Substance abuse and treatment, state and federal prisoners.* Washington, DC: National Institute of Justice.

Nagin, D. S.
2005   *Group-based modeling of development.* Cambridge: Harvard University Press.

Nurco, D.N.
1998   A long-term program of research on drug use and crime. *Substance Use & Misuse, 33,* 1817–1837.

Prendergast, M. L., Hall, E.A., Wexler, H. K., Melnick, G., & Cao, Y.
2004   Amity prison-based therapeutic community: Five-year outcomes. *The Prison Journal, 84,* 36–60.

Rawlings, B., & Yates, R. (Eds.)
2001   *Therapeutic communities for the treatment of drug users*. London: Jessica
        Kingsley Publishers.

Sampson, R. J., & Laub, J.
2003   Life course desisters? Trajectories of crime among delinquent boys
        followed to age 70. *Criminology, 41,* 555–592.

Simpson, D. D.
1981   Treatment for drug abuse: Follow-up outcomes and length of time spent.
        Archives of General Psychiatry, 38, 875–880.

Simpson, D. D., Savage, J., & Lloyd, M.R.
1979   Follow-up evaluation of treatment of drug abuse during 1969 to 1972.
        Archives of General Psychiatry, 36, 772–780.

Simpson, D. D., Joe, G. W., & Brown, B.S.
1997   Treatment retention and follow-up outcomes in the Drug Abuse Treatment
        Outcome Study (DATOS). *Psychology of Addictive Behaviors, 11,* 294–
        307.

Springer, D. W., McNeece, C.A., & Arnold, E.M.
2003   *Substance abuse treatment for criminal offenders: An evidence-based guide
        for practitioners*. Washington, DC: American Psychological Association.

Tims, F.M., De Leon, G., & Jainchill, N. (Eds.)
1994   *Therapeutic community: Advances in research and application: Research
        monograph No. 144.* Rockville, MD: National Institute on Drug Abuse.

West, H. C., Sabol, W., & Cooper, M.
2009   Prisoners in 2008. Washington, D.C.: U.S. Department of Justice, Bureau
        of Justice Statistics.

Wexler, H. K., Melnick, G., Lowe, L., & Peters, J.
1999   Three-year reincarceration outcomes for Amity in-prison therapeutic
        community and aftercare in California. *Prison Journal, 79(3)*, 321–336.