ALTERNATIVE MODELS OF INSTANT DRUG TESTING:

EVIDENCE FROM AN EXPERIMENTAL TRIAL

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ABSTRACT

OBJECTIVE: This study describes and provides relapse and recidivism outcome findings related to an experimental trial evaluating the viability of frequent, random drug testing with consequences for use.

METHODS: The sample consisted of 529 offenders released on parole. An experimental design with random assignment to one of three groups was employed. The Experimental Group received frequent, random drug testing with instant results, immediate sanctions, and referral for substance abuse treatment. Control Group I received frequent, random drug testing and treatment referral, but did not receive immediate test results or immediate sanctions. Control Group II followed standard parole practice. Members of this group were not tested on a random basis and did not receive immediate sanctions. Repeated measures ANOVA and survival analysis techniques were used to explore group differences.

RESULTS: Frequent monitoring of drug use with randomized testing protocols, immediate feedback, and certain consequences is effective in lowering rates of relapse and recidivism. The effectiveness is particularly salient in the short-term during the period of exposure to testing conditions.

CONCLUSIONS: The findings lend support to the use of randomized testing with swift and certain sanctions with parolees. Additional quality evidence is necessary to generalize and refine findings from this study and others that focus on sanction certainty. Future replications must

consider the immediacy of test result and sanction execution as well as the length of exposure to randomized testing periods.

KEYWORDS: Community Supervision, Conditions Evaluation, Corrections, Parolees, Prisoner Reentry, Substance Use

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The tremendous growth in incarcerated populations has necessitated community correctional alternatives. Parole populations have increased three-fold since 1980 and remained relatively stable since 2006 (Sourcebook of Criminal Justice Statistics, 2011). Approximately 728,000 individuals were released in 2009 and supervised under conditional terms (Glaze, Bonczar, & Zhang, 2010). The largest sub-population of parolees is those with drug-involved convictions (Glaze et al., 2010). Histories of drug use are prominent among those convicted on drug-involved offenses (King & Mauer, 2002) as well as among generalized offender populations (Lattimore & Visher, 2010; Mallik-Kane & Visher, 2008; Mumola & Karberg, 2006). Many are in need of substance abuse treatment, but few receive services and continue to battle with unresolved issues while in the community (Mallik-Kane & Visher, 2008; National Research Council, 2008). With needs left unmet, parolees with drug use and abuse histories serve as one of the most difficult populations to manage (Mallik-Kane & Visher, 2008; National Research Council, 2008). Indeed, nearly half of this population will fail to successfully complete terms of supervision and many will find themselves back in prison as a result of parole revocation (Glaze, et al., 2010; Solomon, Osborne, Winterfield, Elderbroom, Burke, Stroker, Rhine, & Burrell, 2008) and recidivism (Beck & Shipley, 1989; Langan & Levin, 2002).

Interest has grown in implementing programs and conditions that utilize drug testing protocols, especially those involving instant results, to inform caseload management decision-making. Practitioners, policy makers, and academics have looked to the evidence of the Hawaii Opportunity Probation and Enforcement (HOPE) quasi-experimental trial and randomized

replication in anticipation of gaining similar successes (see Hawken & Kleiman, 2009). However, there are a number of lingering questions that remain about the HOPE model. It is not clear if behavioral management interventions akin to HOPE would translate across correctional populations to affect parolees. More importantly, it remains to be seen whether the essential elements of HOPE – the combination of randomized drug testing and sanctions – are necessary to reproduce outcomes. This concern was raised by Hawken and Kleiman (2009) and has yet to be explored. By design, the study reported here uses a longitudinal experimental examination of intensive conditions for parolees that manipulate drug test and sanction procedures to answer these questions. Participants in this research were randomly assigned to conditions with salient variations in drug testing (i.e., randomized or non-randomized testing) and sanctioning (i.e., immediate or delayed graduated sanctions for positive tests) schedules. These conditions also required participation in substance abuse treatment on a need basis. It was anticipated that assignment to these conditions would reduce the likelihood of relapse and recidivism and allow for observation of differential effects.

Drug testing is commonly used to identify use, supervise, and manage risk among parolees with substance abuse histories. The ability to detect use has become increasingly more sophisticated, efficient, and effective (Carver, 2004). It has been suggested that testing has inherent value in holding parolees accountable for their behavior and deterring future drug use (Carver, 2004; Haapanen & Britton, 2002), enhancing the effect of substance abuse treatment participation (Anglin & Hser, 1990; National Research Council, 2008), and reducing the likelihood of relapse and recidivism (Taxman, 2008).

Drug testing protocols can serve an instrumental purpose to guide caseload decision-making when protocols are randomized, results are instant, and sanctions are delivered. The theoretical basis of such policies and tactics resides in learning theory. It is postulated that associating negative outcomes with the undesired behavior should lead to the reduction in that behavior (Honig & Staddon, 1977; Skinner, 1938). Within this theoretical model, the immediacy and certainty of the negative consequence are all critical to drug use desistance. Until now, there has been little research which has directly examined the efficacy of such proposals within the context of drug testing and treatment for offenders.

One prominent example has been HOPE, which targeted probationers with substance abuse histories (Hawken & Kleiman, 2009). Contract, incentive, and sanction strategies were used to reinforce compliant behavior, punish non-compliant behavior, and hold participants accountable. Consequences for non-compliance were known and highly likely. Participants were subject to frequent, random drug testing. Violations resulted in swift and certain sanctions that consisted of short jail stays. Graduated sanctions were incorporated and included referral to treatment services for continued non-compliance. Sanctions were uniformly applied, known, and consistent with the initial behavioral contract for participation.

Overall, the results of the HOPE evaluations were promising. Reductions in no-shows for community supervision appointments, positive drug tests, and recidivism were observed for the original quasi-experimental trial with six month follow-up as well as the replicated experimental trial with one year follow-up (Hawken & Kleinman, 2009). A number of secondary benefits were observed that have important implications for community correctional administrators. Hawken and Kleinman (2009; Hawken, 2010) suggested that HOPE assisted with resource allocation

determinations and can replace traditional processes of treatment assessment and referral. Drug testing results were instrumental in the identification of participants in need of intense services as well as those who may abstain from use. The perceived threat and reality of sanctions may deter some participants from use, but not those with entrenched use behaviors. Within-group self-selection is common to many intervention strategies and was built into the HOPE model. Increased attention and resources were diverted to those who were observed to be struggling with continued drug use.

In light of these benefits, approximately three million dollars of federal funding was made available from the Second Chance Act of 2007 to support additional replications (Office of Justice Programs, 2011). Preliminary evidence is still being generated. O'Connell, Visher, Martin, Parker, and Brent (2011) are currently evaluating a randomized trial in Delaware that incorporates parallel schedules of behavioral reinforcement though consequence certainty and swiftness. The six month conditions are administered through a probation office by probation administrators. Preliminary trends from the experimental design for probationers from Alaska using similar critical elements to HOPE suggest reductions in positive drug tests, but these trends must be interpreted with caution (Carns & Martin, 2011). Difficulties in the research design such as small sample size (n=63), participant contamination, and the inability to generate comparison data for the control group limit the interpretation of results (Carns & Martin, 2011).

The findings of HOPE and the design of the Delaware and Alaska trials are congruent with current best practice recommendations (Andrews & Bonta, 2006; Andrews, Zinger, Hoge, Bonta, Gendreau, & Cullen, 1990; Aos, Miller, & Drake, 2006; Landenberger & Lipsey, 2005; MacKenzie, 2000, 2006; Pearson, Lipton, Cleland, & Yee, 2002; Sherman, Gottfredson,

MacKenzie, Eck, Reuter, & Bushway, 1997), especially among those with substance abuse or dependency histories (Fletcher & Chandler, 2006; Prendergast, Podus, Finney, Greenwell, & Roll, 2006). Researchers have argued that such techniques should be paired with schedules of reinforcement that include certain and swift consequences (Boyum, Caulkins, & Kleiman, 2010; Harrell & Roman, 2001; Taxman, Soule, & Gelb, 1999). Indeed, the variable coupling of these components have benefitted participants of residential therapeutic communities (Inciardi, Martin, & Butzin, 2004; Knight, Simpson, & Hiller, 1999; Martin, Butzin, Saum, & Inciardi, 1999; Wexler, Melnich, Lowe, & Peters, 1999), drug courts (Belenko, 2001; Harrell, Mitchell, Hirst, Marlowe, & Merrill, 2002; Harrell & Roman, 2001; Gottfredson, Najaka, & Kearley, 2003), and community-based substance abuse treatment (Center for Substance Abuse Research, 1994; Friedmann, Rhodes, & Taxman, 2009) with observed improvement in relapse, revocation, or recidivism outcomes. Community-based supervision strategies similarly benefitted from the integration of behavioral management and reinforcement approaches (Friedmann et al., 2009; Taxman, 2008; Wodahl, Garland, Culhane, & McCarty, 2011).

There is reason to question the generalizability of HOPE model effects. First, is the participant population. The model was developed for probationers and replications are largely focused on this target population. It is not clear if this model could be extended to parolees. Fundamentally, parolees are presumed to be higher-risk offenders than probationers (Gill, 2010). Hawken and Kleiman (2011) are testing the notion that HOPE can be extended to parolees with an experimental trial of 70 participants (35 per condition) in Washington. Preliminary trends from the trial indicate reductions in the rate of positive drug tests, utilization of incarceration beds, and conviction on new felony offenses six months post-condition assignment. Given the

small sample size and relatively short span of follow-up, these trends do cautiously suggest that HOPE model elements can be extended to parolees.

Second, critical elements of the HOPE model need further examination. Immediate sanctions were assigned for drug test violations and are the product of a hearing that generally takes place within 72 hours after the violation in the original model (Hawken & Kleinman, 2009). Hearings for violations generally occurred within the same time frame in Alaska (Carns & Martin, 2011) and Washington (Hawken & Kleiman, 2011). As such, the sanctioning process is somewhat delayed. In Delaware, sanctions are to be imposed within hours of a violation (O'Connell et al., 2010). Variation in the timing of the sanction and its effect on outcomes is not clear. Swiftness of sanction is central to the theoretical tenants of behavioral conditioning and deterrence, but is difficult to manipulate and examine (O'Connell et al., 2011). Finally, there are concerns with drug testing schedules that serve as the indicator of behavior. Randomized testing is critical (Harrell & Kleiman, 2000). HOPE participants were randomly tested at least once a week for the first two months of participation (Hawken & Kleiman, 2009). The Delaware replication randomly tests once a week for the first three months and graduated sanctions for non-compliance include scheduled tests twice a week for a month (O'Connell et al., 2010). Alaska probationers averaged three random tests per month across a three month period (Carns & Martin, 2011), while Washington parolees averaged three random tests across a six month period (Hawken & Kleiman, 2011). Variability in randomized testing schedules may also contribute to observed effects.

The extant research shows promise for the use of randomized testing as an intervention for drug using or abusing offenders. However, at least three significant questions remain. First,

can results demonstrated with probationers be extended to parolees? Second, what is the effect of differential timing (i.e., immediacy) of consequences? Third, what is the effect of differential certainty of consequences? From a social learning theory perspective, both the immediacy and certainty of consequences should have major impact on future behavior.

Hence, the study reported here was designed to examine prior observed effects in the context of a parolee population and to begin to examine the role of immediacy and certainty of consequences in impacting relapse and recidivism. Two central questions were examined. The first question examined "what was the relative efficacy of alternative drug testing models in terms of levels of relapse?" Relatedly, the second question was "what were the relative efficacy of the alternative drug testing models in terms of levels of recidivism?"

METHODS

Context

This study was conducted in a large urban county within a Midwestern industrialized state. The organizational context for the study conditions were increased prosecution and prison sentences for drug offenses along with high rates of self-reported substance abuse by individuals sentenced to prison on a new commitment and among probation or parole violators returning to prison in the study state. In recognition of the growing problems associated with the management of individuals with substance abuse issues, the Department of Corrections of the study state sought effective programs and procedures and were interested in collaborating in the study. The county received concentrated populations of individuals being released to the community from prison as well as individuals being sentenced to prison on new commitments for technical

violations. The proportion of releases and returnees with substance abuse issues was higher than other locations in the state. The conditions were conceived by the Department of Corrections and included institutional, field office, and programmatic unit staff. Moreover, stakeholders from multiple organizations were actively involved and committed to the program. These included representatives of the funding agency, local Sheriff's Office, local substance abuse treatment service agencies, and the research team.

Participants

An experimental design with random assignment to one of three groups was employed. Randomization was stratified for order of referral. Individual case files were screened for histories of drug problems by a regional community supervision field office during the pre-parole process. All male subjects were considered eligible for the conditions if they had a history of drug problems, and had special community supervision terms that prohibited substance abuse, and were to be placed within one of several postal zones, and did not have chronic or urgent medical needs. Parolees under interstate compacts were excluded from participation. With the use of a randomization protocol eligible subjects were assigned to one of two community correctional field offices. All those randomly assigned to Field Office A were placed in the Experimental Group. All eligible subjects randomly assigned to Field Office B were placed in Control Group I or Control Group II. Each participant was assigned to a community supervision agent who explained the procedures to the individual and his family. Instructions on procedures and requirements for drug testing and the consequences for drug test violations were provided. All participants signed a written notice acknowledging they understood the requirements and conditions of the program.

The sample consisted of 529 offenders. There were no violations of random assignment procedures. The randomization schedule targeted a 2:1:1 participant ratio for the Experimental Group, Control Group I, and Control Group II. The actual Experimental Group consisted of 281 participants, Control Group I consisted of 136 participants, and Control Group II of 112 participants. Table 1 presents the demographic characteristics of the participants. Participants were slightly over 33 years of age. The vast majority was single and had never been married. They had served an average of two years in prison. Thirty-eight (38%) had a primary charge for a property offense, 32% with a drug offense, and 23% with a person offense. The remainder of participants were charged with nonviolent public safety offenses. Over half of the sample had previously served time in jail. Fifty-six percent had previously served time in prison. Nearly three-quarters of the group had served time in either prison or jail. Risk assessments were derived from variant of salient factor scores (Hoffman & Beck, 1974). Assault (Risk Assessment A) and property (Risk Assessment P) crime risks did not differ between the conditions. Over four in five had special conditions of their parole related to alcohol use. Substantial proportions reported problems with alcohol and illegal drugs. They tended to use alcohol in their middle teens and reported using alcohol at least once in the past three days. The majority had used cocaine and approximately one in four had used heroin. Marijuana use was reported by two thirds of the participants. Relatively small numbers reported using methadone, barbiturates, hallucinogens, and inhalants. In short, the participants represented the targeted sub-population of offenders. The group consisted of parolees with extensive prior records and histories of drug abuse. There were no statistically reliable differences observed between the three groups. **[Insert Table 1 about here]**

Procedures

Measures

Three sources of archival data were used. The first, parole agent files, consisted of intake information conditions and the actual number of drug tests, days of incarceration, and referral for treatment. These data were collected by conditions staff and shared amongst stakeholders on a daily basis. Second, archival data was collected electronically from the state correctional management information system. Background information on all participants and follow-up community supervision performance data was gleaned from the system. Third, arrest outcomes were collected from the Law Enforcement Information Network (LEIN) on arrest outcomes during the 12 month follow-up.

Independent Variables

All participants were involved in one of the following three conditions for the first six months following prison release. During the subsequent 12 month follow-up interval, all participants, regardless of condition, were subjected to the standard conditions of parole (i.e., the conditions that Control Group II was exposed to during the first six months).

Experimental Group. Members of the Experimental Group received frequent, random drug testing with instant results, immediate sanctions, and referral for substance abuse treatment. Each weekday, the Experimental Group was required to call a toll free number to find out if they had been randomly selected for testing that day. If so, they were to report to the county jail to submit a urine sample between 12:00 p.m. and 7:00 p.m. The drug testing protocol assured that each individual in the Experimental Group was to be tested an average of twice per week. Individuals did not know which days they would be required to report until they called. A hand-

held urine test device was used to obtain instant test results. The device allowed for monitoring the use of four drugs: alcohol, cocaine, opiates/heroin, and THC. All of the urine samples were forwarded onward to the laboratory for gas chromatography analysis. Lab tests covered eight substances: alcohol, amphetamines, barbiturates, benzodiazepines, cocaine, codeine, hydromorphine, and methadone. Laboratory confirmations were available to conditions staff within several days. Instant test results were the primary indicator of drug use, regardless of the subsequent results from lab tests. The rate of false positives was near zero when instant results were compared to lab follow-up. Less than 1% of false negatives were observed.

Individuals who tested positive were immediately incarcerated for three days. This was true each time they tested positive. Individuals who failed to report for testing were also incarcerated for three days each time they did not report. Three consecutive missed tests led to the pursuit of an abscond warrant. Those who were incarcerated for either a positive drug test or failure to report sanction were assessed for substance abuse treatment by drug counselors from a local non-profit treatment vendor while incarcerated and offered drug treatment. Through internal evaluation and assessment, counselors had discretion to recommend outpatient counseling (i.e., individual therapy, group counseling, drug and alcohol education classes and Alcoholics Anonymous or Narcotics Anonymous self-help meetings), intensive outpatient counseling or day treatment (i.e., less than 9 hours of direct weekly treatment for the first four weeks of enrollment that consisted of individual therapy, didactic education classes, group counseling, and self-help meetings), residential treatment (i.e., twenty four hour, seven day a week live-in programming with at least 30 hours of weekly treatment consisting of individual therapy, group counseling, self-help meetings, GED instruction, vocational and recreational

therapy), or self-help meetings (i.e., Alcohol, Narcotics, and Cocaine Anonymous). This referral was an offer of treatment and was not a condition of community supervision.

Control Group I. Control Group I was designed to allow for the examination of the degree to which any effects observed were attributable to the immediacy of the test results and sanction. As in the Experimental Group, Control Group I participants were required to call the toll free number each working day to find out if they had been randomly selected for substance abuse testing. If so, they also reported to the county jail to submit a urine sample between 12:00 p.m. and 7:00 p.m. Each individual in Control Group I was to be tested an average of two times per week following the same testing protocol as the Experimental Group. However, urine samples were only sent to the laboratory for screening. No instant tests were done on Control Group I. Once the urine screen was submitted, they were allowed to leave the county jail and await contact from community supervision agents who reviewed laboratory results. The results were available to agents within two to three days after submission. Standard sanctioning procedures were in effect for positive test results and failure to appear. The first testing violation resulted in referral for outpatient treatment, the second resulted in referral for inpatient drug treatment, and the third resulted in case review for possible revocation of community supervision. Hence, the Control Group I received frequent random testing and treatment referral, but did not receive immediate test results or immediate sanctions.

Control Group II. Control Group II mirrored standard parole. This group was tested for illegal drugs only when they reported to their community supervision agent. Report dates were scheduled once a month. They were not tested on a random basis nor immediately incarcerated for positive drug tests. They were also referred to treatment when appropriate. Hence, Control

Group II received standard testing frequency, feedback, sanctions, and treatment referral. **[Insert Table 2 about here]**

Implementation Checks

A variety of variables were used to assess the implementation of the experimental conditions. All but one of the implementation check variables were collected for one year following prison release. The first six months reflected parolee behavior during the time they were exposed to the different conditions. The next six months served as a follow-up of release from the conditions and a return to standard parole.

Frequency of Tests. Frequency of tests was defined as the number of drug tests administered. Since the experimental conditions were to be exposed to differential testing, this measure was used to observe variation in testing.

Frequency of Tests by Week. Frequency of tests by week was an alternative measure of differential testing and was defined as the number of drug tests administered by week. The ratio measure was used to scale the frequency of tests variable by a denominator of weeks exposed to the conditions. Weeks were calculated at seven day intervals.

Jail Percent Received. Jail percent received was defined as the proportion of participants who were placed in jail. It is a dichotomous measure of whether a jail sanction had been received. The experimental conditions were to be exposed to differential sanctions. For the Experimental Group, this measure represented the proportion of participants who received a sanction for a positive drug test. The Experimental Group may also have received a jail sanction for failure to report for testing, but these instances were excluded from the measure. For Control

Group I and II, this measure represented the proportion of participants who were placed in jail at the discretion of their parole officer or from contact with law enforcement agencies.

Overall Jail Days. Overall jail days was defined as the number of jail days received. The measure represented the length of time spent in jail by experimental condition. As an average across conditions, this measure includes participants within conditions who were and were not placed in jail.

Jail Days If Jailed. Jail days if jailed was used as an alternative measure of length of time spent in jail and was defined as the number of jail days received by participants within conditions. The measure represented the length of time spent in jail only for the sub-group of participants who received a jail sanction.

Percent Admitted to Treatment. Percent admitted to treatment is defined as the proportion of participants who were admitted to substance abuse treatment. This was the only implementation check variable that was only collected for the first six months following prison release. The experimental conditions were exposed to differential treatment. The use of a treatment admission measure is preferred since assessment or referral protocols were built into the Experimental and Control Group I conditions and referral processes are common to Control Group II.

Dependent Variables

All dependent variables were collected for 18 months following prison release. The first six months reflected parolee behavior during the time they were exposed to the different conditions and the next 12 months a one year follow-up from conditions release.

Relapse. Relapse was defined as a positive drug test. Two metrics were used. First, a ratio measure of proportionality was used to scale positive tests since the protocol for the conditions called for differential rates of drug testing and would artifactually produce higher frequencies of positive drug tests in Experimental and Control Group I. Second, a dichotomous measure was used to present the percentage of participants who tested positive for at least one drug test.

Re-arrest. Re-arrest was defined as any arrest for a new felony offense. This dichotomous measure reflected in which an individual was arrested, but may not have been convicted for an offense.

RESULTS

The purpose of this study was to determine the relative effects of various components of drug testing and sanctions in the context of parole. An experimental design was used to explore the effects of monitoring frequency, feedback timing, and consequence certainty. Prior to the examination of relapse and recidivism outcomes, it was essential to examine the degree to which there was fidelity in the three conditions.

According to the design, it would be expected that the Experimental and Control Group I would have been drug tested at far higher rates than the Control Group II. Further, it would have been expected that the Experimental and Control Group I would be tested at the same rate. To determine the degree of differential testing, the frequencies of drug testing among the conditions were examined across six and 12 month intervals. Six months marked the end of the conditions and the 12 months is used to observe six month post-program experiences. Repeated measures

analysis of variance (ANOVA) models were used to observe differences in the proportionality or means amongst conditions, trends over time, and performance over time for the three experimental conditions. ANOVA techniques were used here and throughout the analysis given its robustness to violations associated with dichotomous outcomes (D'Agostino, 1971; Lunney, 1970).

Table 3 presents a statistical summary of the results. The Experimental and Control Group I were tested eight times as often as Control Group II during the first six months. However, the Experimental and Control Group I received less testing than called for by the experimental model. Both groups were actually tested less than twice per week on average (M_{Exp} = 1.22, SE = .03 and M_{CI} = 1.21, SE = .05).[1] Pairwise comparisons revealed no statistically reliable weekly testing differences between the Experimental Group and Control Group I during the first six months post-release. As anticipated given the six month nature of the conditions, the rate of testing for all groups declined over time, but declined differentially by group. The Experimental Group continued to be tested at a significantly higher frequency than either control conditions during the next sixth months. **[Insert Table 3 about here]**

It was anticipated that the Experimental and Control Group I would be sanctioned more frequently than Control Group II. To determine the degree to which the Experimental Group received certain consequences for their actions, the percentage receiving jail time and the

[1] The reason for the below average tests per week was that the initial protocol called for tests to be administered 7 days a week. However, weekend staffing issues at the local jail led to tests only being administered during the traditional work week. The protocol was revised to 5 days a week weeks prior to the start of the program. Test per week data use 7 as a denominator, which lowers calculated averages.

average number of jail received were examined. Repeated measures ANOVA models were used to explore group differences.

The experimental conditions totaled 23,557 overall jail days for positive drug tests or non-compliance with supervision terms across the first year of parole. Each positive test resulted in incarceration for members of the Experimental Group. As a result, the Experimental Group was most likely to have received a jail sanction. Relative to the control conditions, the Experimental Group was four times more likely to be jailed six months after release and members were twice as likely to be jailed after a year in the community (see Table 3). The control conditions did not receive immediate jail sanctions for positive drug tests. They were, however, placed in jail for non-compliance with community supervision terms. Pairwise comparisons indicated there were no differences between Control Group I and Control Group II with regard to likelihood of being placed in jail. Examination of the overall average of the number of jail days indicates there were no differences between groups. This average includes those who were and were not placed in jail. Through the use of sub-group analysis of those who were placed in jail, the results indicate that the Experimental Group was jailed for significantly shorter stays than the control conditions. At six months post-release, Control Group I and Control Group II were jailed for three times as many days as the Experimental Group. Control Group I was jailed for nearly four times as many days as the Experimental Group one year after release. In summary, the results show the Experimental Group was most likely to have received a jail sanction, while the control groups received longer stays for fewer jail placements.

To examine the degree of treatment referral experienced by participants, the percentage of participants admitted to treatment six months post-release were examined. A one-way

ANOVA model was used to assess group differences. The results indicate that while members of the Experimental and Control Group I were assessed and referred to treatment for each drug test positive or violation while in the program, members of Control Group I were significantly more likely to be admitted to and receive treatment services [$F(2, 522)=4.56$, $p<.01$]. Nearly 50% of Control Group I was admitted to treatment, while approximately a third of the Experimental and Control Group II began treatment services.

The results confirm that varying conditions were implemented with a high degree of fidelity to the conditional design. Drug testing, sanction, and treatment referral portions of the conditions appeared to be fully implemented. Both the Experimental and Control Group I were more likely to be drug tested at a substantial rate while in the program. Both groups were assessed and/or referred to treatment for positive drug tests or violations of testing procedures, but this did not always result in treatment admission. Members of Control Group I were substantially more likely to be admitted relative to the Experimental and Control Group II.

Relapse Outcomes

A variety of statistical techniques were used to assess the effect of the conditions on relapse and recidivism outcomes. Repeated measures ANOVA models were used to determine the significance of differences between experimental conditions. Six and 18 month follow-up intervals were examined. These periods respectively represented the end of the first phase of the experimental conditions and the end of the study period. Survival analysis techniques were used to determine if there are significant differences between groups with regard to the timing of relapse and recidivism events. Kaplan-Meier survival estimates were produced to assess between group differences. Log-Rank test statistics were assessed (Cox, 1972). Where appropriate,

alternative test statistics were used. Wilcoxon (Breslow, 1970) and Tarone-Ware (Tarone & Ware, 1977) test statistics both emphasize group differences towards the beginning of the follow-up period. Wilcoxon is regarded as being more sensitive to initial differences, while Tarone-Ware is conservative and robust for non-constant survival curves (Tarone & Ware, 1977).

Tables 4 and 5 present statistical analyses and effect sizes for relapse results. The experimental conditions submitted a total of 2,378 positive drug tests across 18 months. Pairwise comparisons revealed that the Experimental and Control Group I were significantly more likely to submit a positive test relative to Control Group II. The Experimental Group had the lowest rate (11%) of positive tests during the first six months. Twenty percent of the tests administered to Control Group I resulted in a positive test, while 24% of the tests submitted by Control Group II were positive. Over time, the Experimental Group maintained the lowest rate of positive drug tests. This ratio of testing was observed despite two trends. First, a higher proportion of participants in the Experimental and Control Group I tested positive at least once. Second, members of Experimental Group and especially Control Group I tested positive much faster than Control Group II. These differences were observed relatively early in to the follow-up period [Wilcoxon $\chi^2(2, N = 529)=25.18$, $p<.001$; Tarone-Ware $\chi^2(2, N = 529)=25.84$, $p<.001$] and can be attributed to the testing protocol, which required Experimental and Control Group I to test immediately after release, while Control Group II group was tested monthly.

The timing to the first positive test was statistically significant and more pronounced between groups across the remainder of the study period. On average, Control Group I tested positive 14 days faster than the Experimental Group and 125 days quicker than Control Group II. These findings reinforce trends observed during the first six months, which suggest that drug use was more likely to be detected among Experimental and Control I Groups. In all, these findings

suggest that despite being watched more closely and receiving negative sanctions for positive drug tests, the Experimental Group showed substantially lower rates of drug use.[2] **[Insert Table 4 and Table 5] [Insert Figure A and Figure B]**

Recidivism Outcomes

Tables 4 and 5 also summarize information on recidivism outcomes. The Experimental Group was significantly less likely to have recidivated during the first six months; the time they were monitored most closely in the program. Four percent of the Experimental Group was re-arrested at this time. Comparatively, 9% of Control Group II and 13% of the Control Group I had recidivated. The time to recidivism results at six months indicated that in addition to reduced likelihood, members of the Experimental Group experienced delays in timing to re-arrest. On average, members of the Experimental Group were re-arrested three days later than Control Group II and five days after Control Group II.

The pattern of recidivism persisted across the study period as Control Group I remained most likely to be re-arrested. Twenty-nine percent of Control Group I recidivated, while 25% of Control Group II and 22% of the Experimental Group were re-arrested. Pairwise comparisons indicated that Control Group I was significantly more likely to have recidivated relative to the Experimental Group. However, the likelihood of recidivism was relatively equivalent between

[2] As a check on the sensitivity of the results, random effect probit models were estimated. The random effect models allowed for individual variation in the *response* to the experimental conditions. There were no differences between the random effect and ANOVA models with regard to the experimental conditions. Identical results were obtained. The random effect models did caution the interpretation of the interaction effects of time for the proportion of participants with at least one positive and the main effects of time in the rate of positive testing. It is clear the group differences present at six months remain at 18 months for both indicators of relapse, which explains why the effect of time was not significant in the random effect models. As a result, the effect of time should be interpreted from the ANOVA models with this context in mind.

the Experimental and Control Group II at 18 months as no significant comparisons were observed. Across the study period, the time to re-arrest was not significant as the averages between groups converged.[3]

DISCUSSION AND CONCLUSION

The purpose of this study was to explore the effectiveness of conditions designed to provide frequent, random drug testing with consequences for drug use to reduce levels of relapse and recidivism. Through the use of an experimental design, participants were randomly assigned to conditions that varied with regard to the frequency of drug testing, randomness of drug testing, consequences for drug use, and timing of consequences of drug use. The design allowed for determining the extent to which frequent, random tests, immediate feedback, and immediate sanctions were more effective than simply frequent tests or standard community supervision procedures. The results confirm that frequent monitoring of drug use with randomized testing protocols, immediate feedback, and certain consequences for drug use is effective in lowering rates of relapse and recidivism.

The Experimental Group showed substantially lower rates of relapse and recidivism as compared to participants in Control Group I who received frequent monitoring of drug use with randomized testing and delayed feedback and consequences and participants in Control Group II who were not tested randomly and received standard delayed feedback and consequences. These effects appeared during the initial six month period following release into the community when

[3] Random effect probit models were also estimated to check the sensitivity of recidivism outcomes. Once again, identical results were obtained. There were no differences between the random effect and ANOVA models.

random testing for the Experimental and Control Group I were most active and largely persisted throughout the 12 month follow-up period when the intensity of the conditions lessened by design. While both the Experimental and Control Group I were detected for relapse much faster than Control Group II, the timing to re-arrest was significantly delayed for Experimental and Control Group I within the first six months after release. While the effect sizes for these effects would be categorized as small (see Table 4), they are of practical importance. For example, for the proportion of positive tests outcome, the Experimental Group show approximately half the rate at six months and two-fifths the rate at 18 months. In terms of recidivism, similar patterns hold at six months. Overall, the results confirm that exposure to frequent, random testing and certain and swift consequences significantly lower relapse and recidivism rates during the process of transition into the community.

Unfortunately, the short-term findings did not translate to long-term effects. Behavioral changes observed from participation in the conditions dissipated once participants were not subject to testing and sanction protocols. It should be of no surprise that the removal of swift and certain consequences would dramatically influence learned processes and allow for reversions to past behavior. Swiftness and certainty of sanction are critical components of deterrence theory (Boyum, Caulkins, & Kleiman, 2010; Durlauf & Nagin, 2011; O'Connell et al., 2011). The deterrent value of the experimental conditions were weakened and replaced by standard parole supervision where the threat of consequences was not as imminent.

The findings of this study do lend support to the HOPE model and its generalizability to parolees with substance use histories. Reduced rates of positive drug testing can be achieved. HOPE produced larger reductions than the current study. This is largely due to the process by

which participants entered the experimental conditions. In HOPE, participants were referred to the program after a series of positive drug tests or missed tests or appointments. Participants in the current study paroled directly to the experimental conditions. Hence, the baseline ratio of positive drug testing was considerably higher for HOPE participants. Through the examination of the Experimental Group and Control Group II, the current study achieved a 54% reduction [(24-11)/24*100] in the rate of positive drug tests at six months and a 42% reduction [(26-15/26*100] at 18 months. These findings are comparable, but slightly lower than the trends observed in Washington where parolees entered conditions in a similar manner (Hawkens & Kleiman, 2011).

Recidivism reductions were also consistent with HOPE. In the randomized controlled trial of HOPE with one year follow-up, 21% of HOPE participants and 47% of the control group were re-arrested, which equates to a 55% reduction [(47-21)/47*100]. This is comparable to the rates of the of the current study, where at six months the Experimental Group was half as likely to be re-arrested relative to Control Group II. Within this time frame, a 56% reduction in recidivism was observed [(9-4/9*100]. Across 18 months, the Experimental Group recidivated at a lower rate than Control Group II but these differences were substantive, rather than statistically significant.

A substantial number of jail days were received, with many of these days being accumulated by a small fraction of participants. Mean averages per participant totaled to 47 days, with a median value of three days. The capacity of a local jail to incur such a population is a critical issue. Hawken and Kleiman (2009) suggested that the benefits of the HOPE model can be attained without a dramatic increase in the use of jail resources. Even though HOPE and the

Experimental Group participants were more likely to be placed in jail as a result of testing violations, the number of jail days consumed by participants did not increase. The number of jail days consumed by the Experimental Group was a third lower than Control I and Control II groups. Hawken and Kleiman (2011) also observed trends that suggest considerable reductions in the use of jail and prison beds with parolee participants. Given the use of temporary jail placements for parolees and the dilemma of available bed space, the ability to decrease the use of jail resources is a key observation of the current study.

A number of observations speak to the differences in study populations and the difficulty of managing parolees. Participants in the current study were observed to have higher rates of positive testing and higher proportions of participants who tested positive. Over time, the rate and proportions decreased for HOPE participants as testing and sanction conditions were eased. The opposite was observed in the current study; once conditions ended the rates and proportions increased. The rate of recidivism also increased with longer time in the community. These results are likely due to parolee status. Gill (2010) found that when probationers and parolees were exposed to similar intensities of supervision and surveillance, parolees were more at-risk for supervision term violations and recidivism than probationers. Even with this heightened risk, the current study did find short-term reductions in drug use and recidivism. With these benefits, it is assumed that resource allocation and management decision value of HOPE is likely to transfer to parole staff (see Hawken & Kleinman, 2009; Hawken, 2010).

Kleiman (1988; Kleiman et al., 2003) has argued that drug testing and sanction schedules may be more effective than traditional substance abuse treatment services that rely upon coerced referral and participation. While the aim of this study was not to test Kleiman's claim, the

findings do provide some insight. Namely, the observed partial eta-squared effect sizes in the current study were small for drug use and recidivism. Effect sizes generated from meta-analyses of various drug treatment interventions with offenders in prison or the community also tend to be small for drug use (Mitchell et al., 2012; Mitchell et al., 2007) and recidivism (Aos, Phipps, Barnoski, & Lieb, 2001; Chanhatasilpa et al., 2000; Mitchell et al., 2012; Mitchell et al., 2007; Perry et al., 2009; Prendergast, 2009). This research suggests that the effect of both types of intervention may be more similar than divergent. Additional research is needed to directly test the value of testing and sanction schedules versus treatment.

A few limitations need to be addressed. First, it is the case that parole officers were nested within the different conditions raising the potential confound of intervention provider with intervention. While this concern cannot be entirely dismissed, it can be pointed out that the assignment of intervention condition to office was done randomly. This precluded the possibility that the "best" office was selected for the experimental condition. Further, there were multiple parole agents in each office minimizing the chances that there was a "star" parole agent. Nine parole agents managed the Experimental Group caseload in Field Office A and 8 agents managed the Control Group I and II caseload in Field Office B. Finally, there were no systematic results observed when results are analyzed at the level of agent. Nevertheless, future research will have to sort out the impact of parole agent behavior.

Second, low rates of admission in substance abuse treatment were observed. Substance abuse treatment in the community has the potential to reduce relapse and recidivism (Aos, Miller, & Drake, 2006; Chandler, Fletcher, & Volkow, 2009; Chanhatasilpa, MacKenzie, & Hickman, 2000; MacKenzie, 2006). It remains unclear if the combination of close monitoring

and treatment would have contributed to overall conditions effect. The sanction emphasis without a balance of service provision likely limited the potential promise of the conditions (Fletcher et al., 2009). Third and similarly, the conditions may have been enhanced if the actual number of random tests administered was twice per week. The average number of tests was slightly more than one per week.

It is critical that future replications of the HOPE model for parolee populations consider two components. First, the combination of randomized drug testing and swift and certain sanctions is essential. Randomized testing by itself is not enough to contribute to HOPE-based effects. Drug test results and the subsequent sanction must be immediate. In order to replicate the findings of this study, results and sanctions must be swifter than the HOPE model. For the current trial, randomized drug tests were administered to the Experimental Group at the local county jail, results were instantaneous, and the jail sanction was delivered within minutes of the test result. As evidenced from Control Group II, the three to four day delay in randomized drug test results diluted the swiftness of the sanctioning process. A comparable level of delay for the Control Group II condition is built in to the HOPE model, where a violation hearing is held to deliver the sanction. Future replications with parolees that use delays by design are not likely to reproduce outcomes associated with HOPE.

Second, the length of randomized drug testing protocol may need to be administered for a longer period of time than that which is proscribed by the HOPE model. The length of randomized testing in the current trial was four months longer than HOPE. Longer periods of randomized testing at least once a week with immediate test results and sanctions may be necessary for parolees to reinforce the deterrent effect. It is clear that parolee drug use behaviors

increased once the conditions were relaxed and returned to standard monthly testing conditions with delayed results and standard graduated sanctions.

This study adds to the emerging body of evidence that strategies based upon sanction certainty are needed (Durlauf & Nagin, 2011; Kleiman, 2009). Additional quality evidence is necessary to continue to generalize and refine findings from HOPE to parolee populations. Particular attention must be paid to the relative swiftness of drug test results and certain sanctions as well as the period of exposure to randomized testing.

Table 1: Demographic Characteristics of Participants (n=529)

	Experimental (n=281)	Control I (n=136)	Control II (n=112)	Total (n=529)
Age	34	33	33	33
Race/Ethnicity				
% Black	87%	93%	87%	89%
Educational Background				
% Less High School	55%	53%	55%	55%
% High School Grad	19%	21%	18%	19%
% More Than High School	26%	26%	26%	26%
Marital Status				
% Single	77%	75%	72%	76%
% Married	11%	15%	16%	13%
% Divorced	12%	9%	10%	11%
Number of Charges	2	2	2	2
Conviction Offense				
% Drug	32%	36%	29%	32%
% Person	24%	20%	20%	23%
% Property	37%	36%	41%	38%
% Public Safety	6%	7%	10%	7%
Prior Jail Time	53%	55%	55%	54%
Prior Prison Time	53%	58%	59%	56%
Prior Jail or Prison Time	68%	72%	76%	71%
Risk Assessment A				
% High	11%	12%	13%	12%
% Medium	32%	32%	37%	33%
% Low	56%	54%	49%	55%
Risk Assessment P				
% High	17%	18%	22%	19%
% Medium	46%	48%	52%	48%
% Low	36%	32%	25%	33%
Alcohol Parole Condition	80%	73%	78%	78%
Primary Drug of Choice				
% Alcohol	26%	29%	28%	27%
% Marijuana	14%	9%	15%	13%
% Cocaine	16%	21%	20%	19%
% Heroin	14%	10%	13%	12%
% Missing	30%	32%	23%	29%
Used Alcohol	88%	77%	75%	82%
Age Alcohol	16	17	17	17
Times Used Past 30 Days	9	8	10	9
Used Cocaine	57%	58%	63%	58%
Age Cocaine	25	24	24	24

Times Used Past 30 Days	10	9	9	9
Used Heroin	26%	24%	29%	26%
Age Heroin	21	20	19	20
Times Used Past 30 Days	12	26	10	15
Used Marijuana	69%	61%	65%	66%
Age Marijuana	16	16	16	16
Times Used Past 30 Days	8	8	9	8
Used Methadone	10%	4%	8%	8%
Used Barbiturates	4%	3%	0%	3%
Used Hallucinogens	4%	4%	1%	3%
Used Inhalants	1%	0%	0%	1%

*p<.05, **p<.01, ***p<.001

Table 2: Drug Test and Sanction Procedures by Experimental Conditions

Procedure	Experimental Group	Control I	Control II
Testing Dates	Required to call daily (Monday – Friday)	Required to call daily (Monday – Friday)	No daily calls
Testing Protocol	Random drug test	Random drug test	Routine DOC drug test
Testing Outcome	Instant drug test results	Routine laboratory test results – 3 to 4 day delay	Routine laboratory test results – 3 to 4 day delay
Sanction for Positive Test	Immediate sanctions for positive drug test (3 jail days each instance)	Standard sanctions for positive drug test (graduated; first is mandatory substance abuse assessment, second is mandatory outpatient treatment and raised supervision level, and third is review for inpatient treatment or parole violation and raised supervision level).	Standard sanctions for positive drug test (graduated; first is mandatory substance abuse assessment, second is mandatory outpatient treatment and raised supervision level, and third is review for inpatient treatment or parole violation and raised supervision level).
Sanction for Non-Compliance with Testing	Immediate sanctions for failure to appear for testing (3 jail days each instance)	Standard sanction for failure to appear (graduated; first is additional report to agent for testing, second is additional report to agent for testing plus referral for substance abuse treatment, and third is additional report to agent for testing plus raised supervision level and minimum 3 jail days).	Standard sanction for failure to appear (graduated; first is additional report to agent for testing, second is additional report to agent for testing plus referral for substance abuse treatment, and third is additional report to agent for testing plus raised supervision level and minimum 3 jail days).
Treatment Assessment Process	Required treatment assessment in jail	Standard referral process at agent discretion	Standard referral process at agent discretion
Treatment Referral Process	Offered drug treatment following assessment	Standard referral process may result in treatment intake at provider discretion	Standard referral process may result in treatment intake at provider discretion

Table 3: Implementation Check of Differential Testing and Sanction (n=529)

	At 6 Months		At 12 Months				
	M	SE	M	SE	*F*	df	η_p^2
Frequency of Tests							
Time	22.39	.70	4.24	.27	664.98***	1, 526	.56
Group					131.17***	2, 526	.33
Time x Group					125.23***	2, 526	.32
Experimental	31.56	.89	6.45	.34			
Control I	31.23	1.29	2.98	.49			
Control II	4.39	1.42	3.30	.54			
Frequency of Tests by Week							
Time	.87	.03	.31	.01	707.92***	1, 526	.57
Group					140.56***	2, 526	.35
Time x Group					114.73***	2, 526	.30
Experimental	1.22	.03	.44	.01			
Control I	1.21	.05	.39	.02			
Control II	.17	.05	.09	.02			
Jail Percent Received							
Time	.40	.02	.45	.02	71.73***	1, 526	.12
Group					90.43***	2, 526	.26
Time x Group					11.46*	2, 526	.04
Experimental	.70	.02	.74	.03			
Control I	.17	.04	.35	.04			
Control II	.15	.04	.27	.04			
Overall Jail Days							
Time	13.77	1.50	46.92	3.84	140.09***	1, 526	.21
Group					.34	2, 526	.001
Time x Group					2.01	2, 526	.01
Experimental	17.20	1.91	46.34	4.88			
Control I	11.62	2.75	52.68	7.02			
Control II	12.50	3.03	41.73	7.73			
Jail Days, If Jailed[a]							
Time	58.58	4.02	160.80	9.22	225.71***	1, 233	.49
Group					51.83***	2, 233	.31
Time x Group					47.21***	2, 233	.04
Experimental	24.65	2.63	60.96	6.03			
Control I	68.74	7.68	226.13	17.61			
Control II	82.35	8.93	195.29	20.48			

*p<.05, **p<.01, ***p<.001

a. Analysis and reported statistic for sub-group of conditions who received jail sanction associated with the conditions or jail sanction for behavior extraneous to the program. This translates to 70% of the Experimental Group, 17% of Control I, and 15% of Control II.

Table 4: Repeated Measures ANOVA Relapse and Recidivism Outcomes (n=529)

	At 6 Months		At 18 Months				
	M	SE	M	SE	*F*	df	η_p^2
At Least One Positive							
Time	.53	.02	.65	.02	59.45***	1, 526	.10
Group					11.54***	2, 526	.04
Time x Group					5.84**	2, 526	.02
Experimental	.61	.03	.72	.03			
Control I	.65	.04	.69	.04			
Control II	.35	.05	.53	.04			
Proportion Positive							
Time	.19	.01	.21	.01	6.79**	1, 526	.01
Group					10.75***	2, 526	.04
Time x Group					2.14	2, 526	.01
Experimental	.11	.02	.15	.01			
Control I	.20	.02	.21	.02			
Control II	.24	.02	.26	.02			
Re-arrest							
Time	.09	.01	.25	.02	88.93***	1, 526	.15
Group					2.88**	2, 526	.01
Time x Group					.13	2, 526	.001
Experimental	.04	.01	.22	.03			
Control I	.13	.02	.29	.04			
Control II	.09	.02	.25	.04			

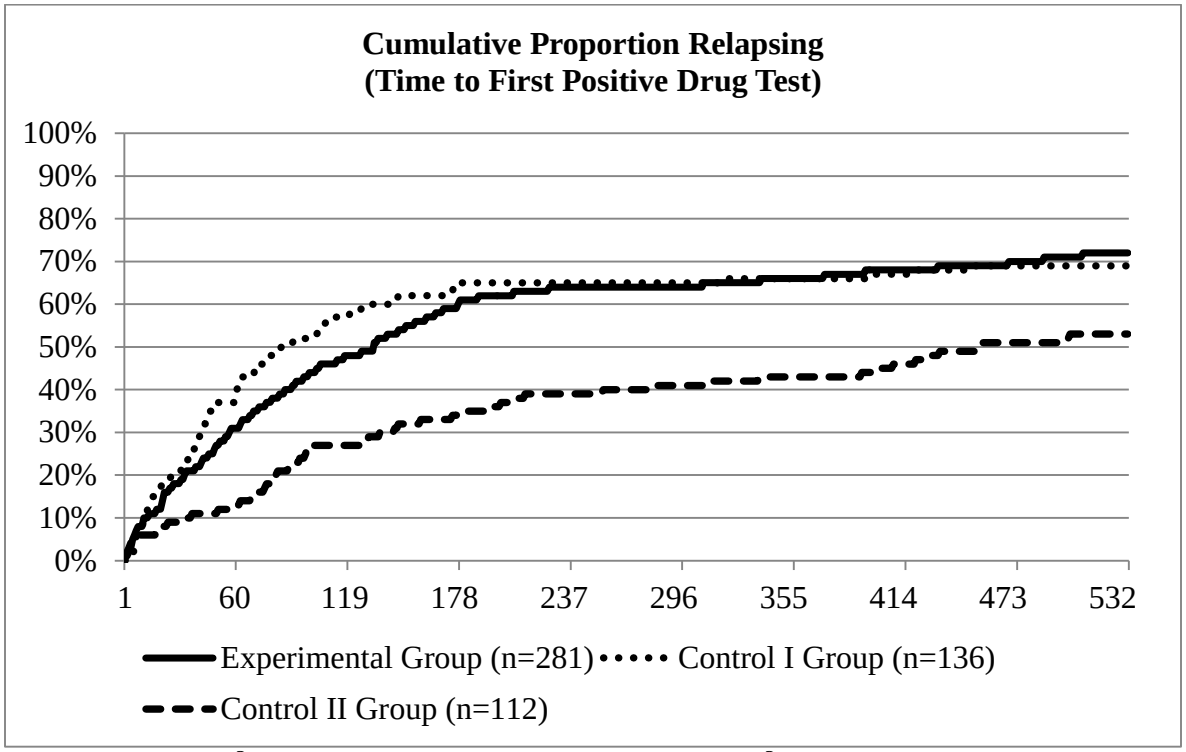
*p<.05, **p<.01, ***p<.001

Table 5: Timing (in Days) to Relapse and Recidivism Outcomes (n=529)

	Experimental (n=281)		Control I (n=136)		Control II (n=112)		
	M	SE	M	SE	M	SE	Log-Rank statistic
First 6 Months							
First positive	114	4.07	100	5.92	143	5.62	25.76***
First re-arrest	178	1.27	175	2.14	173	3.07	9.27**
Total Study Period							
First positive	234	12.98	220	19.46	345	20.35	17.74***
First re-arrest	484	7.38	453	12.91	470	13.75	2.69

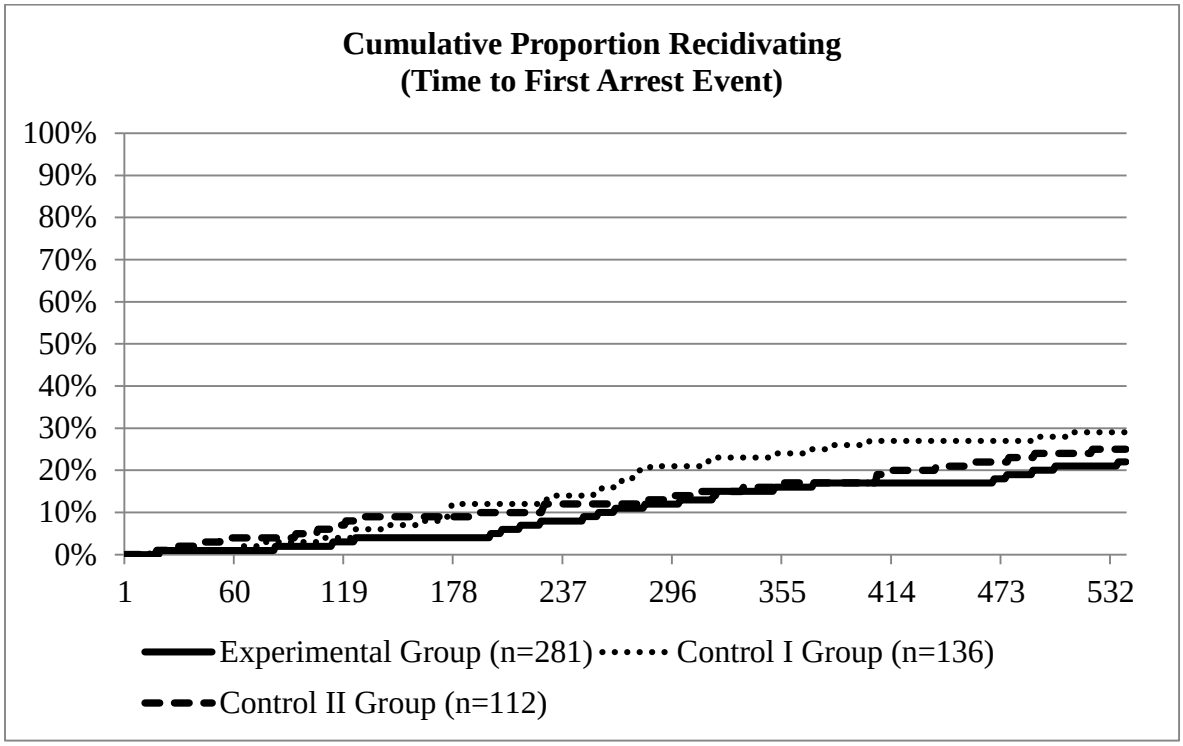
*p<.05, **p<.01, ***p<.001

Figure A: Relapse Failure Curves by Experimental Condition (n=529)



Note: Log-Rank $\chi^2(2, N = 529)=17.74$, $p<.001$; Wilcoxon $\chi^2(2, N = 529)=21.32$, $p<.001$; Tarone-Ware $\chi^2(2, N = 529)=20.09$, $p<.001$.

Figure B: Recidivism Failure Curves by Experimental Condition (n=529)



Note: Log-Rank $\chi^2(2, N = 529)=2.69$, p=.26; Wilcoxon $\chi^2(2, N = 529)=3.10$, p=.21; Tarone-Ware $\chi^2(2, N = 529)=2.90$, p=.24.

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