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Male Methamphetamine-User Inmates in Prison Treatment: During Treatment Outcomes

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Abstract

Psychosocial functioning and criminal thinking of methamphetamine-using inmates were examined before and after their completion of primary treatment in three in-prison drug treatment programs (one “outpatient” and two different modified TCs). The sample consisted of 2,026 adult male inmates in 30 programs in Indiana. Data included background, psychosocial functioning, criminal thinking, and therapeutic engagement indicators. Multi-level repeated measures analysis was used to evaluate changes during treatment and multi-level covariate analysis adjusted for sample differences in tests of between-treatment differences. Significant improvements were found for all three treatments, but the two modified TCs showed significantly better progress than did outpatient treatment housed among the general prison population. Significant predictors of treatment progress included baseline psychosocial functioning and background, wherein higher psychosocial functioning and lower criminal thinking orientation predicted stronger therapeutic engagement. However, treatment engagement level was found to mediate during-treatment improvement and initial criminal thinking.

Keywords

Offender drug treatment; treatment progress; criminal thinking; psychosocial functioning; treatment engagement; client background

1. Introduction

New treatment challenges have arisen for criminal justice institutions in the last decade as the drug abuse profile in the U.S. has shifted and methamphetamine use has become a highly prominent problem. A three-fold increase from 1994 to 2003 in self-reported users of methamphetamine (i.e., 3.8 to 12.4 million; Shrem & Halkitis, 2008; Substance Abuse and Mental Health Services Administration, 2003) has been accompanied by a parallel growth in the number of inmates who report having used this type of drug. For instance, state correctional records show the rate of methamphetamine use in the month prior to arrest rose from 7% to 11% between 1997 and 2004 (Mumola & Karberg, 2006). Race-ethnic comparisons indicate White inmates were almost twice as likely (20%) as Hispanics (12%) to have used, while Blacks

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had a much lower prevalence rate (1%). Similar statistics were found among Federal prisoners (Mumola & Karberg, 2006), with an increase in arrests from 7% to 10% for this drug (Whites, Hispanics, and Blacks reported rates of 29%, 5%, and 1%, respectively). Further signs of the growing magnitude of the methamphetamine problem lay in a nationwide survey of local law enforcement officers conducted in 2005 and 2006 (Hansell, 2006) who reported it to be their primary drug of concern (48%, versus 22% for cocaine, 22% for marijuana, and 3% for heroin).

Long-term methamphetamine use likewise has been shown to be related to problems involving health, psychological well being, social support/networks, and violence (Maxwell, 2005; Shrem & Halkitis, 2008). In addition to health problems such as stroke, cardiac valve thickening, and decreases in lung functioning, chronic methamphetamine use can lead to poor cognitive functioning and poor mental health (Greenwell & Brecht, 2003). Associated brain changes include episodic memory loss and depression, while mental effects owing to methamphetamine abuse involve irritability, physical aggression, confusion, fear, and anxiety. As its use is a concern for victims of physical and sexual abuse (J. B. Cohen et al., 2003) as well as in the spread of HIV and related infectious diseases, there is clearly a need to develop treatment options as part of a viable public health and safety policy.

Presently, the most effective treatments for methamphetamine abuse are cognitive-behavioral approaches, including contingency management interventions (National Institute on Drug Abuse, n.d.). The Matrix Model, which combines behavioral therapy, family education, individual counseling, 12-Step support, and encouragement for nondrug-related activities, has been shown to be an effective community-based treatment for reducing methamphetamine abuse (Rawson et al., 2004).

The present study examined an in-prison application of the Matrix Model in different modified-TC settings adapted for methamphetamine-using offenders. The study had two purposes. First, it evaluated these prison-based treatments in terms of process-related outcomes shown to be integral to behavioral change and posttreatment outcomes in substance abuse treatment (Simpson, Knight, & Dansereau, 2004). More specifically, previous research indicates the groundwork for post-correction rehabilitation depends in large part on changes that take place during the prison treatment episode. Attention has therefore been given to intermediate treatment events and client changes shown to be related to better posttreatment recidivism rates and behavioral outcomes (Simpson & Joe, 2004). These post-release findings include improvements in social functioning, particularly risk taking and hostility (Hiller, Knight, Saum, & Simpson, 2006) and correction of "criminal thinking errors" during treatment (Knight, Garner, Simpson, Morey, & Flynn, 2006).

These types of during-treatment improvements are the focus of major rehabilitative objectives for prison-based treatment in the Indiana Department of Correction (2008b) which aims "to utilize a holistic approach to substance abuse treatment with emphasis on correcting criminal behaviors and thinking." This study therefore tested for evidence of significant "thinking" changes (i.e., on decision making, risk taking, and criminal thinking orientation) among male methamphetamine-using inmates, as measured from intake to completion of their primary treatment phase.

How these changes take place is the subject of corrections-based treatment process research (Simpson et al., 2004), including the role played by "client attributes." Evidence shows motivation (Simpson & Joe, 1993) as well as depression and hostility (Joe, Simpson, & Broome, 1999) are client attributes related to treatment engagement. However, problem severity and criminal thinking are two areas that also can exert strong effects so a second aim of the present study was to study the relationships among client attributes, early treatment engagement (participation and therapeutic relationship), and early recovery (psychosocial

change and behavioral change) effects. In an effort to address questions about treatment effects more specific to criminal thinking orientation, special analyses focused on potential “mediating effects” of early treatment engagement.

Longitudinal records obtained in corrections-based treatment services in Indiana provided an opportunity to study these matters. It was expected that improvement in psychosocial functioning and criminal thinking would serve as important indicators of early recovery, especially as these were targeted in the treatment protocols. Furthermore, improvement in these areas and in anxiety and hostility would be considered important as these are related to mental problems owing to methamphetamine abuse as reported in the literature. Also, analyses of relationships between inmate attributes (e.g., demographics, clinical problems, and pre-treatment criminal thinking) and treatment engagement and end-of-treatment measures of psychosocial functioning could expand knowledge of their roles in the treatment process model. Mediating effects of treatment engagement levels were also expected to be of significance, specifically as a key therapeutic dynamic involved in reducing criminal propensities of prison inmates.

2. Method

2.1. Treatment program descriptions

In response to the treatment needs of incarcerated methamphetamine users, the Department of Correction in Indiana (IN DOC) provided rehabilitation through three treatment approaches. As incentive for inmate participation, completion of treatment can potentially enhance their chances of receiving a sentence time-cut. At the time of present study, one of the treatment options was an “outpatient treatment program” (OTP) made available to inmates housed in general population settings. It operated under a day-treatment model based on group counseling, representing the most common treatment approach in many correctional systems. The two alternatives were 6-9 month specialized “therapeutic community” (TC) programs. One was developed specifically for methamphetamine users called “Clean Lifestyle is Freedom Forever” (CLIFF-TC) and used a curriculum based primarily on the Matrix Model (Center for Substance Abuse Treatment, 2007). The third treatment alternative was a “Modified TC” program that addressed a broad array of substance abuse problems using a curriculum generally similar to that of CLIFF-TC programs but without special emphasis on methamphetamine use.

Outpatient Treatment Program (OTP)—care was considered “regular treatment” and was conducted in three phases (education, primary treatment, and relapse prevention) for qualifying inmates in the general population at selected state prisons. It was based on a standardized group-counseling curriculum developed, approved, and administered by the IN DOC clinical staff (Indiana Department of Correction, 2008b). *Phase 1 Education* was a Guided Self Study (GSS) consisting of educational materials about drug effects, addiction, and treatment. *Phase 2 Primary Treatment* consisted of 48 hours of treatment contact over a period of 3.5 months on average and emphasized decision making and learning to accept responsibility for the consequences of decisions. OTP included development of an Individualized Treatment Plan for each offender which outlined homework assignments/tasks that the offender needed to complete prior to being promoted to the next phase. *Phase 3 Relapse Prevention* was addressed in three segments, each requiring a minimum of 24 hours (i.e., reintegration to the community at large, setting individual goals for the future, and the fellowship of a 12-step support group).

“Clean Lifestyle is Freedom Forever” Program (CLIFF-TC)—care was an award-winning treatment program (2009 American Correctional Association Exemplary Offender Program Award) developed and implemented in 2005 as a specialized unit to address the growing problems related to heavy methamphetamine use of offenders. The expected stay in

this modified therapeutic community (TC) model was 6-9 months in residential prison facilities, segregated from the general prison population. Offenders accepted into CLIFF-TC experienced a highly structured environment with intensive treatment regimen scheduled up to 15 hours per day, 7 days per week. The Matrix Model curriculum was used for its core programming, along with selected cognitive/behavioral change treatment modules such as “Commitment to change” (Samenow, 1994) and “Straight ahead: Transition skills for recovery” (Bartholomew, Simpson, & Chatham, 1993).

These inmates received individual counseling, group counseling, life skills training, and family counseling. Activities emphasized community meetings, group therapy, self help groups, and peer groups. Offenders gained designated privileges and responsibilities as they advanced through the program. The goal was to guide offenders in changing their thinking and behavior as a pathway to developing and maintaining a clean and sober lifestyle after prison. Particular emphasis was placed on reducing criminal thinking errors and negative behavioral orientation, in addition to focusing on the specific aspects of addiction to methamphetamines (and other drugs).

CLIFF-TC units included three discrete treatment phases. In the “education” phase, participants developed and integrated core knowledge and practical skills for daily living. Secondly, in a cognitive behavioral component, thinking patterns and related behaviors that directly contributed to drug addiction were addressed. Here, efforts focused on developing pro-social attitudes, values, and thoughts necessary for a clean lifestyle. The third phase was for “reentry” preparation in which positive living habits and skills to support responsible and drug free living were reinforced and practiced. Program completion was competency based, and there was a strong focus on offender needs as part of planning for re-entry to the community. Program graduates had the opportunity to remain on the unit to continue work on maintaining their recovery and on re-entry issues until time for their release.

Modified Therapeutic Community (Modified TC)—care was an optional 6-9 month program that provided residential substance abuse treatment services while participants were housed in units separated from the general population. They operated on a general modified therapeutic community model but without the heavier emphasis on methamphetamine use that thematically characterized CLIFF-TC units. These intensive services were structured much like the CLIFF-TC programs but focused on a wide array of substance abuse problems as part of the efforts to change criminal thinking patterns and related behaviors. Activities emphasized community meetings, group therapy, self help groups, peer groups, and staff meetings. Program completion was competency based and offenders gained designated privileges and responsibilities as they progressed favorably through the program and approached the point of re-entry to the community. Graduates were expected to remain on the unit and continue working on recovery and re-entry issues until their release.

2.2. Sample

All inmates in the IN DOC system were screened for drug use history and those shown to have drug-related problems were offered participation in drug treatment prior to release from prison. Of the 9,740 male inmates who entered IN DOC treatment programs between April 2005 and October 2007, 3,682 self-reported methamphetamine use in the 12 months before intake. Because the sample for the current treatment evaluation study was drawn in late 2007, many of these inmates had not yet completed their programs. Thus, only 2,026 qualified for inclusion in the research sample for the present study, based on their serial completion of intake and treatment phase assessments which were modeled after those developed at Texas Christian University (Garner, Knight, Flynn, Morey, & Simpson, 2007; Joe, Simpson, Greener, &

Rowan-Szal, 2004). The remaining 1,656 inmates were still in their treatment phase (and thereby had incomplete treatment progress records) when this study was initiated.

A systematized procedure that included medical review of substance abuse, assessments, and a face-to-face interview by a substance abuse counselor guided the recommendations made for finding the most appropriate service for each offender. Inmates included in the present study entered one of 30 different treatment programs. Twenty-six of these IN DOC programs were identified as OTP, two were CLIFF-TC, and two were Modified-TC units. Referrals procedures resulted in assignments made to OTP (n = 1,321), CLIFF-TC (n = 450), and Modified-TC (n = 255). Records show only a small percentage switched programs between the time of intake to completion of the primary treatment phase, including 4.8% in CLIFF-TC, 4.9% in Modified-TC, and 3.4% in OTP admissions. As an incentive for participation, inmates were informed that their completion of treatment could influence prison-based policy decisions about a “sentence time-cut.” Using a research protocol approved by the Institutional Review Board at TCU and the Indiana Department of Correction, the offender data were stripped of personal identifying information by IN DOC staff and transmitted to the Institute of Behavioral Research at Texas Christian University for analysis.

2.2.1. Description of sample characteristics

The total IN DOC male inmate population referred to treatment for drug use problems (N = 9,899) was 59% White, 37% African American, and 3% Hispanic. Their average age was 35 years, 21% were married, and 49% had never been married. Nearly half (49%) reported full employment prior to incarceration. Large percentages were classified as having problems related to criminality (87%), peer relationships (84%), family (82%), and Human Immunodeficiency Virus (HIV) risks associated with sex experiences (59%). Substantial percentages also reported psychological (32%) and medical (36%) problems.

When compared to males in the total treatment population, the 2,026 male methamphetamine using inmates in the present treatment evaluation study were more likely to be White, but their age, social indicators, and prevalence of other drug-related problems were generally comparable. Specifically, Whites comprised a large majority (82%) of these inmates, nearly 40% larger than the percentage of White inmates in the total treatment population. Their average age was 34 years, and 20% were married and 46% had never been married. Nearly half (49%) reported full-time employment prior to incarceration. Most were classified as having problems related to criminality (92%), peers (90%), family (87%), and HIV sex risk (63%). Substantial percentages also were found for psychological (37%) and self-reported medical (36%) problems.

Other drugs used at least weekly by the treatment sample of methamphetamine users in this study (in the 6 months prior to prison) included marijuana (63%), cocaine (38%), sedatives (27%), and opiates (24%). As already noted, inmate placements into the three treatment approaches were based upon a review of substance-related problems (following an inmate assessment battery profile which included prior treatment and violent behavior, along with a counselor's interview with the inmate). It is not surprising, therefore, that those assigned to the three types of treatment programs differed on several characteristics. For instance, OTP inmates were younger and had fewer problems in the areas of drug use and background than those in the two more intensive TC programs. The Modified-TC group had statistically higher scores on criminal thinking, followed by OTP. These differences have implications, of course, for statistical analyses of between-treatment differences as described later.

2.3. Instruments

The IN DOC *Substance Abuse Intake* (SAI) interview addressed background, psychosocial functioning, drug use, HIV risks, and a series of questions providing DSM-IV assessments of alcohol, cocaine, opioid, amphetamines, and cannabis (Joe et al., 2004). From it, a Client Problem Profile was calculated representing composite measures for client problem domains similar to those areas addressed in the ASI. The sum of these composite measures is the Client Problem Profile Index (CPPI), which has evidence of predictive validity (Joe et al., 2004) and therefore was used to represent offender background problems in the present analyses. Its 14 problem indicators include six for drug use (alcohol, cocaine, heroin/opiate, marijuana, other illegal drugs, and multiple drug use), two for HIV risks (needle and sex), three for psychosocial functioning (psychological problems, family strife, and association with negative peers and friends), and single indicators for health, employment, and criminality.

The TCU *CJ Client Evaluation of Self and Treatment* (CJ CEST; Garner et al., 2007; Joe, Broome, Rowan-Szal, & Simpson, 2002) assessment used at intake includes treatment motivation and readiness (Problem Recognition, Desire for Help, Treatment Readiness), psychological functioning (Self Esteem, Depression, Anxiety, Decision Making, Childhood Problems), and social functioning (Risk Taking, Hostility). Their favorable psychometric properties, including reliability and validity of each of the scales based on 5-point Likert responses, are discussed in detail by Garner et al. (2007). The expanded *CJ CEST* used during treatment includes measures of treatment engagement (Joe et al., 2002). It was administered approximately 4 months after the Intake. Two engagement indicators (Counselor Rapport and Treatment Participation) were of primary interest for the present study because they have been established as core measures of treatment process (Simpson & Joe, 2004). Treatment Participation reflects both cognitive and behavioral aspects of client participation, while Counseling Rapport focused on the therapeutic bond between the inmate and his primary counselor.

The *TCU Criminal Thinking Scales* (CTS) define measures of Entitlement, Justification, Power Orientation, Cold Heartedness, Criminal Rationalization, and Personal Irresponsibility, representing concepts with special significance in treatment settings for correctional populations (Garner et al., 2007; Knight et al., 2006; Walters, 1995; Walters & Geyer, 2005). Entitlement is indicative of the extent to which an individual feels ownership of privileges or benefits that are automatic. Justification reflects a thinking pattern characterized by minimizing the seriousness of antisocial acts and justifying actions based on external circumstances. Power Orientation indicates the need for power and control. Cold Heartedness portrays the lack of emotional involvement that the offender has in his or her relationships with others. Criminal Rationalization measures a generally negative attitude toward law and authority figures. Personal Irresponsibility shows a lack of accountability and a general unwillingness to accept ownership for actions and for choices, including a readiness to cast blame on others.

Procedurally, all inmates in the sample completed the SAI, the CJ CEST, and the CTS assessments when admitted to treatment. These represent conceptually distinct key factors in the theoretical guide used to study treatment process (Simpson, 2004; Simpson & Knight, 2001). At the end of the primary treatment phase some 4 months later, the CJ CEST and CTS assessments were re-administered.

2.4. Analysis

Because the inmates studied were nested under prison treatment approaches (and units), multi-level analysis (SAS PROC MIXED; Raudenbush, Bryk, & Congdon, 2005) was required to test our research hypotheses. This multi-level (hierarchical) approach helps address the fact that inmates treated in the same program site tend to be more similar to one another than those

from other program sites in that they are exposed to the same uniqueness in selection attributes, as well as general treatment goals, conditions, and philosophy. First, multi-level repeated measures analysis was used to test for changes on measurements from intake to the end-of-treatment phase – both for treatment in general and within each treatment modality. Covariate adjustments were included for these treatment comparisons because inmates had not been randomly assigned to the three treatments, and there were background and initial measurement differences between the groups.

In addition to testing for changes over time and for differences among treatments, effect sizes (magnitudes of the relationships) were also calculated to aid interpretation. For addressing change, the estimate for dependent groups was applied (J. Cohen, 1988). For addressing between-group treatment differences from the multi-level analyses (Bryk & Raudenbush, 1992), effect size was estimated by using a statistic that paralleled Cohen's f index for linear models. This was $f = [\eta^2/(1 - \eta^2)]^{.5}$, where $\eta^2 = [SS_B/(SS_B + SS_W)]$. SS_B was estimated from the multi-level analyses as the product of (residual estimate) \times (df_B) \times (F-test for treatment fixed effect), and SS_W was estimated as the product of (residual estimate) \times (df_W). The values of df_B and df_W are the numerator and denominator degrees of freedom, respectively, for the F-test for the between treatment fixed effect.

Of the five hypotheses addressed, three are related to overall changes in process outcomes, one to client attributes as significant predictors (covariates) of outcomes, and one to an index of treatment process as an explanatory factor for the relationships between inmate attributes and their end-of-treatment functioning. The first three concerned overall process and focused on whether significant changes related to the treatment objectives had occurred, whether they had occurred consistently within each treatment modality, and whether changes differed in magnitude across treatment approach and settings.

Procedurally, they were performed in three stages. First, we examined evidence for the overall expectation that these prison-based treatments showed collective evidence of change from intake to post-treatment phase in treatment readiness, psychosocial functioning, and correction of thinking errors for the total sample of treated inmates. Second, we asked whether significant changes occurred within each of the three treatment program settings (i.e., OTP, CLIFF-TC, Modified-TC). Third, we addressed the question of whether one treatment approach showed evidence of being better at the end of primary treatment than the others. In making this comparison, we adjusted for inmate background differences across the treatments. The covariates were selected to reflect background differences found among inmates assigned to the different treatments. These included demographics and an index representing history of drug use, crimes of violence, and other background problems.

Particular attention was given to criminal thinking as an additional predictor of motivation, psychosocial functioning, and treatment engagement in a subsequent set of analyses because changing this cognitive orientation was as a major objective of these prison-based treatments. This also addressed the fourth hypothesis that called for identifying offender attributes related to treatment process indicators. Finally, we extended the examination of treatment process components by addressing the “mediating” effects of treatment engagement on relationships between inmate attributes and measures of psychosocial functioning during treatment. Thus, by including treatment engagement as a covariate we were able to study engagement as a possible mediator of inmate changes over time.

3. Results

The first hypothesis questions whether prison-based treatments (collectively) were associated with positive changes over time in methamphetamine-using inmates. To address this, we tested

whether the means calculated for the total sample on each of the motivation, psychosocial functioning, and criminal thinking scales (from the CJ CEST and CTS) had changed significantly by the end of primary treatment (see the right-hand column of Table 1). All tests were significant as evaluated in the multi-level analysis. However, because of the large sample size ($N = 2,026$), effect sizes also were examined. Based on Cohen's D index (J. Cohen, 1988), the changes in Desire For Help ($D = .19$) and Treatment Readiness ($D = .12$) would be considered to be "small" (as they had a D of .20 or less), whereas changes in Risk Taking ($D = .36$), Hostility ($D = .47$), and Depression ($D = .49$) fell into the "small to medium" range (with D sizes greater than .20 but less than .50). The Anxiety ($D = .50$), Decision Making ($D = .66$), and Self Esteem ($D = .70$) changes were in the "medium to large" effect size range.

Overall improvements in criminal thinking orientation from intake to the end of treatment phase also were significant, but their effect sizes were smaller than those found for the psychosocial scales above. The effect size for Cold Heartedness was small ($D = .13$), while the remaining CTS scales were between "small" and "medium". These include Entitlement ($D = .28$), Justification ($D = .35$), Personal Irresponsibility ($D = .31$), Rationalization ($D = .23$), and Power Orientation ($D = .26$). Thus, decreases on the motivation scales were "small," whereas positive changes for the set of psychosocial functioning were generally in the "medium to large" range and criminal thinking scales were "small" to "medium."

It should be noted that changes in motivation scales were actually "decreases" from their very high intake score values. These measures are designed to assess initial desire, pressures, and readiness to enter a treatment program. After client engagement in treatment, however, the meaning of these scales shift by virtue of how motivation constructs are expressed therapeutically. While they serve as significant pretreatment predictors of subsequent treatment progress (e.g., Simpson, 2004), they have limited and only specialized value as during-treatment measures and therefore are not included below in further discussions about change. Reporting of these measures here, however, demonstrates that the overall trend toward "positive" changes in other scales is not a global or indiscriminate response to all measures used.

Another aspect of multi-level analyses is that it provides information on the uniformity of results across the sites studied. That is, it provides a test statistic for whether knowledge of the site identity is needed for prediction of the outcome. The between-site variance for the intercept was significant for two of the six CJ CEST scales [Anxiety ($Z = 2.32, p < .01$), Hostility ($Z = 2.24, p < .02$)] and three of the six CTS scales [Entitlement ($Z = 1.86, .04$), Personal Irresponsibility ($Z = 1.69, p < .05$), and Cold Heartedness ($Z = 1.85, p < .04$)]. In other words, differences in the magnitude of change over time among program sites for these measurements cannot be attributed simply to random sampling variations for these five scales. This was not unexpected because inmates were not randomly assigned to treatments; however, the number of scales that was significant is relatively small compared to the number of outcomes analyzed, and only two of the Z -statistics exceeded 1.96. This suggests a degree of uniformity in the changes occurring across multiple sites.

3.1. Changes within treatment programs

Having evidence for "overall improvements" across all treatments is useful, but it is the effectiveness of each of the three treatment approaches that is of greater interest. Results summarized in Table 1 show indeed that changes on the CJ CEST and CTS scales from intake to end of treatment were significant for all three program types. Changes on the psychological measures were substantial, falling in the "moderate" (Depression and Anxiety) and "large" (Self Esteem and Decision Making) ranges for each treatment. This also was true for social functioning where the changes for Hostility and Risk Taking scores were in the "moderate to large" range.

Effect sizes for the CTS changes within the three treatment programs were smaller. For OTP, all of the changes were closer to “small” than to “moderate,” while for Modified-TC most of the changes were in the “moderate” range. The changes for CLIFF-TC lay in between, with only three effect sizes larger than .30.

3.2. Treatment comparisons after covariance adjustments

Although treatment comparisons reported above might be suggestive about how treatments are differentially effective, they are limited by the fact that their inmates were not equated or randomly assigned. To adjust for these program-level differences, a multi-level covariate analysis model was applied to test for “adjusted” treatment group differences on CJ CEST and CTS means measured at the end of treatment (Table 2). Age, race, the Client Problem Profile Index (CPPI) composite measure, and the corresponding CJ CEST intake measure were used as covariates in the analysis of each outcome.

Table 2 shows that for treatment comparisons on psychological functioning, only Self Esteem and Decision Making were significant, with inmates in Modified-TC scoring significantly higher than those in either CLIFF-TC or OTP. More importantly, inmates in both CLIFF-TC and Modified-TC were significantly higher at the end of the treatment phase than inmates in OTP on Decision Making. CLIFF-TC inmates also were more improved (i.e., significantly lower) than inmates in OTP on Risk Taking.

For the treatment engagement measures of Treatment Satisfaction, Counselor Rapport, and Treatment Participation, the results varied considerably across the treatment programs. OTP inmates were comparatively more “satisfied” with treatment services, but Modified-TC inmates reported having better Counselor Rapport. Both CLIFF-TC and Modified-TC inmates had higher Treatment Participation scores than those in OTP.

For the CTS scales, significant between-treatment differences were found for Justification, Personal Irresponsibility, Rationalization, and Power Orientation, with inmates in OTP having significantly higher means (i.e., showing more criminal thinking problems) than in the two TC groups. Effect sizes corresponding to the overall treatment differences for the CJ CEST and CTS analyses showed these to be in the small range, similar to previous findings. That is, these score differences between the groups, while significant for most of the scales, tended to be small.

3.3. Inmate attributes as predictors of during-treatment outcomes

Inmate attributes were organized into three general areas – background problems (CPPI), demographics, and initial criminal thinking – for analyses of their relationships with end-of-treatment functioning. None of the covariates representing background (CPPI) and demographic (age and race) variables was consistently predictive of every dependent variable. Of these, CPPI was the most prominent in that it was significant for nine of the dependent variables (Self Esteem, Depression, Anxiety, Decision Making, Hostility, Social Support, Justification, Personal Irresponsibility, and Power Orientation). Direction of the relationships was positive for Depression, Anxiety, Hostility, Justification, Personal Irresponsibility, and Power Orientation, and negative for Self Esteem, Decision Making, and Social Support. That is, more background problems were associated with more psychological issues and higher criminal thinking, but also with lower functioning on self esteem, decision making, and social support.

The associated regression weights show older inmates tended to have lower scores on Self Esteem, Anxiety, Hostility, Risk Taking, Social Support, and Power Orientation. Whites were more likely than non-Whites to have higher levels of Anxiety, Risk Taking, and Entitlement,

but lower scores for Justification, Personal Irresponsibility, Rationalization, and Cold Heartedness.

To address the relationship of criminal thinking as an inmate pretreatment attribute affecting treatment progress outcomes, a composite measure of initial criminal thinking (computed as the overall mean of the six criminal thinking scales) was used as an additional covariate in the previous multi-level model. This index was significant for almost every end-of-treatment CJ CEST measure of psychosocial functioning and engagement (Self Esteem, Depression, Anxiety, Decision Making, Hostility, Risk Taking, Treatment Satisfaction, Counselor Rapport, Treatment Participation, Peer Support, and Social Support). That is, criminal thinking (i.e., scored in this analyses as a simple composite index) was positively related to the psychosocial issues of depression, anxiety, hostility, and risk taking, but negatively to decision making and treatment process indicators. Perhaps most importantly in regard to complications for treatment, its strongest relationships were with the treatment engagement measures.

3.4. Treatment engagement effects as a “mediator” of inmate improvements

With pretreatment attributes being related to their end-of-treatment phase functioning, and with during-treatment engagement being related to them as well, attention turned to the possible mediating effects of therapeutic engagement. Thus, the Counselor Rapport and Treatment Participation scale scores were averaged together and then added as another covariate in the previous analytic model in order to address its effects on end-of-treatment psychosocial functioning. These results were very telling as shown in Table 3, under Model 2. This treatment engagement composite measure was highly related in a positive way to better inmate functioning scores at the end of treatment for all three programs. Moreover, adding treatment engagement to the model caused all of the previously significant relationships of initial criminal thinking with end-of-treatment functioning measures to become non-significant. That is, treatment engagement was found to compensate for the negative influences that stronger initial criminal thinking tended to have on psychosocial functioning progress during treatment. For the other inmate attributes studied, on the other hand, the inclusion of treatment engagement did not alter the relationships of demographics and background problems (as represented by the CPPI) with end-of-treatment measures. Moreover, treatment modality differences were still significant for Decision Making and Risk Taking. This is noteworthy as it reconfirms the treatment modality results noted previously, even when controlling for treatment engagement. So while treatment engagement explained away initial criminal thinking, it did not do so for the other inmate attributes included in the analytic model or for treatment effects.

4. Discussion

While the methamphetamine epidemic has made the need to find effective treatments for these users paramount (J. B. Cohen, Greenberg, Uri, Halpin, & Zweben, 2007), it is especially so for correctional populations wherein the rates of methamphetamine-related crimes have continued to rise (Semple, Zians, Strathdee, & Patterson, 2008). On the basis of during-treatment indicators for criteria regarded as important for corrections-based treatment programs (such as decision making, hostility, risk taking, and criminal thinking), the current study suggests all three Indiana DOC in-prison treatments for male methamphetamine-using inmates are effective in moving those treated forward in these objectives. That is, there were significant changes in the “right direction” on these measures (also see Simpson, 2004; Simpson & Joe, 2004). As revealed by their effect sizes, the changes were substantial.

To address the question of differential effectiveness across treatment approaches, making these comparisons required specialized analyses because different types of inmates were referred to each one. In the multi-level covariate-adjusted analysis performed to compensate for this, no single treatment was established as clearly being the “best,” and the effect sizes corresponding

to these program differences were generally in the small range. However, if the criteria for judging were limited to those characteristics believed necessary for reducing criminality – such as better decision making, lower risk taking, and less criminal thinking – then the OTP participants had significantly poorer outcomes than inmates placed in CLIFF-TC and Modified-TC programs. While the CLIFF-TC inmates improved decision making, reduced risk taking, and lowered their criminal thinking more than did their OTP counterparts, they nevertheless reported lower satisfaction with their treatment and lower rapport with counselors. On the other hand, they had higher treatment participation (measured in terms of mental or cognitive engagement in activities). Although Modified-TC was better than OTP on several outcome criteria, the three treatment engagement measures did not differ between these two groups. Such results might be interpreted to mean that more was demanded of inmates in CLIFF-TC since they did not seem to “like it” as much, but their thinking patterns and treatment participation level improved more.

Overall, the results on pre- to post-treatment changes in psychosocial functioning and criminal thinking over time suggest that all three in-prison treatments helped modify important inmate thinking patterns that are considered intermediate to positive behavioral change, thereby achieving the goals of improving decision making and correcting criminal thinking. The next step needs to focus on providing evidence that these positive cognitive changes do in fact translate into positive behaviors in post-prison follow-ups. Recent findings suggest these treatment efforts in Indiana may indeed be helping to reduce recidivism rates. For example, for a cohort of treated inmates in 2004 (Indiana Department of Correction, 2008a), the one-year recidivism rate was 18% for those in the general population. For Modified-TC graduates of 2006, the recidivism rate was 13.9%. These compare to rates of 9.3% for CLIFF-TC graduates and 14.8% for CLIFF-TC non-graduates. Ideally, a systematic study of recidivism rates is needed in order to help connect treatment process measures more explicitly to these outcomes.

Positive findings for the CLIFF-TC in the present prison-based treatment study added support for the curriculum from the Matrix Model. As reported in the CSAT Methamphetamine Treatment Project study (Rawson et al., 2004), those results showed the community-based Matrix Model treatment was successful relative to treatment-as-usual for methamphetamine users and was associated with longer retention and more methamphetamine-negative urine samples during outpatient treatment. Although the superiority of the Matrix Model approach over “treatment as usual” was not well sustained across longer post-treatment timepoints (Rawson et al., 2004), urinalysis results at discharge and at 6-month follow-up were nevertheless encouraging. Namely, 66% of the Matrix Model clients were methamphetamine-free at discharge and 69% were methamphetamine-free.

The TCU Treatment Process Model (Simpson, 2004) served as a guide in the implementation of IN DOC treatments and in the assessments collected to investigate further the relationships among client attributes, early treatment engagement (participation and therapeutic relationship), and early recovery (psychosocial change) indicators. Demographics (age and race) were significant covariates for several during-treatment progress measures, but the CPPI composite (an index measuring offender background for problematic alcohol and drug use, HIV risk, family and peer functioning, health, employment, and criminality) proved to be more consistently related as well as more strongly related than demographic characteristics. However, the construct most consistently related to early engagement and recovery indicators represented pretreatment criminal thinking orientation. This adds merit to the emphasis given to criminal thinking changes in the modified TCs treatment programs of the IN DOC and to a call for extending similar research in England (see Best, Day, Campbell, Flynn, & Simpson, 2009).

The present findings add to the literature that previously addressed the facilitative effects of motivation and depression, and the negative effects of hostility on treatment engagement. Especially important was the use of a treatment engagement measure as a covariate in the analysis of end-of-treatment psychosocial functioning. The results indicate that therapeutic engagement helps remediate the negative impact initial criminal thinking can have on early recovery measures, suggesting that establishing greater treatment program engagement is important for overcoming this barrier to recovery. As changing criminal thinking was a major objective of the in-prison treatments evaluated, it appears that this goal was met.

4.1. Limitations

There are inherent limitations that characterize field research studies, including the basic criticism that these study designs often are not a randomized trial. Often, this type of design is not feasible in practice, as was the current situation. Rather, the present study used a quasi-experimental design and the longitudinal data files were analyzed with a multi-level model with covariate adjustment to test for between-treatment differences. In addition to the lack of random assignment, the study was restricted to inmates from a single state prison system. Nevertheless, characteristics of this inmate sample are similar to those of other recent treatment research samples of methamphetamine and other drug users where the majority were white, in their mid-thirties, unmarried, and employed (Rawson et al., 2004; Semple et al., 2008). Furthermore, substantial percentages had co-occurring alcohol, marijuana, cocaine, and heroin use (Farabee, Prendergast, & Cartier, 2002; Hser, Evans, & Huang, 2005), and large percentages also had histories of criminality, family, peer, and sex-related disease risk problems.

In addition, there was not a standardized time period specifying the point when the primary treatment phase of these prison-based treatments always ended. Prison systems and procedures are subject to policy changes over time, and these introduce variations in treatment availability, eligibility rules, clinical protocols, duration, and other matters. While this places more qualifications on procedural constancy, it also has the effect of enhancing external validity of the findings under practical circumstances. For instance, when we examined the treatment length variable as a covariate in several alternative analyses conducted in conjunction with the present study, the overall results were unchanged from those reported earlier.

It is therefore expected that the current findings can be generalized to other subgroups within the prison system. The present study demonstrates that prison-based interventions targeting specific drug user types can be successful even though they may be for inmates who have characteristics that suggest they are difficult to treat (Rawson, Gonzales, & Brethen, 2002).

Finally, the number of inmates in correctional systems with methamphetamine issues that qualify for treatment raises questions about costs and logistics that deserve to be examined in further research. However, having evidence for promising interventions for these inmates points to the availability of in-prison treatment models that can be adopted by criminal justice institutions. In order to document and further refine the effectiveness of these interventions, this study identified several inmate functioning and treatment engagement domains that should be monitored.

Acknowledgments

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Table 1
Intake to Treatment LS Means on Client Evaluation of Self and Treatment Scales for Indiana Male Methamphetamine User Inmates (N = 2026)

	Treatment Subgroups												Significance F(2, 4033)	
	Cliff-TC			Modified-TC			OTP			Total				
	Mean (S.D.)			Mean (S.D.)			Mean (S.D.)			Mean (S.D.)				
	Intake	Time 2	Intake	Time 2	Intake	Time 2	Intake	Time 2	Intake	Time 2	Intake	Time 2	Trt.	Interaction
Desire for Help	44.9 (.37)	43.4 (.37)	41.8 (.46)	40.8 (.45)	43.3 (.18)	41.7 (.18)	43.3 (.21)	42.0 (.21)	43.3 (.21)	42.0 (.21)	43.3 (.21)	42.0 (.21)	15.76****	1.22
F(1, 4072) Time, ES ^a	31.24****, .26	31.24****, .26	8.02** ,.19	8.02** ,.19	106.94****, .28	106.94****, .28	76.18****, .19	76.18****, .19	76.18****, .19	76.18****, .19	76.18****, .19	76.18****, .19	15.76****	1.22
Treatment Readiness	43.3 (.32)	42.8 (.32)	41.4 (.41)	40.4 (.39)	42.5 (.16)	41.6 (.16)	42.4 (.19)	41.6 (.18)	42.4 (.19)	41.6 (.18)	42.4 (.19)	41.6 (.18)		
F(1, 4072) Time, ES	3.67, .09	3.67, .09	9.88** ,.19	9.88** ,.19	38.47****, .17	38.47****, .17	30.33****, .12	30.33****, .12	30.33****, .12	30.33****, .12	30.33****, .12	30.33****, .12	11.11****	1.31
Self Esteem	30.5 (.51)	36.5 (.48)	32.5 (.63)	39.3 (.59)	30.9 (.25)	36.9 (.24)	31.3 (.29)	37.6 (.27)	31.3 (.29)	37.6 (.27)	31.3 (.29)	37.6 (.27)	6.21**	1.23
F(1, 4071) Time, ES	312.57****, .83	312.57****, .83	224.50****, .93	224.50****, .93	921.36****, .83	921.36****, .83	983.82****, .69	983.82****, .69	983.82****, .69	983.82****, .69	983.82****, .69	983.82****, .69	6.21**	1.23
Depression	28.3 (.54)	24.5 (.55)	27.4 (.67)	22.3 (.68)	28.2 (.26)	24.3 (.27)	27.9 (.31)	23.7 (.32)	27.9 (.31)	23.7 (.32)	27.9 (.31)	23.7 (.32)	2.26	3.31*
F(1, 4071) Time, ES	134.99****, .54	134.99****, .54	135.56****, .72	135.56****, .72	416.60****, .56	416.60****, .56	488.82****, .49	488.82****, .49	488.82****, .49	488.82****, .49	488.82****, .49	488.82****, .49	2.26	3.31*
Anxiety	28.3 (.54)	24.5 (.55)	27.4 (.67)	22.3 (.68)	28.2 (.26)	24.3 (.27)	27.9 (.31)	23.7 (.31)	27.9 (.31)	23.7 (.31)	27.9 (.31)	23.7 (.31)	.04	.61
F(1, 4071) Time, ES	146.23****, .57	146.23****, .57	94.73****, .60	94.73****, .60	386.04****, .54	386.04****, .54	428.23****, .49	428.23****, .49	428.23****, .49	428.23****, .49	428.23****, .49	428.23****, .49	.04	.61
Decision Making	33.2 (.37)	38.6 (.35)	33.8 (.47)	39.1 (.43)	33.0 (.19)	37.2 (.17)	33.3 (.21)	38.3 (.20)	33.3 (.21)	38.3 (.20)	33.3 (.21)	38.3 (.20)	6.31**	8.70****
F(1, 4071) Time, ES	353.08****, .88	353.08****, .88	199.67****, .88	199.67****, .88	634.30****, .69	634.30****, .69	878.86****, .65	878.86****, .65	878.86****, .65	878.86****, .65	878.86****, .65	878.86****, .65	6.31**	8.70****
Hostility	28.4 (.79)	25.0 (.78)	31.0 (1.0)	26.0 (1.02)	29.0 (.40)	25.4 (.40)	29.5 (.50)	25.5 (.49)	29.5 (.50)	25.5 (.49)	29.5 (.50)	25.5 (.49)	1.14	4.78**
F(1, 4072) Time, ES	111.62****, .49	111.62****, .49	135.25****, .72	135.25****, .72	379.06****, .53	379.06****, .53	449.67****, .47	449.67****, .47	449.67****, .47	449.67****, .47	449.67****, .47	449.67****, .47	1.14	4.78**
Risk Taking	34.1 (.45)	28.7 (.47)	33.6 (.56)	28.9 (.58)	34.2 (.22)	30.1 (.23)	34.0 (.26)	29.3 (.26)	34.0 (.26)	29.3 (.26)	34.0 (.26)	29.3 (.26)	2.58†	5.90**
F(1, 4071) Time, ES	261.22****, .76	261.22****, .76	114.16****, .66	114.16****, .66	445.97****, .58	445.97****, .58	260.89****, .35	260.89****, .35	260.89****, .35	260.89****, .35	260.89****, .35	260.89****, .35	2.58†	5.90**
N	450	450	255	255	1321	1321	2026	2026	2026	2026	2026	2026		
CT: Entitlement	18.5 (.46)	16.7 (.45)	20.5 (.58)	17.38 (.57)	19.4 (.22)	18.1 (.22)	19.5 (.27)	17.5 (.27)	19.5 (.27)	17.5 (.27)	19.5 (.27)	17.5 (.27)	3.92*	7.81****
F(1, 4033) Time, ES	46.91****, .32	46.91****, .32	62.76****, .50	62.76****, .50	72.07****, .23	72.07****, .23	160.44****, .28	160.44****, .28	160.44****, .28	160.44****, .28	160.44****, .28	160.44****, .28	3.92*	7.81****
CT: Justification	21.7 (.40)	19.0 (.39)	23.0 (.50)	19.0 (.49)	22.4 (.20)	20.2 (.20)	22.4 (.23)	19.4 (.22)	22.4 (.23)	19.4 (.22)	22.4 (.23)	19.4 (.22)	3.00	7.58****
F(1, 4033) Time, ES	70.57****, .40	70.57****, .40	84.91****, .58	84.91****, .58	132.35****, .31	132.35****, .31	240.81****, .34	240.81****, .34	240.81****, .34	240.81****, .34	240.81****, .34	240.81****, .34	3.00	7.58****
CT: Personal Irresponsibility	21.7 (.53)	19.0 (.52)	23.3 (.66)	20.0 (.65)	22.9 (.26)	20.9 (.25)	22.6 (.31)	20.0 (.30)	22.6 (.31)	20.0 (.30)	22.6 (.31)	20.0 (.30)		

	Treatment Subgroups												Significance F(2, 4033)
	Cliff-TC Mean (S.D.)		Modified-TC Mean (S.D.)		OTP Mean (S.D.)		Total Mean (S.D.)		Trt.	Interaction			
	Intake	Time 2	Intake	Time 2	Intake	Time 2	Intake	Time 2					
F(1, 4033) Time, ES	69.19 ^{*****} , .39		58.52 ^{*****} , .48		102.87 ^{*****} , .28		191.66 ^{*****} , .31		4.45 [*]	5.49 ^{***}			
CT: Rationalization	29.2 (.69)	27.0 (.71)	30.9 (.86)	27.8 (.89)	31.2 (.33)	29.8 (.34)	30.4 (.40)	28.2 (.41)					
F(1, 4033) Time, ES	35.55 ^{*****} , .28		39.61 ^{*****} , .39		39.15 ^{*****} , .17		103.98 ^{*****} , .22		6.28 ^{***}	6.28 ^{***}			
CT: Cold Heartedness	23.3 (.49)	22.5 (.49)	24.2 (.61)	22.7 (.61)	24.3 (.24)	23.3 (.24)	23.9 (.28)	22.8 (.28)					
F(1, 4033) Time, ES	6.68 ^{**} , .12		12.77 ^{***} , .22		29.86 ^{*****} , .15		35.60 ^{*****} , .13		1.79	.85			
CT: Power Orientation	26.5 (.55)	24.6 (.54)	27.7 (.68)	24.4 (.67)	27.5 (.27)	25.5 (.26)	27.2 (.32)	24.8 (.31)					
F(1, 4033) Time, ES	30.63 ^{**} , .26		51.11 ^{**} , .45		94.87 ^{**} , .27		138.03 ^{*****} , .26		1.59	3.68 [*]			
N	439		250		1298								

* $p < .05$,

** $p < .01$,

*** $p < .001$,

***** $p < .0001$;

^aES = effect size

Table 2
Least Square CEST and CTS Means at End of Treatment Phase Adjusted for Demographics and CPPI

CEST	Treatment Modalities			Significant		
	Cliff-TC	Modified-TC	OIP	Total	Treatment	Effect
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Differences	Size
Psychological Functioning						
Self Esteem	36.7 (.40) ^a	38.6 (.50) ^{a,b}	37.0 (.20) ^b	37.4 (.23)	F(2, 1986) = 5.26 ^{**}	.07
Depression	24.5 (.52) ^a	22.7 (.65) ^{a,b}	24.3 (.25) ^b	23.8 (.30)	F(2, 1986) = 2.95 [†]	.05
Anxiety	26.7 (.61)	26.6 (.76)	27.1 (.29)	26.8 (.36)	F(2, 1986) = .43	.02
Decision Making	38.6 (.40) ^a	38.9 (.49) ^b	37.2 (.19) ^{a, b}	38.2 (.23)	F(2, 1986) = 9.62 ^{****}	.10
Social Functioning						
Hostility	25.6 (.33)	24.7 (.42) ^a	25.7 (.18) ^a	25.3 (.19)	F(2, 1987) = 2.21	.05
Risk Taking	28.7 (.54) ^a	29.0 (.67)	30.1 (.26) ^a	29.3 (.31)	F(2, 1986) = 4.07 [*]	.06
Engagement						
Treatment Satisfaction	38.5 (.56) ^a	39.3 (.73)	40.6 (.28) ^a	39.5 (.35)	F(2, 1988) = 7.74 ^{****}	.09
Counselor Rapport	38.8 (.52) ^{a,b}	42.5 (.68) ^b	41.7 (.26) ^a	41.0 (.32)	F(2, 1988) = 16.74 ^{****}	.13
Treatment Participation	43.0 (.33) ^a	43.0 (.40)	42.3 (.16) ^a	42.8 (.19)	F(2, 1987) = 3.15 [*]	.05
Social Support	41.0 (.45)	41.1 (.56)	40.7 (.22)	40.9 (.26)	F(2, 1987) = .28	.02
Peer Support	38.2 (.63)	37.6 (.81)	37.5 (.31)	37.7 (.39)	F(2, 1987) = .62	.02
Criminal Thinking						
Entitlement	17.0 (.46) ^a	17.7 (.58)	18.0 (.22) ^a	17.6 (.27)	F(2, 1949) = 2.38 [†]	.05
Justification	19.3 (.42) ^a	18.9 (.51) ^b	20.2 (.20) ^{a,b}	19.5 (.24)	F(2, 1949) = 4.06 [*]	.07
Personal Irresponsibility	19.2 (.56) ^a	19.9 (.71)	20.8 (.27) ^a	20.0 (.34)	F(2, 1949) = 4.13 [*]	.07
Rationalization	28.2 (.62) ^a	28.0 (.76) ^b	29.6 (.29) ^{a,b}	28.6 (.35)	F(2, 1949) = 3.52 [*]	.06
Cold Heartedness	23.1 (.38)	22.5 (.47)	23.2 (.19)	22.9 (.22)	F(2, 1949) = .75	.03
Power Orientation	25.0 (.41)	24.2 (.51) ^a	25.5 (.21) ^a	24.9 (.23)	F(2, 1949) = 3.32 [*]	.06
N				2026		

[†] $p < .10$.

* $p < .05$,
** $p < .01$,
*** $p < .001$,
**** $p < .0001$

a,b Treatment modalities with common superscript are significantly different.

Table 3
Effects of Engagement as Covariate on Relationships of Patient Attributes to End of Treatment Outcomes

F-Tests for Fixed Effects from Multi-level Analyses for CEST Scales						
	SE	DP	AX	DM	HS	RT
Model 1: Background, Demographics, and Treatment Modality as Predictors (without Engagement)						
Pre-treatment	459.62****	486.74****	661.24****	241.64****	632.23****	361.23****
Treatment modality	5.27**	3.03*	.30	9.35****	2.03	3.62*
Demographics						
Age	6.56*	.04	1.98	.92	14.83****	3.96*
Race: White vs. non White	.23	5.76*	15.15****	.47	.01	8.41**
CPPI	3.50+	5.70*	8.39**	3.29+	4.61*	.03
Criminal Thinking (Initial)	10.44**	5.66*	9.16**	24.53****	5.79*	3.85*
Model 2: Background, Demographics, and Treatment Modality as Predictors (with Engagement)						
Pre-treatment	545.99****	543.88****	733.60****	272.76****	704.55****	411.95****
Treatment modality	2.32+	2.14	.99	17.41****	2.19	5.95**
Demographics						
Age	6.13*	.22	2.74+	2.92+	17.40****	4.45*
Race: White vs. non White	.47	5.90*	14.59****	.70	.04	7.56**
CPPI	8.48**	11.03****	11.48****	13.79****	7.54**	.32
Criminal Thinking (Initial)	.15	.47	.41	.69	.02	.08
Engagement	378.18****	274.33****	142.24****	798.66****	186.97****	115.92****

* $p < .05$,

** $p < .01$,

*** $p < .001$,

**** $p < .0001$