CHANGES IN OFFENDER MOTIVATION DURING PRISON-BASED SUBSTANCE ABUSE TREATMENT: EVALUATING INDIVIDUAL PATHS AND THEIR RELATIONSHIPS TO TREATMENT PROGRESS

by

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Dissertation approved:

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CHANGES IN OFFENDER MOTIVATION DURING PRISON-BASED SUBSTANCE ABUSE TREATMENT: EVALUATING INDIVIDUAL PATHS AND THEIR RELATIONSHIPS TO TREATMENT PROGRESS

Aaron Michael Cherry

Background and Context

Success in substance abuse treatment is related to a number of factors. Engagement studies show that those who stay in treatment longer (Simpson, 1981; Simpson, Joe, & Rowan-Szal, 1997) and attend more sessions (Simpson, Joe, Rowan-Szal, & Greener, 1995) develop stronger peer and counselor relationships (Broome, Knight, Knight, Hiller, & Simpson, 1997; Joe, Simpson, Dansereau, & Rowan-Szal, 2001) and show greater improvements; these are measured by reduced drug use, recidivism, and improved psychosocial functioning. Motivation for treatment, in turn, is associated with increased levels of engagement. That is, more motivated clients tend to engage more in treatment and thus achieve better outcomes. Studies show that individuals highly motivated for treatment are more likely to remain in treatment and develop stronger therapeutic alliances (Broome, Simpson & Joe, 1999; Joe, Simpson, & Broome, 1998).

Treatment motivation and engagement are also important in correctional settings where coercion may be a factor (e.g., Hiller, Knight, Leukefeld, & Simpson, 2002; Hiller et al., 2009).

Additionally, offenders who continue their treatment by entering and engaging in

aftercare show significantly better outcomes than those who do not (De Leon, Melnick, Thomas, Kressel, & Wexler, 2000; Hiller, Knight, & Simpson, 1999; Melnick, De Leon, Thomas, Kressel, & Wexler, 2001).

The importance of these treatment factors and their relationship to treatment outcomes necessitates valid measures from which clinicians can develop treatment plans and monitor treatment progress. Researchers at Texas Christian University (TCU) have developed and validated measures (Garner, Knight, Flynn, Morey, & Simpson, 2007; Joe, Broome, Rowan-Szal, & Simpson, 2002) for this purpose and many institutions have adopted them as part of standard clinical practice. These instruments track dynamic changes in dimensions such as psychological and social functioning, criminal thinking, and treatment engagement.

The role of motivation as a dynamic variable, however, is less clear. Although authors indicate that motivation is a dynamic state and needs to be sustained during treatment (e.g., De Leon, Melnick, & Tims, 2001; Simpson, 2004), few studies have evaluated motivation changes during treatment or how these relate to during-treatment outcomes. A study evaluating motivation change is needed to clarify 1) how changes in motivation relate to treatment progress and during-treatment outcomes, 2) if trajectories provide information beyond intake measures, and 3) what qualitative changes may occur in offender motivations both during-treatment and as they transition into the community.

The following overview of the current study describes motivation and its relationship to treatment progress and treatment outcomes by 1) reviewing theoretical underpinnings for current motivation scales, 2) considering motivation's relationship to the TCU treatment process model, 3) providing evidence for motivation's role in

corrections, 4) describing the limited body of knowledge covering motivation change, and 5) describing a study that addresses some deficits in the current motivation change literature. Data from the Disease Risk Reduction (DRR) study at Texas Christian University (TCU) provide a unique opportunity to explore changes in motivation during treatment. Additionally, qualitative data collected from offenders who have discharged into the community provides context for changes which may occur in treatment motivation.

Literature Review

Motivation Construct

Motivation Types. Motivation for substance abuse treatment is an important dimension related to client involvement in treatment outcomes both during and post-treatment. When discussing motivation it is good to first distinguish between motivation for change and motivation for treatment (De Leon et al., 2001). Whereas motivation for change may come in the form of self-changers (i.e., individuals who do not seek treatment), motivation for treatment is a very specific type of motivation in which an individual recognizes a need for change and seeks treatment as a means to achieve that change. This discussion will focus primarily on motivation for treatment, but the reader should be aware that motivation for change underlies many of the principles to be discussed.

A second distinction is related to the source of motivation. Motivation can be thought of as either internally or externally derived and these sources may have differential prediction of treatment outcomes. Indeed, whereas externally motivated clients are likely to remain in treatment, internally motivated clients are more likely to

engage in the treatment process (Knight, Hiller, Broome, & Simpson, 2000). The current discussion will primarily focus on internally derived motivation and how it relates to treatment process.

Theoretical Underpinnings. Early studies on motivation for treatment were built on the Stages of Change model (Prochaska & DiClemente, 1986). The Stages of Change represent phases in which individuals move during the change process including pre-contemplation, contemplation, preparation, action, and maintenance. Whereas individuals in the pre-contemplation stage are not considering change, movement to the contemplation, preparation and action stages represents increases in cognitive and behavioral commitment to change. Maintenance represents a period of consolidation when an individual must practice new behaviors and integrate them into their lives. Other theorists use multidimensional models including independent factors believed to contribute to the motivation construct (see Circumstances, Motivation, Readiness, and Suitability [CMRS]; De Leon & Jainchill, 1986). The CMRS shifts from the concept of motivation for change to motivation for treatment by measuring special circumstances or pressures, internal motivation, individual readiness to accept formal treatment, and suitability for a formal treatment program.

TCU Studies. Building from these early conceptualizations of motivation, researchers at TCU developed and validated three core dimensions of treatment motivation: assessment of drug use problems, desire for help, and readiness for treatment (Simpson & Joe, 1993). This study showed that clients scoring a 2.5 (on a four point Likert scale) or lower had a 45% dropout rate compared to a 19-25% dropout rate for those with higher levels of motivation. Scales from these studies developed over time

and are now represented in the Client Evaluation of Self and Treatment (CEST; described in the methods). CEST motivation scales include **Problem Recognition**: acknowledgement of problems and their relatedness to drug use; **Desire for Help**: an individual's understanding that they need to change and a desire to get help with that change; and **Treatment Readiness**: willingness to accept action in the form of specific steps or commitments to treatment. These scales will provide the foundation for most of the current discussion on motivation.

Motivation and Treatment Process

Importance of Assessment. Assessments in substance abuse treatment are important because they provide information about client attributes such as motivation, client progress during treatment, and other treatment process measures. Understanding a client's traits and characteristics thus enables treatment staff to tailor treatment plans to client needs and adjust those treatment plans based on progress made. Certain client attributes are static and do not change through the course of treatment (e.g., criminal history or problem severity) whereas other client attributes are dynamic and are expected to change through the course of treatment (e.g., criminal thinking or psychosocial functioning). Ongoing assessments, therefore, are designed to capture these traits and inform treatment and discharge planning. Understanding assessment needs is best understood through a treatment process model in which key elements of treatment and their interrelationships are illustrated.

TCU Treatment Process Model. Treatment process models provide a framework from which both evidence-based practices (EBPs) and measurement strategies of client progress can be implemented. To best understand treatment process it is helpful to

illustrate the interrelationships of key treatment components graphically. The TCU treatment process model (Simpson, 2004) shown in Figure 1(below) illustrates the "black box" of treatment (i.e., early engagement, early recovery, and stabilized recovery) along with dimensions that influence the way clients progress through treatment and ultimately how they fare after treatment.

In the model, engagement is measured by participation and therapeutic relationships that precedes positive changes in the way an individual thinks and acts. Changes in cognitions and behaviors then are associated with post-treatment outcomes. In offender populations, outcomes often include measures of criminal activity (e.g., recidivism) in addition to drug use measures. Additionally, aftercare services are typically provided to offenders to support positive outcomes. Treatment needs, drug use severity, and treatment motivation are located before the "black box" and are considered to be factors that influence a client's level of engagement. The following sections describe evidence supporting the various components of the TCU treatment process model and how motivation relates to them.

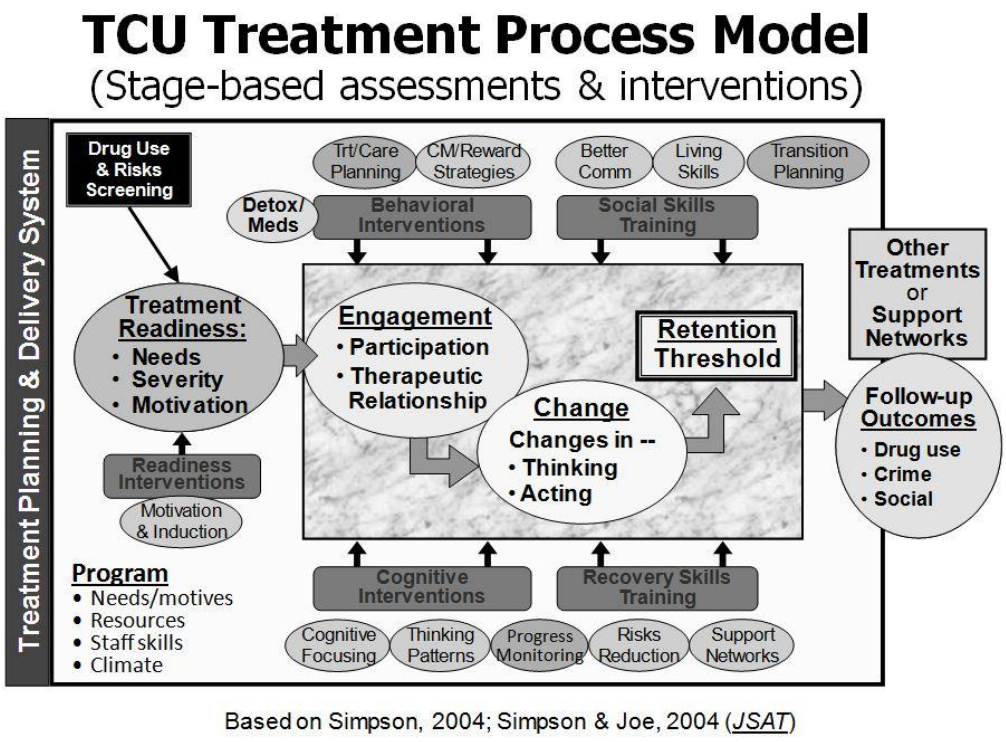


Figure 1: TCU Treatment Model

Motivation Predicts Engagement. Client motivation is related to engagement in substance abuse treatment which is an essential ingredient for successful outcomes. Early studies focused on treatment tenure as an approximation of treatment engagement. Clients spending less than 90 days in treatment, for example, did not fare significantly better than those only participating in a detox program (Simpson, 1981). Later studies refined engagement measures to include session attendance (Simpson et al., 1995), treatment participation (Yang et al., 2013), and therapeutic relationships (Broome et al., 1997; Joe et al., 2001). These refined measures of engagement are related to during-treatment and post-treatment outcomes.

Session attendance, for example, has been associated with reductions in post-treatment outcomes such as illegal activities and drug use as well as during-treatment improvements in self-esteem, depression, and hostility (Simpson et al., 1995).

Additionally, clients with poor therapeutic relationships were almost 4 times as likely to be involved in illegal activity, 3 times as likely to test positive for cocaine, and 2 times as likely to test positive for heroin after treatment. These studies indicate the importance of client engagement in the treatment process and necessitate studying factors related to increased levels of engagement.

Motivation for substance abuse treatment is a central predictor of treatment retention and treatment engagement across multiple treatment modalities (Broome et al., 1999; Joe et al., 1998). In one study, *Treatment Readiness* was a significant predictor of 90-day retention in long-term residential (LTR) and outpatient methadone (OMT) settings, but not in outpatient drug-free (ODF) programs (Joe et al., 1998). Non-significant findings for ODF clients were explained in terms of the stages of change model in which ODF clients are more likely to be in the contemplation stage. Perhaps more importantly, this study reported positive correlations between *Treatment Readiness* and treatment process measures (i.e., treatment confidence, counselor rapport, and treatment engagement). Another study used structural equation modeling to demonstrate motivation's relationship to engagement and engagement's relationship to outcomes (Griffith, Knight, Joe, & Simpson, 1998). Notice in the model below (Figure 2) that motivation predicted increases in engagement and engagement predicted reductions in deviance after treatment. This model also illustrates important antecedents to motivation (discussed below).

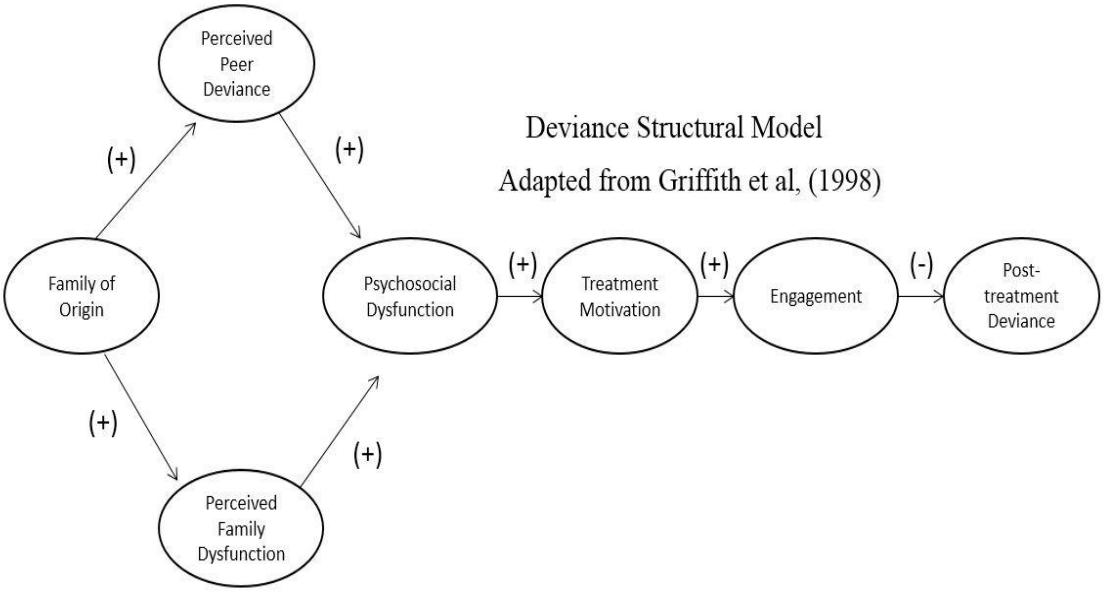


Figure 2: Deviance Structural Model

Motivation Correlates

In addition to understanding motivation's relationship to outcomes, it is important to understand positive and negative correlates of motivation that may influence its degree or usefulness. Understanding facilitators and barriers to motivation provides valuable information for clinicians dealing with varying degrees of client motivation. The following sections describe some positive and negative correlates of motivation and how they interrelate.

Psychosocial Dysfunction. Predictors of increased motivation for substance abuse treatment often involve various types of dysfunction that act like road signs signifying a need for help. That is, when a person relates problems such as depression, anxiety, or low self-esteem to their drug use, they are more likely to desire help in refraining from drug use. Conversely, a person that does not perceive problems as being related to their drug use is likely to be unmotivated and not engage in treatment. Early

studies on treatment motivation (Simpson & Joe, 1993) showed that psychosocial problems such as depression, anxiety, and inability to control violent behavior were positively correlated with *Desire for Help* and *Treatment Readiness.* Referring back to Figure 2, notice that psychosocial dysfunction (i.e., low self-esteem, depression, anxiety, risk-taking and social conformity) predicted a composite motivation score that was related to post-treatment outcomes (Griffith et al., 1998).

Criminal Thinking. Whereas psychosocial dysfunction variables are associated with increased levels of motivation, criminal thinking constructs are associated with lower levels of motivation. Based in Sutherland's differential association theory (Sutherland & Cressey, 1978), Sykes and Matza's neutralization theory (Sykes & Matza, 1957), and Yochelson and Samenow's criminal personality perspective (Yochelson & Samenow, 1976), criminal thinking represents criminal attitudes and cognitive errors that influence the initiation and maintenance of criminal behavior (Walters, 2006). Neutralization theory is particularly interesting because it describes techniques in which individuals "neutralize" dissonant effects caused by behaving in ways incongruent with their values (Sykes & Matza, 1957). These techniques are defense mechanisms which serve to protect clients' views of themselves as "good," keeps them from accepting responsibility for their actions, and limits their desire for change in drug treatment.

Studies show that criminal thinking is negatively correlated with treatment motivation and treatment engagement. Negative correlations, for example, were reported between criminal thinking scales (i.e., *Entitlement, Justification, Personal Irresponsibility, Power Orientation, Cold Heartedness, and Criminal Rationalization*) and motivation scales (i.e., *Desire for Help* and *Treatment Readiness*) as well as

treatment engagement measures (Garner et al., 2007). Moreover, clients high in criminal thinking show lower levels of psychological and social functioning (Best, Day, Campbell, Flynn, & Simpson, 2009). These considerations are especially important in correctional settings where criminal attitudes flourish.

Motivation in Correctional Settings

Issues with Coercion. Assessing motivation's importance in correctional-based treatment centers is important because of the potential coercion associated with treatment in these settings. Studies have specifically addressed this problem and demonstrated the efficacy of measuring motivation in correctional settings. One study found that, while controlling for age, gender, marital status, drug type, and number of arrests, motivation significantly predicted positive therapeutic process measures such as personal involvement, personal progress, and psychological safety (Hiller et al., 2002). Additional research (Knight et al., 2000) showed that both internal and external sources of motivation were important, but that internal sources seemed to be most relevant to treatment participation whereas external motivation was associated with treatment tenure.

Motivation Predicts Aftercare Entry. Entry into aftercare is important to the success of in-prison substance abuse treatment in offender populations (Hiller et al., 1999). Studies have shown that intake motivation for substance abuse treatment predicts entry into aftercare and subsequent reductions in recidivism. Using the Circumstances, Motivation, and Readiness (CMR) scales, researchers showed that high intake motivation was associated with entering aftercare, which in turn predicted reductions in drug use and recidivism (De Leon et al., 2000). Extending this research, Melnick et al., (2001) showed

that a combination of influence between motivation and treatment engagement predicted entry into aftercare suggesting that motivation must be maintained throughout treatment.

Motivation Change

Induction Strategies. In addition to understanding the interrelationships between motivation at intake and treatment process indicators, it is important for clinicians to have strategies to improve motivation in poorly motivated clients and to maintain motivation in highly motivated clients. Numerous induction strategies exist and typically are used to heighten a client's awareness of drug-related problems in a non-direct way. Indeed, direct confrontation of a person's drug addiction and related problems may serve to raise a client's defense mechanisms and curb motivation rather than increase it. Motivational interviewing (see Miller & Rollnick, 2002) is a prominent, non-confrontational technique that can be used to increase motivation. Similarly, cognitive games such as the *Downward Spiral* (Czuchry, Sia, Dansereau, & Dees, 1997; Czuchry, Sia, & Dansereau, 2006) are used to enhance an individual's awareness of drug-related problems and thus increase commitment to formal treatment. Although there are well established methods for increasing motivation, only a limited body of research has addressed changes in motivation during treatment.

Limited research. Motivation is consistently referred to in the literature as a dynamic construct that must be sustained throughout treatment (e.g., De Leon et al., 2001; Simpson, 2004). Despite this commonly accepted view, few studies have examined motivation change during the course of treatment. One exception used the CMRS scales and a latent growth curve analysis to describe change in motivation (Morgen & Kressel, 2010). In this study "motivation" represented internal reasons for

wanting to change and "readiness" represented perceived need for treatment to aid that change. It was reported that readiness for treatment was a significant predictor of motivation, but that change in motivation was relatively small and flat. The authors, however, stress that a limitation with latent growth curve analysis is that it estimates the average slope of change and can wash out important differences (i.e., some individuals may show increases in motivation and others decreases).

Additional studies have evaluated motivation change over time using the TCU motivation scales. Utilizing three separate growth curve models, changes in *Problem Recognition* and *Desire for Help* were found to be non-significant, but there was a significant decrease in *Treatment Readiness* scores from intake (Hiller, Knight, Rao, & Simpson, 2002). Another study echoed these findings showing that *Desire for Help* and *Treatment Readiness* decreased during treatment, though the effect sizes reported for these changes were considered small (Joe, Rowan-Szal, Greener, Simpson, & Vance, 2010).

Measurement Issues. Client attributes contribute to the way an individual progresses through treatment. These characteristics can be both static and dynamic variables (e.g., criminal history or problem severity before treatment versus psychosocial functioning or treatment engagement during treatment). Measuring treatment dimensions that change over time is important because it provides information about client progress. Indeed, many of the treatment dimensions discussed thus far may be monitored throughout treatment and treatment plans may be adjusted accordingly. Depression, for example, is a psychological construct that clinicians should evaluate for change (especially after interventions have been administered to address it). Therapeutic

engagement, likewise, should be monitored through the course of treatment and should change as clients move through treatment. Clinicians may then use this information to adjust treatment or discharge plans to match current client needs.

Measurement and interpretation of motivation during treatment, however, is not well understood. Some authors (e.g., Joe et al., 2010) suggest that motivation scales have only limited and specialized use beyond intake. If this is true, measures of motivation beyond intake may result in misinterpretations by clinicians and lead to reduced treatment effectiveness or wasted resources. Considering the scant evidence for changes in motivation, clinicians are often left to anecdotal or experiential understandings of motivation changes and are likely to vary considerably between clinicians or agencies.

Although some research has evaluated motivation change (e.g., Hiller et al., 2002; Joe et al., 2010; Morgen et al., 2010), the methodologies used in these studies may not provide a complete picture and mask meaningful effects. Indeed, as previously noted, latent growth curve analysis estimates the average slope of change on a given dimension. Finding relatively flat slopes may be due to some individuals increasing in motivation and some decreasing. A study is needed to evaluate motivation changes with techniques that will highlight any hidden growth patterns. Moreover, the study should evaluate difference in growth in relation to changes in other treatment process variables and treatment outcomes.

Theory of Current Concern. Goal theories (e.g., theory of current concern) provide additional frameworks needed to evaluate motivation change. The Theory of Current Concern (TCC) postulates that a *current concern* drives commitment to a goal until the goal is either achieved or relinquished. Defined by Klinger and Cox (2011),

"Commitment to a goal pursuit launches a latent, time-binding brain process (a *current concern*) that sensitizes the individual to respond emotionally and to notice, recall, think about, dream about, and act on cues associated with the goal pursuit" (p.3).

In measuring motivation across time, a *current concern* may drive how an individual responds on a set of questions evaluating treatment processes such as motivation. Moreover, because of the improving nature of treatment, client concerns are likely to shift in meaning or value. As Klinger and Cox (2011) note, goals are driven by either aversive or appetitive stimuli. An offender's treatment motivation may begin with aversive life events (such that removing drug-related problems is the primary drive for treatment) but then transition to appetitive goals in which the offender is motivated to continue treatment for positive life advancements (e.g. family, relationships, career, etc.).

Current Study

Study Design

The current study uses a mixed-method approach to evaluate change in offender motivation during treatment and its relationship to treatment progress. Mixed-methods designs use both quantitative and qualitative data conjointly to provide a more complete picture of a given situation. This approach is useful because it utilizes "real world" qualitative data to provide context for quantitative findings. The current study, therefore, was approached with both **Quantitative and Qualitative** goals in mind (each studied independently; see Figure 3).

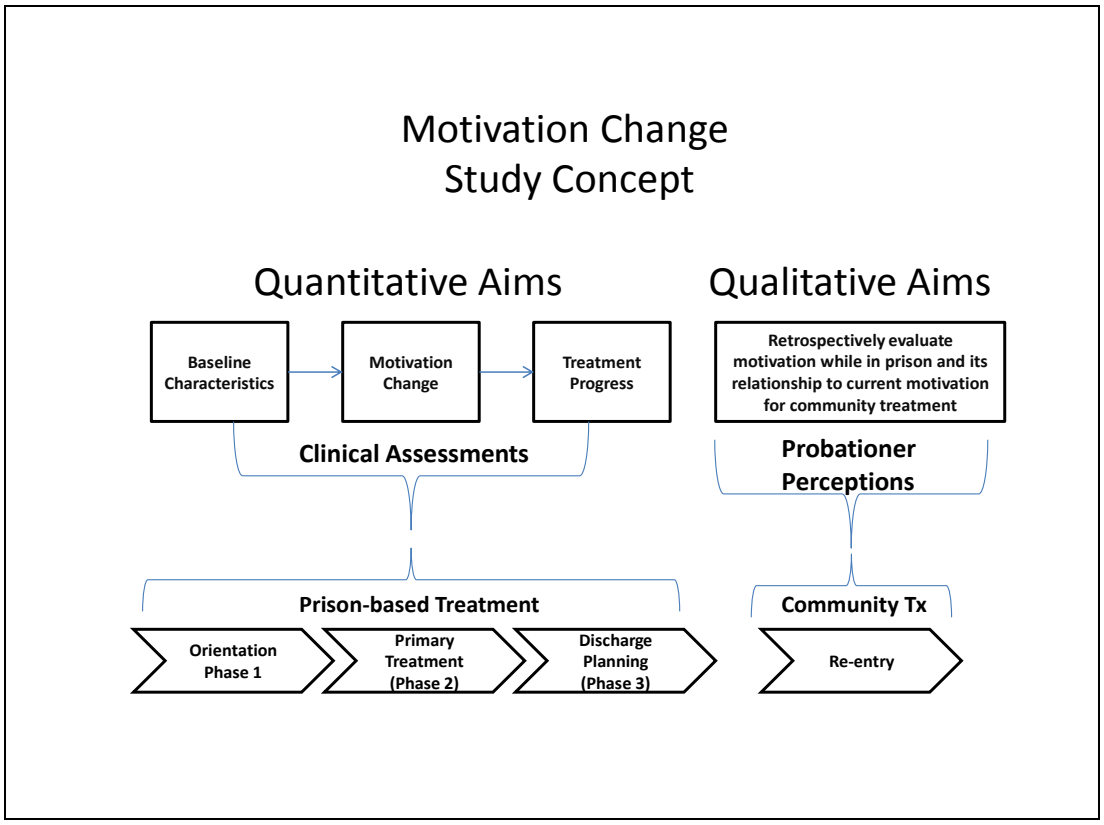


Figure 3

Secondary data (i.e., clinical assessments used to track offender progress in prison-based treatment) were used to evaluate quantitative changes in motivation and its relationship to treatment progress. Group-based modeling was used to model change in motivation and treatment progress measures. In this approach, discrete groups with varying growth trajectories are formed and cases are assigned to the group in which they most likely belong. In this way, comparisons can be made between different growth styles in *Treatment Motivation*.

Additionally, qualitative information was elicited from probationers who had participated in prison-based treatment; these participants were asked to retrospectively evaluate their motivation during prison-based treatment and its relationship to their current motivation for community-based treatment. The remainder of this document (i.e.,

study aims, methods, analytic approach, results and discussion) is divided into **Quantitative** and **Qualitative** sections.

Quantitative Aims

Aim 1 modeled change in *Treatment Motivation* and selected motivation groups for comparison (to be used in Aims 2 and 3). First, a group-based modeling approach was used to explore growth trajectories (i.e., types of change) in offender motivation during prison-based treatment. Groups with similar starting levels of motivation but divergent growth patterns were then selected for comparison. The following hypotheses include specific predictions about the expected types of motivation groups to be found:

- Groups exist with relatively stable motivation and would primarily differ on intake mean (based on previous findings, e.g., Hiller, et al., 2002).
- Groups exist with high levels of motivation at intake but show substantial reductions in motivation through the course of treatment (e.g., asocial clients may respond in a socially desirable way at intake [Pankow & Knight, 2012]; client dissatisfaction may induce loss of motivation).
- Groups exist with low levels of motivation at intake but show substantial increase in motivation through the course of treatment (e.g., based on the widespread use of treatment induction strategies; e.g., Miller & Rollnick, 2002).

Aim 2 used Logistic regression models to evaluate characteristics that may be associated with motivation trajectories—specifically, trajectories with similar starting levels of motivation, but divergent patterns of motivation over time. We evaluated the ability of known correlates of intake motivation levels (i.e., Drug Severity, Psychological/Social Functioning, and Criminal Thinking) to predict membership in

these groups. Figure 4 illustrates, as an example, two models that were used in this evaluation; the reader should note, however, that two additional models were evaluated for the High-Start motivation groups (HS-Stable vs. HS-Increase and HS-Stable vs. HS-Decrease).

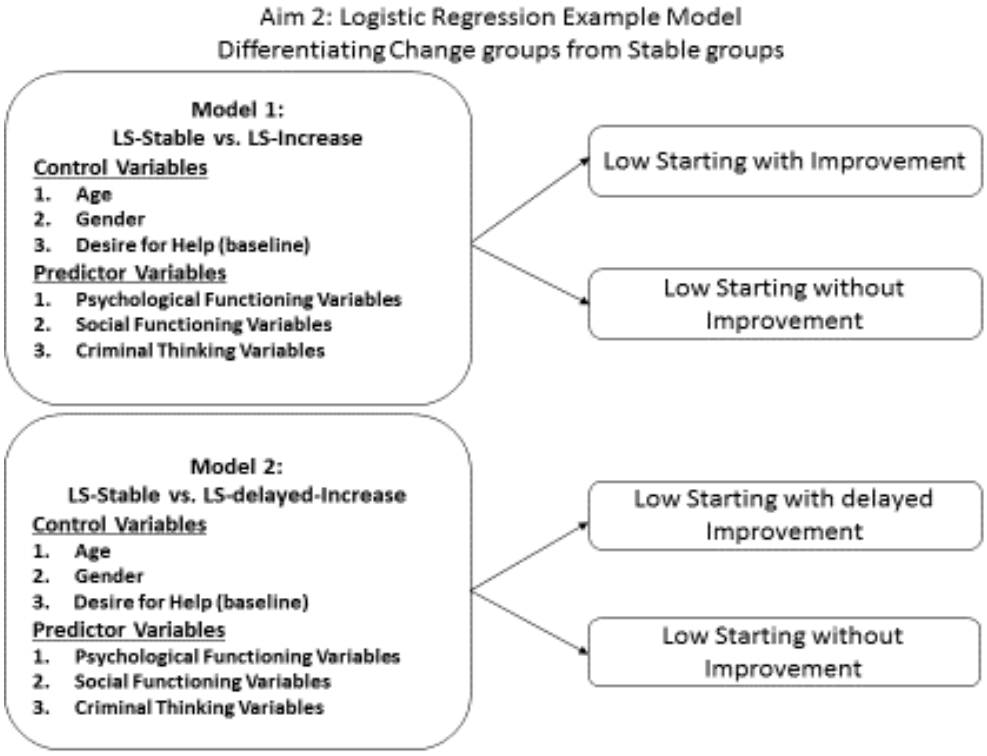


Figure 4

Aim 3 modeled change in *Treatment Progress* variables using group-based modeling and then evaluated the joint probabilities of being in each *Treatment Progress* group given membership in each *Treatment Motivation* group. It was hypothesized that:

- Those who start with high levels of motivation but decrease over time would show lower engagement and satisfaction with treatment, fewer cognitive improvements, and less change in criminal thinking than those who start with similar levels of motivation but maintain it throughout treatment.

- Those who start with low motivation but increase during treatment will show higher engagement and satisfaction with treatment, greater cognitive improvements, and decreased levels of criminal thinking compared to those who start with similar levels of motivation but maintain it throughout treatment.

Qualitative Aims

Aim 4 used qualitative interviews to elicit information from probationers who participated in prison-based treatment and were currently participating in community-based treatment. Interviews asked offenders about their motivation for treatment during prison (i.e., *Problem Recognition, Desire for Help, and Treatment Readiness*), how it changed during prison, and how it related to their motivation for community-based treatment. It was hypothesized that motivation for treatment would have qualitative changes during treatment in the following ways:

- Probationers would report more aversive reasons for their *Treatment Motivation* at the beginning of prison-based treatment and more appetitive reasons toward the end of treatment.
- Probationers would report a change in the types of help they desire from treatment as they move closer to discharge.
- Probationers would vary in their initial evaluation/expectations of treatment and their evaluation of treatment as they became involved in treatment.

Methods

The methods section will be subdivided into Quantitative Methods and Qualitative Methods, each with their own participants, instruments, and analytic plans. The Quantitative portion of the study utilized pre-existing data from the Disease Risk

Reduction study and thus does not have a procedures section; general information about the collection of these data is reported under the Quantitative Participants section. The Qualitative portion of the study, however, collected primary data and includes a procedures section.

Quantitative Methods

Quantitative Participants represent a diverse sample of 6,963 men and women offenders drawn from eight correctional institutions in two states. The sample was collected as part of the Disease Risk Reduction (DRR) project which implemented and tested an intervention designed to reduce the spread of infectious diseases. Data were collected on all offenders at participating treatment centers during the time of the study and are not limited to participants who specifically signed up to participate in the DRR intervention; these data were obtained as de-identified secondary data collected as part of routine clinical practice at the eight facilities. Procedures were approved by the TCU Institutional Review Board (IRB).

The eight correctional institutions varied by gender and by specialization. Substance Abuse Felony Punishment (SAFP) facilities and In-Prison Therapeutic Communities (IPTC) represented institution types from one state. The core difference between these institutions is that IPTCs generally included more long-term prisoners who were mandated to treatment as a condition of release, and SAFPs typically housed offenders who had shorter sentences or were being diverted into treatment. Sites from another state consisted of minimum security level prisons providing therapeutic community substance abuse treatment.

Approximately 68% were men and 32% were women. Mean age for the whole group was 34.9 years (*SD* = 9.97), 20% of the sample identified as Latino, 26% identified as Black, 52% identified their race as White, and 22% identified as Other. Education levels were heterogeneous with 38% having less than 12 years, 44% having 12 years, and 18% having more than 12 years of education. Lastly, 25% were married, 46% were single, and 29% were widowed/divorced. Table 1 shows demographics for the Quantitative Participants.

Table 1
Demographic Characteristics of Quantitative Participants

Gender	Male (n = 4706)	Female (n = 2257)	Combined (n = 6963)
Mean Age	35.6	33.5	34.9
Latino (yes)	21%	19%	20%
Race			
Black	30%	16%	26%
White	46%	64%	52%
Other	24%	20%	22%
Education			
Less than 12 years	36%	44%	38%
12 years or GED	48%	35%	44%
More than 12 years	16%	21%	18%
Marital Status			
Married	25%	25%	25%
Single	48%	42%	46%
Divorced/Widow	27%	33%	29%

Quantitative Instruments consisted of TCU assessments used during routine clinical practice in prison-based treatment centers and include the following: The Global Risk Assessment Adults (TCU A-RSKform) provided demographic information such as age, gender, race, education level, and marital status; The Motivation form (TCU MOTform) provided quantitative measures of motivation across time on three motivation domains (*Problem Recognition, Desire for Help,* and *Treatment Readiness*); The

Engagement form (TCU ENGform) provided information on level of participation and therapeutic alliances built during treatment; The Psychological functioning form (TCU PSYform) and Social functioning form (TCU SOCform) provided information on offender psychological and social functioning over the course of treatment; The Texas Christian University Drug Screen (TCUDS II) was used to measure Drug Severity; the Criminal Thinking Scales (TCU CTS) provided measures on criminal attitudes and thinking errors. These scales have demonstrated good psychometric properties and can be found at www.ibr.tcu.edu and in Appendix A-E. With the exception of demographics from the A-RSK form and certain questions on the TCU-DS II form, all variables were scored on a five point Likert-type scale ranging from disagree strongly to agree strongly. *Note: Reliabilities reported below for Criminal Thinking, Treatment Motivation, Psychological Functioning, Social Functioning, Treatment Engagement, and Drug Severity are from Simpson et al. (2012).*

TCU Form administrations were given at four time points. Intake (Admin 1) was measured soon after arrival at the treatment facility, End of Phase I (Admin 2) was measured at the end of orientation for the program (about 30 days after intake), End of Phase II (Admin 3) was measured at the end of the main part of treatment, and End of Phase III (Admin 4) was measured at the end of discharge planning as the offenders prepared to be released back into the community. It should be noted that these treatment phases varied in length between some institutions and varied within institutions according to offender progress during treatment (i.e., offenders moved through phases based on progress made rather than preset intervals). The administration points (*Admin*) are indicated for each of the following constructs.

Aim 1 Variables: Modeling Motivation Change

Treatment Motivation (Admin 1-4). The present study focused on *Desire for Help* for the purposes of quantitatively evaluating changes in motivation. *Desire for Help* (DH; alpha = .81) consisted of 6 items such as "you need help dealing with your drug use" and "it is urgent that you find help immediately for your drug use" which characterizes an offender's desire to obtain help in dealing with their addiction. TCU motivation scales "Treatment Readiness" and "Problem Recognition" were not evaluated in the quantitative portion of this study to narrow the study's focus. The *Desire for Help* construct was used because it seemed most applicable in evaluating motivation over time. Certain questions in the Problem Recognition scales (e.g., "Your drug use is going to cause your death if you don't quit soon") and Treatment Readiness (e.g., "You need to stay in treatment") are context dependent and may make less sense when being evaluated over time. Although only the single *Desire for Help* sub-scale was used, we will refer to the quantitative motivation construct as "*Treatment Motivation*" for the remainder of this document.

Aim 2 Variables: Predicting Treatment Motivation Group Membership

Control Variables (Admin 1). Demographic variables *Age* and *Gender* were used as control variables in the Aim 2 analysis and were collected using the ARSK described above. Additionally, we also controlled for baseline *Treatment Motivation* described above.

Psychological Functioning (Admin 1). Psychological functioning was measured with each of the following sub-scales: *Depression, Anxiety,* and *Self-esteem*. *Depression* (DP; alpha = .81) consisted of 6 items like "you feel extra tired or run down." *Anxiety*

(AX; alpha = .85) consisted of 7 items such as "you feel anxious or nervous." *Self-esteem* (SE; alpha = .76) consisted of 6 items like "you have much to be proud of."

Social Functioning (Admin 1) was measured using two individual subscales: *Hostility* and *Risk-taking*. *Hostility* (HS; alpha = .84) consisted of 8 items like "you feel a lot of anger inside you" or "you get mad at other people easily." *Risk-taking* (RT; alpha = .80) assesses an individual's willingness to engage in risky behaviors and consisted of 7 items such as "you like to take chances" and "you like friends who are wild."

Criminal Thinking (Admin 1) was evaluated at baseline using six individual subscales: *Entitlement, Justification, Power Orientation, Cold Heartedness, Criminal Rationalization,* and *Personal Irresponsibility*. *Entitlement* (EN; alpha = .78) consisted of 6 items such as "you have paid your dues in life and are justified in taking what you want." *Justification* (JU; alpha = .75) consisted of 6 items like "when being asked about the motives for engaging in crime, you point out how hard your life has been." *Power Orientation* (PO; alpha = .81) consisted of 7 items such as "when not in control of a situation, you feel the need to exert power over others." *Cold Heartedness* (alpha = .68) consisted of 5 items like the reversed scored item "seeing someone cry makes you sad." *Criminal Rationalization* (alpha = .71) consisted of 6 items such as "police do worse things than do the 'criminals' they lock up." *Personal Irresponsibility* (alpha = .68) consisted of 6 items such as "you are not to blame for everything you have done."

Drug Severity (Admin 1). The *Drug Severity* (alpha = .89) score used 12 items which yielded a score between 0-9 that measures pretreatment drug severity from the TCU DS II form. The core dimensions of the score are based on the *Diagnostic and Statistical Manual of Mental Disorder* (DSM-IV; 2000) criteria that focus on drug use

patterns, reoccurring consequences, and withdrawal (Simpson et al., 2012); whereas scores greater than 3 indicate relatively severe drug-use problems we used the 0-9 scale as a continuous variable.

Aim 3 Variables: Evaluating Treatment Progress

Treatment Progress (Admins 1-4). Although not a formal variable, *Treatment Progress* refers to variables that indicate how well an individual was progressing through treatment. These were used as reference points to indicate how motivation during treatment related to progress made in the treatment episode. *Treatment Progress* included measures on *Therapeutic Engagement, Treatment Satisfaction, Decision Making* and *Neutralizations*; these are described in detail below.

Therapeutic Engagement (Admin 2-4). Following the lead of Joe et al., (2010), *Therapeutic Engagement* was a composite score created by averaging two engagement constructs: Treatment Participation and Counselor Rapport. Treatment participation (TP; alpha = .86) consisted of 12 items such as "you are willing to talk about your feelings during counseling" and "you are following your counselor's guidance." Counselor Rapport (CR; alpha = .93) consisted of 12 items such as "your counselor is easy to talk to" and "your counselor respects your opinion."

Treatment Satisfaction (Admin 2-4). *Treatment Satisfaction* (TS; alpha = .79) consisted of 7 items designed to capture the level of satisfaction an offender had with their treatment program. Typical items were "You are satisfied with this program" or "This program is organized and run well."

Decision Making (Admin 1-4). This *Treatment Progress* variable was used to represent change in offender ability to plan ahead. *Decision Making* (DM; alpha = .74)

was a single subscale and consisted of 9 items such as "You think about probable results of your actions."

Neutralizations (Admin 1-4). The *Neutralizations* variable was created from three of the Criminal Thinking variables (Justification, Criminal Rationalizations, and Personal Irresponsibility; outlined above) to represent the neutralization techniques often used by criminals to justify their crimes (see Sykes & Matza, 1957). This variable was used as a measure of *Treatment Progress* in that effective treatment should either reduce these cognitions or at least curb the growth of them.

Quantitative Analytic Plan. The quantitative analyses sought to determine number of trajectories in *Treatment Motivation* (Aim 1), evaluate factors that best distinguish groups with similar starting levels of *Treatment Motivation* but differing growth trajectories (Aim 2), and evaluate how these divergent patterns in *Treatment Motivation* relate to *Treatment Progress* measures (Aim 3).

Aim 1 analyses. A group-based modeling approach was used to identify different trajectories or groups of change in *Treatment Motivation*. In this approach, the user defines progressively more complex models (i.e., more groups) starting with one group, then two, and so on, to identify the number of groups that best fit the data. A program developed for SAS called "proc TRAJ" was used to detect clusters of change in *Treatment Motivation*. Procedures outlined by Jones, Nagin, and Roeder (2001) were used to limit the number of meaningful groups in the analyses by evaluating the *log Bayes factor.*

The *log Bayes factor* is approximately two times the difference between the Bayesian Information Criterion (BIC) of the simpler model from the more complex

model (i.e., more user-defined number of groups). Models with successively more groups were compared until the *log Bayes factor* was less than 2—a change not worth mentioning according to Jones et al. (2001)—which indicates that the model with more groups does not fit the data sufficiently better than the model with fewer groups. In favor of parsimony, the model with fewer groups was retained. Average posterior probabilities of group membership for each group were also calculated which provided an estimate of the reliability of each group; these should generally be .70 or higher (Andruff, Carraro, Thompson, Gaudreau, & Louvet, 2009). Groups with lower average posterior probabilities are at increased risk for misclassification and thus posterior probabilities were considered in addition to the *log Bayes factor*.

Aim 2 analyses. Independent, binary logistic regressions were used to test the predictive model presented in the *Current Study* section of this manuscript. Each prediction model used *Drug Severity*, *Psychological Functioning* measures (*Depression, Anxiety,* and *Self-Esteem*), *Social Functioning* (*Hostility* and *Risk*-Taking), and *Criminal Thinking* (*Entitlement, Justification, Power Orientation, Cold-Heartedness, Criminal Rationalization,* and *Personal Irresponsibility*) as predictors of group membership between a "change" group and a stable group with similar intake scores. In addition to these predictor variables we controlled for baseline *Treatment Motivation, Age,* and *Gender*. A chi-square test was used as an omnibus test of the overall predictive capacity of the model and the Lemeshow and Hosmer test was used as a measure of model fit to the data. Regression coefficients of good fitting models were evaluated.

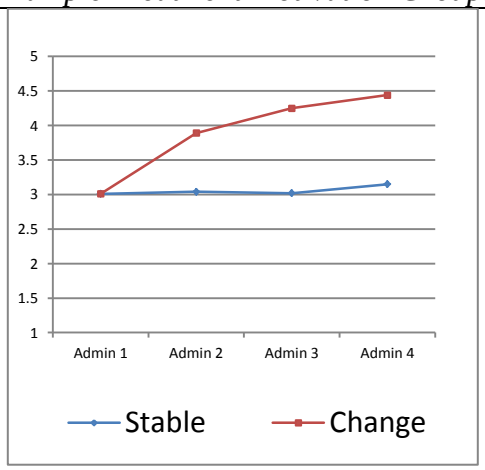
Aim 3 analyses. To evaluate the *Treatment Progress* paths of divergent *Treatment Motivation* trajectory groups, we first modeled change in each *Treatment*

Progress measure (*Therapeutic Engagement*, *Treatment Satisfaction*, *Decision Making*, and *Neutralizations*) in the same fashion that we modeled change in *Treatment Motivation*. Dual trajectory modeling, an extension of group-based modeling (used in Aim 1), was originally intended to compare different *Treatment Progress* paths of those in contrasting *Treatment Motivation* groups. Convergence issues with some of the models, however, precluded this as a comprehensive strategy to evaluate our hypotheses.

We altered our plan slightly and in the following ways: To evaluate differences in *Treatment Progress* of offenders who had similar starting levels of *Treatment Motivation* but divergent growth patterns we first modeled change in *Treatment Progress* measures and then evaluated the relative odds of each of two *Treatment Motivation* groups (change vs. stable) of belonging to each type of *Treatment Progress* modeled. Figure 5 (below) provides an illustration to help understand our approach.

Aim 3 Illustrative Model

Example Treatment Motivation Groups	*Example Treatment Progress Groups*



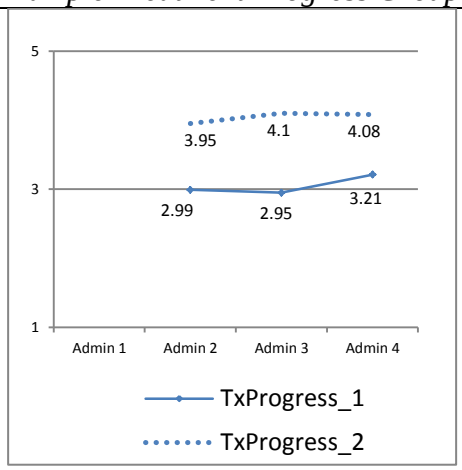


Figure 5

Figure 5 shows two hypothetical *Treatment Motivation* groups (Stable vs. Change) on the left and two hypothetical *Treatment Progress* groups on the right. Consider the following example: our approach was to compare the "Stable" group's odds

of belonging to TxProgress_1 to the "Change" group's odds of belonging to TxProgress_1; the same comparisons were then performed for TxProgress_2. Odds Ratios were calculated and statistical associations were tested by constructing Confidence Intervals (CI). Odds ratios were calculated as the ratio of a "change" *Treatment Motivation* group's probability of belonging to a given *Treatment Progress* group compared to the "stable" *Treatment Motivation* group's probability of belonging to the same *Treatment Progress* group; a ratio of 1/1 (OR =1.0) indicates no relationship or that each of the *Treatment Motivation* groups had the same odds of belonging to that specific *Treatment Progress* group. 95% Confidence Intervals were then constructed to evaluate if ORs greater or less than 1.0 were statistically different from 1.0. In practice, if the 95% CI encompasses 1.0, then the null hypothesis of no relationship could not be rejected at the .05 probability level.

Qualitative Methods

Qualitative Participants. Participants for this portion of the study consisted of Probationers who had completed prison-based treatment and were assigned to community-based treatment by the Tarrant county SAFP (Substance Abuse Felony Punishment) courts. Participants were recruited and screened from probation office waiting rooms. Eligible participants were asked to take part in a semi-structured interview that took 20 to 30 minutes. The sample included 20 adult probationers who participated in prison-based substance abuse treatment and were currently involved in community-based treatment. The total number of participants included 10 males and 10 females; three participants declined the interview when instructed that participation was

completely voluntary and one participant withdrew his consent after the interview was started.

Qualitative Instruments consisted of a *semi-structured interview* (Appendix F) that elicited information from probationers about their motivation for prison-based treatment and its relationship to their motivation for community-based treatment. Specifically, the interview guide asked probationers to retrospectively evaluate their motivation on core motivation dimensions (*Problem Recognition, Desire for Help,* and *Treatment Readiness*) while in prison, how the importance and nature of these dimensions shifted over time, and how these dimensions related to their motivation for community-based treatment.

Qualitative Procedures. Participants were recruited from probation offices (from the Tarrant County SAFP Courts) to take part in a face-to-face interview. A research assistant asked if participants were interested in answering some questions about their treatment and briefly explained the scope of the study. Interested participants had the study described in more detail and were asked to sign an Informed Consent document and a Media Release (approved by the TCU IRB) for audio recording. A semi-structured interview lasting approximately 20 to 30 minutes was conducted and audio recorded. Participation in the study was completely voluntary and no monetary compensation was offered to participants for participation. Additionally, no identifying information was collected on participants during the interview and consent forms were not linked to the audio recordings (i.e., they were stored aggregately in a separate folder).

Qualitative Analytic Plan. The qualitative analytic plan addressed Aim 4 by evaluating the interview content using qualitative coding procedures (described below).

An iterative process was used to extract common themes related to probationers' motivations for prison-based treatment and its relationship to their motivations for community-based treatments. Main codes consisted of topic content from areas addressed in semi-structured interviews whereas sub-codes consisted of the specific content—related to the main codes—provided by the participants. It was expected that participants would have a qualitative shift in the nature and reasons for their motivation. Specifically, reasons for motivation at the beginning of treatment may be more related to the aversive consequences of their drug-abuse whereas motivation nearing the end of treatment may be more related appetitive reasons such as desire to help others, obtain employment, or reunite with family.

Qualitative analysis software (*Atlas ti*) was used to aid code development (i.e., theme development) as well as evaluate prevalence of themes and associations within themes. Atlas ti utilizes a query function using Boolean operators that allows users to create reports on occurrences and co-occurrences of themes. Emerging themes are discussed in relation to Qualitative interview topics (Problem Recognition, Desire for Help, and Treatment Readiness) and Quantitative findings for the corresponding motivation dimension. These results add to the Quantitative findings by providing greater detail and insights into the nature of change in the core motivation dimensions. Whereas the quantitative analyses provided statistical information about individual motivation levels over time, the qualitative analyses broadened the scope to include the offender's opinions on the importance of those dimensions at various points in treatment, what things changed during treatment that influenced their motivation, and how these changes influenced their desire to participate in community-based treatment upon release.

Qualitative Power Analysis. Determining sample size needed for qualitative analysis is a somewhat subjective endeavor. In general, the concept of saturation is used to denote the point at which gathering additional interviews no longer provides new information (Mason, 2010). Qualitative analysts have, however, developed some "rule of thumb" guidelines to assist researchers in estimating, a priori, the number of participants needed to approach saturation. The present study will take the lead of Creswell (1998) who suggested that, in grounded theory methodology (i.e., one that uses an iterative, inductive approach to analyzing qualitative data) researchers should seek 20 to 30 participants.

Results

Quantitative Results

Aim 1: Modeling Change in *Treatment Motivation*. Modeling *Treatment Motivation* was completed in several stages. The first stage used group-based modeling to complete an *Initial change model of Treatment Motivation;* the second stage involved *Selecting Treatment Motivation comparison groups;* and the third stage used group-based modeling for a *Reevaluation of the comparison group sub-set* (this was done to verify number of groups, group sizes, and shapes of trajectories).

***Initial Model of Treatment Motivation*.** A group-based modeling approach was used to model change in *Treatment Motivation*. A series of increasingly complex models (i.e., more groups) were fitted to determine the number of discrete groups which best describe the data. In practice we were looking for the model with the greatest absolute BIC value (details about the procedure can be found in the Quantitative Analytic Plan). An 11-group solution was determined to best represent the number of distinct trajectories

in *Treatment Motivation*. Models from a 1-group solution through an 11-group solution yielded BIC values ranging from -24,861 to -20,438, respectively. Addition of a 12th group yielded a BIC value of -20,466, which was no longer an improvement over the previous model; the 11-group solution was thus retained. Average posterior probabilities of group membership ranged from 0.64 to 0.88 (moderate to good reliability) which provides an indication of whether or not cases were assigned to the correct group.

Table 2 provides a description of these groups including the average posterior probability, group size, and trajectory shape. The trend statistics presented in the table (i.e., intercept, linear, quadratic, and cubic) provide a value for the degree of change in shape of the trajectory over the four administration points. Group 1, for instance, has an average starting *Treatment Motivation* level of 2.16; the negative linear trend (linear = -2.05) indicates a significant and negative linear slope between Administrations 1 and 2, the significant quadratic slope indicates a change to an increasing or positive slope between Administrations 2-3 and, finally, the cubic trend indicates a slight reduction in *Treatment Motivation* for this group between Administrations 3 and 4. Notice in Table 2 that some groups have been bolded black and some are grayed; the bold black groups were selected for additional analyses in Aims 2-3.

Table 2
*Description of **Treatment Motivation** Trajectories*.

Group	N	% of Total	Posterior Probability	Intercept	Linear	Quad	Cubic
1	**30**	**0.43**	**0.88**	**2.16*** **	**-2.05*** **	**2.77*** **	**-0.64*** **
2	**120**	**1.72**	**0.75**	**2.36*** **	**-0.01**	**----**	**----**
3	**93**	**1.33**	**0.77**	**2.53*** **	**1.55*** **	**-0.31*** **	**----**
4	391	5.62	0.71	2.96***	-0.01	----	----
5	891	12.80	0.70	3.57***	-0.06***	----	----
6	**2,752**	**39.52**	**0.73**	**4.08*** **	**-0.03*** **	**----**	**----**
7	**29**	**0.42**	**0.81**	**4.24*** **	**1.39** **	**-1.86*** **	**0.38*** **
8	**155**	**2.23**	**0.64**	**4.39*** **	**0.25** **	**----**	**----**
9	1,828	26.25	0.66	4.65***	-0.12***	----	----
10	600	8.62	0.64	5.31***	-0.19***	----	----
11	74	1.02	0.74	5.33***	2.05***	----	----

Note: $p < .05$* $p < .01$** $p < .001$***
Bolded groups were selected for comparison in additional analyses
Grayed groups were excluded from analyses in Aims 2 and 3; see ***Selecting Treatment Motivation comparison groups*** section below.

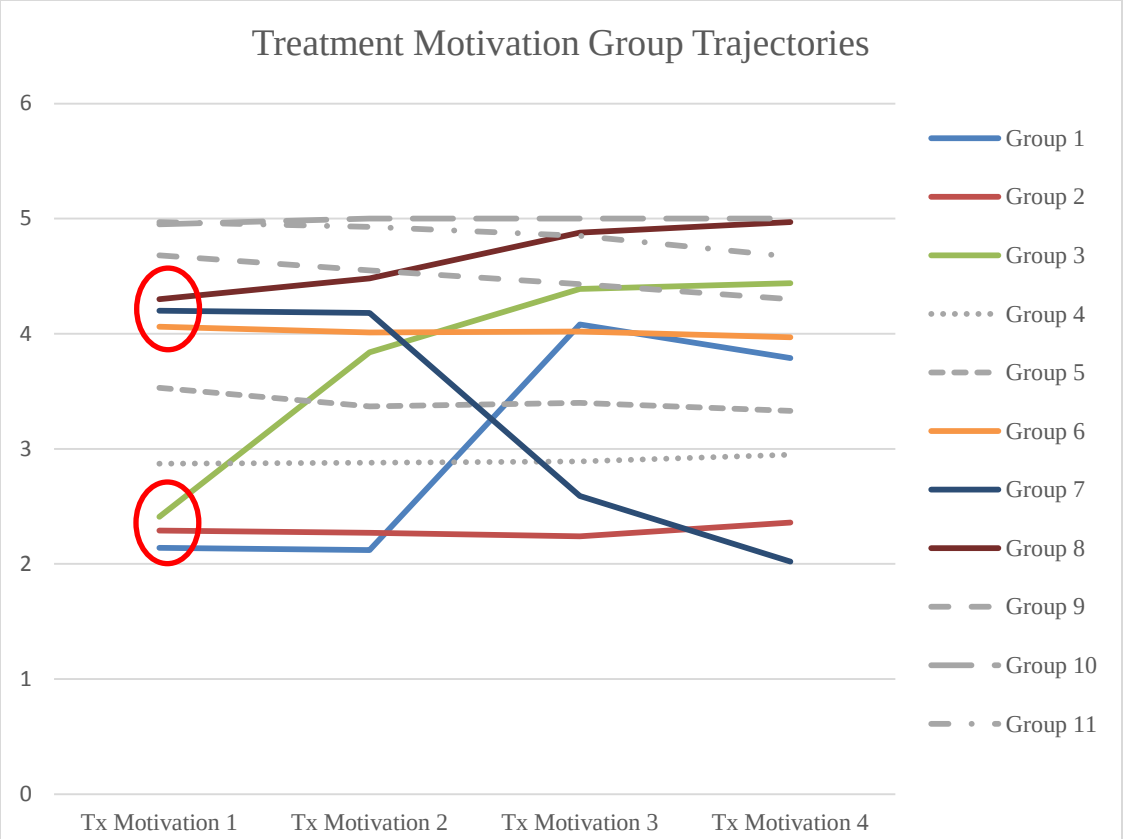
Generally speaking, a great majority of the cases were in groups in which *Treatment Motivation* either had no change or showed slight decreases over time, primarily differing on intake mean; these results support the first hypothesis for Aim 1 that groups would emerge with relatively little change in *Treatment Motivation* over time. The hypothesized change groups (albeit only about % of the total sample) also emerged from the data and are discussed in greater detail below.

Selecting Treatment Motivation comparison groups. Groups with similar starting values on *Treatment Motivation* but divergent growth patterns were selected for comparison in Aims 2 and 3. A visual inspection of the trajectory groups revealed two broad classifications of divergent comparison groups (see Figure 6). Notice the groupings circled in red. One set starts with low values of *Treatment Motivation* (Low Start; LS) and the other starts with high levels of *Treatment Motivation* (High Start; HS). A *t*-test between the means of the highest starting "Low Start" group and the lowest

starting “High Start” group showed that these two groupings were significantly different from each other ($p < .05$).

Notice among the Low Start groups *Treatment Motivation* levels appear to increase during treatment for two groups, whereas the third group appears to remain relatively unchanged during treatment; Group 3 in Figure 6 will be called *LS-Increase* (Low-Start Increase) and Group 1 will be called *LS-delayed-Increase* for the remainder of this manuscript. The stable group (Group 2 in Figure 6) in the Low Start set will be called *LS-Stable* and will be used as the comparison group.

Similarly, in the High Start groups, one of the groups appears to remain relatively unchanged during treatment, one group appears to increase and another appears to decrease during treatment; Group 9 in Figure 6 will be called *HS-Increase* (High-Start Increase), Group 4 will be called *HS-Decrease*, and Group 7 will be called *HS-Stable* (used as comparison group) for the remainder of this manuscript.



Note: Groups are numbered from lowest starting value (Group 1) to highest starting value (Group 11).
Note: Solid-colored lines were selected for further analysis. Grayed lines were excluded

Figure 6

Reevaluation of the comparison group sub-set. Because we were interested in comparing groups with divergent patterns of *Treatment Motivation,* we sub-set the Low-Start and High-Start comparison group sets and re-evaluated them using group-based modeling procedures. This was done to narrow the focus of the sample and to verify the same distinct trajectories would emerge from the subsets. These are described under *Low Start Treatment Motivation descriptions and High Start Treatment Motivation descriptions.*

Low Start Treatment Motivation descriptions. The Low-Start groups were subset and reanalyzed (using the group-based modeling procedures) for reasons described

above. Reevaluations of the *Low Start* groups yielded groups of the same trajectory shape and size. Please note that all of the following analyses involving the Low Start groups were performed on the subset. The following provides a brief description of these groups.

Individual *t*-tests were used to evaluate *Treatment Motivation* group differences at each time point. Results showed that, at Administration 1, means between the *LS-Increase* ($M = 2.41$) and the *LS-delayed-Increase* ($M = 2.16$) groups were not significantly different ($p > .05$) from the *LS-Stable* group ($M = 2.29$). At administration 2, however, the *LS-Increase* group mean ($M = 3.84$) was significantly greater ($p < .05$) than the *LS-stable* group mean ($M = 2.26$) and the *LS-delayed-Increase* group mean ($M = 2.14$) which did not differ ($p > .05$). At administration 3, both the *LS-Increase* ($M = 4.39$) and the *LS-delayed-Increase* ($M = 4.08$) groups were significantly greater ($p < .05$) than the *LS-Stable* group ($M = 2.24$). Lastly, at administration 4, both the *LS-Increase* ($M = 4.44$) and the *LS-delayed-Increase* ($M = 3.79$) remained significantly greater ($p < .05$) than the *LS-Stable* group ($M = 2.36$).

High Start DH Group descriptions. The High-Start groups were also subset and reanalyzed. When reanalyzing the High Start groups, a 7-group solution, rather than the three groups revealed in the complete dataset, was determined to best represent the data. We decided to remove the cases forming the newly determined trajectories for a second round of analysis so that we could evaluate those cases most likely to belong to the originally determined groups. By removing these cases we improved the posterior probability of each of the specified groups. Specifically, the HS-Stable was reduced by 241 participants but had an improved posterior probability of .98; the HS-Increase was

reduced by 44 but had an improved posterior probability of .98; and the HS-Decrease increased in sample size by 2 participants and had an improved posterior probability of .99. Recall that the posterior probability provides the average likelihood that cases have been assigned to the correct group. It was preferable to remove the "noise" created by the cases that may have been misclassified that emerged as distinct groups in the reevaluation. All further analyses for the High-Start groups were performed on this subset.

Individual *t*-tests were used to evaluate *Treatment Motivation* group differences at each time point. Results showed that means between the *HS-Stable* ($M = 4.06$) and the *HS-Decrease* ($M = 4.16$) groups were not significantly different ($p > .05$); differences between the *HS-Stable* ($M = 4.06$) and the *HS-Increase* ($M = 4.31$) group, however, were significant ($p < .05$) although they had a relatively small effect size (Cohen's $d = 0.28$). At administration 2, the *HS-Stable* group mean ($M = 4.00$) was significantly less ($p < .05$) than both the *HS-Increase* group mean ($M = 4.66$) and the *HS-Decrease* group mean ($M = 4.23$). At administration 3, the *HS-Stable* group ($M = 4.04$) was significantly less ($p < .05$) than the *HS-Increase* group ($M = 4.92$) and significantly greater ($p < .05$) than the *HS-Decrease* group ($M = 2.63$). Lastly, at administration 4, the *HS-Stable* group mean ($M = 4.00$) remained significantly smaller than the *HS-Increase* group ($M = 4.96$) and significantly greater ($p < .05$) than the *HS-Decrease* group ($M = 1.96$).

Summary of Aim 1 Results: Modeling Treatment Motivation. The goal for this aim was to model change in *Treatment Motivation* using a group-based modeling approach which groups cases with similar starting levels and trajectories into discrete groups. Overall, the results supported the hypothesized groups. Specifically, groups

emerged that showed little to no change differing primarily by intake levels of *Treatment Motivation*; these groups represented a great majority of the sample. Conversely, groups emerged that started with low motivation, but then diverged and showed substantial increase in motivation over time, whereas other groups started with high levels of motivation, but showed a substantial decline in motivation over time. An unexpected group also emerged from the data which started with a relatively higher level of motivation and showed improved levels of *Treatment Motivation* during treatment.

Aim 2: Predicting Differential Growth in *Treatment Motivation*. Aim 2 sought to identify pre-treatment factors that would predict membership in groups with similar starting levels of *Treatment Motivation* but divergent patterns of change over time. Independent logistic regressions were used to evaluate whether intake variables known to be correlated with *Treatment Motivation* could predict membership in a change group vs. a stable group (separated into High Start and Low Start analyses).

Separate binary logistic regressions were used to evaluate the hypothesized model described in the Current Study section of this manuscript. Control variables including *Age*, *Gender*, and baseline *Treatment Motivation* scores and predictor variables including *Drug Severity, Psychological Functioning* variables *(Depression, Anxiety, and Self-esteem), Social Functioning* variables *(Hostility and Risk Taking)* and *Criminal Thinking* variables *(Entitlement, Justification, Power Orientation, Cold-Heartedness, Criminal Rationalizations, and Personal Irresponsibility)* were used in an effort to predict membership between the two groups in each analysis set.

***Predicting Group Membership: LS-Stable vs. LS-Increase*.** A logistic regression was performed to explore potential predictors that could predict membership in the LS-

Stable vs. the LS-Increase group. The predictive model included *Drug Severity*, *Psychological, Social,* and *Criminal Thinking* as predictors and baseline *Treatment Motivation*, *Age*, and *Gender* as control variables. The overall omnibus test of the model coefficients was significant $\chi^2 = 25.67$, $p = .03$, and a Hosmer and Lemeshow test indicated the model fit the data $\chi^2 = 3.50$, $p = .90$.

Results show that, while controlling for all other variables in the model, a 1 unit increase in *Gender* (male to female) was associated with a reduction in the odds of being in the LS-Increase group ($b = -1.11$, Exp(B) = 0.33, Wald $\chi^2 = 8.10$, $p = .004$). Conversely, while controlling for all other variables in the model, a one unit increase in *Hostility* was associated with increased odds of being in the LS-Increase group ($b = 0.58$, Exp(B) = 1.78, Wald $\chi^2 = 3.92$, $p = .048$). A classification table shows that the model correctly classified 48.3% of the LS-Increase group, which was an improvement over the null model which classified 0% of the LS-Increase group correctly. (It should be noted, however, that while the overall classification accuracy improved, the full model misclassified 19% of the LS-Stable group who were classified correctly in the null model.)

***Predicting Group Membership: LS-Stable vs. LS-delayed-Increase*.** Logistic regression procedures for the LS-Stable vs. the LS-delayed-Increase groups showed the overall omnibus test of the model coefficients was non-significant $\chi^2 = 12.27$, $p = .59$, and a Hosmer and Lemeshow test indicated a relatively poor model fit ($\chi^2 = 14.97$, $p = .06$); because of this we did not report further on this section.

Predicting Group Membership: HS-Stable vs. HS-Increase. A logistic regression for the present comparison showed a significant overall omnibus test of the

model coefficients, χ^2 =79.27, $p < .001$, and a Hosmer and Lemeshow test indicated the model fit the data $\chi^2 = 8.37$, $p = .40$. Although the overall model was significant and tests indicated the model fit the data, a classification revealed that the full model classified 0% of the HS-Increase correctly, although it correctly classified 100% of the HS-Stable group. This could be due to the grossly imbalanced cell distributions between the two *Treatment Motivation* groups (i.e. n = 2508 for the HS-Stable vs. n = 111 for HS-Increase). Additionally, the only significant predictor variable in the model was baseline *Desire for Help* which was used to control for baseline variation in *Treatment Motivation.*

Predicting Group Membership: HS-Stable vs. HS-Decrease. In testing the overall predictive capacity of our model for the HS-Stable vs. HS-Decrease comparison, a logistic regression showed the overall omnibus test of the model coefficients was significant χ^2 =39.97, $p < .001$, and a Hosmer and Lemeshow test indicated the model fit the data $\chi^2 = 5.41$, $p = .71$.

Results show that, while controlling for all other variables in the model, a 1 unit increase in *Gender* (male to female) was marginally associated with an increase in the odds of being in the HS-Decrease group ($b = 1.09$, Exp(B) = 2.96, Wald $\chi^2 = 3.74$, $p = .053$). A one unit increase in *Justification* was associated with a decrease in odds of being in the HS-Decrease group ($b = -2.05$, Exp(B) = 0.13, Wald $\chi^2 = 12.56$, $p < .001$), whereas a one unit increase in *Power Orientation* was associated with an increase in the odds of being in the HS-Decrease group ($b = 0.99$, Exp(B) = 2.69, Wald $\chi^2 = 5.00$, $p = .025$). The classification showed similar results as the previously discussed High Start comparisons in which the full model classified 0% of the HS-Decrease group correctly, and 100% of the HS-Stable group correctly.

Aim 2 Summary. Overall, the models did not have strong predictive utility for group membership. A small association was noted between gender and group membership for two of the comparisons (LS-Stable vs. the LS-Increase and HS-Stable vs. HS-Decrease). Additionally, increased *Hostility* was associated with improved odds of membership in the LS-Increase group; increased *Justification* was associated with a reduction in odds of being in the HS-Decrease group; and increased *Power Orientation* was associated with increased odds of being in the HS-Decrease group. The lack of consistent findings between models suggests, however, that the significant results may have been spurious.

Aim 3: Evaluating Group Differences in *Treatment Progress*. The purpose of Aim 3 was to evaluate differences in *Treatment Progress* of groups with similar starting levels but divergent growth patterns of *Treatment Motivation*. Initially, we planned to use dual-trajectory modeling—an extension of the group-based modeling procedures previously described—to model *Treatment Motivation* groups and *Treatment Progress* groups conjointly. This process yields estimated conditional probabilities of belonging to a given *Treatment Progress* group given membership in a particular *Treatment Motivation* group. Convergence issues with some of the dual models, however, precluded this as a comprehensive method to evaluate our hypotheses.

Continuing along the same lines of analysis, we used group-based modeling to model change in each *Treatment Progress* measure (*Therapeutic Engagement, Treatment Satisfaction, Decision Making,* and *Neutralizations*). We then calculated the relative odds (odds ratio; OR) of each of two *Treatment Motivation* groups (change vs. stable) belonging to a given *Treatment Progress* group.

A series of 2x2 cross tabulations were carried out that included *Treatment Motivation* group on one axis (change vs. stable) and membership to a *Treatment Progress* group on the other axis (true vs. false). Confidence Intervals (CI) were constructed as a statistical measure of association for these odds ratios. For an odds ratio to be significantly different than 1.0 (OR of 1 means there is no association) the CI should not include 1.0. These results are divided by Treatment Engagement Measures (i.e. *Therapeutic Engagement* and *Treatment Satisfaction*) and Cognition Measures (i.e. *Decision Making* and *Neutralizations*).

Treatment Engagement Measures. Two Treatment Engagement measures were used to evaluate the relationships between *Treatment Motivation* group membership and *Treatment Progress* group membership*;* these variables were *Therapeutic Engagement* and *Treatment Satisfaction.* The *Therapeutic Engagement* measure was a combination of an individual's rapport developed with their counselor at each administration point and their participation in individual and group counseling sessions; the *Treatment Satisfaction* measure evaluated an individual's satisfaction with various dimensions of their treatment. The following sections describe the most probable growth trajectories on these constructs given a particular type of growth in *Treatment Motivation.*

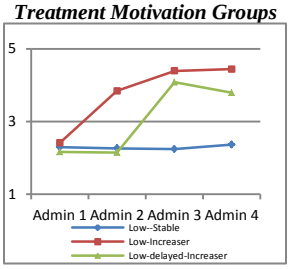
Therapeutic Engagement

Low-Start Odds Ratios for Therapeutic Engagement. Group-based modeling results for *Therapeutic Engagement* in the Low-Start groups revealed three groups with posterior probabilities ranging from .80 to .83. Group 1 (TE_1) had an intercept of 3.04 and a non-significant liner trend; Group 2 (TE_2) had an intercept of 3.98 with a significant increase between Administrations 2 and 3 and then decreased between

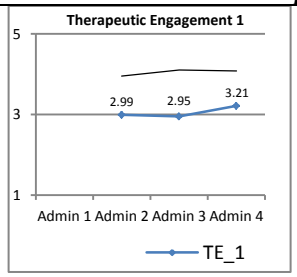
Administrations 3 and 4; Group 3 (TE_3) had an intercept of 4.55 and had a significant and positive linear trend. These trends are presented in Figure 7 below.

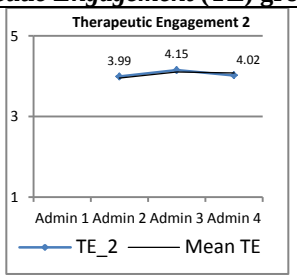
Figure 7 shows growth trajectories for Treatment Motivation and Therapeutic Engagement for the Low-Start groups. Note: The black line represents the average TE for all groups.

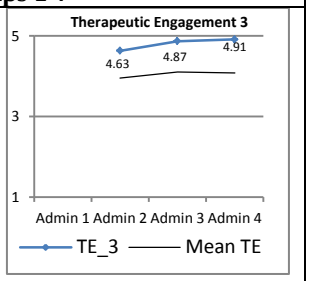
***Treatment Motivation* groups**



***Therapeutic Engagement* (TE) groups 1-7**







Adjoining Table shows the probability of each Low-Start Treatment Motivation group (belonging to each Therapeutic Engagement group. ORs compare the LS-Increase and the LS-delayed-Increase groups to the LS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Therapeutic Engagement	***Treatment Motivation* groups**								
	LS Stable (n=120)			LS-Increase (n=93)			LS-delayed-Increase (n=30)		
	n	%	OR	n	%	OR	n	%	OR
TE_1	24	20.0%	---	4	4.3%	0.22*	2	6.7%	0.34
TE_2	90	75.0%	---	70	75.3%	1.000	20	66.7%	0.89
TE_3	6	5.0%	---	19	20.4%	4.08*	8	26.7%	5.34*

Figure 7

Odds ratios were calculated to give the relative likelihood of each *Treatment Motivation* group belonging to each of the above mentioned *Therapeutic Engagement* groups. Figure 7 illustrates the joint trajectories with calculated odds ratios. In general, participants from each of the Low-Start *Treatment Motivation* groups were most likely to belong to the middle *Therapeutic Engagement* group (TE_2) with probabilities ranging from 66.7% to 75.0%; these odds were not significantly different. Additionally, participants in the change groups (LS-Increase and LS-delayed-Increase) tended to have a greater chance of belonging to the highest *Therapeutic Engagement* group (TE_3) whereas the LS-Stable group tended to have a greater chance of being in the lowest

Therapeutic Engagement group (TE_1). The following will discuss comparisons and trends for each of the Low Start *Treatment Motivation* groups separately.

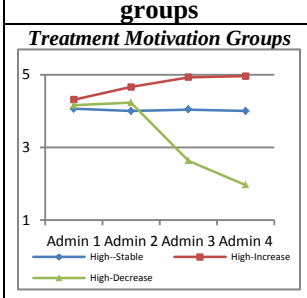
LS-Increase group comparisons. Compared to the LS-Stable group, participants in the LS-Increase group were less likely to be in the lower *Therapeutic Engagement* group, equally likely to be in the middle *Therapeutic Engagement* group, and more likely to be in the upper *Therapeutic Engagement* group. Only about 4% of the LS-Increase group, compared to 20% of the LS-Stable group, belonged to the lowest *Therapeutic Engagement* group (TE_1); these odds were significantly different (OR = .22, 95% CI [0.08, 0.60]). Conversely, about 20% of the LS-Increase group was in the highest *Therapeutic Engagement* group (TE_3) compared to 5% of the LS-Stable group; these odds were also significantly different (OR = 4.08, 95% CI [1.70, 9.80]). Although the LS-Increase and LS-Stable groups did not differ in their odds of being in the middle *Therapeutic Engagement* group (TE_2), these results support the hypothesis that increases in *Treatment Motivation* are associated with greater levels of *Therapeutic Engagement* and reduced risk of low levels of *Therapeutic Engagement.*

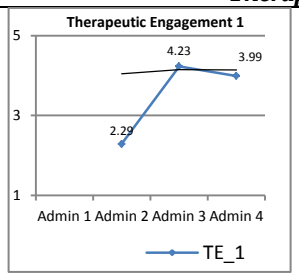
LS-delayed-Increase group comparisons. Similar results were found when evaluating the LS-delayed-Increase group. Approximately 27% of the LS-delayed-Increase group, compared to 5% of the LS-Stable group, belonged to the highest *Therapeutic Engagement* group (TE_3); these odds were significantly different (OR = 5.34, 95% CI [2.00, 14.29]) and provide additional support for the hypothesis that increases in *Treatment Motivation* are associated with increases in *Therapeutic Engagement.*

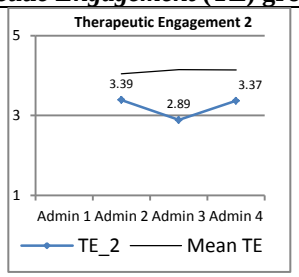
High-Start Odds Ratios for Therapeutic Engagement. Group-based modeling results for *Therapeutic Engagement* in the High-Start groups revealed a seven group solution with posterior probabilities ranging from .63 to .92. Intercepts for these groups ranged from 3.44 to 4.88. All groups had significant linear trends and all but group 7 had significant quadratic trends. The linear trends indicated either positive or negative change initially and the quadratic trends indicated a change in the slope from administrations 3-4. These groups are presented graphically in Figure 8 below.

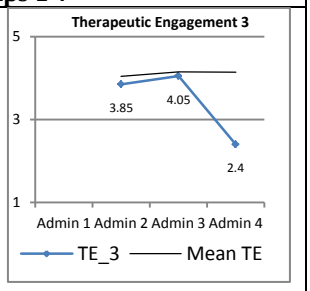
Figure 8 shows growth trajectories for Treatment Motivation and Therapeutic Engagement for the High-Start groups. Note: The black line represents the average TE for all groups.

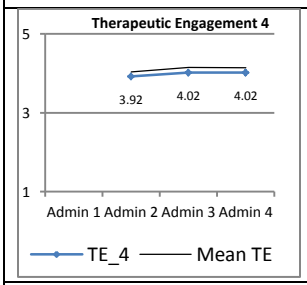
***Treatment Motivation* groups**	***Therapeutic Engagement* (TE) groups 1-7**

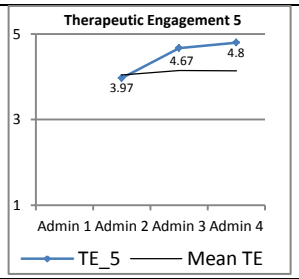


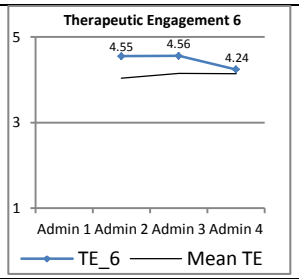


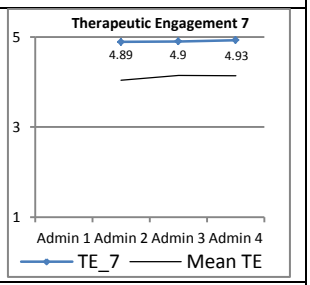












Adjoining Table shows the probability of each Treatment Motivation group belonging to each Therapeutic Engagement group. ORs compare the HS-Increase and the HS-Decrease groups to the HS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Therapeutic Engagement	***Treatment Motivation* groups**								
	HS-Stable (n=2511)			HS-Increase (n=111)			HS-Decrease (n=31)		
	n	%	OR	n	%	OR	n	%	OR
TE_1	14	0.6%	----	1	0.9%	1.5	3	9.7%	16.16*
TE_2	86	3.4%	----	0	0.0%	∞	6	19.4%	5.71*
TE_3	11	0.4%	----	0	0.0%	∞	2	6.5%	16.25*
TE_4	1803	71.8%	----	30	27.0%	0.38*	8	25.8%	0.36*
TE_5	157	6.3%	----	28	25.2%	4.00*	1	3.2%	0.51
TE_6	339	13.5%	----	20	18.0%	1.33	6	19.4%	1.44
TE_7	101	4.0%	----	32	28.8%	7.20*	5	16.1%	4.03*

Figure 8

Odds ratios were calculated to give the relative likelihood of each *Treatment Motivation* group belonging to each of the above mentioned *Therapeutic Engagement* groups. Figure 8 illustrates the joint trajectories with calculated odds ratios. It is important to note that almost 72% of the HS-Stable group belonged to the fourth *Therapeutic Engagement* group which highly influenced the average (solid-black)

comparison line presented in Figure 8. Almost 75% of the HS Increase group belonged to groups above the overall group average whereas the HS-Decrease group was more evenly dispersed among all the *Therapeutic Engagement* groups. The following sections describe which *Therapeutic Engagement* trajectory each of the *Treatment Motivation* groups are most likely to belong. Results were mixed but provide some support for the study hypotheses.

HS-Increase group comparisons. Compared to the HS-Stable group, the HS-Increase group was more likely to be in two of the three above average *Therapeutic Engagement* groups. Specifically, those in the HS-Increase group were more likely to be in TE_5 (OR = 4.00, 95% CI [2.83, 5.75]) and TE_7 (OR = 7.20, 95% CI [5.05, 10.20]), although all three *Treatment Motivation* groups had similar odds of being in TE_6. These results provide partial support for the hypothesis that increased levels of *Treatment Motivation* are associated with increased levels of *Therapeutic Engagement.*

HS-Decrease group comparisons. Participants whose *Treatment Motivation* decreased (HS-Decrease) were significantly more likely than the HS-Stable and HS-Increase groups of belong to one of the three lowest starting *Therapeutic Engagement* trajectories (TE_1, TE_2, TE_3). Generally speaking, however, significant associations noted between the *HS-Decrease* group and other High Start groups included small cell sizes (n = 1-8) and should be interpreted cautiously. Notice, for example, that although the HS-Decrease group was significantly more likely than the HS-Stable group (9.7% vs. 0.6%) and the HS-Increase group (9.7% vs. 0.9%) of belonging to TE_1 (ORs = 16.16 and 10.78 with 95% CIs [5.26, 58.82] and [1.16, 99.69], respectively) that this included a cell size of 3 participants. Similarly, results showed that the HS-Decrease group was

approximately 4 times greater than the HS-Stable group of being in the highest *Therapeutic Engagement* group but, again, the cell size for the HS-Decrease group was 5 participants. Although trends suggested some support for the hypothesis that groups with decreasing *Treatment Motivation* would have lower engagement, the small sample in this case does not warrant a definitive conclusion.

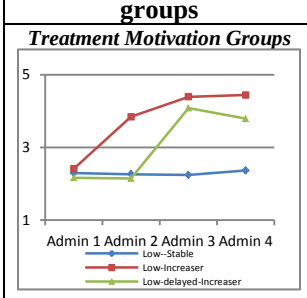
Treatment Satisfaction

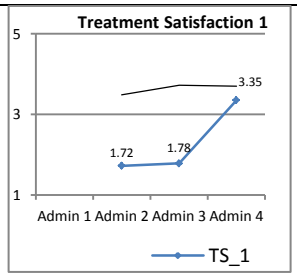
Low Start Odds Ratios for Treatment Satisfaction. Group-based modeling results for *Treatment Satisfaction* in the Low-Start groups revealed a 4-group solution with posterior probabilities ranging from .79 to .87. Group 1 (TS_1) had an intercept of 1.73 with an initially negative linear trend (-.74) but a positive quadratic trend (.77) indicating an increase in *Treatment Satisfaction* between Administrations 3 and 4. Group 2 (TS_2) had an intercept of 3.14 with a significantly negative linear trend (-0.25). Group 3 (TS_3) had an intercept of 3.66 showing an initial significant increase (liner trend) followed by a negative quadratic tend, indicating a decrease in *Treatment Satisfaction* between Administrations 3 and 4. Group 4 (TS_4) had an intercept of 4.83 with a non-significant liner trend. These trends are presented in Figure 9 below.

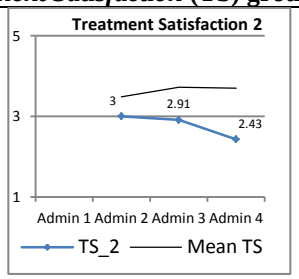
Figure 9 shows growth trajectories for Treatment Motivation and Treatment Satisfaction for the Low-Start groups. Note: The black line represents the average TS for all groups.

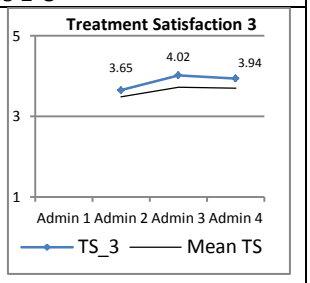
Treatment Motivation groups

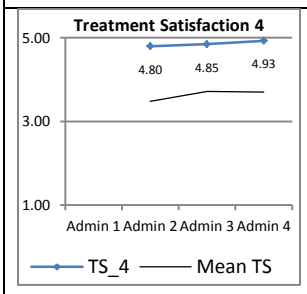
Treatment Satisfaction (TS) groups 1-8











Adjoining Table shows the probability of each Treatment Motivation group belonging to each Treatment Satisfaction group. ORs compare the LS-Increase and the LS-delayed-Increase groups to the LS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Treatment Satisfaction	***Treatment Motivation* groups**								
	LS Stable (n=120)			LS-Increase (n=93)			LS-delayed-Increase (n=30)		
	n	%	OR	n	%	OR	n	%	OR
TS_1	15	12.5%	----	3	3.2%	0.26*	4	13.3%	1.06
TS_2	28	23.3%	----	4	4.3%	0.18*	4	13.3%	0.57
TS_3	72	60.0%	----	71	76.3%	1.27*	21	70.0%	1.16
TS_4	5	4.2%	----	15	16.1%	3.83*	1	3.3%	0.79

Figure 9

Odds ratios were calculated to give the relative likelihood of each *Treatment Motivation* group belonging to each of the above mentioned *Treatment Satisfaction* groups. Figure 9 illustrates the joint trajectories with calculated odds ratios. Participants in each *Treatment Motivation* group were generally most likely to belong to the third *Treatment Satisfaction* group (TS_3) with probabilities ranging from 60% to 76.3%. Whereas results tended to support the hypothesis that increases in *Treatment Motivation*

would be associated with increases in *Treatment Satisfaction* for the LS-Increase group, finding for the LS-delayed-Increase group did not reach statistical significance.

LS-Increase group comparisons. Compared to the LS-Stable group, the LS-Increase group was less likely to be in the two lower *Treatment Satisfaction* groups (TS_1 and TS_2), slightly more likely to be in TS_3 and significantly more likely to be in the highest *Treatment Satisfaction* group TS_4. About 3.2% of the LS-Increase group, compared to 12.5% of the LS-Stable group, was in the lowest *Treatment Satisfaction* group (TS_1); these odds were significantly different (OR = 0.26, 95% CI [0.08, 0.86]. Similarly, only 4.3% of the LS-Increase group, compared to 23.3% of the LS-Stable group, were in the second *Treatment Satisfaction* group (TS_2); these odds were also significantly different (OR = 0.18, 95% CI [0.07, 0.51].

Conversely, the LS-Increase group was slightly more likely than the LS-Stable group of belonging to the middle *Treatment Satisfaction* group (TE_3; OR = 1.27, 95% CI [1.06, 1.53]) and was almost 4 times more likely than the LS-Stable group to be in the highest *Treatment Satisfaction* group (TS_4); OR = 3.83, 95% CI [1.46, 10.31]. Together, these results support the hypothesis that increased levels of *Treatment Motivation* are related to increased levels of *Treatment Satisfaction.*

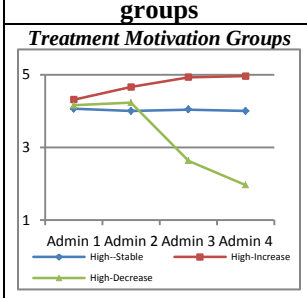
LS-delayed-Increase group comparisons. Comparing the odds of the LS-delayed-Increase group belonging to the LS-Stable group did not yield any statistically significant associations. Overall, these results show that participants in the LS-Increase group had less chance of belonging to lower starting *Treatment Satisfaction* groups and a greater chance of belonging to higher *Treatment Satisfaction* groups but no associations were noted when comparing the LS-delayed-Increase group.

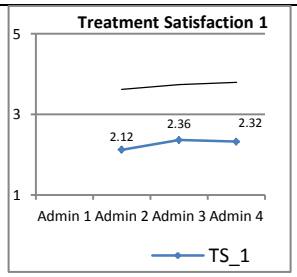
High-Start Odds Ratios for Treatment Satisfaction. Group-based modelling results for *Treatment Satisfaction* in the High-Start groups revealed an eight group solution with posterior probabilities ranging from .62 to .86. The reader should note that the posterior probabilities of groups 2 (.68) and 3 (.62) fell below the suggested threshold (.70) for good posterior probabilities—indicating that participants assigned to these groups may have been misclassified.

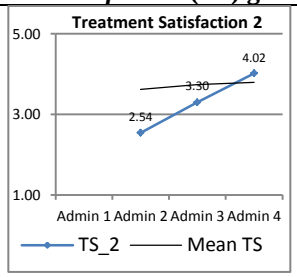
Intercepts for these groups ranged from 2.27 – 5.17. Groups 1, 3, and 8 had non-significant linear trends indicating no change throughout treatment. Group 2 had a significant and positive linear trend indicating increased *Treatment Satisfaction* throughout treatment. Groups 5, 6, and 7 had significant and positive linear trends and significant and negative quadratic trends indicating some increase on *Treatment Satisfaction* from administrations 2 to 3, but then a stabilization or decline in *Treatment Satisfaction* between administrations 3 and 4. Lastly, group 4 had a significant and negative linear trend between administrations 2 and 3, but a positive quadratic trend between administrations 3 and 4. These groups are presented graphically in Figure 10 below.

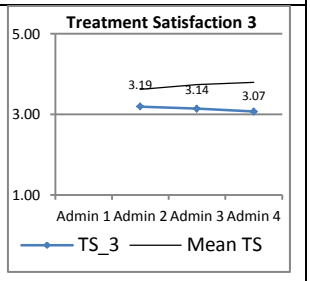
Figure 10 shows growth trajectories for Treatment Motivation and Treatment Satisfaction for the High-Start groups. Note: The black line represents the average TS for all groups.

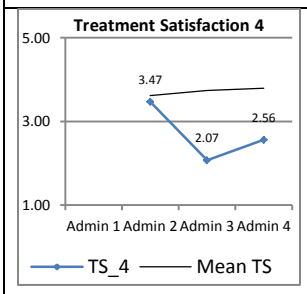
***Treatment Motivation* groups**	***Treatment Satisfaction* (TS) groups 1-8**			

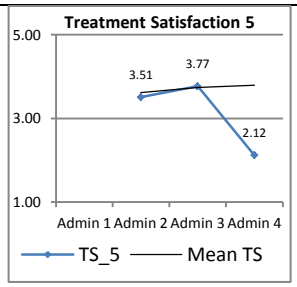


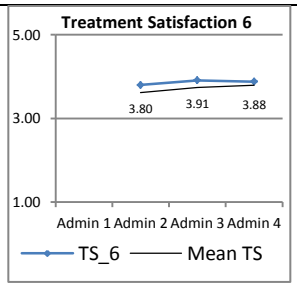


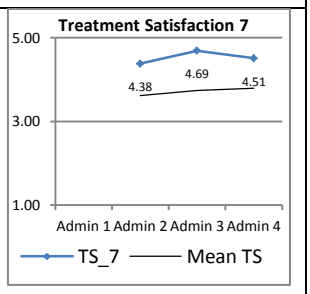


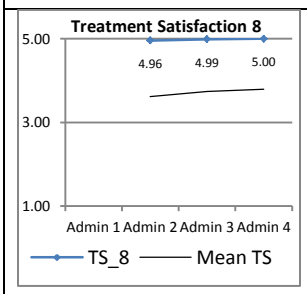












Adjoining Table shows the probability of each Treatment Motivation group belonging to each Treatment Satisfaction group. ORs compare the HS-Increase and the HS-Decrease groups to the HS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Treatment Satisfaction	***Treatment Motivation* groups**								
	HS-Stable (n=2511)			HS-Increase (n=111)			HS-Decrease (n=31)		
	n	%	OR	n	%	OR	n	%	OR
TS_1	56	2.2%	----	0	0.0%	∞	3	9.7%	4.41*
TS_2	180	7.2%	----	2	1.8%	0.25	2	6.5%	0.90
TS_3	381	15.2%	----	12	10.8%	0.71	4	12.9%	0.85
TS_4	48	1.9%	----	1	0.9%	0.47	4	12.9%	6.79*
TS_5	16	0.6%	----	0	0.0%	∞	3	9.7%	16.16*
TS_6	1692	67.4%	----	47	42.3%	0.63*	10	32.3%	0.48
TS_7	123	4.9%	----	36	32.4%	6.61*	3	9.7%	1.98
TS_8	15	0.6%	----	13	11.7%	19.25*	2	6.5%	10.83*

Figure 10

Odds ratios were calculated to give a relative likelihood of each *Treatment Motivation* group belonging to each of the above mentioned *Treatment Satisfaction* groups. Figure 10 illustrates the joint trajectories with calculated odds ratios. Each of the three High-Start *Treatment Motivation* groups (HS-Stable, HS-Increase, and HS-Decrease) did not differ in odds of belonging to *Treatment Satisfaction* groups 2 and 3. Each group was most likely to belong to *Treatment Satisfaction* group 6—which was close to the average line—with probabilities ranging from 32.3% - 67.4%. Results for the HS-Increase group provided some support for our study hypothesis but results for the HS-Decrease group were not considered due to small cell sizes.

HS-Increase group comparisons. Participants in the HS-Increase group had a greater chance of being in TS_7 (32.4%) than the HS-Stable group (4.9%; OR = 6.61, 95% CI [4.81, 9.09]) and were approximately 19 times more likely than the HS-Stable group of being in the highest *Treatment Satisfaction* group (TS_8); OR = 19.25, 95% CI [9.52, 40.00]. Overall, these results support the hypothesis that *Treatment Satisfaction* would be higher when *Treatment Motivation* increased during the treatment episode.

HS-Decrease group comparisons. The HS-Decrease group had significantly greater odds, when compared to the HS-Stable group, of belonging to *Treatment Satisfaction* groups 1, 4, 5, and 8. Generally speaking, however, significant associations noted between the *HS-Decrease* group and other High Start groups included small cell sizes (n = 2-4) and should be interpreted cautiously. Notice, for example that participants in the HS-Decrease group had greater odds of being in TS_1 (about 9.7%) compared to the HS-Stable group (2.2%; OR = 4.41, 95% CI [1.43, 13.16]), which was the lowest *Treatment Satisfaction* group, but also was significantly more likely to be in the highest

Treatment Satisfaction group (TS_8). Although these results provide some support for the study hypotheses, the small cell sizes and inconsistent trends suggest they may be spurious.

Treatment Engagement Summary. Results for Treatment Engagement measures generally supported the study hypotheses. Groups whose *Treatment Motivation* increased tended to have improved *Therapeutic Engagement* and *Treatment Satisfaction*. Results shown for decreasing levels of motivation were, to some degree in the directions we expected, but were interpreted cautiously due to small cell sizes. Lastly, whereas results for the Low-Start group tended to be consistent and in line with the study hypotheses, the High Start results sometimes showed mixed support for our hypotheses. In addition to these results we have provided Analysis of Covariance (ANCOVA) tables that compare *Treatment Progress* means of each *Treatment Motivation* group in Appendices G-H.

Cognition Measures. Two Cognition measures were used to evaluate the relationships between *Treatment Motivation* change and *Treatment Progress;* these variables were *Decision Making* and *Neutralizations.* The *Decision Making* construct consisted of items designed to assess the individual's ability to think and plan ahead whereas the *Neutralization* measures (i.e. techniques used by criminals to justify crimes) evaluated cognitive errors likely to interfere with treatment. The following sections describe the probable growth trajectories on these constructs given a particular type of growth in *Treatment Motivation.* In general these results did not yield significant or consistent associations. The figures have been moved to the appendices to minimize the

burden of reading these null findings. Additional findings are also found for these variables in Appendices G-H

Decision Making

Low Start Odds Ratios for Decision Making. Group-based modeling results for *Decision Making* in the Low-Start groups revealed four groups with posterior probabilities ranging from .89 to 1.00 and intercepts ranging from 2.96 to 4.57. These trends are presented graphically in Appendix I including associated Odds Ratio tables. The Low-Start *Treatment Motivation* groups were distributed somewhat evenly in the Decision Making groups. In fact, none of the comparisons reached statistical significance. Participants in the LS-Stable group, however, trended toward being significantly less likely to belong to the highest *Decision Making* group when compared to the LS-Increase group (OR = .39, 95% CI [.14, 1.10]) and the LS-delayed-Increase group (OR = .32, 95% CI [.09, 1.09]). Overall, these results show little association between *Treatment Motivation* group membership and *Decision Making* group membership for the Low-Start groups.

High-Start Odds Ratios for Decision Making. Group-based modeling results for *Decision Making* in the High-Start groups revealed an 11-group solution with posterior probabilities ranging from .64 to .95 and intercepts ranged between 2.42 and 4.72. These trajectories are presented graphically in Appendix J along with associated Odds Ratios.

Results generally did not show associations between *Treatment Motivation* group and membership in *Decision Making* groups. Groups did not differ, for example, in their probability of belonging to any of the first five *Decision Making* groups. Additionally, three significant findings for the HS-Decrease group included small samples ranging

from 1-5 participants each and were not considered. A few results did emerge, however, and will be discussed briefly.

Participants in the HS-Increase group were more likely to belong to *Decision Making* groups who were above average. Specifically, the HS-Increase group was more likely than the HS-Stable group to belong to DM_6 (OR = 7.50, 95% CI [3.79, 14.93] and more likely to belong to DM_9 (although this had a cell size of 6); and DM_10 (OR = 4.08, 95% CI [2.78, 5.88]. Overall, these results show some support for the hypothesis that groups with increased *Treatment Motivation* would have improved *Decision Making* but do not support the hypothesis that declining *Treatment Motivation* groups would have decreased *Decision Making.*

Neutralizations

Low Start Odds Ratios for Neutralizations. Group-based modeling results for *Neutralizations* in the Low-Start groups revealed a five group solution with posterior probabilities ranging from .82 to .99 and intercepts ranging from 1.57 to 3.14. These trends are presented graphically in Appendix K with associated Odds Ratios.

In general, participants in each of the *Treatment Motivation* groups had similar odds of being in each of the *Neutralization* groups modeled above. Participants in the LS-Stable group, when compared to the LS-Increase group, had a greater chance of being in one of the higher *Neutralization* groups (NT_4; OR = 3.10, 95% CI [1.75, 5.49] and were less likely to belong to the middle *Neutralization* group (NT_2; OR = .70, 95% CI [.53, .93]). All other comparisons did not reach statistical significance indicating that, in general, participants in each *Treatment Motivation* group had similar odds of belonging

to each *Neutralization* group. Overall, these results show little association between Low-Start *Treatment Motivation* groups and type/level of *Neutralizations*.

High-Start Odds Ratios for Neutralizations. Group-based modeling results for *Neutralizations* in the High-Start groups revealed an eleven group solution with posterior probabilities ranging from .69 to .99 and intercepts ranging from 1.03 to 3.40. These trajectories are presented graphically in Appendix L including associated Odds Ratios. Results generally did not support the study hypotheses. A number of the *Treatment Motivation/Neutralization* group comparisons showed no association while others did not have sufficient samples to warrant interpretation; a few significant findings were, however, noted and worth mentioning.

The HS-Increase group was more likely than the HS-Stable group to be in two *Neutralization* groups that were below average or fell below average during treatment. Specifically, the HS-Increase was more likely than the HS-Stable group to be in NT_4 (OR = 5.29, 95% CI [3.94, 7.25]) and NT_8 (OR = 7.20, 95% CI [3.94, 7.25]). Additionally, the HS-Increase group was less likely to be in two groups with near average and above average *Neutralizations* compared to the HS-Stable group. Specifically, the HS-Increase group was less likely to belong to NT_6 (OR = 0.29, 95% CI [0.16, 0.52] and NT_9 (OR = 0.33, 95% CI [15, .73] when compared to the HS-Stable group. These results are mixed but provide some evidence that those whose *Treatment Motivation* increased were more likely to have lower *Neutralizations* throughout treatment, whereas those with stable or decreasing *Treatment Motivation* had increased odds of being in groups with high or increasing *Neutralizations* during treatment.

Qualitative Results

Aim 4: Evaluating Probationer Perceptions of Treatment Motivation.

Qualitative interviews elicited information from probationers about their *Treatment Motivation* while in prison-based substance abuse treatment. Specifically, the interviews asked about the probationer's ability to recognize problems, their desire for help, and readiness for treatment at various times through the treatment process. Each of four study hypotheses were addressed with the qualitative interviews and then a conceptual framework was built from the findings. The following sections include: *Sample description*, *Addressing study hypotheses*, and *A conceptual Model*.

Sample description. A stratified sample of 10 males and 10 females were interviewed. Of these, 10 participants identified as Caucasian, 4 identified as being African-American, 3 identified as being Hispanic, and 3 identified as other or multiple ethnicity. Participants had between 0 and 6 previous experiences with prison-based treatment, with a mean of 1.35. The average age was 33.1 ranging between 21 and 46 years of age. Lastly, participants varied in the amount of time that had lapsed since they had been in prison-based treatment or "free world" time; this time ranged from 1 to 23 months with an average of 5.68 months.

Addressing study hypotheses. Probationers were asked to retroactively evaluate their motivation during prison-based treatment. Several hypotheses were formed related to motivation change during treatment and were addressed in the qualitative interviews. The following sections address each of the four hypotheses presented earlier in this manuscript.

Hypotheses 1. It was hypothesized (hypothesis 1) that probationers would report aversive reasons related to their treatment motivation during the beginning of treatment (e.g., psychological problems or other types of dysfunction) and more appetitive reasons for their motivation toward the end of treatment (e.g. goal pursuits, reconnecting with family, etc.).

Interviews with probationers produced mixed findings related to this hypothesis. Probationers tended to report aversive reasons for their treatment motivation but often did not shift into a goal driven pursuit. When they did report a shift in the nature of their motivation it was usually related to a change in temporal perspective of their drug-related problems (i.e. reports of not wanting to return to where they were). One probationer stated:

> I lost my job…I couldn't hold a job. I was either living in the car or with my boyfriend's parents and um…you know I was stealing to support my habit. Um…a lot of contact with the police, fights, physical altercations…things like that.
>
> [Later in the interview when asked which was more important to her continued engagement (her problems or goals pursuits) she noted that:]
>
> I would say at this point…not wanting to go back…you know to where I was before, is probably a larger motivation still at this point. Um…I guess because I haven't…you know because the goals are still kind of vague. I think as I'm out longer and I see some of those like come to fruition then yes. But right now I think the main driving force is not wanting to go back to where I was before.

Other probationers reported that they initially had goal pursuits but as they got involved in treatment and began realizing their problems, that a problem-focused motivation became a central driving force for their treatment. This was a prominent theme for persons who apparently had initially low-motivation but gained perspective as a process of treatment. Examples of how probationers reported this experience are as "an awakening," "the blinders were off," or "the fog had lifted." As one probationer explained:

> At first it was…I was just doing what I had to do just to go home and get a good judge report [fake it 'till you make it] but then after a couple of months I really felt heart in it and I really started doing it for the right reasons and you know…just to wake that person up…

Another probationer reported:

> Yeah, I had seen a lot more problems, ah that I had with myself, specifically. And, ah with other people around I just...you know it's kind of like I just came to reality...you know I didn't have this kind of cloud blocking my vision anymore. I kind of just stepped out of that and you know it was just like the fog was kind of lifted.

Hypothesis 2. It was hypothesized that probationers would report a change in the types of help they desired as they neared discharge of prison-based treatment. This was because we expected reasons for motivation to shift from aversive (i.e., problem-based) to goal pursuits. Given that the previous findings did not strongly support this, our expectations for Hypothesis 2 were limited. Rather than report a change from problem-

based to goal-based motivations, probationers tended to report that they wanted to continue working on their drug use. Consider the following:

> I feel like it's [community treatment] helping the most because I'm continuing to realize all the things that needed changing. And I am continuing to be able to work on it.

Probationers also reported that the structure they had in prison-based treatment was very helpful to them and that they wanted continued help with structure on the outside. The following example demonstrates this:

> So it [community treatment] is helping with some structure and some guidelines and things and kind of give me a comfort zone where I can gradually venture out and take care of responsibilities and learn how to…you know and this is my first time to ever be locked up before too and I was gone for a year so everything is very overwhelming getting back out here...

Hypothesis 3. Lastly, it was hypothesized that probationers would vary in their initial evaluations/expectations of treatment and their evaluations of treatment as they became involved in treatment. A number of treatment attitudes emerged from the data relating to what offenders expected from treatment prior to arrival and their reported experiences after arrival to treatment. In general, these attitudes were categorized by the way they initially felt about treatment and changes in attitude as a result of treatment.

Five of the twenty probationers interviewed, indicated that they were disappointed or otherwise had a poor experience once actually in treatment. Two of these had a negative attitude going in such that they thought it was going to be a bad thing and they actually felt it was not a worthwhile treatment—calling it a "snitch" program and saying

it was just like prison. Other probationers had hopes for it being a positive experience but described some level of disappointment. One probationer reported that:

> I thought I was going to get some treatment. I thought I was going to get some help. My perception was that I was going to get some help...I was going to get some tools to hopefully help me out and you know just better myself. I think it was almost the complete opposite. You know like I said going back to the parolees in there [he distinguished himself as a probationer versus offenders coming from prison who he calls parolees]...it was almost like being in prison because they're there [the parolees]--that's how they make you feel. Like this was an actual prison.

Another probationer described his perception of treatment before he arrived as optimistic saying that he expected much more:

> I didn't even know it existed. I didn't know what it was. They told me it was a rehab. I got there fully expecting that while I was going to sit down, there was going to be counselors…uh…that you somebody were going to get to talk to somebody on the other end that is a real counselor. You know, if I was paying money, this is exactly what you would expect as a customer. I heard the money they spend on it was ridiculous. I thought we had a real Clock-Work orange type of thing going on. We were going to something to the bottom of some things. But it was nothing at all like that.

Although there were a substantial number of interviewees who reported negative experiences, 75% of the sample reported treatment attitudes that were more supportive of the prison/treatment environment. Of these, 5 probationers expressed negative attitudes

about treatment before entry but after getting involved stated that their attitude improved. The following quote describes a participant who expressed a negative attitude in the beginning but then realized that you really get what you put into treatment. When asked what he expected prison to be like he stated:

> Fight or flight…dog fight. Uh very little programming more of who's going to be the top dog.
>
> [Then when asked if these perceptions changed he stated:]
>
> Um…Yes and no. Uh…depending on how you viewed…depending on what you want to do for yourself, because with prison-based treatment it's all what you want to do for yourself…because it is a peer driven community. So if you want help and you seek help you're going to get the help, but if you're just looking to jack around, play games all day, and goof off then that's what you're gonna get.

Several probationers identified their attitude as open because they did not know what to expect from treatment but they knew they wanted help. A certain amount of fear was noted in these interviews due to this unknown, but a prominent theme was that probationers pushed forward to get the most out of their experience. The following participant stated that she had heard a lot of bad stuff about treatment prior to treatment entry. When asked about her perceptions of prison-based treatment she said:

> Oh gosh…I mean you hear all the stories and you think it's going to be hard core like boot camp and I mean…yeah…everybody I knew who had been to SAFP or knew somebody who had gone to SAFP always said, "Don't go. Don't sign for it." I mean it has a bad reputation.
>
> [When asked how her attitudes changed she stated:]

> Well…you know I really feel like a lot of the people that talked bad about SAFP—and not that I thoroughly enjoyed my stay there but—I think a lot of times it's people who don't really want help. So for me, going into it with an open mind and some willingness…even though it was very stressful, I understood what I could achieve from it if I stayed open minded to it and willing to take what I could out of it. I mean there were a lot things I didn't like about it but I understand that a program can't be tailored to every individual person. So I realized that I'm going to get out of it what I put into it. So whereas a lot of people think negative of it because of the restrictions and being locked up…I actually got a lot out of that.

Building a Conceptual Model. A conceptual model was developed as a framework to understand the previously discussed qualitative findings. Figure 15 illustrates how the findings interrelate. The diagram shows that an individual's Desire for Help (from the treatment program they were in) was influenced by their attitude toward treatment. Attitudes tended to group into positive, negative, and ambivalent sub-groups. Additionally, probationers reported various sources that contributed to their attitudes including their ability to recognize their drug use as a problem (Problem Recognition), their experience during treatment (Treatment Experience), and external sources (e.g. talk from others who had been, family, and online research). The model demonstrates a time component because the various pieces of the model are subject to change dependent upon where a given individual is in their personal recovery and where they are in relation to the treatment process.

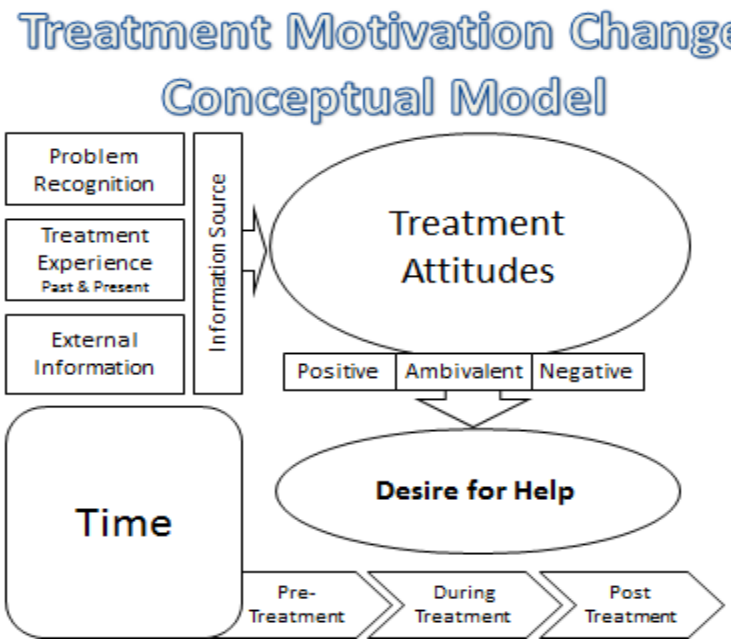


Figure 15

Discussion

The current study sought to evaluate changes in substance abuse treatment motivations as offenders' progressed though the treatment episode. To do this, we used a mixed-method approach to evaluate quantitative changes in treatment motivation using the well-established TCU motivation scales and then used semi-structured interviews to collect qualitative information from offenders about their motivations during prison-based substance abuse treatment. The following discussion sections will be broken into Quantitative Discussion, Qualitative Discussion, Quantitative/Qualitative Study Integration, Study Limitations, Treatment Implications, and Concluding Remarks.

Quantitative Discussion

The quantitative discussion will be organized around the three quantitative aims of the study: Aim 1 sought to model change in *Treatment Motivation* using a group-based modeling approach and to select groups with similar starting levels but divergent growth

patterns for comparison; Aim 2 evaluated a model for its predictive ability of *Treatment Motivation* group membership; and Aim 3 compared *Treatment Motivation* groups (selected in Aim 1) on several *Treatment Progress* indicators.

Aim 1 Discussion: Modeling Change in Treatment Motivation. A group-based modeling approach (Jones, et al., 2001) was used to model discrete motivation trajectories over four time points during prison-based treatment. Although previous literatures have demonstrated that treatment motivation remains relatively stable throughout treatment (e.g., Hiller et al., 2002; Joe et al., 2010) there were several reasons we believed motivation change should occur during treatment. It was hypothesized that, due to the widespread use of treatment induction strategies (e.g., Miller & Rollnick, 2002; Czuchry et al., 1997; Czuchry et al., 2006), groups would emerge that started with low treatment motivation but demonstrate improvements throughout the treatment episode. Additionally, we thought that groups may exist that scored high on treatment motivation scales at treatment entry but, as the individual lost interest, show reductions in treatment motivation.

Results generally supported previous research findings showing that treatment motivations—as measured by the TCU-Motivation scales—remained relatively unchanged during treatment and primarily differed by intake scores. Although the hypothesized groups did emerge from the data, only about five percent of our total sample was classified into a group that appeared to exhibit major changes in motivation during treatment. There are a number of reasons this could have occurred.

It could be that motivation enhancement strategies are not being effectively used (or used at all) within these prison-based settings; this could be a misinterpretation of

motivation norms (which tend to have relatively high averages; see http://ibr.tcu.edu/means-and-norms-for-client-functioning-cest/) in which case clinicians and programs might not use induction strategies because they don't realize they are needed; we did not have enough program information to know if induction strategies were being use—a fact that will be discussed further in the limitations section. Another possibility is that, even though there is empirical support for the effectiveness of induction strategies, it is possible that they are used but ineffective in the prison-based settings because of low fidelity in how the strategies were implemented. Lastly, motivation scales being used may not be sensitive enough and/or appropriate for measuring changes in motivation over time.

We proceeded with our analyses because it is important to understand if these changes, despite their small prevalence, have clinical meaning. This is especially true considering the relationship that *Treatment Motivation* has with engagement measures (Broome et al., 1999; Griffith et al., 1998; Joe et al., 1998) and subsequent outcomes. Although previous authors have suggested that changes detected in treatment motivation have little meaning and should be interpreted with caution (e.g., Joe et al., 2010), not much empirical evidence has supported this possibility. Moreover, since authors have stressed the importance of understanding *Treatment Motivation* as a "dynamic state" that must be maintained throughout treatment (De Leon et al., 2000; De Leon et al., 2001; Melnick et al., 2001; Simpson, 2004) it is important to understand what information can be gleaned by measuring *Treatment Motivation* longitudinally with our current scales. If current measures do provide clinically meaningful information, it is important to have

empirical backing as to their efficacy—and these findings need to be disseminated to clinicians that rely on the scales to inform treatment.

Aim 2 Discussion: Predicting Differential Growth in *Treatment Motivation*.

Aim 2 explored potential predictors of divergent *Treatment Motivation* group membership. Because the quantitative data for this study came from a secondary source, we were limited on the number and types of variables to use in these prediction models. We looked at a number of variables known to correlate with intake *Treatment Motivation* including psychological functioning variables, social functioning variables, criminal thinking variables, and drug severity. In general, results did not show that these variables could predict whether or not an individuals' *Treatment Motivation* changed once in treatment. Although various types of dysfunction have been shown to positively correlate with *Treatment Motivation* (Griffith et al., 1998; Simpson & Joe, 1993) and some negatively with *Treatment Motivation* (Best et al., 2009; Garner et al., 2007), these variables have been related to *Treatment Motivation* at intake and would not necessarily predict divergent motivation groups. Our qualitative analyses in Aim 4 revealed considerable information about this topic and will be discussed further in that section.

Aim 3 Discussion: Evaluating Group Differences in Treatment Progress.

Aim 3 evaluated differences in treatment progress of groups whose *Treatment Motivation* changed relative to individuals with similar levels of intake *Treatment Motivation* who did not change. We used a group-based modeling approach to model change in *Treatment Motivation* and in *Treatment Progress* measures (i.e., *Therapeutic Engagement, Treatment Satisfaction, Decision Making, Neutralizations*) and then looked

at the relative odds of having a particular type of growth in *Treatment Progress* given a particular type of growth in *Treatment Motivation*.

In general, results showed that, when *Treatment Motivation* changed it related to changes in treatment engagement (i.e., *Therapeutic Engagement* and *Treatment* Satisfaction) in expected ways, but results did not tend to support relationships between *Treatment Motivation* change and cognitive improvement variables (i.e., *Decision Making* and *Neutralizations*). Whereas research has demonstrated the link between *Treatment Motivation* and treatment engagement—and ultimately treatment outcomes (Broome et al., 1999; Griffith et al., 1998; Joe et al., 1998)—less evidence has shown a direct link between motivation and cognitive improvements. We included cognitive improvements as ancillary variables because of the relationships that treatment engagement has with during-treatment and post-treatment outcomes.

Although results for these cognitive functioning variables did not turn out, the relationships shown between *Treatment Motivation* change and treatment engagement were arguably more important results. The present results showed that, even when motivation levels were initially low, motivation improvements were related to an individual's commitment to treatment. This was evidenced by a greater likelihood of belonging to higher *Therapeutic Engagement* and *Treatment Satisfaction* groups when an individual's motivation improved relative to someone with a similar starting value whose motivation did not improve. It appears that individuals whose motivation improves tend to utilize treatment more than their non-changing counterparts. These results begin to provide evidence toward the idea that motivation should be sustained throughout treatment (De Leon et al., 2000; De Leon et al., 2001; Melnick et al., 2001; Simpson,

2004) and that, to some degree, changes in the present scales provide meaningful and interpretable information for clinicians; these implications will be discussed further in the Treatment Implications section.

Qualitative Discussion

Qualitative interviews were used to elicit information about motivations for treatment from probationers who had recently completed prison-based substance abuse treatment. Questions targeted different aspects of motivation at different phases during treatment. The first part of these analyses was directed at the study hypotheses. Our expectation was that probationers would report aversive or problem-based reasons for their motivation early on but shift into a goal-oriented pursuit as they neared the end of treatment.

Results revealed that this hypothesis was only partially supported. Whereas people tended to report aversive reasons during the beginning of treatment, they often did not report a shift to appetitive reasons such as wanting to reconnect with family, regain employment, or engage in other prosocial behaviors. Instead, probationers tended to report that their primary motivation was related to <u>not</u> wanting to return to the place they were before (i.e., being down and out due to drug use). Although this is different from what we expected, it still resonates with the *Theory of Current Concerns* presented in the literature review (Klinger & Cox, 2011). Rather than their current concern shifting to more appetitive reasons, the concern to remain free from substance abuse continued to be a powerful motivator. Although it is reasonable to think that someone recovering from drug and alcohol problems would, at some point, begin to be motivated toward sobriety

by prosocial behaviors, our results seem to indicate that, to some extent, the individuals we interviewed had not reached a point at which their "current concern" had shifted.

We also hypothesized that probationers would report a change in their attitudes, expectations, and evaluations of treatment after treatment entry. These changes were reported in both positive and negative directions and for a variety of reasons and were especially important when considering the null findings in our Quantitative Aim 2. Offenders reported that their motivation for treatment changed as their evaluations of treatment changed. Some individuals reported, for example, that they had negative or ambivalent attitudes toward treatment prior to arrival but that as their involvement increased their attitudes and motivation for treatment improved. Conversely, some reported a desire for treatment before arrival but expressed displeasure in the treatment they received and thus a decrease in their motivation for treatment.

These results fit nicely within a Theory of Planned Behavior framework (Ajzen, 1985) and can be related back to the idea of a current concern. In the Theory of Planned Behavior, an individual's behavior is related to their behavioral intentions; behavioral intentions are thought to be influenced by three constructs: attitudes, subjective norms, and perceived behavioral control. When thinking about a person's engagement in treatment then, their attitudes about treatment are important. Our findings showed that attitudes toward treatment were informed through their ability to recognize their drug use as a problem, treatment experiences (past and present), and external information (e.g., friends or other probationers). An individual's *Current Concern* may shift as their information and perceptions about treatment change. A person with low problem recognition might report a shift in their *Current Concern* when they gain awareness that

their drug use is problematic, for example, and begin engaging in the treatment process. Conversely, someone who is interested in treatment based on the information they have, but feels that treatment is not worthy, will likely have different *Current Concerns;* engaging in treatment would likely not be a target for their behavior. For instance, they may try to minimize their engagement and use alternative methods for self-improvement (e.g., 12 steps or faith-based programs).

Quantitative/Qualitative Study Integration

Although the quantitative and qualitative studies were conducted independently, the intent was to use qualitative data to provide context and meaning to the quantitative findings. The qualitative interviews gave us some insights into why our quantitative findings did not turn out the way we expected. Here we will discuss the qualitative context provided to each quantitative aim.

Aim 1: Qualitative Context. Recall that, although the expected *Treatment Motivation* groups did emerge from the quantitative data, that the prevalence of such change was rather low (only about 4.5%). Reports from the qualitative section indicated a much greater prevalence of changes in motivation. Probationers reported that their desire for help from the treatment program changed as they acquired new information. Whereas some reported that they went in with high expectations of treatment that their desire for help from that particular type of treatment quickly dwindled as they became familiar with the program (these included 3 of the 20 interviews or 15% of the total qualitative sample). Conversely, 25% of the qualitative sample (5 of 20) reported having initially negative attitudes or low motivations for treatment, but maintained that after getting involved they really began to see the benefits. While these are not conclusive

results and could have benefitted from a larger sample, there is some indication that the prevalence of motivation change is greater than indicated by the quantitative findings.

Aim 2: Qualitative Context. As previously discussed, the qualitative findings helped us understand why *Treatment Motivation* changes during the treatment episode. Quantitative prediction models were generally not effective in predicting motivation change. Our qualitative results indicated that there were a number of factors related to motivation. Probationers reported that their attitudes about treatment were influenced by their ability to recognize their drug use as a problem, outside information about the treatment program, and their personal experience with treatment once they arrived. Two questions, however, remain: 1) "How can clinicians identify persons whose motivation is likely to change (for the good or bad)?" and 2) "What strategies can be implemented to deal with these situations?" Although the present research does not provide answers to the former, we do offer suggestions to the latter. These findings indicate that, for those with initially low treatment motivation, the answer lies within existing induction strategies such as motivational interviewing. For others, who are at risk of losing motivation, helping them manage expectations of treatment, helping individuals make the best of what is available, and empowering individuals to take control of their own recovery may be important for sustaining the treatment motivations they had when they first came in.

Aim 3: Qualitative Context. Aim three results supported the idea that changes in *Treatment Motivation* are related to changes in treatment engagement. The qualitative findings indicated that there is likely a feedback loop in which *Treatment Motivation* is influenced by level of engagement in the program. Indeed, as previously noted, a number

of individuals indicated that they had low motivation going into treatment, but that once they got involved their *Treatment Motivation* improved. Conversely, probationers who indicated initially high levels of motivation and reductions over time may have benefitted from additional engagement strategies.

Limitations and Future Directions

The current study had several limitations that should be discussed. First, the quantitative and qualitative samples were different. Since we were interested in evaluating changes in motivation and why they change, it would be interesting to compare an individual's quantitatively derived motivation levels with their introspective reports of their motivation and why it changed. Additionally, our qualitative interviews were captured retrospectively, sometimes many months after the fact, which could obscure the way probationers reported on the topic. Specifically, participants may have undergone an evolution in thought toward treatment's efficacy and could potentially report their current views rather than their view during prison-based treatment.

The quantitative data were collected as secondary data which also limited the scope of the questions we could ask. This was apparent in our Aim 2 analyses that sought to identify predictors of motivation change. Our qualitative interviews were very helpful in this respect, despite their retrospective collection, and provided important insights into why a person's motivation might change.

We did not have complete information on what types of treatment each institution offered nor did we know specifically what types of treatment each individual had been offered, which presented another limitation to the study. Whereas treatment induction strategies may have accounted for some motivation improvement, participant

characteristics or interactions between these characteristics and the specific type of treatment they received may also have accounted for improved motivation. Future studies should address these issues by collecting data specifically for the purpose of evaluating motivation over time.

Treatment attitudes are an important point of study for improving treatment motivation or deterring treatment resistance. Researchers should consider developing additional measures of motivation that are more sensitive to detecting change—and the reasons behind those changes—so that clinicians can target motivation interventions more effectively. A Theory of Planned Behavior model may be important in assessing and predicting treatment behaviors.

Additionally, broadening the scope and looking at a person's motivation for change or motivation for recovery might be a useful endeavor. As previously discussed, De Leon and colleagues (2001) made the distinction between motivation for treatment and motivation for change. Since multiple pathways to recovery have been identified (e.g., Cunningham, 1999; 2000), understanding if an individual is motivated for change but not treatment could be helpful in steering them toward using treatments that are currently available to them. Additionally, it might be important to have measures in place that evaluate ability to sustain changes once they are made.

Future studies should look at smaller-scale changes in motivation and their relationships to treatment. It may be that small changes, or the degree to which scores change, is a subjective endeavor and one not detected by our current study methods. This was partially evidenced in the current study because we detected additional *Treatment Motivation* groups when sub-setting and re-evaluating the High-Start groups.

Specifically, within-group changes—albeit on a smaller scale—may provide clinical information just as useful as the larger changes we detected in our study. Moreover, changes on a smaller scale may be more indicative of growth patterns for the average client and these growth patterns may relate to treatment engagement in the same way as the larger changes detected in the current study.

Lastly, concurrent validity studies between the TCU motivation form and other available measures—especially with the idea of measuring motivation longitudinally—may be a useful endeavor. There are many other scales that measure motivation and it is important to know how well other scales fare in measuring this important construct. This type of evidence would tell us whether or not a need for additional scales is necessary and point to the strengths and limitations of available motivation measures.

Treatment Implications

Given findings in the current study, several points should be addressed. We feel that more studies are necessary and clinicians may want to defer their interpretations until further information is revealed. Although our results indicated that changes in motivation relate to engagement measures in expected ways, we suggest clinicians interpret quantitative measures in motivation cautiously and couple these findings with clinical impressions. More investigation is needed to evaluate the reasons for the low prevalence of change and whether our scales are sufficient for measuring change.

Clinicians should, if they are not already doing so, consider motivation levels relative to established norms and relative to an individual's previous scores. As previously noted, there could be an underutilization of motivation strategies because average motivation levels appear relatively high. Dissemination and training effort may

be important for buttressing the use of these scales and motivation efforts during treatment.

Our qualitative findings point toward the need to consider an individual's attitude toward treatment, their attitude about drug-problems, and their attitude about recovery as an indication of how they will utilize the treatment being offered them. Indeed, our findings indicated that some individuals reported that they recognized drug-related problems, and that they wanted help for those problems, but that they didn't believe the type of treatment they were receiving (i.e., being mandated to) was appropriate. This topic could be explored further under the ideas of coercion and self-determination, but it will not be discussed at length here.

Clinicians should be attuned to not only the emotions people express toward treatment (e.g. treatment sucks, the guards are mean, etc.), but also their attitudes toward those emotions. Specifically, we had reports of individuals who had a "make the best of it" attitude. Whereas they reported that prison-based treatment was not a fun place to be, and that they desired to get it over with as quickly as possible, their overall attitude was that the treatment was beneficial to them.

Concluding Remarks

Motivation for substance abuse treatment is an important topic that has been operationalized in a number of ways. Whereas it is important to advance our understanding of substance abuse treatment motivation in conceptual ways, it is equally important to develop strategies of disseminating the information to clinicians and program directors in a meaningful and applicable manner. Sometimes offenders engage in treatment for reasons other than a desire to get clean and sober, whereas others work

the program to curry favor with treatment staff or those making parole decisions, simply out of boredom, or to make their time go smoothly (often called “fake it till you make it”). Understanding fully how motivations for treatment and recovery interrelate, how they fluctuate, and ultimately how they relate to long-term recovery is important for our efforts in providing the best possible care for those suffering from substance-abuse.

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Appendix A

TCU MOTFORM (MOTivation)

Scales and Item Scoring Guide

Scoring Instructions. Items shown below from this assessment are *re-grouped by scales*, and response categories are 1=Strongly Disagree to 5=Strongly Agree. Scores for *each scale* are calculated as follows (and no more than half of the items for any scale can be missing).

1. Find and reverse the scoring for *reflected items* (i.e., those designated with ®) by –
   a. subtracting the response value (1 to 5) for this item from "6",
      (e.g., if the response is "2", the *revised* score is "4" [i.e., 6-2=4]),
2. Sum the response values of all non-missing items for each scale,
3. Divide the sum of item responses by the number of items included (yielding an average),
4. Multiply this average by 10 (in order to *rescale* the score so it ranges from 10 to 50) (e.g., an average response of "2.6" for a scale therefore becomes a score of "26").

TREATMENT NEEDS/MOTIVATION SCALES

A. Problem Recognition (PR)

5. Your drug use is a problem for you.
8. Your drug use is more trouble than it's worth.
10. Your drug use is causing problems with the law.
11. Your drug use is causing problems in thinking or doing your work.
16. Your drug use is causing problems with your family or friends.
20. Your drug use is causing problems in finding or keeping a job.
24. Your drug use is causing problems with your health.
28. Your drug use is making your life become worse and worse.
33. Your drug use is going to cause your death if you do not quit soon.

B. Desire For Help (DH)

1. You need help dealing with your drug use.
12. It is urgent that you find help immediately for your drug use.
13. You will give up your friends and hangouts to solve your drug problems.
22. Your life has gone out of control. 26. You are tired of the problems caused by drugs.
30. You want to get your life straightened out.

C. Treatment Readiness (TR)

2. You need to be in treatment now.
4. This treatment gives you a chance to solve your drug problems.
6. This kind of treatment program is not helpful to you. ®
18. This treatment program gives you hope for recovery.
21. You want to be in drug treatment.
25. You are ready to leave this treatment program. ®
27. You are at this treatment program only because it is required. ®

35. You are not ready for this kind of treatment program. ®

D. Pressures for Treatment Index* (PT – not scored as single scale)
3. You have family members who want you to be in treatment.
9. You are concerned about legal problems.
14. You feel a lot of pressure to be in treatment.
17. You expect to be sent to jail or prison if you are not in treatment.
29. You have serious drug-related health problems.
32. Several people close to you have serious drug problems.
34. You have legal problems that require you to be in treatment.

E. Treatment Needs (TN) Index
7. You need help with your emotional troubles.
15. You need individual counseling sessions.
19. You need educational or vocational training services.
23. You need group counseling sessions.
31. You need medical care and services.

F. Accuracy (Attentiveness)
36. Please fill in the "Uncertain" box as your response for this question.

Appendix B

TCU CTSFORM (Criminal Thinking Scales)

Scales and Item Scoring Guide

Scoring Instructions. Items shown below from this assessment are *re-grouped by scales*, and response categories are 1=Strongly Disagree to 5=Strongly Agree. Scores for *each scale* are calculated as follows (and no more than half of the items for any scale can be missing).

1. Find and reverse the scoring for *reflected items* (i.e., those designated with ®) by –
a. subtracting the response value (1 to 5) for this item from "6",
(e.g., if the response is "2", the *revised* score is "4" [i.e., 6-2=4]),
2. Sum the response values of all non-missing items for each scale,
3. Divide the sum of item responses by the number of items included (yielding an average),
4. Multiply this average by 10 (in order to *rescale* the score so it ranges from 10 to 50) (e.g., an average response of "2.6" for a scale therefore becomes a score of "26").

A. Entitlement (EN)*

9. You have paid your dues in life and are justified in taking what you want.
22. You feel you are above the law.
23. It is okay to commit crime in order to pay for the things you need.
24. Society owes you a better life.
32. Your good behavior should allow you to be irresponsible sometimes.
33. It is okay to commit crime in order to live the life you deserve.

B. Justification (JU)*

7. You rationalize your actions with statements like "Everyone else is doing it, so why shouldn't I?"
11. When being asked about the motives for engaging in crime, you point out how hard your life has been.
16. You find yourself blaming the victims of some of your crimes.
25. Breaking the law is no big deal as long as you do not physically harm someone.
26. You find yourself blaming society and external circumstances for the problems in your life.
35. You justify the crimes you commit by telling yourself that if you had not done it, someone else would have.

C. Power Orientation (PO)*

4. When people tell you what to do, you become aggressive.
10. When not in control of a situation, you feel the need to exert power over others.
13. You argue with others over relatively trivial matters.
14. If someone disrespects you then you have to straighten them out, even if you have to get physical.
15. You like to be in control.
20. You think you have to pay back people who mess with you.

28. The only way to protect yourself is to be ready to fight.

D. Cold Heartedness (CH)

1. You get upset when you hear about someone who has lost everything in a natural disaster. ®
6. Seeing someone cry makes you sad. ®
12. You are sometimes so moved by an experience that you feel emotions you cannot describe. ®
17. You feel people are important to you. ®
27. You worry when a friend is having problems. ®

E. Criminal Rationalization (CN)

5. Anything can be fixed in court if you have the right connections.
8. Bankers, lawyers, and politicians get away with breaking the law every day.
18. This country's justice system was designed to treat everyone equally. ®
19. Police do worse things than do the "criminals" they lock up.
30. It is unfair that you are locked-up when bankers, lawyers, and politicians get away with their crimes.
34. Prosecutors often tell witnesses to lie in court.

F. Personal Irresponsibility (PI)

2. You are locked-up because you had a run of bad luck.
3. The real reason you are locked-up is because of your race.
21. Nothing you do here is going to make a difference in the way you are treated.
29. You are not to blame for everything you have done.
31. Laws are just a way to keep poor people down.
36. You may be a criminal, but your environment made you that way.

*A revised "Psychological Inventory of Criminal Thinking Styles (PICTS)" scale, taken from
Walters, G. D. (1998). Changing lives of crime and drugs: Intervening with substance-abusing offenders. New York: John Wiley & Sons.

Appendix C
TCU PSYFORM (PSYchological functioning)
Scales and Item Scoring Guide

Scoring Instructions. Items shown below from this assessment are *re-grouped by scales*, and response categories are 1=Strongly Disagree to 5=Strongly Agree. Scores for *each scale* are calculated as follows (and no more than half of the items for any scale can be missing).

1. Find and reverse the scoring for *reflected items* (i.e., those designated with ®) by –
a. subtracting the response value (1 to 5) for this item from "6",
(e.g., if the response is "2", the *revised* score is "4" [i.e., 6-2=4]),
2. Sum the response values of all non-missing items for each scale,
3. Divide the sum of item responses by the number of items included (yielding an average),
4. Multiply this average by 10 (in order to *rescale* the score so it ranges from 10 to 50) (e.g., an average response of "2.6" for a scale therefore becomes a score of "26").

PSYCHOLOGICAL FUNCTIONING SCALES

A. Self-Esteem (SE)
2. You have much to be proud of.
6. You feel like a failure. ®
10. You wish you had more respect for yourself. ®
19. You feel you are basically no good. ®
25. In general, you are satisfied with yourself.
29. You feel you are unimportant to others. ®

B. Depression (DP)
5. You feel interested in life. ®
12. You feel sad or depressed.
14. You feel extra tired or run down.
20. You worry or brood a lot.
22. You feel hopeless about the future.
32. You feel lonely.

C. Anxiety (AX)
1. You have trouble sleeping.
7. You have trouble concentrating or remembering things.
8. You feel afraid of certain things, like elevators, crowds, or going out alone.
9. You feel anxious or nervous.
15. You have trouble sitting still for long.
28. You feel tense or keyed-up.
30. You feel tightness or tension in your muscles.

D. Decision Making (DM)

3. You consider how your actions will affect others.
4. You plan ahead.
13. You think about probable results of your actions.
16. You think about what causes your current problems.
18. You think of several different ways to solve a problem.
21. You have trouble making decisions. ®
23. You make good decisions.
26. You make decisions without thinking about consequences. ®
33. You analyze problems by looking at all the choices.

E. Expectancy (EX)

11. You are likely to feel the need to use drugs in the next few months. ®
17. You are likely to drink alcohol in the next few months. ®
24. You are likely to relapse in the next few months. ®
31. You are likely to have problems in quitting drug use. ®

F. Accuracy (Attentiveness)

27. Please fill in the "Disagree" box as your response for this question.

Appendix D

TCU SOCFORM (SOCial functioning)

Scales and Item Scoring Guide

Scoring Instructions. Items shown below from this assessment are *re-grouped by scales*, and response categories are 1=Strongly Disagree to 5=Strongly Agree. Scores for *each scale* are calculated as follows (and no more than half of the items for any scale can be missing).

1. Find and reverse the scoring for *reflected items* (i.e., those designated with ®) by –
a. subtracting the response value (1 to 5) for this item from "6",
(e.g., if the response is "2", the *revised* score is "4" [i.e., 6-2=4]),
2. Sum the response values of all non-missing items for each scale,
3. Divide the sum of item responses by the number of items included (yielding an average),
4. Multiply this average by 10 (in order to *rescale* the score so it ranges from 10 to 50) (e.g., an average response of "2.6" for a scale therefore becomes a score of "26").

SOCIAL FUNCTIONING SCALES

A. Hostility (HS)

8. You have carried weapons, like knives or guns.
10. You feel a lot of anger inside you.
12. You have a hot temper.
13. You like others to feel afraid of you.
15. You feel mistreated by other people.
24. You get mad at other people easily.
28. You have urges to fight or hurt others.
36. Your temper gets you into fights or other trouble.

B. Risk Taking (RT)

3. You only do things that feel safe. ®
16. You avoid anything dangerous. ®
18. You are very careful and cautious. ®
26. You like to do things that are strange or exciting.
30. You like to take chances.
33. You like the "fast" life.
34. You like friends who are wild.

C. Social Support (SS)

1. You have people close to you who motivate and encourage your recovery.
5. You have close family members who want to help you stay away from drugs.
6. You have good friends who do not use drugs.
9. You have people close to you who can always be trusted.
17. You have people close to you who understand your situation and problems.
20. You work in situations where drug use is common. ®
21. You have people close to you who expect you to make positive changes in your life.

25. You have people close to you who help you develop confidence in yourself.
31. You have people close to you who respect you and your efforts.

D. Social Desirability Scale (SD)

2. You have never deliberately said something that hurt someone's feelings.
4. You are sometimes irritated by people who ask favors of you.
7. When you do not know something, you do not at all mind admitting it.
11. You sometimes try to get even rather than forgive and forget.
14. You are always willing to admit it when you make a mistake.
19. There have been occasions when you took advantage of someone.
22. You can remember "playing sick" to get out of something.
23. No matter who you are talking to, you are always a good listener.
27. You have felt like rebelling against people in authority even when they were right.
32. Occasionally, you gave up doing something because you thought too little of your ability.
35. You sometimes feel resentful when you do not get your way.

E. Accuracy (Attentiveness)

29. Please fill in the "Agree" box as your response for this question.

Appendix E

TCU A-RSKFORM

Instructions: Please mark answers to the series of questions listed below.

1. What is your current age?
2. What was your date of admission to THIS program or facility?
3. What is your gender? .....Male ⎵ Female
4. Are you Hispanic or Latino?.....No Yes
5. Are you? [MARK ONE]
   American Indian/Alaska Native
   Asian
   Native Hawaiian/Pacific Islander
   Black/African American
   White
   More than one race
   Other (specify)
6. How many years of school have you completed – that is, the highest grade?
   None, 1-6, 7-9, 10-11, 12 or GED, over 12
7. What is your current legal marital status?
   Single (never married)
   Married or living with a partner
   Separated
   Divorced
   Widowed
8. How many children do you have (only include your biological children)?
   None,1, 2, 3, 4 or more
9. How much of the time in the PAST 6 MONTHS before entering this program or facility were
   you LOCKED UP (i.e., not living in the 'free world")?
   None, Less than 1 month, 1-3 months, 4-5 months, All 6 months
10. When you entered this treatment program or facility, when was the last time you had lived in
    the "free world" for AT LEAST 6 MONTHS?
    Under a month ago, 1-5 months ago, 6-11 months ago, 1-3 years ago, Over 3 years ago

In the 6 months before entering this program or facility (or being "locked up"), were you ever –

11. employed full time (35+ hrs/week)? ..... ⎵*No* ⎵*Yes*
12. unemployed and NOT looking for work? ..... ⎵*No* ⎵*Yes*
13. receiving any public financial support (food stamps, disability, public assistance? *No* ⎵*Yes*
14. on parole or probation? ..... ⎵*No* ⎵*Yes* 15. treated in an emergency room? ..... ⎵*No* ⎵*Yes* 16. treated for a mental health problem? ..... ⎵*No* ⎵*Yes* 17.

treated for an alcohol use problem? ..... ⎵*No* ⎵*Yes* 18. treated for illegal drug use? ..... ⎵*No* ⎵*Yes*
19. arrested? ..... ⎵*No* ⎵*Yes*
20. in jail or prison? ..... ⎵*No* ⎵*Yes*

Based on Rounsaville et al. (Eds.). (1993). Diagnostic Source Book. NIH Pub 93-3508
Also see Joe, Simpson, Greener, & Rowan-Szal (2004). *Psychological Reports*, *36*(2), 215-234.

Appendix F
Probationer Perspectives on their Motivation for Treatments: Semi-Structured Interview Guide

Instruct the participant to not identify themselves or others during the interview.

Problem Recognition:

1. Thinking back to when you first entered prison-based treatment (e.g., SAFP), were you concerned about problems related to your drug use?
   - **Probe**: What were some of these concerns?
   - **Probe**: Did your awareness of these problems increase as a result of treatment?
2. In your opinion, how important was it to recognize these problems in order to want help for these problems?
   - **Probe**: Is awareness of these problems still a driving force for seeking help now that you are in the community-based treatment?
3. When you were in prison-based treatment, did you consider how treatment might help you obtain goals and aspirations once on the outside? Describe some of these.
   - **Probe**: Do you feel these goals were an important factor in you motivation while in prison-based treatment?
   - **Probe**: How about now that you are in community treatment?
4. Thinking about the concerns you had over your-drug use, were these concerns more important for your motivation for treatment at any particular time during treatment?
   - **Probe**: When do you feel they were the most prominent driving force for your participation in treatment?
   - **Probe**: What about the goals you had…when do you feel like they were a driving force for your participation in treatment?

Desire for Help:

5. Thinking back to when you first entered prison-based treatment, did you initially want help with drug problems?
   - **Probe**: Did you feel the treatment program you were in could help you with those problems? In what ways?
6. In your opinion, did your desire for help from treatment staff increase, decrease, or stay about the same during the time you were in prison-based treatment?
   a. **Probe**: How do you think this influenced your participation while you were in treatment?
   b. **Probe**: Did the types of things you wanted help with change? In what ways?
7. Nearing the end of prison-based treatment did you feel it was important to have help transitioning back to the community?
   a. **Probe**: Do you feel the treatment you are getting addresses those needs? In what ways? In what ways do you feel it is lacking or could be improved upon?

Treatment Readiness:

8. Thinking back to before you entered prison-based treatment, do you feel you were ready for formal treatment?
    a. **Probe:** Before arriving, what were your perceptions of the treatment program? Positive or Negative?
    b. **Probe:** Did these perceptions change after you became involved in treatment? In what ways? What factors influenced these changes?

9. Nearing the end of prison-based treatment, did you feel additional treatment/services were necessary once back in the community?
    a. **Probe**: What were your perceptions of the treatment program that you would be going to?
    b. **Probe**: Did these perceptions change once you entered community-based treatment? In what ways? What factors influenced changes in the way that your perceive community-based treatment?

Additional Questions:

10. What do you consider your race to be?
    American Indian/Alaska Native
    Asian
    Native Hawaiian/Pacific Islander
    Black/African American
    White
    More than one race
    Other (Specify)_____
11. How many times before now have you ever been in a drug treatment program (Do not include AA/NA/CA meetings)?
    Never, 1 time, 2 times, 3 times, 4 or more times
12. What is your current age?
13. That is all of the questions I have. Do you have any additional comments you would like to make before we end the interview?

Thank you and have a nice day!

Appendix G

Compares Low Start Groups on Treatment Progress factors (means adjusted using the Sidak method)

Dependent Variables	Admin	Low-Start Desire for Help Groups		
		Low-Stable	Low-Increase	Low-delayed-Increase
Therapeutic Engagement	1	-----	-----	-----
	2	3.83[a]	4.13[b]	3.92[ab]
	3	3.88[a]	4.35[b]	4.28[b]
	4	3.77[a]	4.49[b]	4.24[b]
Treatment Satisfaction	1	-----	-----	-----
	2	3.24[a]	3.85[b]	3.25[a]
	3	3.43[a]	4.07[b]	3.84[ab]
	4	3.31[a]	4.14[b]	4.01[b]
Decision Making	1	3.64[a]	3.71[a]	3.84[a]
	2	3.69[a]	3.73[a]	3.71[a]
	3	3.79[a]	3.96[a]	3.90[a]
	4	3.72[a]	4.21[b]	4.01[ab]
Neutralizations	1	2.35[a]	2.28[a]	2.32[a]
	2	2.37[a]	2.19[a]	2.35[a]
	3	2.31[a]	1.96[b]	2.12[a]
	4	2.28[a]	1.86[b]	2.28[ab]

Note: Means with like subscripts are not significantly different ($p > .05$).
Note: Therapeutic Engagement and Treatment Satisfaction were not measured at Admin 1.

Appendix H

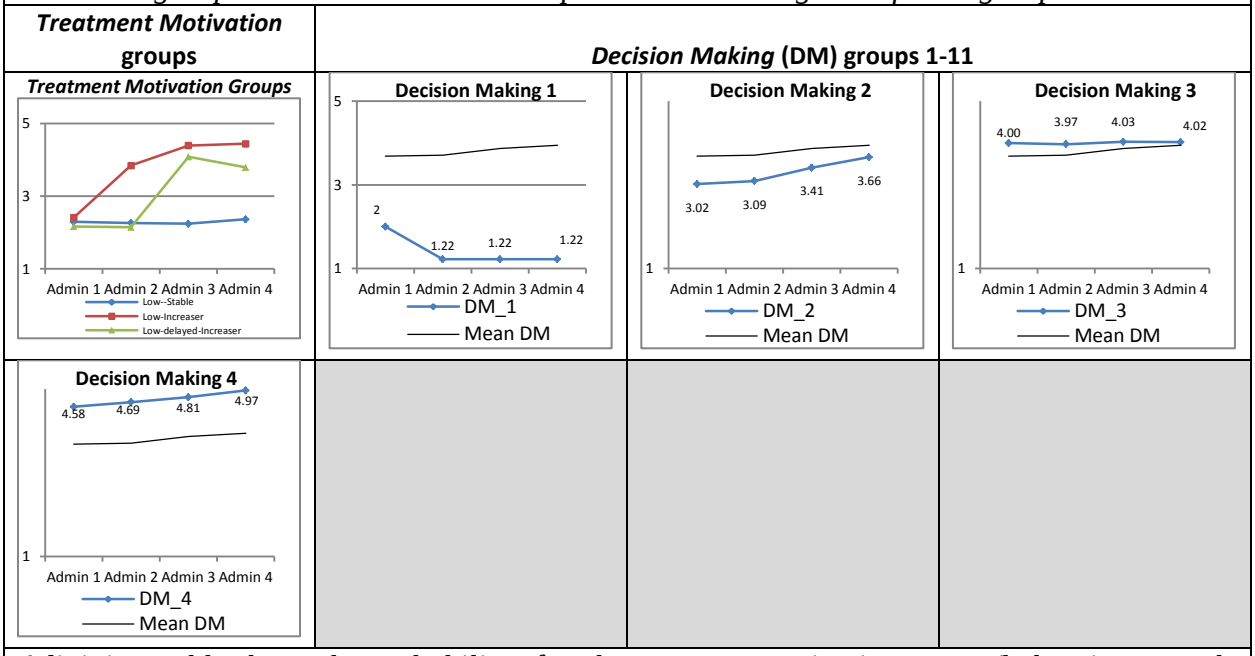
High Start Comparisons on Treatment Progress factors (means adjusted using the Sidak method)

Dependent Variables	Admin	High-Start Desire for Help Groups		
		High-Stable	High-Increase	High-Decrease
Therapeutic Engagement	1	-----	-----	-----
	2	4.02[a]	4.34[b]	3.90[a]
	3	4.12[a]	4.64[b]	4.19[a]
	4	4.11[a]	4.59[b]	3.92[a]
Treatment Satisfaction	1	-----	-----	-----
	2	3.60[a]	4.01[b]	3.61[a]
	3	3.70[a]	4.31[b]	3.60[a]
	4	3.76[a]	4.22[b]	3.44[a]
Decision Making	1	3.55[a]	3.70[b]	3.84[b]
	2	3.70[a]	3.87[b]	3.98[b]
	3	3.77[a]	4.09[b]	4.11[b]
	4	3.80[a]	4.28[b]	3.81[a]
Neutralizations	1	2.35[a]	2.23[b]	2.32[ab]
	2	2.31[a]	1.96[b]	2.28[a]
	3	2.23[a]	1.72[b]	2.48[c]
	4	2.20[a]	1.58[b]	2.27[a]

Note: Means with like subscripts are not significantly different ($p > .05$).
Note: Therapeutic Engagement was not measured at Admin 1.

Appendix I

Figure 9 shows growth trajectories for Treatment Motivation and Decision Making for the Low-Start groups. Note: The black line represents the average DM for all groups.

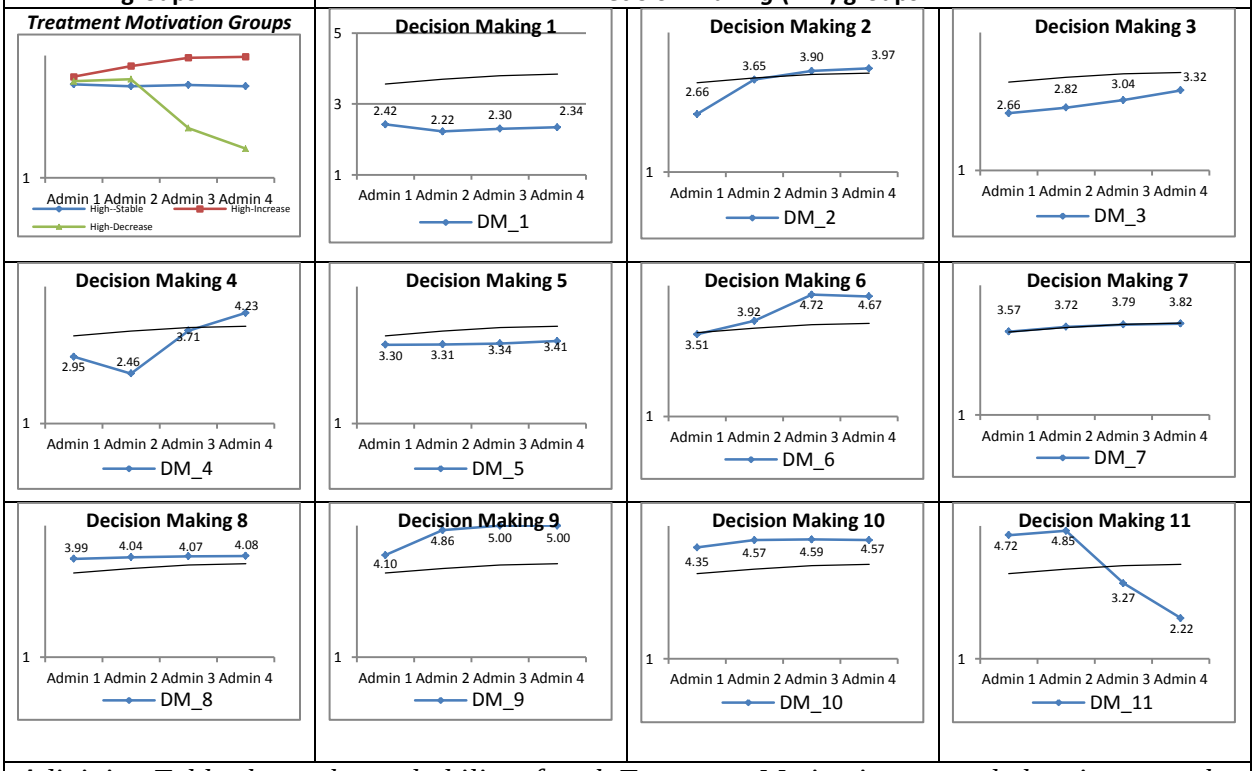


Adjoining Table shows the probability of each Treatment Motivation group (belonging to each Decision Making group. ORs compare the LS-Increase and the LS-delayed-Increase groups to the LS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Decision Making	***Treatment Motivation* groups**								
	LS Stable (n=120)			LS-Increase (n=93)			LS-delayed-Increase (n=30)		
	n	%	OR	n	%	OR	n	%	OR
DM_1	1	0.8%	----	0	0.0%	∞	0	0.0%	∞
DM_2	43	35.8%	----	33	35.5%	0.99	9	30.0%	0.84
DM_3	71	59.2%	----	50	53.8%	0.91	17	56.7%	0.96
DM_4	5	4.2%	----	10	10.8%	2.57	4	13.3%	3.16

Appendix J

Shows growth trajectories for Treatment Motivation and Decision Making for the High-Start groups. Note: The black line represents the average DM for all groups.

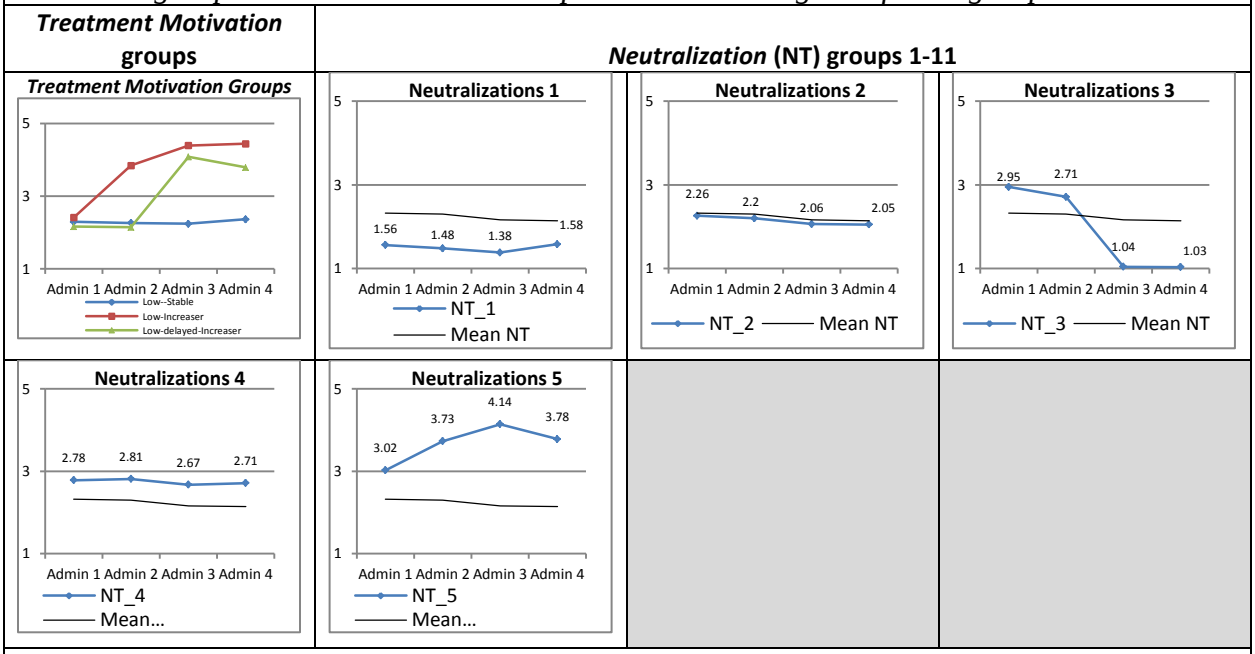


Adjoining Table shows the probability of each Treatment Motivation group belonging to each Decision Making group; ORs compare the HS-Increase and the HS-Decrease groups to the HS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Decision Making	***Treatment Motivation* groups**								
	HS-Stable (n=2511)			HS-Increase (n=111)			HS-Decrease (n=31)		
	n	%	OR	n	%	OR	n	%	OR
DM_1	51	2.0%	----	1	0.9%	0.45	0	0.0%	∞
DM_2	146	5.8%	----	7	6.3%	1.09	0	0.0%	∞
DM_3	92	3.7%	----	3	2.7%	0.73	0	0.0%	∞
DM_4	38	1.5%	----	4	3.6%	2.40	1	3.2%	2.13
DM_5	481	19.2%	----	14	12.6%	0.66	7	22.6%	1.18
DM_6	30	1.2%	----	10	9.0%	7.50*	0	0.0%	∞
DM_7	887	35.3%	----	21	18.9%	0.54*	7	22.6%	0.64
DM_8	640	25.5%	----	20	18.0%	0.71	7	22.6%	0.89
DM_9	7	0.3%	----	6	5.4%	18.0*	3	9.7%	32.30*
DM_10	133	5.3%	----	24	21.6%	4.08*	5	16.1%	3.04*
DM_11	6	0.2%	----	1	0.9%	4.5	1	3.2%	16.00*

Appendix K

Figure 10 shows growth trajectories for Treatment Motivation and Neutralizations for the Low-Start groups. Note: The black line represents the average NT for all groups.

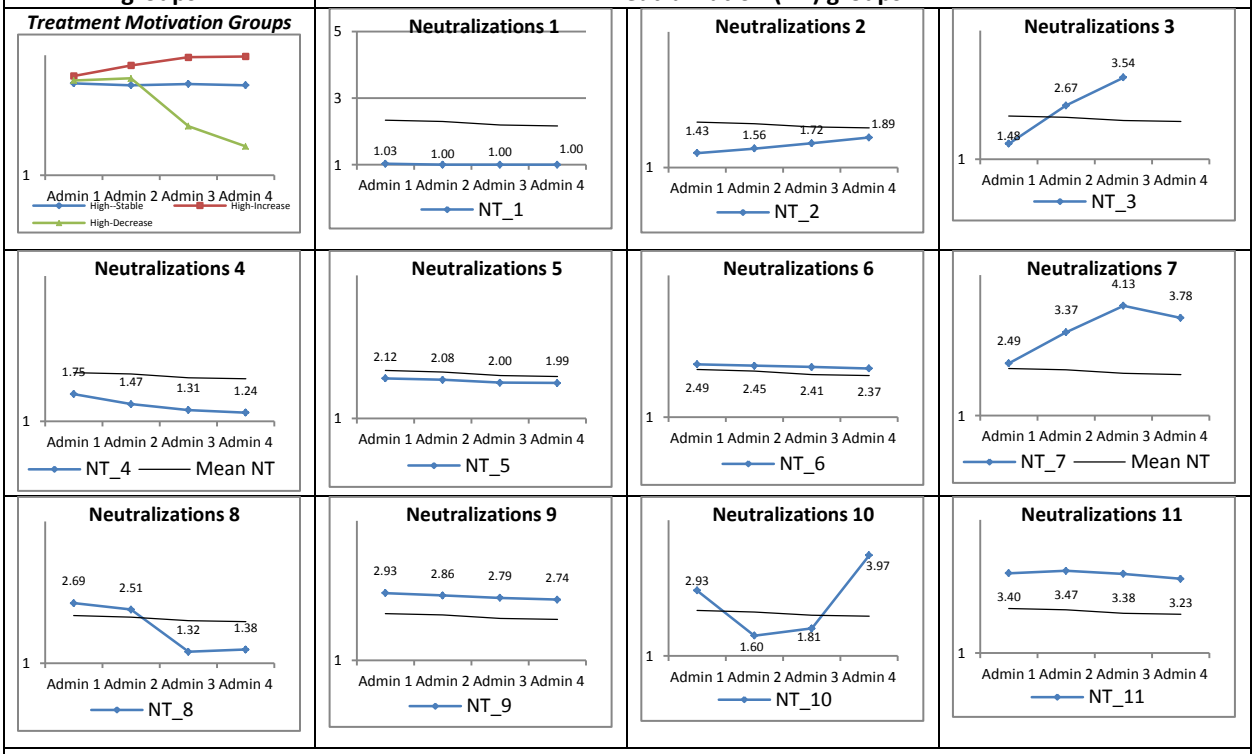


Adjoining Table shows the probability of each Treatment Motivation group belonging to each Neutralization group. ORs compare the LS-Increase and the LS-delayed-Increase groups to the LS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Neutralizations	***Treatment Motivation* groups**								
	LS Stable (n=120)			LS-Increase (n=93)			LS-delayed-Increase (n=30)		
	n	%	OR	n	%	OR	n	%	OR
NT_1	20	16.7%		19	20.4%	1.22	6	20%	1.20
NT_2	49	40.8%		54	58.1%	1.42*	12	40%	0.98
NT_3	0	0.0%		5	5.4%	∞	1	3.3%	∞
NT_4	48	40.0%		12	12.9%	0.32*	10	33.3%	0.83
NT_5	3	2.5%		3	3.2%	1.28	1	3.3%	1.32

Appendix L

Figure 14 shows growth trajectories for Treatment Motivation and Neutralizations for the High-Start groups. Note: The black line represents the average NT for all groups.



Adjoining Table shows the probability of each Treatment Motivation group belonging to each Neutralization group. ORs compare the HS-Increase and the HS-Decrease groups to the HS-Stable group in each row. Asterisks indicate significant OR at the 95% Confidence level.

Neutralizations	***Treatment Motivation* groups**								
	HS-Stable (n=2511)			HS-Increase (n=111)			HS-Decrease (n=31)		
	n	%	OR	n	%	OR	n	%	OR
NT_1	1	0.00%	----	4	3.6%	∞	0	0.0%	∞
NT_2	129	5.1%	----	4	3.6%	0.71	2	6.5%	1.27
NT_3	12	0.5%	----	0	0.0%	∞	0	0.0%	∞
NT_4	157	6.3%	----	37	33.3%	5.29*	4	12.9%	2.05
NT_5	894	35.6%	----	38	34.2%	0.96	9	29.0%	0.81
NT_6	781	31.1%	----	10	9.0%	0.29*	4	12.9%	0.41
NT_7	30	1.2%	----	0	0.0%	∞	3	9.7%	8.08*
NT_8	25	1.0%	----	8	7.2%	7.20*	1	3.2%	3.20
NT_9	408	16.2%	----	6	5.4%	0.33*	6	19.4%	1.20
NT_10	10	0.4%	----	1	0.9%	2.25	1	3.2%	8.00*
NT_11	64	2.5%	----	3	2.7%	1.08	1	3.2%	1.28

VITA

Aaron Michael Cherry was born on the 16th day of December, 1977, in Searcy, Arkansas. His parents were Joe and Juanita Cherry and he had two siblings Joe Jr. and Wendy. Aaron completed a high school equivalency in 1995 and, in 2010, proudly graduated Summa Cum Laude from Abilene Christian University with a Bachelor of Applied Studies degree with an emphasis in Psychology.

While completing his bachelor's degree, Aaron gained experience in treating addicted substance abusers at the Serenity Foundation in Abilene, Texas and extended those foundations to the treatment of eating disorders at Shades of Hope in Buffalo Gap, Texas. During his final semester at Abilene Christian, he enrolled and was accepted to pursue graduate studies at Texas Christian University.

Concomitant with his undergraduate degree in psychology, and his interests in the field of addictions, Aaron secured a Research Assistant position at the Institute of Behavioral Research, where he assists in addiction research aimed at improving the effectiveness of drug abuse treatment through the implementation of evidenced based practice. He obtained his Master's degree at TCU and is working on his Ph.D. Aaron is currently working as a program director at a substance abuse treatment facility and teaches two psychology classes at a local community college.

Aaron married his lovely wife Christine and joined her family of four children, Andrew, Joseph, James, and Bea in December 2011.

ABSTRACT

CHANGES IN OFFENDER MOTIVATION DURING
PRISON-BASED SUBSTANCE ABUSE TREATMENT:
EVALUATING INDIVIDUAL PATHS AND THEIR RELATIONSHIPS
TO TREATMENT PROGRESS

by Aaron Michael Cherry, M.S, 2012

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Introduction: Although much literature has evidenced the importance of intake motivation levels for substance abuse treatment, considerably less has evaluated treatment motivation longitudinally. The current study modeled motivation change using the well-established Texas Christian University *Treatment Motivation* scales and evaluated how these changes related to pre-treatment and during treatment factors.

Method: A mixed-methods approach was used in which quantitative models of *Treatment Motivation* change were evaluated in relation to treatment progress measures; semi-structured interviews were used to collect qualitative data which provided context for the quantitative findings. Participants in both portions of the study were male and

female, averaged around 35 years of age, and represented diverse races and ethnicities. **Results:** Quantitative findings showed that motivation change groups did emerge from the data but that these represented only about 5% of the total sample. Whereas available baseline indicators did not tend to predict whether or not an individual's motivation would change, we did find that motivation changes related to certain treatment progress measures (i.e., treatment engagement measures) in expected ways. Qualitative findings showed that motivation changed in both positive and negative directions and for a variety of reasons; these reports supplemented the quantitative findings. We developed a model from these reports illustrating common themes related to motivation change. **Discussion:** Although these findings provided some additional insights into changes in treatment motivation, we concluded that additional studies are necessary before making definitive conclusions. Clinicians are advised to interpret changes they see with current treatment motivation scales cautiously and couple them with clinical impressions.