Virginia Commonwealth University

VCU Scholars Compass

2012

THE EFFECT OF LEGAL STATUS ON RESPONSES TO BRIEF MOTIVATIONAL INTERVIEWING WITH SUBSTANCE USERS

Thomas Moore
Virginia Commonwealth University

www.manaraa.com

THE EFFECT OF LEGAL STATUS ON RESPONSES TO BRIEF MOTIVATIONAL
INTERVIEWING WITH SUBSTANCE USERS

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science at Virginia Commonwealth University.

By: Thomas Burton Moore

B.A., The Evergreen State College

M.S. Northeastern University

Director: Dace S. Svikis, Ph.D.

Professor of Psychology, Psychiatry, and Obstetrics/Gynecology

Department of Psychology and Psychiatry

Virginia Commonwealth University

Richmond, Virginia

May, 2012

Acknowledgments

I would like to acknowledge the members of my committee, Drs. Dace Svikis, Lori Keyser-Marcus, and Bruce Rybarczyk, for their guidance on this project. I would like to thank Dr. Svikis for her mentorship and encouragement throughout my graduate training thus far. Additionally, I would like to thank Dr. Leroy Thacker for his patience. I would like to acknowledge the support and encouragement of my family and friends. Finally, I would like thank my wife, Danielle Moore, for her unconditional love and unwavering support during my graduate school career thus far.

Table of Contents

List of Tables

List of Figures

Abstract

THE EFFECT OF LEGAL STATUS ON RESPONSES TO BRIEF MOTIVATIONAL
INTERVIEWING WITH SUBSTANCE USERS

By Thomas Burton Moore, M.S.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science at Virginia Commonwealth University.

Virginia Commonwealth University, 2012

Major Director: Dace Svikis, Ph.D.
Professor of Psychology, Psychiatry, and Obstetrics/Gynecology
Department of Psychology and Psychiatry

The effectiveness of drug abuse treatment for clients coerced into care remains controversial.

Some studies find clients with legal pressure do better than those without legal pressure,

while others report the exact opposite. Opposing views are often fueled by the wide-ranging

models that guide delivery of addiction treatment. The present study examined how

participants with and without legal pressure to attend treatment responded to a motivational

(MET) vs. traditional (TAU) form of addiction treatment. Additionally, the predictive value

of the Readiness to Change (RTC) score, from the URICA, was assessed across days of

substance use and treatment retention. Legal status was shown to have a significant effect on

days of primary substance use per week and treatment retention, regardless of intervention

condition. The RTC score was shown not to be predictive of days of primary substance use

or treatment retention. Research and clinical implications and future directions are discussed.

The effect of legal status on responses to brief motivational interviewing with substance users

Substance Use Disorders

Substance abuse and dependence affects 22.2 million Americans each year (NSDUH, 2008). The treatment of addiction and addiction-related problems continues to be a heavily argued and discussed field. The medical and social costs of a substance use addiction of any type are costly. In 2003 it was estimated that 21 billion dollars per year was spent on addiction services (NSDUH, 2008), with costs associated with drug and alcohol use (i.e. health care, lost wages, legal, etc.) accounting for a total of $500 billion annually (Jason & Ferrari, 2010).

Prevalence and Diagnosis of Substance Use Disorders

Substance Use Disorders are present in a surprisingly large proportion of the population and account for a significant amount of the costs associated with health care and mental health services each year. Data from the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) conducted by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) in 2001-2002, indicated that Alcohol Use Disorders afflict 17.6 million adult Americans. These findings, derived from a national, face-to-face survey (N=43,093), noted that alcohol use disorders (AUD) were more common among men and younger respondents than among women and older respondents (Compton, Thomas, Stinson & Grant, 2007). These results are consistent with an earlier study which suggested 17.4 million adult Americans suffered from AUD's (Sobell, Sobell, & Gavin, 1995), and present some of the most comprehensive data looking at substance use and abuse in the United States.

1

A more recent survey conducted by The Substance Abuse and Mental Health Services Administration (SAMHSA), is the 2008 National Survey on Drug Use and Health (NSDUH). Data for this study were collected between 2007-2008 (N=136,606) (SAMSHA, 2010). A representative sample of 136,606 individuals aged 12 or over were interviewed in their place of residence. According to the results of this survey 20.1 million (8%) Americans aged 12 or over had used illicit drugs in the past month (9.3% of youths aged 12-17, 19.6% of adults aged 18-25 and 5.9% of adults over 25), and 51.6 % (129.0 million) of persons aged 12 or over used alcohol in the past month. A total of 23.3% (58.8 million) of people aged 12 or over had engaged in binge drinking (5 or more drinks in the same day) in the past month. Heavy drinking, defined as 5 or more days of binge drinking in a month, was engaged in by 6.9% of the population, or 17.3 million Americans aged 12 or over. In 18-25 year olds, the reported rates of binge drinking and heavy drinking were 41% and 14.5%, respectively.

Substance use disorders (SUD), have a long history in the Diagnostic and Statistical Manual of Mental Disorders, first conceptualized as sociopathic personality disturbances in DSM-I and later personality disorders and sexual deviations in DSM-II (Nathan, Skinstad, Langenbucher,1999). With DSM, DSM-III, and DSM-III-R, SUDs were formalized and separated into two distinct diagnoses: Substance Abuse and Substance Dependence. Substance Abuse was viewed as the less severe of the two disorders. Further refinements in the criteria occurred for Substance Abuse and Dependence in the DSM-IV. According to the DSM-IV, Substance Dependence criteria are to be applied first, then, if an individual does not meet these criteria, a diagnosis of Substance Abuse considered. Text revisions were made to DSM-IV in 2000 to reflect new empirical evidence and correct factual errors (APA, 2000). Although there were refinements in the diagnostic criteria for SUDs between DSM-III-R and

2

DSM-IV, these changes were not substantive. Changes included: 1) the addition of qualifiers of "with or without physiological dependence" to the disorder of Substance Dependence; and 2) moving the criterion of social and occupational consequences of substance use from Substance Dependence to Substance Abuse. Additional changes are planned for the DSM-V, due out in 2012. It is uncertain if these changes will represent a major or minor change in SUD criteria. Specific criteria for the current DSM-IV-TR Substance Dependence and Substance Abuse diagnoses are summarized below (DSM-IV-TR, 2000).

A diagnosis of substance dependence requires demonstrating three or more of the following; 1) tolerance, 2) withdrawal, 3) compulsive use, 4) "persistent desire or unsuccessful efforts to cut down", 5) increased time spent in substance seeking behaviors, 6) continued use despite negative physical or psychological problems, and 7) social, occupational or recreational activities given up because of substance use. Tolerance is defined in the DSM-IV as "a need for markedly increased amounts of the substance" for achieving the same high or "a markedly diminished effect". Individuals diagnosed with dependence experience withdrawal symptoms or avoid them through the use of other substances. Compulsive use is defined as taking the substance in larger amounts over a longer period of time than intended (DSM-IV-TR p. 181, 2000).

Substance abuse is defined according to the DSM-IV-TR as a "pattern of substance use leading to clinically significant impairment or distress" in one or more of four criteria and never meeting the criteria for Substance Dependence. Substance use has resulted in 1) "failure to fulfill major role obligations at work, school, or home", 2) is the "recurrent use of the substance in situations in which it is physically hazardous", 3) is "recurrent substance-related legal problems", 4) "continued substance use despite having persistent or recurrent

3

social or interpersonal problems caused or exacerbated by the effects of the substance" (DSM-IV-TR p. 182-183, 2000). Meeting one or more of the above criteria is enough to meet criteria for a Substance Abuse diagnosis.

It is estimated that 8.9% (22.2 million) of Americans met classification for substance abuse or dependence in the past year. Of this population, 3.1 million were classified with dependence or abuse of both alcohol and illicit drugs, 3.9 million were dependent or abusing illicit drugs but not alcohol, and 15.2 million were dependent or abusing alcohol but not illicit drugs (NSDUH, 2008). There is no indication of a change in prevalence between 2002 and 2008 (22.0 million in 2002 and 22.2 million in 2008) (NSDUH, 2008). In 2008, it is estimated that 23.1 million persons aged 12 and above were in need of treatment for illicit drug and/or alcohol use problems. Of this 23.1 million, only 2.3 million received treatment, meaning that 20.8 million people in need of treatment had not received any specialty treatment at a substance abuse facility in the past year. Of those that did not receive treatment 1.0 million (4.8%) felt that they needed treatment, with 23.3% (233,000) of this sub-group making an effort to get treatment, and 76.7% (766,000) making no effort to get treatment (NSDUH 2008).

The substance abuse literature continues to support that substance use disorders are a chronic, relapsing condition. Despite this, outside the substance abuse literature, these disorders consistently are conceptualized as a social problem, because of the effects on social systems (legal problems, lost work, etc.). This view holds that substance dependence is primarily a social problem requiring prohibition and legal enforcement rather than a health problem that requires prevention and treatment. It is likely that this "SUDs as a social problem" perspective is held and maintained because 40% to 60% of patients treated for

4

alcohol or other drug dependence return to active substance use within a year following treatment discharge (McLellan & McKay, 1998; Finney & Moos, 1992). According to McLellan, Lewis, O'Brien, Kleber (2000), viewing drug and alcohol dependence as a curable, acute condition supports this social problem view. However, if a chronic illness model is adopted for SUDs, the standards for treatment and outcome expectations would be found among other chronic illnesses such as type 2 diabetes mellitus, hypertension, and asthma (McLellan et al., 2000). With these chronic conditions, as with substance abuse, there is a high relapse of symptoms when treatment is withdrawn.

It is important to recognize that in the population of over 23 million Americans who were in need of treatment, only 10% received this treatment (NSDUH, 2008). There are several possible reasons why this is the case, some include, the inability to access services, lack of resources to pay for services, belief that treatment services do not work and stigma associated with seeking out these services.

Conceptualization of substance abuse by professionals in the field has changed considerably in the last thirty years, however, the general population has been slow to catch up. Many still hold views about substance abuse that are outdated, and in many cases have been shown to be erroneous. One such perspective is that substance use is a weakness of character, that abuse problems are the fault of the individual for engaging in "immoral" drug-seeking behavior. As a result, the traditional social mechanism for controlling immoral behavior results in the criminal sanctioning of this behavior, and the person committing the behavior (Fingarette, 1989). Another such view, popularized by twelve step programs, asserts that before a person can make a change in their behaviors they must hit their lowest point (i.e., "rock bottom"). It is this lowest point that provides the motivation for all future

5

actions to avoid substances (Fingarette, 1989). Another more nuanced stance, is that substance abuse is static and unchanging, and that attitudes toward substance use are also static and unchanging. This view, and the others briefly described run contrary to the most recent and empirically supported models of substance use. The Transtheoretical stages of change model and Self determination theory are both examples of such, and will be discussed more fully as a way of understanding substance use and the effectiveness of a motivational approach to treatment of substance use.

Transtheoretical Model of Change

A diagnosis of substance abuse or dependence is an important way to categorize substance users, and it has been discussed in great detail, however it provides little information for the way in which we conceptualize the process of change from substance user to recovery. The most prevalent and widely held way of conceptualizing this process of change is through the use of the transtheoretical model of change (Prochaska & DiClemente, 1983). This model includes three dimensions representing critical elements of the change process: stages, processes, and levels of change (Prochaska, DiClemente & Norcross, 1992). Stages are a representation of the temporal and motivational aspects of change. This process is the mechanism that facilitates the movement through the stages. The five levels of change are, precontemplation, contemplation, preparation, action, and maintenance. Though not initially included as a stage of change, relapse is now conceptualized as a unique part of the stages of change. The stages of change can be thought of as a series of steps through which substance abusers traverse. Precontemplation is when there is no thought given for changing, contemplation is the consideration of change (weighing of the pros and cons), preparation is the commitment and planning to change, action is the modification of behaviors, and

6

maintenance is when the substance abuser sustains the changes made. Change is presented in a sequential pathway from precontemplation to maintenance; however change rarely occurs so simply or neatly. Often change is characterized by regression, relapse and repetition of stages (DiClemente, 1999).

Progress

| Precontemplation |
| Contemplation |
| Preparation |
| Action |
| Maintenance |

Relapse
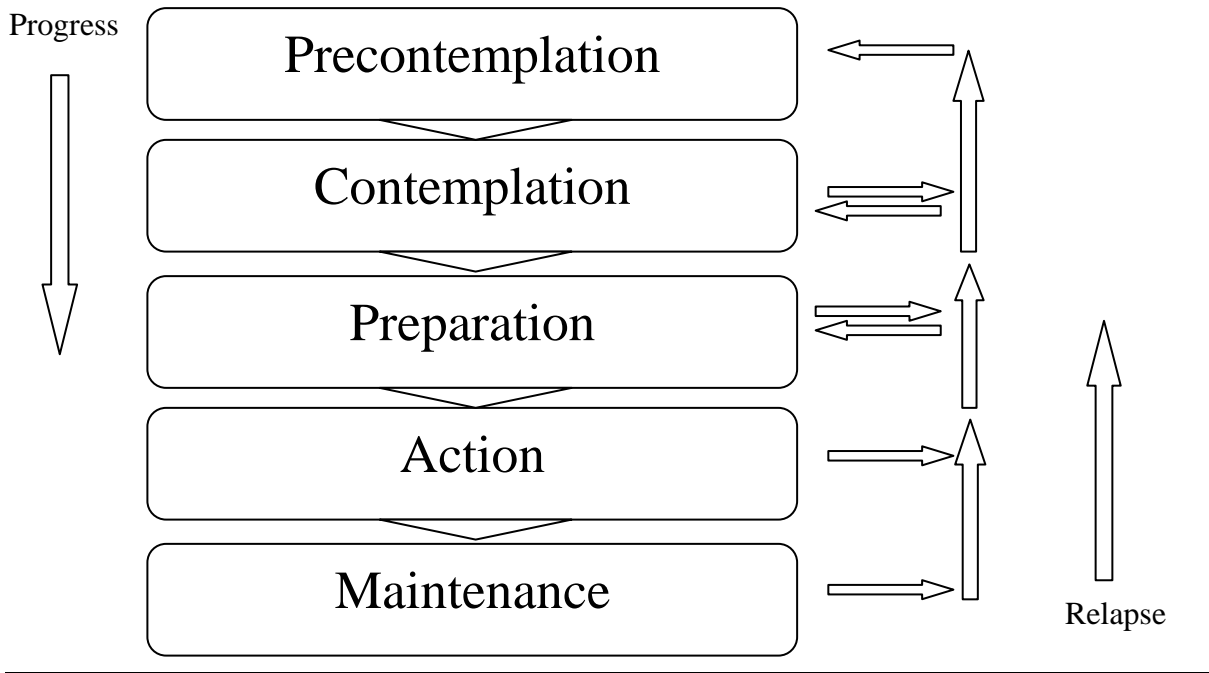
Adapted from Prochaska & DiClemente 1983.

Figure 1. Transtheoretical Model of Change.

Self Determination Theory (SDT)

The Transtheoretical Model of Change represents a way that recovery from substance use is conceptualized. A second important theory that is essential to the understanding of Motivational Interviewing is Self Determination Theory (SDT). This theory is a broad framework for the study of human motivation and personality. Within SDT, intrinsic and extrinsic sources of motivation, are defined and the respective roles of intrinsic and extrinsic motivation are described in cognitive and social development, and in individual differences. Three conditions are identified that support an individual's experience; autonomy,

competence and relatedness (Ryan & Deci, 2000). Self Determination Theory also proposes that the degree to which any of these three psychological needs is unsupported or undermined within a social context will have a detrimental impact on wellness in that setting. This framework has broad implications for understanding the practices that enhance, versus diminish functioning of the individual (Ryan & Deci, 2000).

Self Determination Theory can be utilized as a theoretical framework for understanding the role and nature of motivation in substance abuse treatment. According to SDT, individuals have a psychological need for autonomy. Undermining personal autonomy makes them feel as if their behavior is coerced, which reduces their interest and motivation to engage (in treatment). The application of SDT to substance abuse treatment predicts that the perception of pressure to enter or remain in treatment that is exerted by an external sources can be perceived as undermining autonomy. This theory supports the use of treatment and treatment engaging services that seek to enhance patient motivation to engage in treatment, thereby reducing external pressure and enhancing autonomy.

Motivation has been conceptualized in many different ways, with the majority of researchers and health care professionals treating motivation as something that varies in amount, and therefore, trying to identify and explore conditions that enhance or decrease motivation. While SDT acknowledges the importance of this distinction, the theory goes further by considering that people can be moved into action by a number of different forces, ranging from self-determined inwardly endorsed motives, including personal interests (intrinsic motivation), to external and controlling forces that pressure the individual to behave in a certain way (extrinsic motivation). Considering these forces, SDT has been able to identify six distinct types of motivation, ranging from intrinsic motivation to external

8

motivation (i.e., external regulation, introjections, identification and integration) and amotivation. Each of these motivational types is theorized to result in different outcomes, even when the level of motivation is high (Ryan & Deci, 2000; Williams, Saizow, & Ryan, 1999).
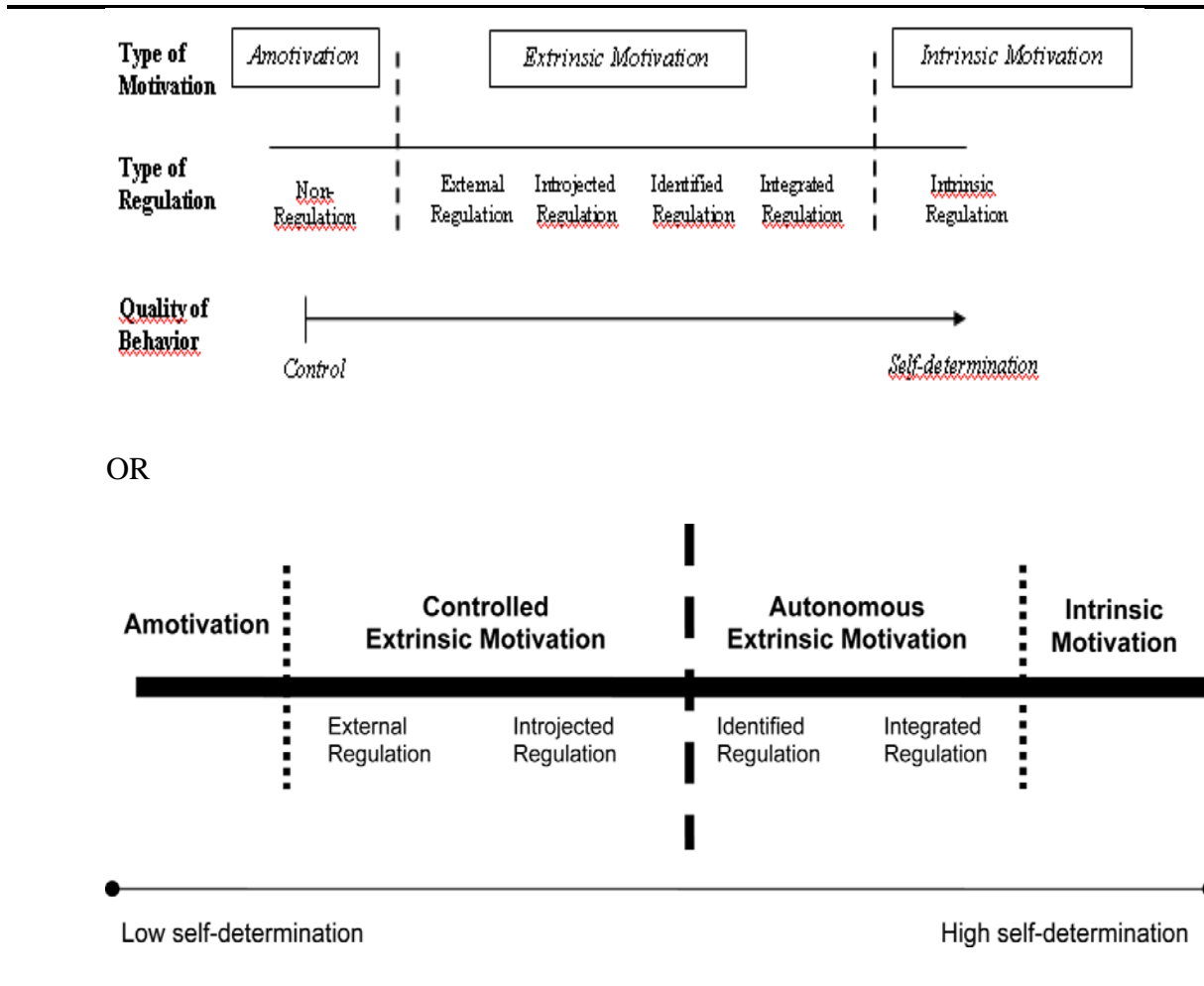
(Ryan & Deci, 2000).

Figure 2. Self Determination Theory

A major obstacle identified in the treatment of substance abusers is the lack of
motivation or ambivalence toward treatment (Miller & Rollnick, 2002; Battjes, Onken, &
Delany, 1999). Assessing motivation presents a significant challenge, especially when the
many factors and influences on a person's motivation (e.g. internal thoughts, external forces)
are taken in to account. There is a large body of research to support the importance of
motivation in treatment seeking behaviors, treatment engagement, retention and treatment
outcomes (Neff & Zule, 2002; De Leon, Melnick, & Kressel, 1997; Lemke & Moos, 2002).

10

Currently, there is not a standardized terminology to describe the variety of complex and nuanced motivations for treatment. Terminology such as coerced (Wild, 2006; Klag, O'Callaghan, & Creed, P., 2005; Sullivan et al., 2008), mandated (Wild, 2006), institutionally pressured (Polcin & Beattie, 2006), externally motivated (De Leon et al., 2001) and socially controlled (Wild, 2006) permeate the literature. According to Wild (2006), this lack of consistent and agreed upon definitions has allowed researchers to operate under the assumption that referral source adequately assesses the motivation into treatment. Wild (2006), goes on to argue that in order to truly understand motivation, the referral source and client perceptions must be independently measured. This argument has merit as it seeks to provide and understand the more nuanced view of treatment engagement, however, it only breaches the surface of the complexity. Future research may benefit from utilizing this more intricate understanding of motivation, however, current and past studies have focused solely on method of treatment entry (i.e. legally mandated vs. non-mandated).

Motivation is generally broken into as two distinct types: intrinsic and extrinsic. These types of motivation are in reference to the origin of the individuals desire to engage in a particular behavior or treatment (Curry, Wagner & Grothaus, 1990). Intrinsic motivation is generally defined as behaviors and desires which are internal to the person (Deci & Ryan, 1985). On the other hand, extrinsic motivation refers to "perceived outside pressures or coercions to change, or to enter and/or remain in treatment" usually through legal, health, family or employment pressures (De Leon et. al., 2001, p. 145). Wild (2006), identifies 3 types of social pressure which he defines as social control strategies; legal (i.e. drug court, probation, etc.), formally initiated (i.e. outside the legal system but still including institutional strategies for facilitating treatment), and informal social controls (persuasive

11

interpersonal tactics). It is important to acknowledge that legal coercion is not the only type of social pressure and can be conceptualized as one of three large categories. Despite this, both intrinsic and extrinsic motivations can effect an individual's participation in treatment with the majority of research into extrinsic motivation focusing on legal pressures.

Treatment for substance abuse involves meeting the needs of voluntary and mandated clients, and for people who may be extrinsically motivated into treatment, raising their motivation for treatment (Lincourt, Kuettel, & Bombadier, 2002). There is evidence to support that people's perceptions of having choice, control and, self-determination over their behaviors perform better, are more persistent (Deci & Ryan, 1991; Sheldon, Ryan, Rawsthorne, & Ilardi, 1997) and are more motivated and interested in substance abuse treatment (Koestner & Losier, 1996; Wild, Enzle, Nix, & Deci, 1997).

Motivational Interviewing

Motivational Interviewing (MI) was developed in a parallel manner to the transtheoretical model of change. While MI was not 'based' on this model, both MI and the transtheoretical model of change identified that the substance use was not a static construct. Substance use is not a constant and unchanging behavior, instead it is a dynamic process through which people progress. This understanding of progression and movement within stages allowed for the development of interventions that sought to move people through stages and facilitate the already present changing nature of substance use (Miller & Rollnick, 2009).

Motivational Interviewing was first presented by Miller and Rollnick (1991) in "Motivational Interviewing, Preparing people for change". They define MI as a "directive, client centered counseling style for eliciting behavior change by helping clients to explore

and resolve ambivalence" (Miller & Rollnick, 1991, pp. 25). Further, Motivational

Interviewing is described as a skillful clinical method, and style of counseling and

psychotherapy rather than a set of techniques. Motivational Interviewing can employ a

number of specific tasks/exercises but is not solely classifiable by these techniques. Instead

MI stresses the importance of collaboration between the therapist and the client (Miller &

Rollnick, 2002). According to Miller and Rollnick (2002), an underlying motivational spirit

to MI encompasses several key ideas, including collaboration, evocation, and autonomy.

The collaborative relationship between practitioner and client is an integral

component of any MI-based intervention. This relationship actively avoids the authoritarian

stance employed in many treatment seeking relationships, and instead encourages a partner-

like relationship. Each individual (both the clinician and the client) brings specific expertise

to the treatment. This creates a positive, not coercive, interpersonal atmosphere that is

conducive to change.

Through the process of evocation, the therapist helps to elicit information or feelings

from the client. In the spirit of the collaborative relationship in MI, the therapist avoids the

role of imparting, instilling or installing, and instead works with the individual to identify

their own motivation. To be effective, the relationship requires the drawing out of

motivation from the individual. Miller and Rollnick (1991), also express the importance of

finding intrinsic motivation for change within the individual and evoking it from the person.

A final core component to the 'spirit' of MI is autonomy. Responsibility for change

lies within the client. The individual client must present the motives and arguments for

change. They cannot be made to do anything or forced to change, if there is any hope of long

13

term or internal change. This type of therapeutic intervention is self direction of the client, by the client, and for the client.

Four general principles are integral to MI: expression of empathy, development of discrepancy, rolling with resistance, and supporting self-efficacy. While several exercises can be used to demonstrate these principles, the exercises do not define them. Expression of empathy is a fundamental and defining characteristic of MI. Founded on Carl Rogers's work of reflective listening and accurate empathy (Hettema, Steele, & Miller, 2005) this skill is utilized throughout the entire MI encounter. It is through empathy that the counselor can achieve understanding of the client without judgment, criticism or blame. Expressing empathy does not require agreement with the client's reporting, only acceptance by the clinician that the client's perspective is a valid view point within the client's personal framework, regardless of whether the same perspective is held by the therapist. As Miller and Rollnick say, this "attitude of acceptance and respect builds a working therapeutic alliance and supports the client's self-esteem, which further promotes change" (Miller & Rollnick, 2002, pp. 37).

Motivational Interviewing encourages an intentionally directive approach. The development of discrepancy is the means by which the therapist attempts to help amplify discrepancies between a client's present state, and how they want to be. The clinician may also amplify the differences between the client's behaviors and their broader goals and values. The challenge for the clinician in developing discrepancy is that there may be such an enormous gap between where a client is, and where they want to be, that this discrepancy actually becomes de-motivational. Generally, when developing discrepancy, the client is

prompted to identify reasons for change. Having the client report on personal motivation for change is more effective than the clinician saying it for them.

Many traditional substance abuse treatment models identify client resistance as "denial". This therapeutic hurdle usually triggers a therapist to advocate for change, while the client advocates equally as loud, or louder, for the status quo. Conversely, MI stresses that therapists must "roll with resistance" in an effort to reframe client resistance and move toward the direction of change. The therapist's role is not to provide answers, but to help elicit answers from the client. The client is identified as the expert on themselves, and as such, they are in possession of important insight and solutions to their own problems.

The final principle of MI is the support of self-efficacy. Self-efficacy is the enhancement of an individual's confidence to succeed, identify and manage their own problems, and successfully develop solutions to these problems. Support comes from the therapist's belief in the client and his/her intrinsic ability to make changes. It is important to remember that it is not the therapist doing the change. The therapist is affirming the client's ability and providing a voice of encouragement. For example, being supportive of changes in behavior that the client is willing to make.

Motivational Enhancement Therapy (MET)

Motivational Enhancement Therapy (MET) is the systematic implementation of the principles of MI and Prochaska and DiClemente's (1983), Stages of Change theory. It is designed to produce rapid, internally-motivated change. Motivational Enhancement Therapy (Miller & Rollnick, 1991; Miller et al., 1992) incorporates elements found in successful brief intervention strategies, summarized by the acronym FRAMES: **F**eedback regarding personal risk, negative consequences, or impairment related to substance use; emphasis on personal

15

Responsibility to change; the provision of clear **A**dvice to change; presentation of a **M**enu of change options; an **E**mpathic therapist style; and facilitation of the patient's **S**elf-efficacy.

Motivational Enhancement Therapy is a manualized treatment that was developed, using MI principles, for Project MATCH, one of the largest studies to date looking at multiple treatments for alcohol problems (Project MATCH Research Group, 1997a,b, 1998). Project MATCH was a multi-site, randomized clinical trial conducted at ten sites across the U.S., which sought to compare Twelve-step Facilitation Therapy (TSF), an approach based on the principles of Alcoholics Anonymous; Cognitive-behavioral Coping Skills Therapy (CBT), an approach based on social learning theory; and Motivational Enhancement Therapy (MET), a less intensive form of therapy based on the principles from Motivational Interviewing.   MET was developed and manualized from the underlying MI intervention in order to ensure fidelity of the intervention across participating sites.

Project MATCH found that the three interventions (TSF, CBT and MET) were equally effective at decreasing alcohol consumption and days drinking, even though TSF and CBT were delivered over 12 weekly sessions, compared to 4 MET intervention sessions over a twelve week period. MET was found to be a significantly briefer intervention with outcomes consistent with more intensive and 'established' treatments. Additionally, better outcomes were noted for clients with lower "readiness to change" (i.e. pre-contemplation, contemplation) in terms of the transtheoretical stages of change stages model (described previously) with MET than with CBT, whereas the reverse would apply to those who had reached the action stage of change (Project MATCH Research Group, 1997a).

The MET intervention was slightly modified for the recent CTN004 protocol, to, consist of three carefully planned sessions. Session one is described as focused on reviewing

an individualized Personal Feedback Report, which is created through summarization of objective information and client report at intake, and serves as a means of summarizing the client's view of substance-related problems, consequences, and reasons for quitting The second and third sessions are then focused on discussing plans for changing substance use (Carroll et al., 2002).

Prevalence Rates Among Correctional Populations

Among correctional populations a disproportionate number of individuals with substance use disorders exist. These numbers can be seen to reflect the "War on Drugs" mentality of the United States law enforcement system (Miller & Carroll, 2006). Correctional populations include a variety of individuals who are involved with the correctional system at any level, including people who are incarcerated or received a deferred judgment, probation or parole. In their review of substance abuse among men and women entering prison, Fazel, Bains & Doll (2006), found prevalence rates many orders of magnitude higher than in the general population, with estimates of alcohol abuse and dependence rates for male prisoners ranging from 18 to 30% , and in female prisoners ranging from 10 to 24%. Drug abuse and dependence rates ranged from 10 to 48% in male prisoners and 30 to 60% in female prisoners (Fazel, Bains & Doll, 2006). These numbers are considerably higher than the estimated 11.9% of males and 6.1 % of females with substance abuse and dependence, in the general population (SAMHSA, 2010b).

The National Criminal Justice Treatment Practices (NCJTP), a national survey of adult offenders in prisons, jails and community correctional agencies, estimates that 7 million (BJS, 2004) to 8 million (Taxman, Young, Wiersema, Rhodes, & Mitchell, 2007) adults are under correctional control. Of those, probationers accounted for 75% to 85% of all persons

under correctional control in 2005 (Taxman, Perdoni, & Harrison, 2007).   According to the Bureau of Justice Statistics there were 3,296,513 men and women on probation at the state or federal level as of 1/1/1998. In 1998, the number of individuals on probation increased by 3.7% to 3,417,613 (BJS, 1998). By 2008, the rates of probationers had risen to 4,270,917, with parolees accounting for an additional 828,169 individuals, totaling nearly 5.1 million individuals under correctional control in community supervision settings (BJS, 2009).

While on probation, many offenders continue to use illegal substances. Isaac, Heatley & Savoie (1998), found that 36% of probationers and parolees tested positive for illicit substances, 43% percent had used some type of illicit drug the past year, and 28% had used an illicit drug within the past month. The most common illicit drug used was marijuana; 23% of probationers had used it within the past month. Cocaine (9%), psychotherapeutics (6%), and hallucinogens (5%) were the next most commonly used illicit drugs. These drugs, as well as most other illicit drugs, were used at much higher rates among probationers than they were among the general population. (Brittingham, Schildhaus, & Gfroerer, 1999))

Studies have shown that without treatment, substance-abusing offenders will invariably repeat the same types of behaviors that led to their criminal justice status (Harrison, 2001). Among the nearly 300,000 prisoners released in 15 states in 1994, 67.5% were rearrested within 3 years and 51.8% were back in prison (Langan & Levin, 2002). Approximately half of those who ended up back in prison did so for technical parole violations (e.g., failing a drug test and missing an appointment with their parole officer). The Drug Abuse Treatment Outcome Study (DATOS) found that more than 42% of the clients enrolled in publicly funded drug abuse treatment programs were from the criminal justice system (Craddock, Rounds-Bryant, Flynn, & Hubbard, 1997). It is likely that the number of

offenders engaging in community treatment drug abuse programs has risen since this study was conducted, however, more current data are unavailable. Offenders tend to participate in traditional community outpatient programs that consist of drug education and counseling services. There is considerable focus on increasing treatment services received, with much less discussion about how to provide these services effectively (Craddock, Rounds-Bryant, Flynn, & Hubbard, 1997).

Existing Approaches with Substance Use in Correctional Populations

There are a number of programs and approaches that address substance use in correctional populations. One such program is probation and parole. Through this mechanism, former prisoners are released from prison and are required to adhere to strict behavioral guidelines, including abstinence from illicit substances. If they are unable to remain abstinent they receive harsh sanctions or return to prison. These programs operate under the general principle that by providing negative incentives for using that these behaviors will not happen (Lawrence, 2008).

Another approach available for correctional populations is jail based substance abuse treatment, often times focusing on twelve step substance abuse support. These programs operate in many prisons and are a way for individuals who are trying to remain abstinent from substances can receive peer support to maintain their abstinence (Hedden, Guard, & Arndt, 2011).

An additional program that seeks to address specific treatment needs of correctional populations is drug court. Drug Courts, first introduced in 1989, have been utilized as a means of diverting substance offenders from the traditional court system into a specific Drug Court system which utilizes sanctions (Wilson, Mitchell & MacKenzie, 2006). In this system

19

an offender is mandated to treatment, monitored by the court system and has sanctions enacted. Sanctions are enacted for substance use relapse, failure to attend treatment or for other infractions (Wilson, Mitchell & MacKenzie, 2006). These programs are currently utilized, or have plans to be enacted, in 50 states, the District of Colombia, Puerto Rico, and over 70 tribal locations (Madras, 2010).

Use of Drug Court programs attempts to tailor how substance abusers are managed within the criminal justice system, with different management dependent on the individual's needs. Still numerous gaps remain in appropriate and effective treatment for mandated clients. It is still unknown if there are differences in effectiveness of treatment for populations that seek substance abuse services with or without legal motivation. Other informational gaps include questions regarding if mandated individuals will respond more favorably, with decreased substance use, than more traditional treatment seeking populations.

MI/MET Research

Motivational Interviewing and MET have substantial research literature supporting their efficacy and establishing their role as an Evidence Based Practice (EBP). In addition to being supported in the literature, they have also been established as brief interventions (BI) designed to enhance an individual's motivation to change problem behaviors. A significant research base exists supporting the efficacy of MI with a variety of substance using populations, including: cocaine (Stotts, Schmitz, Rhoades, & Grabowski, 2001), heroin (Saunders, Wilkinson & Phillips, 1995; Ward, Mattick & Hall, 1992), marijuana (The Marijuana Treatment Project Research Group, 2004; Stephens, Roffman & Curtin, 2000) and multiple substances (Carroll, Libby, Sheehan, 2001; Martino, Carroll, Malley, &

Rounsaville, 2000). Additionally, MI/MET represents one of the primary EBP's for treatment of substance use disorders.

Motivational Interviewing was initially conceptualized for use with alcohol related disorders and as such, has a substantial research base with this population (Brown & Miller, 1993; Bien, Miller, & Tonigan, 1993; Miller & Rollnick, 2002). In their study looking at the impact of MI on treatment participation and post-treatment alcohol consumption, Brown and Miller (1993), found a significant beneficial effect. In this study, participants were randomized to treatment as usual (TAU) or a two session MI assessment and interview at intake in addition to standard treatment procedures. Therapist rating of patient treatment involvement was shown to be significantly higher for the MI intervention group. There was also a significant treatment effect at post treatment (3-month follow up), showing that the MI group achieved more favorable outcomes (64% less substance use compared to 29% in the control group). While the three month follow up period was not a long enough period to establish if there were enduring effects on drinking behavior, it is suggestive of a positive long-term outcome.

In the original multi-site clinical trial (Ball et al., 2007) from which this secondary data analysis was carried out, 461 adults who abused substances were randomized to receive either MET as adjunct to Treatment as Usual (TAU) or TAU alone (i.e., standard treatment). Findings from the study showed a significant reduction in substance use across both interventions during the 4-week therapy phase. Post-intervention, MET sustained these reductions while CAU showed a significant increase in substance use over this same follow up period. Study findings supported the superior treatment effects of MET in a real world setting across 5 treatment sites.

21

Utilization of the skills or "spirit" of MI is integral to the successful administration of MI. A study comparing three treatment approaches: confrontational, client centered, and control (treatment as usual), found that the client centered approach (which adhered closely to MI) was significantly more effective at reducing substance use than the control or confrontational groups (Miller, Benefield, & Tonigan, 1993). These effects were present at both 6 weeks post treatment and, through collateral report, at 12-month follow up. These results continue to support the utility of, and lasting effects of MI when implemented within an alcohol using population. Further, findings supported the relationship between confrontational approaches and patient drinking at the 12-month follow up. This study, and the previous ones, are good examples of the existing research conducted with MI, and supports the efficacy of MI with alcohol using populations.

In a relatively small (N=23) pilot study conducted by Martino et al. (2000), with individuals diagnosed with drug dependence and concurrent mood or psychotic disorders, participants were randomized to receive either a standard intake or a 45-60 minute motivational interview at intake. Although no significant differences in substance use were observed, the MI group demonstrated higher rates of attendance through 3 month follow-up. These findings support the efficacy of MI at improving treatment engagement.

A multisite randomized clinical trial conducted by The Marijuana Treatment Project Research Group (2004), compared a two session MET intervention with a nine-session multi-component intervention and a delayed treatment control group. Results indicated that both the two-session MET and nine-session multi-component interventions were significantly more effective than the control. While the longer multi-component intervention showed the greatest decreases in marijuana use, statistically significant reductions in frequency of

22

marijuana use and dependence symptoms were also observed for the briefer, two session MET condition when compared to the control. Similarly, in their brief study of opiate users attending a methadone maintenance program, Suanders and colleagues (1995), found that participants randomized to brief MI intervention (N=57) reported significantly greater increases in commitment to abstinence, fewer opiate related problems, better compliance with methadone program and longer abstinence rates than those randomized to an educational control (n-65). Moreover, considerably higher attrition rates at 6-month follow up were noted for the educational group (49%) as compared to the MI group (30%). Less favorable results were achieved for increasing or maintaining self-efficacy in the MI condition, though this may be due to lack of follow through on treatment interventions for individuals that were seeking additional treatment services.

A number of meta-analyses have done an exceptional job of looking at the MI literature. One such analysis was conducted by Burke, Arkowitz and Menchola (2003), reviewed 30 studies that had utilized adaptations of motivational interviewing (AMI). Results found greater reductions in problem behaviors in AMI's when compared to no-treatment or placebo controls, there was a significant reduction in problem behaviors, but when compared to previously established effective treatments there was no difference. In the 15 studies that were specific to alcohol and drugs, there was a significant effect when compared to no treatment or placebo groups, but not when compared to other active treatments. However, AMI's were, on average, 180 minutes shorter than traditional active treatments and resulted in the same effect. This suggests that AMI's are as effective as other treatments, and because they can be conducted in a shorter time period, may be more palatable for implementation. Variability in the effectiveness of AMI's across problem

23

behaviors was also noted, with medium effects observed for drug addiction (0.56) and diet and exercise (0.56), and small to medium (0.23 to 0.53) effects for alcohol.). Treatment effects appeared to have consistent durability at follow up.

In their meta analysis of 119 studies targeting outcomes of substance use (tobacco, alcohol, drugs, and marijuana), health-related behaviors (diet, exercise, safe sex), gambling, and engagement in treatment, Lundahl, Kunz, Brownell, Tollefson and Burke, (2010) found consistently small but significant positive effects of MI across a wide range of substances. The majority of studies reviewed in the analysis related to substance use, which is not surprising given the origination of MI, however significant results were not limited to this field, and positive results were observed across all identified areas. Motivational Interviewing was supported as more effective than non-specific treatments, and, while not necessarily better than CAU, in some cases it was at least as good. Effects of MI were observed to be durable up to two years post intervention, and beyond in some cases.

Although the research on the effectiveness of MI/MET among legally mandated participants is limited, findings that do exist, are encouraging. One existing study is a pilot conducted by Lincourt et al. (2002), which looked at mandated clients for a 6 session group based MI grounded intervention. The researchers were concerned that clients were not benefiting from CAU, had a high level of resistance and were prematurely ending treatment. Looking specifically at a group of clients who were unable to identify a problem upon entering treatment (n=167), participants were assigned to receive either MI plus standard treatment (n=75) or standard treatment only (n=92). Though not randomized, the groups were equivalent on age, sex, years of education, proportion of those married, and ethnic makeup. Participants in the MI group were significantly more likely to complete treatment

24

than those taking part in standard care alone. Within the MI group, self-report of motivation significantly increased from baseline to follow-up, and treatment participation and completion rates were nearly double that of the standard care group. Overall, it was suggested that motivationally based interventions, especially group, may be beneficial for a mandated client population.

Harper & Hardy (2000), examined the effectiveness of utilizing MI with clients in a probation setting, and found that while there was improvement noted across all conditions, those in contact with probation officers trained in MI techniques exhibited statistically greater improvements across all conditions. Stevens et al. (2006), looked at a European sample of Quasi-Compulsory Treatment (QCT) participants and found that in the face of this research, it has been suggested that people who are coerced into treatment will not be motivated to change (Cahill, Adinoff, Hosig, Muller & Pulliam, 2003) and thus less likely to engage and succeed in treatment (DiClemente, Belluno & Nevins, 1999). Despite these concerns there exists a promising, if limited, research in support of utilizing motivational treatments among legally mandated clients.

The above findings support the efficacy of MI within a variety of populations across a range of settings. Additionally, the results are supported as durable and at least *as good* as existing treatments. An additional strength of MI is its effectiveness as a standalone BI. Swanson, Pantalon, & Cohen (1999), and Martino et al. (2000), reported that a single session of motivational interviewing was associated with better treatment compliance and retention for dual-diagnosis participants compared with treatment as usual in inpatient and day treatment settings, respectively. A multisite trial of 450 marijuana-dependent participants

25

found that two sessions of MET was significantly more effective than a delayed-treatment control condition in reducing marijuana use and related outcomes (Babor, 2004).

An additional strength of MI is its use as an adjunct for facilitating engagement and retention in more traditional drug treatment programs (Saunders, Wilkinson, & Phillips, 1995; Aubrey, 1998; Lincourt, Kuettel, & Bombardier, 2002; Krupski, Sears, Joesch, Estee, He, Dunn, Huber, Roy-Byrne, Ries, 2010). MI also appears to be differentially effective with clients who are more angry and resistant, or less ready for change (Project MATCH Research Group 1997). This is consistent with the original intent and theoretical rationale for MI. A study conducted in a community treatment program found that a single session of MET, delivered by staff members who received only brief (single day) training, doubled the rate of treatment initiation compared to the standard evaluation among drug-abusing parents referred to treatment through the child protection system (Carroll, Libby, & Sheehan, 2001). Saunders et al. (1995) reported that a single session of motivational interviewing for participants entering a methadone maintenance program resulted in clients' greater commitment to abstinence and fewer opioid-related problems over a 6-month follow up period.

While there is much research in support of the efficacy of MI as a treatment strategy, considerable variability exists with regard to implementation in implementation, longevity and training. There is still room for improvement in our understanding of what makes MI work and with whom, and a greater understanding of these questions will allow for the optimal implementation of this effective intervention. In Project MATCH, the relative efficacy of an MI-based intervention varied significantly across sites and therapists despite extensive efforts to standardize training and treatment procedures (Project MATCH Research

26

Group 1998). Thus, it appears that variation in the delivery of MI can have substantial impact on its outcome.

Statement of Problem and Hypotheses

A wide range of studies have examined the efficacy of MI and MET in a range of settings with an array of target populations (Bien et al., 1993; Steinberg et al, 2002; Stotts et al. 2001; Carroll et al., 2001; Martino et al., 2000; Martin et al. 2006; Winhusen, Kropp, Babcock, Hague, Erickson, Renz, et al. 2008). Despite numerous articles in support of utilizing MI, little research has focused on the variations in the efficacy of MI in different treatment populations. While MI has demonstrated success with a range of problem areas (i.e. substance abuse, smoking cessation, gambling, etc.), and across broad population groups (i.e. adults, adolescents, pregnant women, etc.), less is known about MI's success within such broad subgroups.

There is a significant controversy in the general population, criminal justice community and treatment communities on how best to engage individuals who are legally motivated to participate in treatment. This controversy will not be resolved without further research. To date, little research has been devoted to the role of MI in engaging individuals are legally motivated to treatment. A legal mandate for treatment, depending on the individual, represents a variable degree of encouragement to attend, participate and make changes in behaviors. Motivational interviewing by its very nature and design may be an ideal way to engage and work with legally mandated individuals. Given the frequency of legal involvement among individuals suffering from substance abuse and dependence this gap represents a significant limitation in the existing research.

The few studies that have examined this potentially significant variation in substance using populations have yielded mixed results. For example, Project MATCH found limited statistically significant outcomes for treatment matching, while Lincourt, Kuettel and Bombardier (2002), observed increased attendance and completion among court ordered participants in a MI group program. Unfortunately these studies also differ methodologically in ways that make comparisons across studies difficult. At this time there is a need for further research to help unravel the inconsistency and shed new light on the subject of MI and it's applications with legally mandated individuals.

The current study used data collected from a multi-site study of MET with diverse patient groups and had two specific aims. First, using legal status as an indicator of motivation (legally incentivized vs. non-legally incentivized) to attend treatment, those with and without legal incentive were compared on distinct variables (e.g. demographics, primary substance, etc.). Second, using legal incentive status we compared outcome variables of treatment retention and substance use frequency (at weekly time points).

Data Checking. Treatment effects will be observed for both treatment groups (MET and TAU). A reduction in primary substance use during the experimental phase of treatment will be observer for both treatment conditions. A mixed linear model will be conducted to examine the effectiveness of the interventions (MET vs. TAU) through experimental treatment completion (Baseline through Week 4) and the effectiveness of the interventions (MET vs. TAU) at post intervention follow-up (Week 4 through week 16).

Hypothesis 1. When participants randomized to either MET or TAU are further subdivided into those with and without legal incentives to enter substance abuse treatment, it is hypothesized that those in the MET with legal incentives group will have the most positive

28

treatment outcomes (greater reduction in days per week of primary substance use; higher rates of treatment retention at 16 weeks) over time relative to the other three participant subgroups. Analyses will be conducted to assess the effects of Treatment Group and Legal Status on two outcome variables, primary substance use (baseline through 16 weekly data points) and treatment retention (active in treatment at study completion [y,n]).

Hypothesis 2. When participants randomized to either MET or TAU are further subdivided into those with primary alcohol or primary drug and with and without legal incentives to enter substance abuse treatment, it is hypothesized that those in the MET intervention presenting with primary alcohol problems and legal incentives will have the most positive treatment outcomes over time relative to the other participant subgroups.

Hypothesis 3. When participants randomized to either MET or TAU are further subdivided into those with high and low motivation to enter substance abuse treatment, it is hypothesized that those in the MET with low motivation group will have the most positive treatment outcomes (greater reduction in days per week of primary substance use; higher rates of treatment retention at 16 weeks) over time relative to the other three participant subgroups.

<div align="center">

Methods

</div>

Participants

The present study utilized data from a multi-site randomized clinical trial conducted under the auspices of the NIDA Clinical Trials Network (CTN). Recruitment occurred at six community treatment programs and clients providing informed consent were randomized to receive either motivational enhancement therapy (MET) or treatment as usual (TAU) during

the first 4 weeks of drug abuse treatment. Substance use and related outcomes were assessed

at baseline as well as 8 and 16 weeks post randomization.

Study Subject. Subjects were (n=461) clients admitted to one of the six participating

community treatment programs who met study inclusion criteria and consented to research

participation. Participants were predominantly male (70.9%); minority (58%); never married

(81.6%); with a mean age of 34.8 (SD=10.2).

Study Sites. For this multi-site protocol, substance abuse treatment programs were

chosen from the network of community providers participating in the NIDA Clinical Trials

Network (CTN). Only outpatient programs were eligible for this particular protocol. To

achieve adequate numbers of study participants, six community treatment programs (CTPs)

were chosen. The final cadre included rural, urban and suburban sites and represented the

States of California, Connecticut and Pennsylvania.

Patient Ascertainment. To maximize sample diversity and representativeness, study

inclusion and exclusion criteria were kept to a minimum. To be included in the study,

individuals had to: 1) be seeking outpatient substance abuse treatment; b) be at least 18 years

of age; and c) meet recent substance use criteria (past month). Excluded were persons found

medically or psychiatrically unstable (could not provide informed consent) or those enrolled

in residential care, methadone maintenance or a medical detoxification only program of care.

Study Procedures

Study recruitment took place over a 37-month period from June, 2001 to July, 2004.

The flow of participants from screening and informed consent through 18-week follow- up

assessment is shown in Figure 3.

```
                    ┌─────────────────────────────┐
                    │   Screened  (n = 683)       │
                    └─────────────────────────────┘
                                  │
                    ┌─────────────────────────────┐
                    │ Met eligibility criteria and│
                    │ provided informed consent   │
                    │        (n = 496)            │
                    └─────────────────────────────┘
                                  │
                    ┌─────────────────────────────┐
                    │ Completed baseline          │
                    │ assessment and were         │
                    │ randomized  (n = 461)       │
                    └─────────────────────────────┘
```

TAU (n = 245)	MET (n = 216)
Completed post Intervention follow up (n = 163)	Completed post intervention follow up n = 151
Completed follow up 1 (8 weeks post randomization) (n =156)	Completed follow up 1 (8 weeks post randomization) (n = 143)
Completed follow up 2(16 weeks post randomization) (n = 166)	Completed follow up 2 (16 weeks post randomization) (n=149)

Diagram of eligibility, enrollment, treatment and follow up rates. TAU = treatment as usual; MET = motivational enhancement therapy

Figure 3. CONSORT Diagram of Eligibility, Enrollment, Treatment and Follow up Rates**.**

Screening. Patients seeking admission to one of the six participating outpatient CTPs learned about the study through posted flyers, their counselors or an on-site Research Assistant (RA). Those wanting more information (N=683) met with the RA who explained the purpose of the study and answered any questions they might have. Patients who were eligible for the study were informed that participation was voluntary and a decision not to participate would have no negative impact on their treatment at the CTP. Also, they were told they could discontinue their participation in the study at any time with no negative consequences to themselves or their substance abuse treatment.

If a person indicated they were not interested in the study, they were referred to their counselor at the CTP for appropriate care or referral. If instead they wished to be in the study, the RA proceeded to obtain written informed consent and proceeded with baseline assessment.

Informed Consent. Potential study participants were told about the study by RAs who successfully completed all required training, including the training in human subjects protections, Good Research Practices (GRP), through the Training Subcommittee of the NIDA CTN. RAs were closely monitored with on-site supervision and corrective action when necessary. As described above, RAs provided potential subjects with an overview of the study, then read the consent form aloud, verbatim, stopping to clarify and answer questions as needed. RAs made sure potential study participants understood their participation would be voluntary and a decision not to participate would have no negative consequences on their standard treatment at the CTP. For persons interested in study participation, the RA witnessed signing of the consent form. The participant was given a

32

copy of this form (co-signed and dated by the RA) and the original was stored in a locked file cabinet separate from the participant's research data.

The study protocol was reviewed and approved by the Institutional Review Boards (IRBs) of all participating Universities and their CTP affiliates prior to implementation. In addition, a Data Safety Monitoring Board (DSMB) was convened by the National Institute on Drug Abuse (NIDA). The national DSMB monitored study progress and reviewed adverse events throughout the course of the study.

Baseline Assessment. Baseline assessment required approximately 2 hours to complete and typically took place on the same day as study recruitment. Assessment measures included: demographic form, University of Rhode Island Change Assessment (URICA, Treatment Attitude and Expectations, Substance Dependence Severity Scale (SDSS), Addiction Severity Index (ASI-'lite'), Substance Use Calendar (SUC), Short Inventory of Problems-revised (SIP-R), Treatment Utilization Form (TUF), urine test, breathalyzer

Random Assignment. Randomization to either the MET or TAU intervention group occurred following completion of baseline assessment. To balance groups on demographic and other key variables, URN randomization was used. URN variables included: gender (male, female), race (Caucasian, African American, Hispanic, Asian, Other), primary drug of abuse (cocaine, methamphetamine, alcohol, opioids, marijuana, benzodiazepines, other), mandated to treatment (yes, no), and currently employed (yes, no).

Study Arms. Participants in this study were randomly assigned to 'treatment condition' where they received 3 sessions of either MET or TAU, with the latter defined by each local CTP.

33

TAU Intervention. Participants randomized to the control group received three sessions of individual counseling as is usually provided at that CTP. Sessions were between 45-55 minutes each and were provided during the four week active phase. Sessions were not standardized across sites, but were allowed to vary according to standard clinical procedures of each individual CTP. Clinicians "collected information on substance use and psychosocial functioning, explained treatment program requirements, discussed the participant's goals for treatment, provided early case management and substance use counseling, encouraged attendance at 12-step meetings, promoted abstinence, and emphasized follow through with treatment at the clinic" (Ball et al., 2007, p. 559).

MET intervention. *P*articipants randomized to the experimental group received three sessions of MET from counselors trained by members of CTN staff (Miller & Rollnick, 1991; Miller et al. 1992). Each session was between 45-55 minutes long and the 3 sessions were scheduled over weeks 1-4 post randomization. First MET therapists reviewed the participants individualized Personal Feedback Report (PFR). This was created using data provided during baseline assessment and focused on substance-related problems, consequences, and reasons for quitting. Second and third sessions then focused upon discussing plans for changing substance use. Strategies used during MET intervention included, but were not limited to, asking open ended questions, avoiding and rolling with resistance, listening with empathy, eliciting self-motivational statements, and reframing.

Therapist Training and Certification. All counseling staff at participating CTPs were eligible to serve as study therapists. Participation required 1) a willingness to learn a manualized version of MET, 2) consent to be randomized to provide either MET or TAU, and 3) be willing to have sessions audio taped. In addition, supervisory staff approval was

required. Therapist volunteers were then randomly selected to receive MET training, the others were asked to continue TAU counseling as before. Fore MET, Training of Trainers (TOT) model was used, with one individual from each participating Node serving as the local trainer, supervisor, and intervention fidelity monitor. Node MET trainers were all familiar with MET prior to attending the two day "training of trainers" workshop where all Node trainers met to rehearse how staff at their respective CTP's would be trained in the intervention. Following this TOT, Node trainers returned to their sites with MET manuals, training materials (video tapes, role plays, slides), and therapists assigned to MET for the Node participated in 16 hours of didactic MET training.

Fidelity of the MET intervention provided by therapists was maintained through regular supervisory meetings, review of audiotapes, and therapist self-monitoring of their behavior through Therapist Checklists. During the implementation of the study, each CTP supervisor (or Node MET expert) provided biweekly group supervision (in person or by phone) and provided individual supervision when it was needed. Supervision included, reviewing of audiotapes and providing corrective feedback around the use of prescribed versus proscribed techniques from the MET manual. The on-site MET supervisor received at least monthly consultation (phone or face-to-face) with the Node MET supervisor regarding supervisory issues. All sessions in the MET condition were audio taped with a sample rated by independent evaluators blind to participants' treatment assignment.

Standard CTP Services. Standard treatment offered at each separate CTP, except for the 3 individual sessions participants received as part of the study intervention, was not otherwise constrained or controlled. That is, if it was standard practice at a CTP for patients to attend weekly group sessions in addition to individual counseling, participants in both

MET and standard treatment would do so (providing the total number of sessions was equal across conditions). Participation in treatment after the conclusion of the treatment period was measured by the Treatment Utilization Form (TUF).

Follow-up Assessments. Follow up Assessment Battery: Follow ups were conducted with study participant by the RA at the conclusion of the 4 week intervention period and at 8 and 16 weeks post intervention completion. Follow-up visits took approximately 1 hour to complete. Data were analyzed using intent-to-treat principles, such that once a participant was randomized to MET or TAU they were followed and considered in outcome analyses.

Compensation. Participants were compensated $10 for completing each of the assessments (pretreatment, each week during treatment, posttreatment, and each of the two follow-ups. Therefore, participants were eligible to receive a total of $70 if they attended all seven interviews as scheduled.

Measures

The following assessments were completed at baseline and/or follow ups. All interviews were conducted by CTN-trained and certified research assistants.

Demographic Form. The demographic form collected information about age, ethnicity, education level, employment, reason for entering treatment and marital status as well as information about present substance use.

Addiction Severity Index, Version 5 (ASI, McLellan, Kusher, Metzger, Peters, Grissom, et al. 1992). The ASI 'lite' is a minor variation (six fewer questions and no interviewer ratings) of the ASI, a widely used instrument that assesses seven domains of psychosocial functioning commonly effected by alcohol and drug dependence, they are,

36

medical, employment/support, alcohol, drugs, legal, family/social, and psychiatric. Participants provide objective data on the number, extent and duration of problem symptoms across two time periods: 30 days prior to study enrollment and lifetime (excluding past 30 days).

Treatment Utilization Form (TUF). The 11-item TUF records a number and duration of substance abuse treatment sessions attended over target periods of assessment (Carroll et al., 2001). Participant involvement in ancillary services (i.e., non-study related counseling, child care, medical, psychiatric, vocational, legal and medication services) is recorded. The TUF was adapted and shortened from the Treatment Services Review (TSR; McLellan, Alterman, Cacciola, Metzger, & O'Brien, 1992), which has shown to be a reliable and valid assessment (McLellan et al., 1992).

Substance Use Calendar (SUC). Detailed reports of substance use were obtained with the SUC, which was the Timeline Followback method (Sobell and Sobell, 1992; Miller and Dleboca, 1994; Fals-Stewart et. al. 2000). The SUC is administered as a semi-structured interview. In the present study it focused on the following substances, marijuana, cocaine, alcohol, methamphetamine, benzodiazepines, opioids, and other drugs). For the present study, the primary outcome measure was created from the SUC. It was defined as days per week using the primary substance of abuse. Days of use during each of the 16 weeks of post enrollment were recorded.

University of Rhode Island Change Assessment (URICA). A 32 item, widely used, self-report which assesses the participant's current position regarding readiness for change (e.g. precontemplation, contemplation, preparation) with regard to substance use (DiClemente & Hughes, 1990; Callahan, Taylor, Moore, Jungerman, Vilela & Bundy, 2008)

37

The URICA when scored, results in 4 composite scores; precontemplation, contemplation, action, maintenance. A readiness to change score ranging from -2 to 14 is created using the following formula, contemplation + action + maintenance – precontemplation = Readiness to Change score. Factor analysis has supported the four-factor structure in some studies (Carney & Kivlahan, 1995), but not in others (Belding, Iguchi, & Lamb, 1996) and evidence for the predictive validity of the URICA has produced equally mixed findings (Blanchard et al., 2003; Henderson, Saules, & Galen, 2004).

Data Management. Data were entered continuously throughout the study by RA's. Within one week of data entry the Node data manager reviewed the data entered for missing, illogical, out of range, and inconsistent values; accuracy of key variables such as gender, age, race, treatment assignment, and therapist, as well as checks within and across fields for logical inconsistencies. The above variables were defined in the study Data Dictionary, which was distributed to Node Data Managers at the outset of the study. Weekly status reports were distributed to the research assistants which identified any problems that were encountered that needed correction and clarification.

Participant confidentiality was maintained through a numbered reference system with participants names appearing only on the "key", which was kept by the project coordinator at each site. Additionally, a Federal Certificate of Confidentiality was obtained by each to ensure that there were no increased risks to participants beyond that which would be incurred through seeking and entering treatment at the participating CTP.

Variables for Present Study

Variables abstracted from the original data set or created by modifying the original data set measures are as follows:

38

Demographics. Age; race (Caucasian, African American, Hispanic, Other), years of education, marital status (married/cohabitating, all others [e.g., never married/divorced/separated/ widowed]), employment status (full time/part time/student, unemployed/disabled/not working outside the home).

Treatment Condition. Motivational Enhancement Therapy (MET) or Treatment As Usual (TAU).

Substance Use. Substance use was measured using the Substance Use Calendar (SUC) at four time points; baseline, post intervention, one month post intervention and three months post intervention. A single number, representing average number of days using primary substance, was created from the SUC for mean baseline days of primary substance use per week. This continuous variable has values from 0-7. Primary substance use during the study was measured by the SUC and provided 16 sequential weekly data points. These continuous variables are scored 0-7 and represent the number of days using the primary substance during each of the 16 weeks post randomization.

Treatment Retention. Treatment retention was measured using the Treatment Utilization Form (TUF) at the 16 week follow up. It was defined categorically by using the yes or no response to "participant active in treatment at 16 weeks post-randomization" from the TUF.

Treatment Phase. The data were divided into two discrete time points, or phases, because of the possible changes in slope due to the treatment condition. One Phase consisted of baseline through week 4; the second Phase consisted of week 5 through 16.

Primary Substance. Initially identified by a categorical variable on the demographic

form; cocaine, methamphetamine, alcohol, opiates, marijuana, other, alcohol and drug). See

percentages on Table 1.

Table 1.

Primary Substance (from Demographic Form) (n = 461)

	%
Cocaine	23.2%
Methamphetamine	3.5%
Alcohol	28.6%
Opiates	9.3%
Marijuana	15.6%
Other	8.2%
Alcohol and Drug	11.5%

The initial consideration was to collapse substance use into 3 categories; alcohol only, drug

only, and drug and alcohol. After preliminary analyses it was decided that the frequencies of

these categories were too small for the analyses proposed (see table 2).

Table 2.

Primary Substance Used (3 grouping)

	%
Primary Alcohol	28.6%
Primary Drug(s)	56.4%
Primary Alcohol and Drug(s)	15.0%

Several grouping strategies were assessed and the decision was made to collapse the

substance use categories into a dichotomous variable; primary alcohol users and primary

drug users. The primary alcohol variable contains any alcohol use while the primary drug

category contains one or more drugs used but no evidence of primary alcohol use. The

decision to combine the groups was supported by the literature (Ball et al, 2007) and by the

40

similarities observed for the alcohol only and alcohol and drug groupings (e.g. age, marital status, ethnicity, life time # of arrests, lifetime psych # of psych treatments). These similarities were not observed with the drug only group. The decision was made to combine the two groups based on sample size of the primary alcohol and drugs group (15%), existing literature and the similarities between the two groupings. Participants self identified primary substance was used to create a dichotomous variable with the following values, Alcohol: participant reported alcohol to be the primary substance they used; or Drug: participant did not report alcohol as the primary substance use, which then categorized the participant as primary drug. From this, the two category primary substance variable was created, those with primary alcohol and those with primary drug (with no alcohol).

Legal status. Using the demographic form, the legal status of the participants (n=461) was assessed. Participants responded to one of five choices; "mandated or referred as alternative to jail" (17.4%), "referred by probation/parole officer" (8%), "referred by other federal/state/private agency" (8.2%), "other legal issues involved" (3.7%), and "no known legal issues involved" (62.7%). This information was re-coded into a 3 group categorical variable where 62.7% reported no legal involvement, 20% reported some legal involvement ("referred by probation/parole officer"; "referred by other federal/state/private agency"; "other legal issues involved") and 17.3% reported3 that they were mandated to treatment. These variables showed that in a three group legal variable that only n=19 cases were mandated in the primary 'alcohol' group compared to n=61 for 'other drug' group. Some legal involvement is n=30 for 'alcohol' and n=62 for 'other drug'. No legal involvement is n=152 for 'alcohol' and n=137 for 'other drug'. The small numbers of participants in the mandated to treatment category for alcohol use (n=19) is small for the research questions and could result

41

in complete separation or quasicomplete separation when more complex statistical analyses with covariates are run. Because of this, it was decided that a dichotomous legal variable would be used where there would be "any legal involvement" and "no legal involvement". This variable was obtained by collapsing the legal status variable from the demographic form. The "any legal involvement" group was made by collapsing "mandated or referred as alternative to jail", "referred by probation/parole officer", "referred by other federal/state/private agency", and "other legal issues involved". The "no legal involvement" group was made up of the "no known legal issues involved" category.

Motivation. Motivation was measured using a composite score created from the University of Rhode Island Change Assessment (URICA). The URICA is a 32 question measure of motivation. The URICA when scored, results in 4 composite scores; precontemplation, contemplation, action, maintenance. A readiness to change score is created using the following formula, contemplation + action + maintenance – precontemplation = Readiness to Change Score. The Readiness to Change score can range from -2 to 14. There are no agreed up on cut off scores presented in the literature. While several potential algorithms are presented in the literature (Callaghan, Taylor, Moore, Jungerman, Andrioni De Biaze Vilela, Budney, 2008) there is no consensus. As such, a mean separation was done to create a low and high motivation category using this sample. One algorithm, created by the Addition Technology Transfer Center (ATCC) suggested cut off scores for the three stages of change; precontemplation (-2-10.15), contemplation (10.16-11.80), action/maintenance (11.81 and above). The mean separation yielded comparable results to the ATCC algorithm. Using the mean separation, a total of 225 participants were categorized as low motivation, while 226 were categorized as high motivation. Using the

42

ATCC algorithm 226 participants were precontemplation and 225 were either contemplation or action / maintenance. Using this procedure, motivation was dichotomized into: Low Motivation, those with a Readiness to Change score below -2-10.14; and High Motivation, those with Readiness to Change scores 10.15-14.

Data Analysis Plan

       Demographics and Initial Analyses. Statistical analyses were performed using SPSS v.18.0 (SPSS, Chicago, IL). The data set obtained for this secondary data analysis had already been prepared for use (see Ball et al., 2007). Comparisons of participant characteristics between MET and TAU were performed by means of ANOVA and chi-square analysis. ANOVA and chi-square analysis were also conducted to examine differences in site characteristics. Descriptive analyses to describe demographic characteristics (e.g., age, race) were calculated.

       Hypotheses. The hypothesized relationships between intervention group and legal status on primary substance use and treatment retention were examined (Hypothesis 1). A mixed linear model was fit with Treatment Group, Legal Status, Time, all possible interactions and the treatment outcome (dependent measure) of Substance Use was examined. Nonsignificant interactions and main effects, and additional covariates, that did not add to the model were removed until the most parsimonious model was arrived at. Binary logistic regression was conducted to predict the outcome of treatment retention (defined categorically by "participant active in treatment at 16 weeks post-randomization", yes/no) using Treatment Group (MET, TAU) and Legal Status (incentives or no incentives) as predictors (Hypothesis1).

43

A relationship was hypothesized for intervention group and primary substance and legal status on primary substance use was examined (Hypothesis 2). A mixed linear model was fit with Treatment Group, Primary Substance, Legal Status, Time, all possible interactions and the treatment outcome (dependent measure) of Substance Use was examined. Nonsignificant interactions and main effects that did not add to the model were removed until the most parsimonious model was achieved.

The hypothesized relationships between intervention group and motivation on primary substance use and treatment retention were examined (Hypothesis 3). A mixed linear model was fit with Treatment Group, Motivation, Time, all possible interactions and the treatment outcome (dependent measure) of Substance Use was examined. Nonsignificant interactions and main effects that did not add to the model, including additional covariates, were removed until the most parsimonious model was arrived at. Binary logistic regression was conducted to predict the outcome of treatment retention using Treatment Group and Motivation (high/low) as predictors (Hypothesis 3).

<div align="center">

Results

</div>

Data Analysis

Outliers and Tests of Normality. Frequency distributions of continuous variables that represented substance use were examined for evidence of non-normality and outliers. If the data contained outliers and there was a meaningful rationale to remove them (e.g., outliers were not expected), they were coded as missing. If by removing outliers the data were normal, no further changes were made to the variable. Variables were re-coded from continuous to categorical variables because non-normal variables prevented the use of

44

ANOVA. Following the re-coding of any non-normal variables, mean scores and frequencies were calculated for each variable.

Initial examination of years of education completed was found to be skewed and kurtotic. When one outlier was removed however, the data were normally distributed, remaining slightly Kurtotic but below 1.5, with average education being 12.55 years (SD=2). The lifetime arrests of participants was non-normally distributed. A total of 11 were over 3 SD above the mean and were removed. After the removal of the 11 extreme data points the descriptive statistics were re-run and while the sample was still slightly skewed and kurtotic, the values were not above 1.5 on either statistic. Several of the variables were assessed only at baseline and as such, contain the whole (n = 461) sample. These variables include gender, ethnicity, age, employment patter, primary substance used and marital status. No values were missing from these variables. These variables were normally distributed and within expected ranges.

Substance use was assessed at 4 time points. From this, a baseline use mean score was created and 16 weekly time points. Weekly data points were created from the SUC based on the responses at the 4 time points. A total of 425 participants provided baseline substance use. Participant attrition was expected as treatment progressed. Missing data were coded as such.

Demographics: Descriptive statistics for the study participants (N=461) are summarized in Table 3. Age was normally distributed with the average age of participants being 34.8 years (SD= 10.21, 18-64 years old). The sample was male (70.9%). Race was evenly distributed between Blacks (42%) and Caucasian (42%), with the remaining 11% Hispanic and 5% "Other". Participants reported a mean of 12.5 years formal education (SD

45

= 2.00, range 7-20 years) and most were never married or single (81.6%) at the time of study

participation.

Table 3.

Participant Characteristics: MET (n = 216) and TAU (n =245)

	MET % or $\underline{M}$ (SD)	TAU % or $\underline{M}$ (SD)	Total Sample % or $\underline{M}$ (SD)
Legal Status			
No legal involvement	63.4%	62.0%	62.7%
Legal involvement	36.6%	38.0%	37.3%
Primary Substance			
Alcohol	45.4%	42.0%	43.6%
Drug(s)	56.6%	58.0%	56.4%
Age (years)	33.0 (10.5)	35.5 (9.9)	34.8 (10.2)
Gender			
Male	69.9%	71.8%	70.9%
Female	30.1%	28.2%	29.1%
Education (years)	12.6 (2.0)	12.5 (2.0)	12.6 (2.0)
Marital Status			
Married/cohabitating	20.4%	16.7%	18.4%
Single/divorced/separated/widowed	79.6%	83.3%	81.6%
Ethnicity			
Caucasian	45.4%	38.8%	41.9%
African American	39.4%	44.9%	42.1%
Hispanic	10.2%	11.0%	10.6%
Other	5.1%	5.0%	5.4%
Currently awaiting charges or sentencing (y)	13.5%	16.3%	15%
Employed in the past 30 days (y)	40.3%	38.8%	39.5%
Total lifetime number of arrests	4.8(5.2)	5.2(5.5)	5.0 (5.4)
Total number of months incarcerated lifetime	10.4(22.3)	10.0(21.3)	10.2(21.7)

Primary Substance Use Characteristics. Chi-square tests of the relationship

between categorical demographic variables and substance use and standard crosstabs were

used for comparison of continuous variables (see Table 5). Men and women did not differ in

patterns of substance use characteristics, $\chi2$ (2,461) = .848, p > .05. However, a difference

was found across race/ethnicity groups specifically, between substance used (primary

alcohol, primary drug) and identified ethnicity χ2 (3, 461) = 13.21, p < .004, Cramer's V =

.17. Caucasian and African Americans were similar, with between 41% and 51% reporting

primary alcohol use, where as Hispanics and 'other' reported only 24.5% and 36% primary

alcohol use respectively. Substance use also varied by marital status χ2 (5, 461) = 22.15, p <

.001, Cramer's V = .22. For alcohol as the primary substance, the percentage of participants

who were married was 22.9% compared with only 10% of other drug users and 48.3% of

alcohol users were never married compared with 66.5% of other drug users.   A one-way

between groups analysis of variance showed a significant difference between primary

substance used and years of education, $F(1,458) = 17.264$, $p < .001$. Additionally there was a

significant difference between substance and age $F (1,459) = 45.506$, $p < .001$. A difference

was found across current employment χ2 (1, 461) = 7.39, p = .007, Cramer's V = .131. Of

the participants who primarily used alcohol, 46.8% had full or part time employment

compared with 33.8% of primary drug users. Rates of various substance use characteristics

are further summarized in Table 4.

Table 4.

Primary Substance Use Characteristics: Primary Alcohol (n = 201) and Primary Drug (no alcohol) (n = 260)

	Primary Alcohol % or $\underline{M}$ (SD)	Primary Drug (no alcohol) % or $\underline{M}$ (SD)	Total Sample % or $\underline{M}$ (SD)	p
Age (years)	38.3 (9.9)	32.1 (9.6)	34.8 (10.2)	<.001***
Gender				
Male	71.6%	70.4%	70.9%	
Female	28.4%	29.6%	29.1%	ns
Education (years)	13.0 (2.1)	12.2 (1.9)	12.6 (2.0)	<.001***
Marital Status				
Married/cohabitating	24.9%	13.5%	18.4%	
Single/divorced/separated/widowed	75.1%	86.5%	81.6%	.002**
Ethnicity				
Caucasian	39.8%	43.5%	41.9%	
African American	49.8%	36.2%	42.1%	
Hispanic	6.0%	14.2%	10.6%	
Other	4.5%	6.2%	5.4%	.004**
Employment				
Full or part time past 30 days	46.8%	33.8%	39.5%	
Unemployed/disability/not working	53.2%	66.2%	60.5%	.005**

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

Legal Status. As anticipated, a chi-square test for independence did show a significant association between legal status from the demographic form (mandated or referred as alternative to jail, referred by probation/parole officer, referred by other federal/state/private agency, other legal issues involved, and no known legal issues involved) and a dichotomous (yes/no) variable from the ASI which asked "was the treatment admission prompted by the legal system" $\chi2(4,n=460) = 393.15$, p < .001, Cramer's V = .92. A second Chi-square test for independence showed a significant association between legal status as a 3 category variable (legally mandated, some legal involvement, no legal

48

involvement) and the dichotomous (yes/no) variable from the ASI which asked "was the treatment admission prompted by the legal system" $\chi 2(2,n=460) = 372.00$, $p < .001$, Cramer's V = .90. A Chi-square test for independence (with continuity correction) showed a significant association between dichotomous legal status created from the demographic form (any legal involvement/no known legal involvement) and a dichotomous (yes/no) variable from the ASI which asked "was the treatment admission prompted by the legal system" $\chi 2(1,n=460) = 353.63$, $p < .001$, Cramer's V = .88. A Pearson product-moment correlation coefficient conducted with these two variables shows a strong positive correlation, $r = .918$, n=461, $p < .001$, with 84% shared variance. These results suggest that the use of the dichotomous legal variable created from the legal status question on the demographic form is significantly correlated with the legal status variable from the ASI and encourages the use of only one of the legal variables identified in this protocol. The collapsed variable used was the dichotomous variable created from the Demographic Form.

There was a significant association observed between the dichotomous legal status and primary substance used. A Chi-square test of independence (with continuity correction) showed $\chi 2$ (1, 460) = 24.51, $p < .001$, Cramer's V = .24. Almost three quarters (71.5%) of those participants who had legal involvement identified drugs as their primary substance compared with only one quarter (28.5%) of participants who identified alcohol as their primary substance.

A Chi-square test of the relationship between categorical demographic variables and legal status and standard crosstabs were used for comparison of continuous variables (see Table 5). A one-way between groups analysis of variance showed a significant difference between legal status and years of education, $F (1,458) = 10.60$, $p =.001$. Additionally there

49

was a significant difference between legal status and age $F(1,459) = 77.43$, $p < .001$.

Participants with legal involvement were significantly younger ($\underline{M} = 29.77$, SD = 9.15) than

those entering treatment without legal involvement ($\underline{M} = 37.79$, SD = 9.64). A difference

was also observed across current employment $\chi2(1,461) = 4.36$, p = .019, Cramer's V =

.029. Of those who were legally involved, 45.9% had full or part time employment

compared with 54.1% who did not. For participants with no legal involvement 35.6% held

full or part time employment compared with 64.4% who did not.

Table 5.

Participant Legal Characteristics: No Legal Involvement (n =288) and Legal Involvement (n = 172)

	Legal Involvement % or M (SD)	No Legal Involvement % or M (SD)	Total Sample % or M (SD)	*p*
Primary Substance Used				
Primary Alcohol	28.5	52.6	43.6	
Primary Drug(s)	71.5	47.4	56.4	<.001***
Age (years)	29.77 (9.15)	37.79 (9.64)	34.80 (10.21)	<.001***
Gender				
Male	73.8	69.2	70.9	
Female	26.2	30.8	29.1	*Ns*
Education (years)	12.20 (1.89)	12.78 (2.00)	12.55 (2.00)	.001**
Marital Status				
Married/cohabitating	12.8	21.8	18.4	
	87.2	78.2	81.6	.016*
Single/divorced/separated/widowed				
Ethnicity				
Caucasian	46.5	39.1	41.9	
African American	34.3	46.7	42.1	
Hispanic	12.8	9.3	10.6	
Other	6.4	4.8	5.4	*Ns*
Employment				
Full or part time past 30 days	45.9	35.6	39.5	
Unemployed/disability/not working	54.1	64.4	60.5	.019*

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

Readiness to Change. The URICA Readiness to Change score was computed for 452 of the participants. A total of 9 participants had incomplete URICA subscales which did not allow for the creation of a Readiness to Change score for these participants and they were excluded listwise from analyses using the Readiness to Change score. An independent samples t-test was conducted to compare the Readiness to Change (high, low) scores at baseline for the two treatment conditions (MET, TAU). There were no significant difference in scores for MET (M=10.07, SD = 2.01) and TAU (M=10.34, SD=1.80); t (450) = 1.51, p=.132. This shows that there is not a significant difference between the two treatment conditions and the Readiness to Change score at the baseline assessment.

A Chi-square test of independence for Readiness to Change (high, low) and intervention assignment (MET, TAU) did not show a significant difference χ2 (1, 451) = 3.37, p = .066. Additionally, an analysis of primary substance used did not result in a significant difference, χ2 (1, 451) = .660, p = .417. A significant difference was observed for legal status and Readiness to Change score, χ2 (1, 451) = 48.322, p < .001, Cramer's V = .332. Participants who did not have legal involvement were more likely to have high motivation (62.9%) while participants who were legally involved were more likely to have low motivation (71.4%). There was also a significant difference present for gender and Readiness to Change score, χ2 (1, 451) = 10.818, p = .001, Cramer's V = .160. Within gender, men were more likely to be in low motivation (55%) compared to women (37.4%). There was also a significant difference for age, F (1,459) = 37.51, p <.001, with participants in the high motivation group being older. Further explanation of findings can be seen in Table 6.

Table 6.

Primary Characteristics of Readiness to Change Categories: Low (n =226), High (n = 226)

	Low Motivation % or M (SD)	High Motivation % or M (SD)	p
Treatment Condition			
MET	54.7%	45.3%	
TAU	45.6%	54.4%	*ns*
Primary Substance Used			
Primary Alcohol	47.5%	52.5%	
Primary Drug(s)	51.8%	48.2%	*ns*
Legal Status			
Legal involvement	71.4%	28.6%	
No legal involvement	37.1%	62.9%	<.001***
Age (years)	32.0(10.3)	37.7(9.3)	<.000***
Gender			
Male	78.2%	63.7%	
Female	21.8%	36.3%	.001**
Education (years)	12.4(1.8)	12.7(2.2)	*ns*
Ethnicity			
Caucasian	52.3%	47.7%	
African American	47.9%	52.1%	
Hispanic	50.0%	50.0%	
Other	100.0%	0%	*ns*

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

Replication Analyses. The first aim of this study was to replicate the findings from the primary article which utilized this data set. To assure the data set was the same and to provide sample characteristics the results of the primary retention and substance use outcomes by therapy condition and program site were replicated and are presented in table 7. The results of the replication of patient and program differences across site are presented in table 8. There were no substantive differences between the results of these analyses and those previously conducted by the primary article (Ball et al., 2007). Some fluctuations were

observed, however, the fluctuations were minor and likely due to differences in the statistical

packages used.

Table 7.

Patient and Program Differences across Site (n = 461)

	Site 1 % or M (SD)	Site 2 % or M (SD)	Site 3 % or M (SD)	Site 4 % or M (SD)	Site 5 % or M (SD)	Total % or M (SD)	*p*
Gender (female)	17.0	26.0	25.0	29.5	48.0	29.1	<.005
Ethnicity							<.005
African Amer.	25.0	31.0	45.0	45.9	64.0	41.9	
Caucasian	59.0	63.0	40.0	42.6	6.0	42.1	
Hispanic	13.0	1.0	14.0	3.3	19.0	10.6	
Other	3.0	5.0	1.0	8.2	11.0	5.4	
Age	35.33 (9.7)	39.56 (9.5)	29.35 (9.4)	34.47 (11.4)	35.15 (9.1)	34.80 (10.2)	<.005
Years education	11.84 (2.0)	13.07 (2.0)	12.14 (1.7)	12.36 (1.6)	13.42 (2.6)	12.58 (2.1)	<.005
Marital status							<.005**
Married/cohabitating	6.0	34.0	9.0	6.6	32.0	18.4	
Widowed/ separated	32.0	27.0	12.0	23.0	21.0	23.0	
Not married/ single	62.0	39.0	79.0	70.5	47.0	58.6	
Previous Treatment							
Alcohol	56.6	41.0	20.0	41.0	39.0	39.3	<.005**
Drug	84.8	45.0	53.0	42.6	57.0	57.6	<.005**
# Psychiatric Treatment	1.95 (3.1)	1.01 (1.6)	.77 (2.2)	5.31 (9.8)	2.20 (2.7)	1.99 (4.5)	
Legal involved							
Court mandate	12.0	9.0	57.0	55.7	18.0	28.2	<.005**
Legal sys referral	13.1	4.0	75.0	54.1	23.0	32.2	<.005**
Current probation /parole	27.3	9.0	68.0	39.3	28.0	33.9	<.005**
# lifetime arrests	6.89 (7.5)	2.61 (3.7)	5.48 (7.0)	7.62 (8.7)	7.18 (8.2)	5.81 (7.3)	<.005**

Table 7 (continued)

# months incarcerated	17.11 (26.9)	2.08 (8.4)	10.31 (12.8)	12.61 (23.0)	9.88 (23.5)	10.20 (21.7)	<.005**
Primary substance							
Alcohol	9.23 (7.2)	10.36 (9.1)	12.07 (10.7)	7.47 (9.0)	11.58 (8.9)	10.44 (9.2)	<.005**
Cocaine	6.92 (7.2)	9.38 (8.8)	5.32 (8.5)	7.08 (8.5)	7.55 (8.3)	7.26 (8.2)	<.005**
opioids	6.90 (7.5)	4.17 (7.1)	2.89 (6.6)	2.54 (5.3)	3.95 (6.7)	4.22 (6.9)	<.005**
marijuana	2.30 (5.2)	.25 (1.8)	1.22 (4.5)	0.13 (0.5)	1.03 (3.9)	1.06 (3.8)	<.005**
Years substance Use	3.57 (6.4)	3.10 (7.2)	7.08 (10.1)	1.95 (4.1)	4.26 (8.8)	4.16 (8.0)	<.005**
Alcohol	13.21 (9.8)	15.22 (10.4)	9.74 (9.3)	15.70 (10.6)	9.60 (8.4)	12.44 (10.0)	<.005**
Cocaine	8.06 (7.0)	6.25 (7.4)	3.76 (6.3)	6.44 (8.4)	4.01 (5.3)	5.64 (7.0)	<.005**
Opioid	1.32 (2.8)	0.10 (0.8)	0.80 (2.2)	1.77 (5.3)	1.03 (3.8)	0.94 (3.1)	<.005**
Marijuana	9.27 (9.0)	8.18 (8.6)	7.51 (7.4)	8.03 (7.3)	6.06 (7.6)	7.79 (8.1)	.079

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

Table 8.

Outcome by Site and Therapy Condition (n = 461)

	MET M (SD)	TAU M (SD)	Therapy Condition	Program Site	Therapy X Site
Days enrolled in Tx Site 1	71.33 (42.97)	74.61 (40.90)			
Days enrolled in Tx Site 2	65.83 (38.91)	60.55 (30.36)			
Days enrolled in Tx Site 3	87.09 (44.97)	96.57 (38.35)			
Days enrolled in Tx Site 4	74.63 (38.09)	63.34 (44.11)			
Days enrolled in Tx Site 5	58.92 (44.70)	52.88 (42.89)			
Days enrolled in TX Total	72.23 (43.14)	69.23 (42.12)	$F(1.376) = .217, P=.642$	$F(4.376) = 9.556, P <.001***$	$F(4.376) = .781, P = .583$
% enrolled at follow up Site 1	.33 (.48)	.41 (.50)			
% enrolled at follow up Site 2	.28 (46)	.19 (.40)			
% enrolled at follow up Site 3	.74 (.44)	.85 (.35)			
% enrolled at follow up Site 4	.43 (.50)	.41 (.50)			
% enrolled at follow up Site 5	.43 (.50)	.43 (.50)			
% enrolled at follow up Total	.47 (.50)	.46 (.50)	$F(1.375) = .108, P=.743$	$F(4.375) = .16.92, P<.001***$	$F(4.375) = .606, P=.659$

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

Data Checking

The first aim on the current study was to replicate findings reported by Ball et al. (2007) in the primary outcome paper. Previous research showed that with this sample there would be a reduction in primary substance use during the experimental phase of treatment which would be observed for both intervention conditions (MET, TAU). A mixed linear model tested the effectiveness of the interventions (MET vs. TAU) by substance use through intervention completion (Baseline through Week 4) and the effectiveness of the interventions (MET vs. TAU) post-intervention (Week 4 through week 16).

A Mixed Linear Model was run with the following variables; Treatment Group (MET, TAU), Phase (baseline through week 4, week 5 through week 16), and Time (baseline followed by 16 weekly data points). Each participants unique identification number was used to anchor their data. The study involved an intervention arm (MET or TAU for week 1-4) and substance abuse treatment at participating programs throughout the 16 week period of assessment. Since the first 4 weeks provided a different level of care from that offered in weeks 5-16, it was deemed inappropriate to force a single linear estimate through all 17 data points (baseline and 16 weeks thereafter). Specifically the original study posited that changes in slope should accompany the transition between the intervention treatment phase and post intervention.   Instead, a repeated covariance type of compound symmetry was chosen thereby allowing for the split-plot design, necessary for the Phase variable.
The model using Treatment Group, Phase, and Time was run with all possible two, and three-way interactions; results are summarized in Table 9.

Table 9.

Data Checking: Treatment Group X Phase X Time

	Model 1 (without additional covariates)	
Variable	F	*P*
Phase	165.442	.000***
Time	228.595	.000***
Treatment Group	1.097	.295
Phase X Time	231.590	.000***
Phase X Treatment Group	9.584	.002*
Time X Treatment Group	6.329	.012*
Phase X Time X Treatment Group	8.333	.004**

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

  As reported by Ball et al. (2007) the present analyses found a significant main effect for Phase, *F* (1,5170.002) = 165.442, *p* < .001, and Time, *F* (1,5242.150) = 228.595, *p* < .001. Significant two-way interactions were observed for Treatment Group X Phase, *F* (1,5149.870) = 9.584, *p* = .002, Treatment Group X Time, *F* (1,5210.135) = 6.329, *p* = .012, and Phase X Time, *F* (1,5227.472) = 231.590, *p* < .001.

  The present study also replicated the significant three way interaction (see Figure 4) found in Ball et al. (2007) between Treatment Group X Phase X Time, *F*(1, 5197.615) = 8.333, *p* = .004. As shown in Figure 4, participants randomized to either MET and TAU interventions significantly reduced their substance use during the 4-week intervention phase. However, participants in the MET intervention maintained these improvements over the subsequent 12 week post intervention period, while TAU participants showed an increase in substance use during the post intervention period.
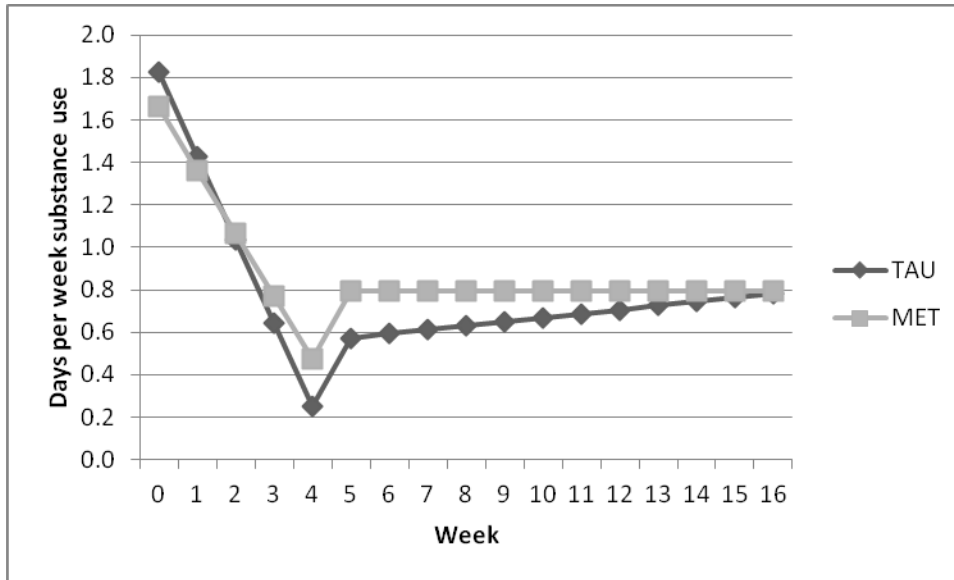
Week = baseline through 16 weeks; Days per week substance use = days per use of primary substance during week each week that was assessed; MET = motivational enhancement therapy; TAU = treatment as usual.

Figure 4. Data Checking: Three Way Interaction for Treatment Group X Phase X Time

Hypothesis One

To test Hypothesis 1, a mixed linear model was fit with the following predictor variables; Treatment Group (MET, TAU), legal status at treatment entry (no legal involvement, legal involvement) and Time (mean weekly use prior to entry into treatment and 16 weekly data points). The model tested Treatment Group, Time and Legal Status and all interactions terms: Treatment Group, Time, Legal Status, Treatment Group X Time, Treatment Group X Legal Status, Time X Legal Status and Treatment Group X Time X Legal Status. Eight variables were added to the model as additional covariates. The eight covariates run were; gender, age, years of education, race (White, Minority), currently awaiting charges or sentencing (y/n), employed past 30 days (y/n), total number of lifetime arrests, total lifetime number of months incarcerated. The findings from this model with these additional variables are presented in Table 10 (Model 1). Then, to see if these

59

experimental effects remained significant, the model was rerun without the additional

covariates. None of the additional covariates contributed significantly to model 1 and

therefore, they were not retained. The full model without the additional covariates was

retained and is shown in table 10 (Model 2).   The following were found to be nonsignificant

and were removed to create the most parsimonious model, Time X Treatment Group X Legal

Status, $F(1,5164.687) = .011$, $p =.917$, Treatment Group X Legal Status $F(1,356.439) =$

2.253, $p = .134$, Time X Treatment Group, $F(1,5163.010) = .186$, $p = .667$, and Treatment

Group, $F(1,356.664) = .061$, $p = .805$.

Table 10.

Hypothesis 1: Mixed Linear Model With and Without Additional Covariates

	Model 1 (with additional covariates)		Model 2 (without additional covariates)		Model 3 (final model)	
Variable	F	*p*	F	*p*	F	*p*
Treatment group	.828	.363	1.164	.281		
Time	79.837	.000***	81.860	.000***	143.825	.000***
Legal Status	5.599	.018**	7.887	.005**	6.095	.014*
Treatment Group X Time	.039	.843	.119	.731		
Treatment Group X Legal Status	1.494	.222	2.141	.144		
Time X Legal Status	33.470	.000***	33.871	.000***	61.490	.000***
Treatment Group X Time X Legal Status	.000	.992	.011	.917		
Gender (M/F)	.403	.526				
Age	.002	.963				
Years of Education	.039	.843				
Race (W/M)	.053	.818				
Currently waiting Charges or Sentencing (Y/N)	.043	.837				
Employed Past 30 Days (Y/N)	.883	.348				
Total # of Lifetime Arrests	1.128	.289				
Total # of Months Incarcerated	.638	.425				
Readiness to Change (mean separated)	.089	.766				

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

The significant main effects for the most parsimonious model (Model 3) included Time, $F(1,5171.655) = 143.825$, $p < .001$, Legal Status $F(1,440.844) = 6.095$, $p = .014$, and as shown in Figure 5, a significant 2 way interaction for Time X Legal Status $F(1,5168.642) = 61.490$, $p < .001$. As seen in Figure 6, participants entering treatment without legal incentives had similar reductions in substance use regardless of intervention group assignment (MET or TAU). In contrast, participants in both interventions conditions with no legal incentives showed little or no reductions in substance use.
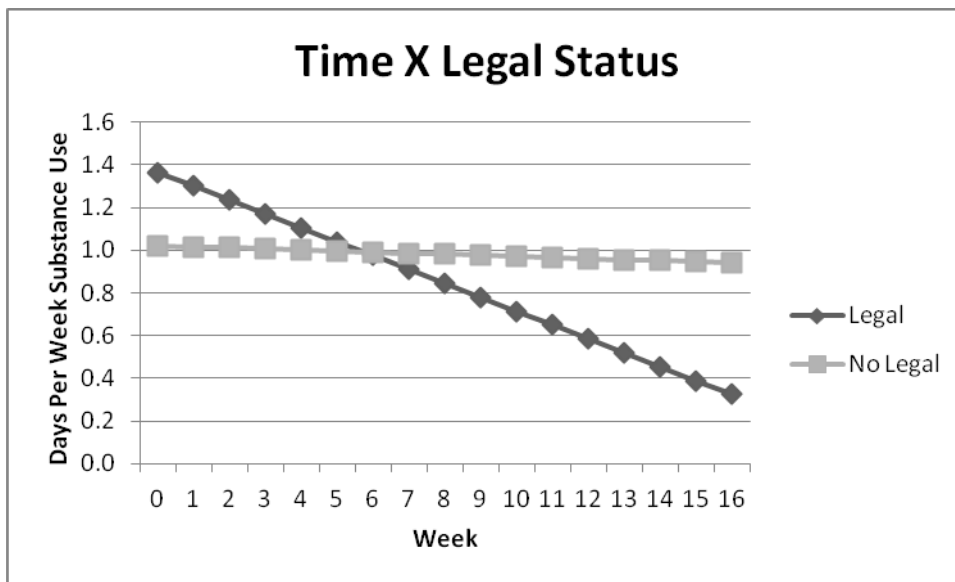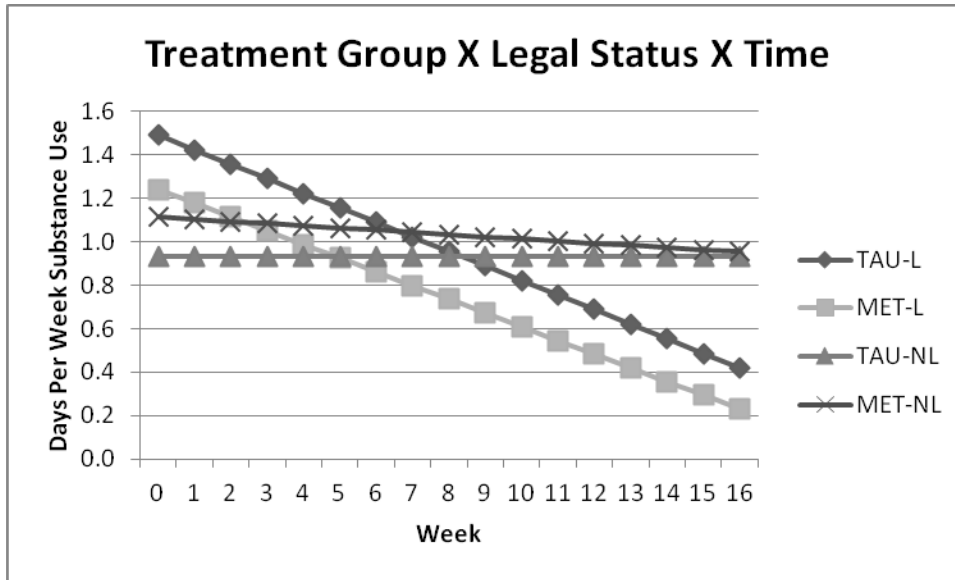

Legal = any legal involvement; No Legal = No legal involvement

Figure 5. Hypothesis 1: Two-way Interaction for Time X Legal Status (Model 3)

MET-L = motivational enhancement therapy with legal involvement; MET-NL = motivational enhancement therapy with no legal involvement; TAU-L = treatment as usual with legal involvement; TAU-NL = treatment as usual with no legal involvement.

Figure 6. Hypothesis 1: Days Using Primary Substance per Week Separated by Treatment Group and Legal Status (Model 2)

A logistic regression was performed to assess the effects of Treatment Group and Legal Status on treatment retention at study completion. The full model was significant, $\chi2$ $(2,461) = 8.242$, p = .016, indicating that the model was able to distinguish between participants who did and did not stay involved in treatment through study completion. As seen in Table 11, only Legal Status made a significant contribution to the model $\chi2$ $(1,461) = 7.889$, p = .005. The strongest predictor of remaining in treatment was legal involvement, recording an odds ratio of 1.873. This indicates that participants with legal incentives are almost twice to still be in treatment at 16 weeks post-enrollment compared to participants without such incentives. This finding mirrors previous findings and shows that Treatment Group was not significant for changing treatment retention, while Legal Status resulted in significant differences in treatment retention from baseline to treatment completion.

63

Table 11.

Logistic Regression Predicting the Likelihood of Being Active in Treatment at Study Completion

	β	S.E.	Wald χ^2	df	*p*	Odds Ratio	Lower	Upper
Treatment Group	.019	.207	.009	1	.926	1.019	.680	1.529
Legal Status	.627	.223	7.889	1	.005**	1.873	1.209	2.901
Constant	.658	.158	17.326		.000	1.931		

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

Taken together, Hypothesis one was not supported by study findings as participants with legal involvement, regardless of intervention conditions, generally reported greater reductions in substance use over the course of treatment than those without legal incentives.

Hypothesis Two

To test Hypothesis Two, a Mixed Linear Model was fit with the following predictor variables; Treatment Group (MET, TAU), Legal Status at treatment entry (no legal involvement, legal involvement), Primary Substance (alcohol, drug [no alcohol]) and Time (mean weekly use prior to entry into treatment and 16 weekly data points). The model was fit to test Treatment Group, Legal Status, Primary Substance, Time and all interactions terms: Treatment Group, Primary Substance, Legal Status, Time, Treatment Group X Primary Substance, Treatment Group X Time, Treatment Group X Legal Status, Primary Substance X Time, Primary Substance X Legal Status, Time X Legal Status, Treatment Group X Primary Substance X Time, Treatment Group X Primary Substance X Legal Status, Treatment Group X Time X Legal Status, Primary Substance X Time X Legal Status and Treatment Group X Primary Substance X Time X Legal Status.

None of the additional covariates added to Hypothesis 1 contributed significantly to this model and therefore, they were not retained. The results of this model are presented in Table 12.

A significant main effect was seen for Time, F (1,5148.617) = 23.244, $p < .001$. Significant two-way interactions were seen for Treatment Group X Time $F(1,5130.795) = 5.235$, $p = .022$, and Time X Legal Status, $F(1,5140.162) = 11.860$, $p = .001$. Significant three-way interactions were present for Treatment Group X Primary Substance X Time, $F(1,5145.783) = 6.377$, $p = .012$, and Treatment Group X Time X Legal Status, $F(1,5127.103) = 6.722$, $p = .010$.

Table 12.

Hypothesis 2: Final Model Retained for Mixed Linear Model of Treatment Group, Primary Substance, Time, Legal Status and All Interactions

Variable	F	*p*
Treatment Group	1.108	.293
Primary Substance	.263	.608
Legal Status	1.972	.161
Time	23.244	.000***
Treatment Group X Primary Substance	.298	.585
Treatment Group X Time	5.235	.022*
Treatment Group X Legal Status	.986	.321
Primary Substance X Time	.109	.741
Primary Substance X Legal Status	.079	.779
Time X Legal Status	11.860	.001**
Treatment Group X Primary Substance X Time	6.377	.012*
Treatment Group X Primary Substance X Legal Status	.006	.938
Treatment Group X Time X Legal Status	6.722	.010*
Primary Substance X Time X Legal Status	.010	.919
Treatment Group X Primary Substance X Time X Legal Status	11.231	.001**

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

In addition, the four way interaction for Treatment Group X Primary Substance X Time X Legal Status was significant, $F(1,5152.083) = 11.231$, $p = .001$ and is shown in Figure 7. To more clearly describe these results, the three-way interaction for Treatment Group X Primary Substance X Time is shown for participants with and without legal incentives in Figures 8 and 9. Entering treatment without legal incentives across both intervention conditions, shown in Figure 8, resulted in similar slow decreases in substance use through treatment except for those in the MET condition using drugs. Those individuals actually showed a slow increase from baseline substance use. In contrast, as shown in Figure 9, participants across both treatment conditions with legal incentives showed a more pronounced decreases in substance use. The one exception to this pronounced decrease was

66

for participants in the MET condition with a primary substance of alcohol, these participants showed a more modest decrease across treatment comparable to what was seen for participants without legal incentives.

Taken together, Hypothesis Two was not supported by study findings as participants with legal involvement and alcohol use in the MET intervention showed only modest reductions in substance use. Overall, regardless of treatment condition or primary substance used, those with legal involvement generally reported greater reductions in substance use over the course of treatment than those without legal incentives.

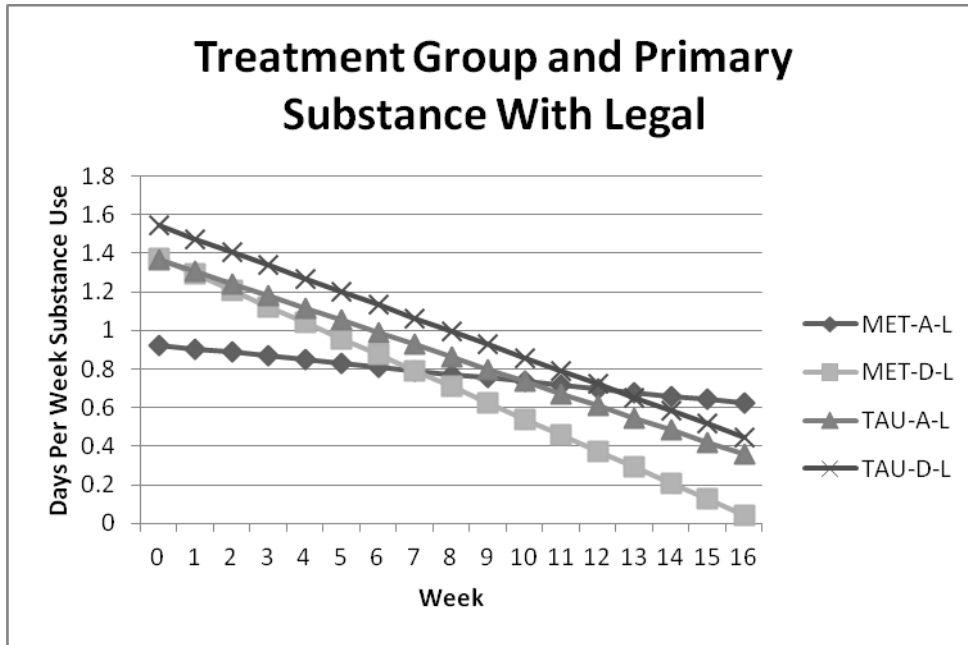**Treatment Group X Legal Status X Primary Substance X Time**
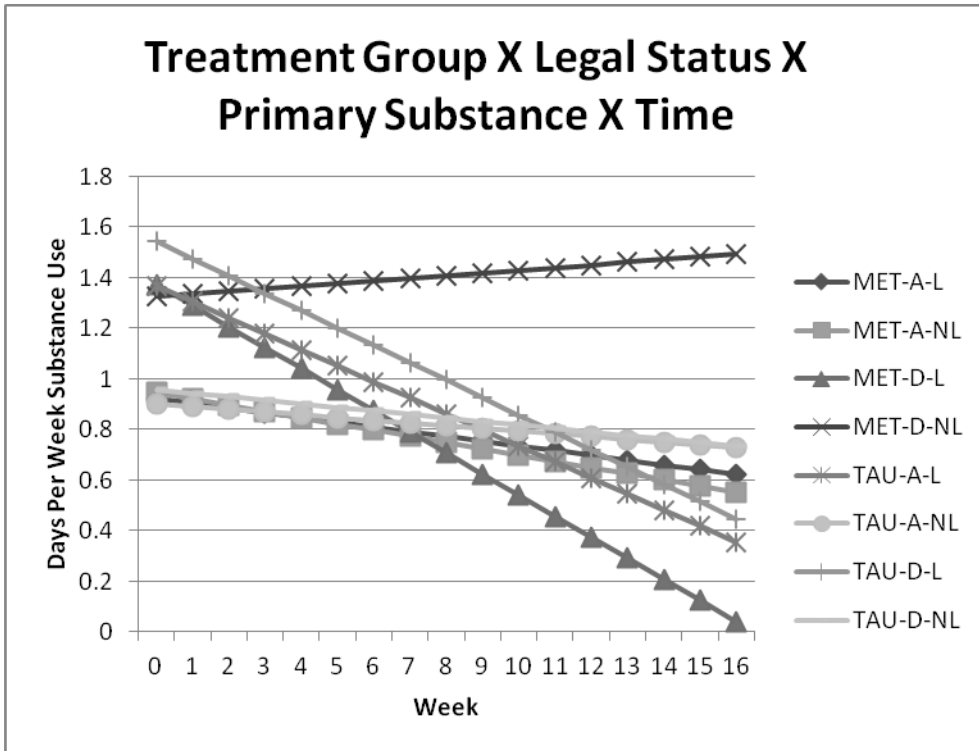
MET-A-L = motivational enhancement therapy with alcohol primary and legal involvement; MET-A-NL = motivational enhancement therapy with alcohol primary and no legal involvement; MET-D-L = motivational enhancement therapy with drug primary and legal involvement; MET-D-NL = motivational enhancement therapy with drug primary and no legal involvement; TAU-A-L = treatment as usual with alcohol primary and legal involvement; TAU-A-NL = treatment as usual with alcohol primary and no legal involvement; TAU-D-L = treatment as usual with drug primary and legal involvement; TAU-D-NL = treatment as usual with drug primary and no legal involvement .

Figure 7. Hypothesis 2: Four-way Interaction of Treatment Group X Legal Status X Primary Substance X Time
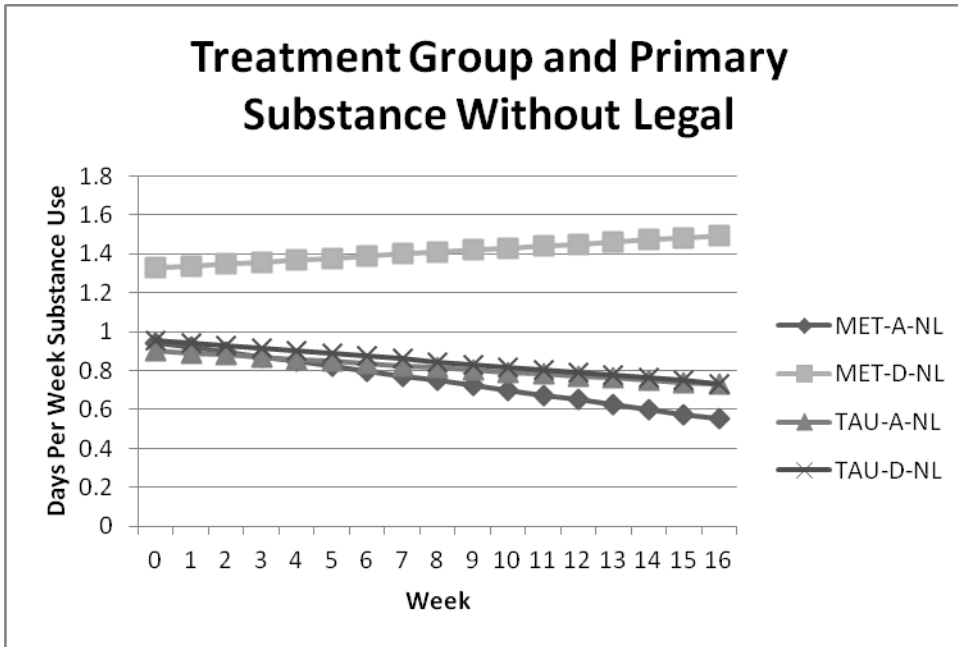
Treatment Group and Primary Substance Without Legal

MET-A-NL = motivational enhancement therapy with alcohol primary and no legal involvement; MET-D-NL = motivational enhancement therapy with drug primary and no legal involvement; TAU-A-NL = treatment as usual with alcohol primary and no legal involvement; TAU-D-NL = treatment as usual with drug primary and no legal involvement.

Figure 8. Hypothesis 2: Three-way Interaction of Treatment Group X Primary Substance X Time for Participants Without Legal Involvement

69

MET-A-L = motivational enhancement therapy with alcohol primary and legal involvement; MET-D-L = motivational enhancement therapy with drug primary and legal involvement; TAU-A-L = treatment as usual with alcohol primary and legal involvement; TAU-D-L = treatment as usual with drug primary and legal involvement.

Figure 9. Hypothesis 2: Three-way Interaction of Treatment Group X Primary Substance X Time for Participants With Legal Involvement

Hypothesis Three

To test Hypothesis Three, a Mixed Linear Model was fit with the following predictor variables; Treatment Group (MET, TAU), Motivation at treatment entry (low, high), and Time (mean weekly use prior to entry into treatment and 16 weekly data points). The model was run with Treatment Group, Time, Motivation and all interactions terms: Treatment Group, Time, Motivation, Treatment Group X Time, Treatment Group X Motivation, Time X Motivation and Treatment Group X Time X Motivation.

None of the additional covariates added contributed significantly to this model and therefore, were not retained. The results of this model are presented in Table 13.

After the removal of nonsignificant terms a significant main effect was seen for Time, $F(1,5153.926) = 86.161$, $p < .001$. A significant three way interaction for was seen for Time X Treatment Group X Motivation $F(1,5330.429) = 5.715$, $p = .017$. As seen in Figure 10, all participants showed a pattern of reducing substance use irrespective of treatment group or motivation. Participants in the MET intervention group with high motivation showed the least change in substance use across treatment.

Table 13.

Hypothesis 3: Final Model Retained for Mixed Linear Model of Treatment Group, Time, Motivation and All Interactions.

Variable	F	p
Treatment group	23.104	.411
Time	.676	.000***
Motivation	.035	.851
Treatment Group X Time	1.123	.289
Treatment Group X Motivation	.012	.913
Time X Motivation	.932	.335
Treatment Group X Time X Motivation	3.963	.047*

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

Treatment Group by Motivation
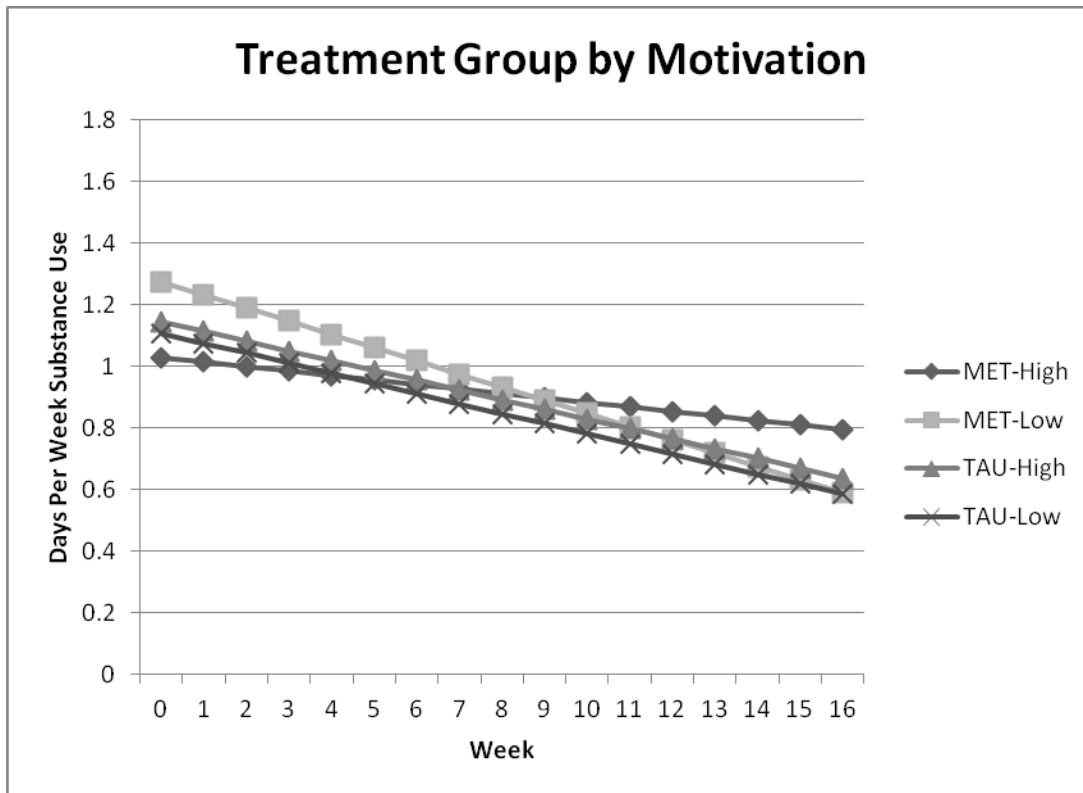
MET-High = motivational enhancement therapy with high motivation at baseline; MET-Low = motivational enhancement therapy with low motivation at baseline; TAU-High = treatment as usual with high motivation at baseline; TAU-Low = treatment as usual with low motivation at baseline.

Figure 10. Hypothesis 3: Three-way Interaction of Time X Treatment Group X Motivation

Logistic regression was performed to assess the effects of Treatment Group and Motivation on treatment retention at study completion. As seen in Table 14, the full model was nonsignificant, $\chi2(2,451) = .658$, $p = .720$, indicating that retention of participants at treatment completion could not be predicted by treatment group or motivation.

72

Table 14.

Hypothesis 3: Logistic Regression for Predicting the likelihood of Being Active in Treatment at Study Completion

	β	S.E.	Wald χ^2	df	*p*	Odds Ratio	Lower	Upper
Treatment Group	.30	.208	.021	1	.884	1.03	.685	1.551
Motivation	-.163	.208	.610	1	.435	.85	.565	1.278
Constant	.951	.183	26.864		.000	2.588		

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

Taken together, Hypothesis Three was not supported by study findings as participants with low motivation, regardless of intervention condition, generally reported similar reductions in substance use over the course of treatment to those with high motivation. Motivation at baseline and treatment group were also unable to predict participation in treatment at study completion.

Exploratory Analysis

While replicating the analyses and outcomes obtained in the original study by Ball and colleagues (2007) it became clear that time was not a linear variable. Instead, there appeared to be 2 phases: intervention phase (experimental [weeks 0-4]); followed by post-intervention phase (retention [weeks 5-16]). This finding prompted a reanalysis of the data, adding phase as an additional covariate.

An exploratory analysis was run with the most parsimonious model using the variables Treatment Group, Phase, Time and Legal Status and all possible two, three and four-way interactions. As shown in Table 15, a significant main effect was observed for Treatment Group, $F(1,685.30) = 5.849$, $p = .016$, Phase , $F(1,5177.957) = 68.629$, $p < .001$, Time , $F(1,5259.41) = 106.888$, $p < .001$, and Legal Status, $F(1,696.123) = 7.123$, $p = .008$.

73

Significant two-way interactions were seen for Treatment Group X Phase , $F(1,5135.89) =$ 4.305, $p = .038$, Treatment Group X Time, $F(1,5191.01) = 15.812$, $p < .001$, Treatment Group X Legal Status, $F(1,686.70) = 5.097$, $p = .024$, and Phase X Time, $F(1,5243.77) =$ 93.098, $p < .001$. Significant three-way interactions were seen for Treatment Group X Phase X Time, $F(1,5179.21) = 15.130$, $p < .001$, and Treatment Group X Time X Legal Status, $F(1,5199.99) = 9.956$, $p = .002$.

In addition, the four way interaction for Treatment Group X Phase X Time X Legal Status was significant, $F(1,5187.74) = 7.263$, $p = .007$ and is shown in Figure 11. To better understand this interaction, the two graphs (Figures 12 & 13) represent the three way interaction between Treatment X Time X Phase separated by the fourth variable, Legal Status. For those participants with legal incentives we see an initial difference in their response to the intervention, however following the intervention both groups showed similar reductions in substance use (See Figure 12). Entering treatment without legal incentives had similar reductions in substance use during the intervention phase regardless of group assignments, however participants in the MET condition showed an initial increase in substance use immediately post intervention. This initial increase in substance use post-intervention was also seen for TAU but in a gradual increase over the full 12 weeks post intervention (See Figure 13).

Table 15.

Exploratory Analysis: Final Model Retained for Mixed Linear Model of Treatment Group, Phase, Time, Legal Status and All Interactions

Variable	F	P
Treatment Group	5.849	.016*
Phase	68.629	.000***
Time	106.888	.000***
Legal Status	7.123	.008**
Treatment Group X Phase	4.305	.038*
Treatment Group X Time	15.812	.000***
Treatment Group X Legal Status	5.097	.024*
Phase X Time	93.098	.000***
Phase X Legal Status	.137	.712
Time X Legal Status	1.498	.221
Treatment Group X Phase X Time	15.130	.000***
Treatment Group X Phase X Legal Status	.039	.844
Treatment Group X Time X Legal Status	9.657	.002**
Phase X Time X Legal Status	.072	.788
Treatment Group X Phase X Time X Legal Status	7.263	.007**

Note. $*p < .05$, $**p < .01$, $***p < .001$
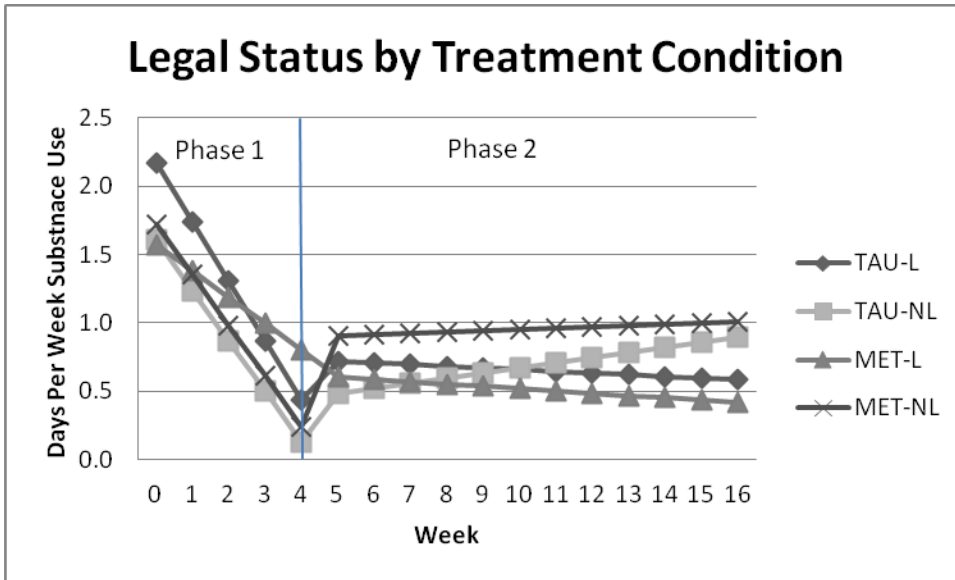
Legal Status by Treatment Condition

MET-L = motivational enhancement therapy with legal involvement; MET-NL = motivational enhancement therapy with no legal involvement; TAU-L = treatment as usual with legal involvement; TAU-NL = treatment as usual with no legal involvement .

Figure 11. Exploratory Analyses: Four-Way Interaction of Treatment Group X Phase X Time X Legal Status
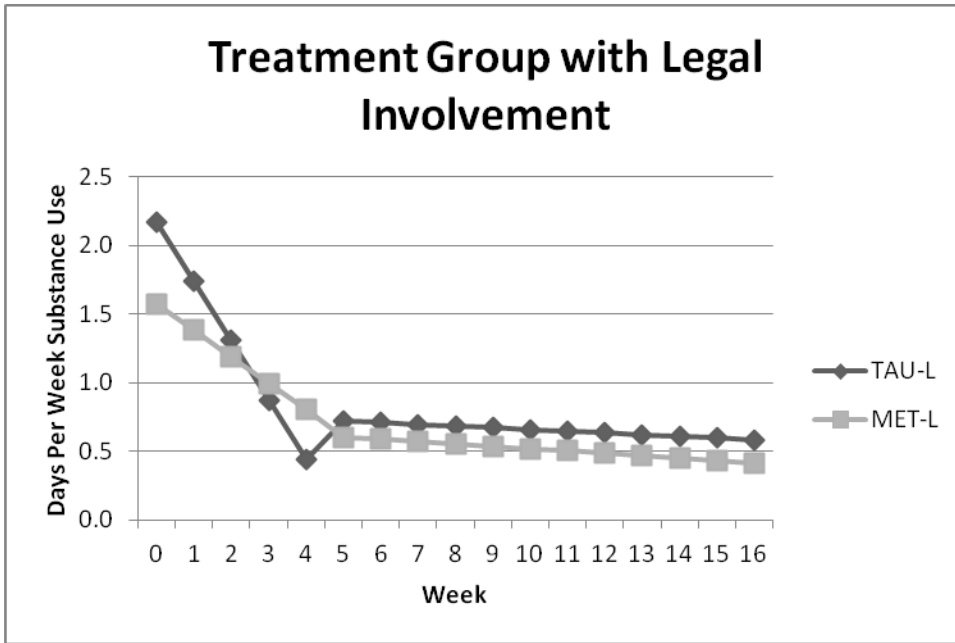
MET-L = motivational enhancement therapy with legal involvement; TAU-L = treatment as usual with legal involvement.

Figure 12. Exploratory Analysis: Three-Way Interaction of Treatment X Time X Phase Separated by Legal involvement
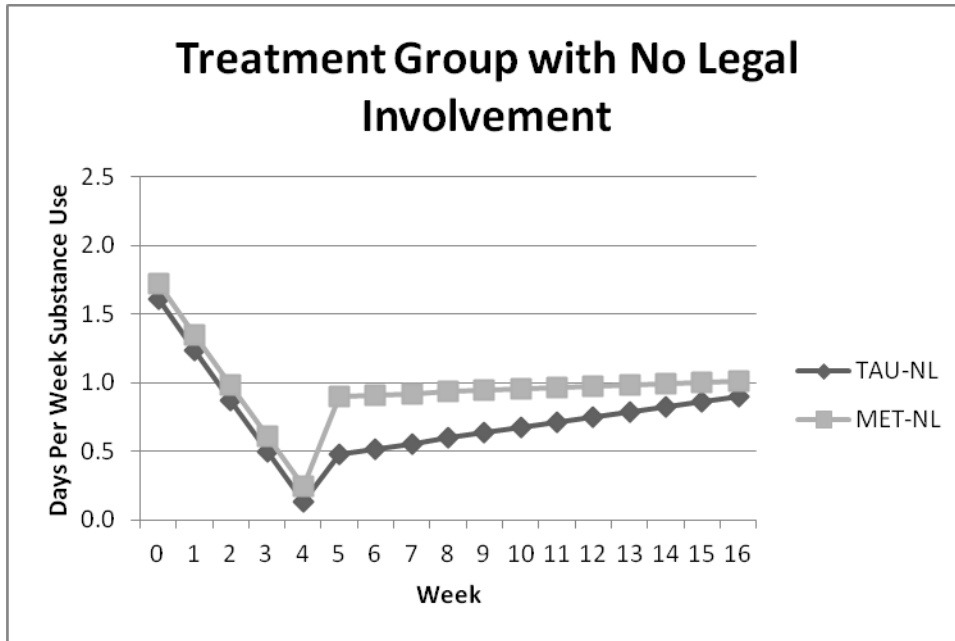
Treatment Group with No Legal Involvement

MET-NL = motivational enhancement therapy with no legal involvement; TAU-NL = treatment as usual with no legal involvement .

Figure 13. Exploratory Analysis: Three-Way Interaction of Treatment X Time X Phase Separated by No Legal Involvement

Given the complexity of a four-way interaction and to further parse out the effect of Phase, A mixed linear model was conducted with only the intervention phase. This model was fit to test the following variables; Treatment Group (MET, TAU), and Time (mean weekly use prior to entry into treatment, week 1, week 2, week 3, week 4) and legal status at treatment entry (no legal involvement, legal involvement). The model tested the Treatment Group, Time and Legal Status variables. All interactions terms were assessed for the intervention phase of treatment: Treatment Group, Time, Legal Status, Treatment Group X Time, Treatment Group X Legal Status, Time X Legal Status and Treatment Group X Time X Legal Status. None of the additional covariates added to previous models contributed significantly to the model and therefore, they were not retained. To create the most parsimonious model, the analysis was run with the three primary variables, Treatment Group,

78

Legal Status, Time and all potential interactions.   As shown in Table 16, Main effects for the most parsimonious full model included Treatment Group $F(1,679.12) = 4.544$, $p = .033$, Time $F(1,1423.85) = 73.358$, $p < .001$, and Legal Status $F(1,690.09) = 5.194$, $p = .023$, as well as a significant 2 way interaction for Treatment Group X Time $F(1,1396.91) = 10.628$, $p = .001$.

Table 16.

Exploratory Analysis: Final Model Retained for Mixed Linear Model of Treatment Group X Time X Legal Status and All Interactions for the Intervention Phase.

	Model without covariates	
Variable	F	*P*
Treatment group	4.544	.033*
Time	73.358	.000***
Legal Status	5.194	.023*
Treatment Group X Time	10.628	.001**
Treatment Group X Legal Status	3.512	.061
Time X Legal Status	.707	.400
Treatment Group X Time X Legal Status	6.248	.013*

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

In addition, a significant three-way interaction for Treatment Group X Time X Legal Status was found, $F(1,1400.70) = 6.248$, $p = .013$, and is shown in Figure 14. Participants entering treatment without legal incentives had similar reductions in substance use regardless of intervention group assignment (MET or TAU). In contrast, participants with legal incentives responded differently based on intervention group assignment. Those receiving MET showed a more modest decrease in substance use over time as opposed to those in the TAU intervention group. Participants with legal involvement generally reported greater substance use over the intervention period than those without legal involvement.
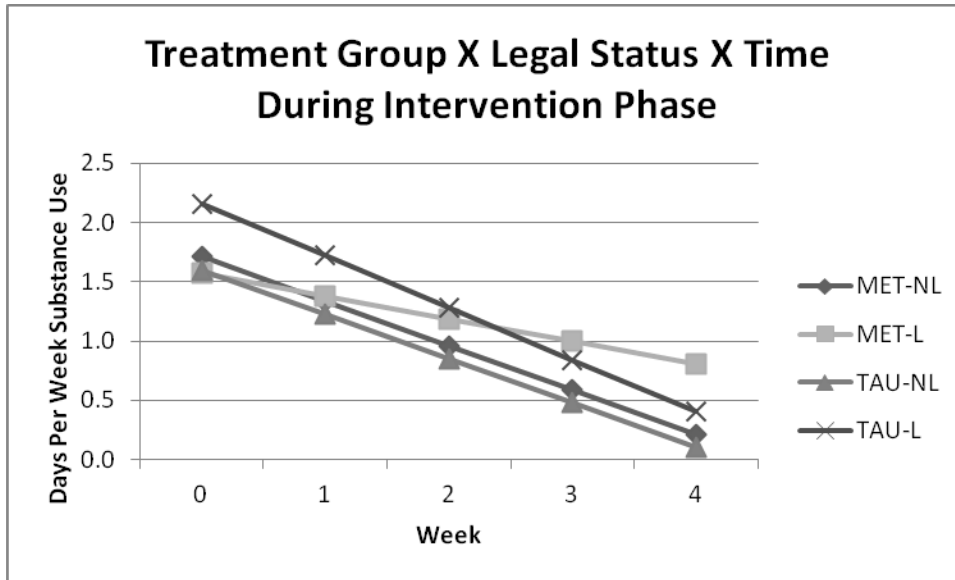
Treatment Group X Legal Status X Time During Intervention Phase

MET-L = motivational enhancement therapy with legal involvement; MET-NL = motivational enhancement therapy with no legal involvement; TAU-L = treatment as usual with legal involvement; ; TAU-NL = treatment as usual with no legal involvement .

Figure 14. Exploratory Analysis: Three-Way Interaction of Treatment Group X Time X Legal Status

A similar mixed linear analysis was run for the variables, Treatment Group, Time, Legal Status and all interaction terms for the 12 week post intervention phase (weeks 5-16) of the study: Treatment Group, Time, Legal Status, Treatment Group X Time, Treatment Group X Legal Status, Time X Legal Status and Treatment Group X Time X Legal Status. As with previous models, potential covariates were first tested in the model. When found to be nonsignificant, the covariates were eliminated from the model (Model 1). The most parsimonious model is presented below (Model 2) and is shown in Table 17.

Table 17.

Exploratory Analysis: Final Model Retained for Mixed Linear Model of Post-Intervention Phase for Treatment Group, Time, Legal Status and All Interactions.

Variable	Model 1		Model 2	
	F	*p*	F	*p*
Treatment Group	.250	.671		
Time	2.971	.085	5.536	.019*
Legal Status	1.991	.159	.815	.367
Treatment Group X Time	.000	.993		
Treatment Group X Legal Status	1.228	.268		
Time X Legal Status	21.511	.000***	25.817	.000***
Treatment Group X Time X Legal Status	1.752	.186		

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

A significant main effect was observed for Time $F(1,3337.16) = 5.536$, $p = .019$. A significant 2-way interaction was found between Time X Legal Status, $F(1,3334.895) = 25.817$, $p < .001$, and is shown Figure 15. During the post-intervention period, as shown in Figure 16, participants entering treatment with legal incentives continued to show comparable rates of decline in substance use regardless of intervention group assignment. In contrast, participants without legal incentives showed a different response with an increase in substance use over the 12-week post intervention period.

Overall, the data support the role of legal incentive, irrespective of treatment group, for sustained reductions in substance use over the post-intervention period.

Time X Legal Status

Legend: Legal, No Legal
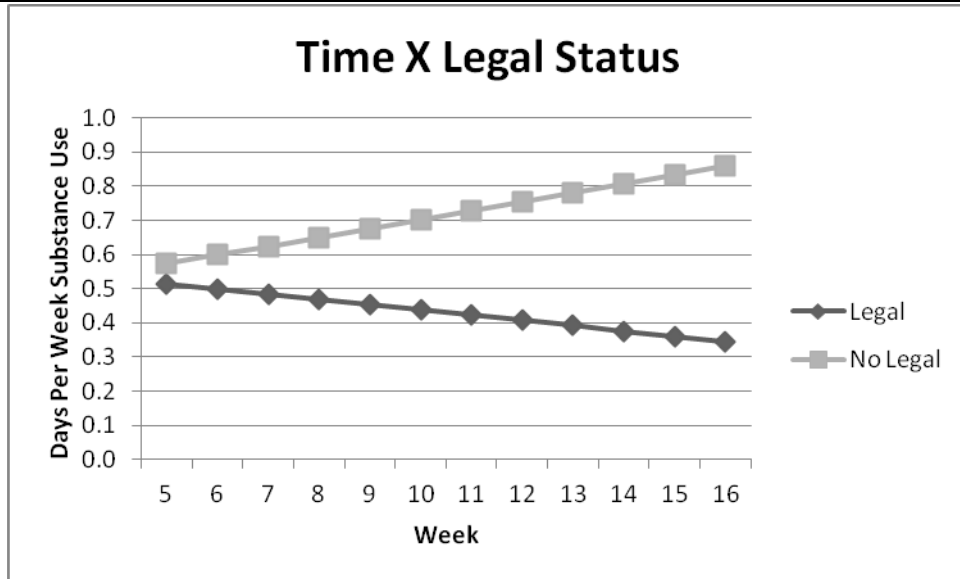
Legal = any legal involvement; No Legal = no legal involvement

Figure 15. Exploratory Analysis: Two-way Interaction of Time X Legal Status
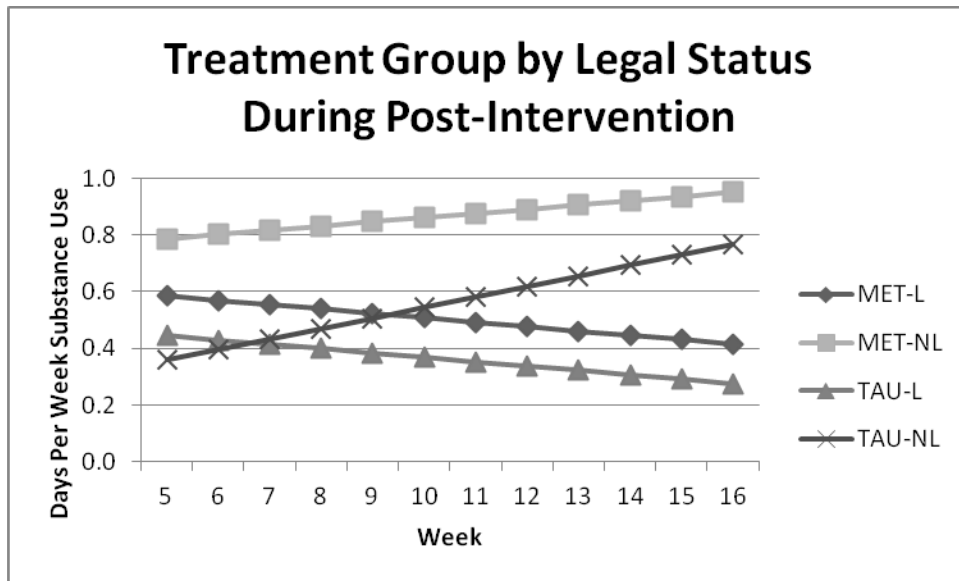
MET-L = motivational enhancement therapy with legal involvement; MET-NL = motivational enhancement therapy with no legal involvement; TAU-L = treatment as usual with legal involvement; TAU-NL = treatment as usual with no legal involvement .

Figure 16. Exploratory Analysis: Days Using Primary Substance per Week Separated by Treatment Group and Legal Status during the Post-Intervention Phase

Discussion

The present study examined whether individuals with and without legal incentives to enter substance abuse treatment differed in their response to MET, a brief motivational intervention to improve engagement and early retention in substance abuse treatment. Using data from a multisite clinical trial of MET (CTN-0004), the present study first compared participants with and without legal incentives to enter treatment on a variety of baseline demographic and substance use characteristics. Second, mixed linear models and logistic regression were used to determine whether type of intervention and legal status interacted in predicting outcomes of substance use (greater reduction in days per week of substance use) and treatment retention (higher rates of treatment retention at 16 weeks). Third, Readiness to change scores (high/low) were compared for participants with and without legal incentives

83

to enter treatment. In addition, the study examined whether level of motivation (readiness to change) at study enrollment predicted treatment across the two Treatment and Legal Status groups.

Summary of Findings

When participants randomized to either MET or TAU are further subdivided into those with and without legal incentives to enter substance abuse treatment, it was hypothesized that those in the MET with legal incentives group will have the most positive treatment outcomes (greater reduction in days per week of substance use; higher rates of treatment retention at 16 weeks) over time relative to the other three participant subgroups.

The hypothesis that when participants randomized to either MET or TAU are further subdivided into those with and without legal incentives to enter substance abuse treatment, that those in the MET with legal incentives group will have the most positive treatment outcomes over time relative to the other three participant subgroups was not supported by the data. Similarly, treatment retention rates were higher for participants with legal incentives regardless of intervention group assignment. Given variability across groups in baseline rates of primary substance use, additional analyses, controlling for baseline use, were performed and in all cases interactions remained statistically significant. Thus, the observed findings could not be explained by the variability in baseline rates of primary substance use. While findings confirm the positive relationship between legal incentives to enter treatment and measures of treatment outcome, they do not support motivational interventions further strengthening this association.

The hypothesis that when participants randomized to either MET or TAU are further subdivided into those with primary alcohol or primary drug and with and without legal

incentives to enter substance abuse treatment, those in the MET intervention presenting with primary alcohol problems and legal incentives will have the most positive treatment outcomes over time relative to the other participant subgroups was not supported. Reductions in primary substance use were generally uniform across all participants with a legal incentive to enter treatment, but were weakest in the MET with primary alcohol use group. Participants in the MET group with primary drug use and no legal incentive to enter treatment actually showed an increase in substance use over the 16 week study period. Once again these results suggest that legal status and not treatment intervention most impacts substance use.

The hypothesis that participants in the MET intervention with low baseline motivation to change would show greater reductions in substance use and higher treatment retention than participants in the other 3 groups was also not supported. Rather, baseline motivation, as measured by the URICA Readiness to Change score, was not associated with either measure of treatment outcome.

Discussion of Findings

Legal Status. The present study found participants with legal incentives to enter treatment had a more positive outcome than participants without legal incentives for care. This is consistent with much of the literature, that is, legal incentives have been associated with better treatment retention (Brocato, 2004; Broome et al., 1999; Simpson & Joe, 2004; Simpson et al., 1997) and lower rates of substance use (Howard & McCaughrin,1996). Not all studies have found such relationships, however, several studies have found no change in substance use (Brecht, Anglin, and Wang, 1993; Hser, Anglin, and Liu, 1991) and lower

85

retention rates (Grichting, Uchtenhagen, and Rehm, 2002; Howard & McCaughrin, 1996) for participants with legal incentives prompting further study.

Some of the variability across studies may stem from how legal encouragement to enter treatment is defined and measured. Defining "legal incentive to enter treatment" was challenging. The present study defined it as being mandated or referred as alternative to jail, referred by probation/parole officer, referred by other federal, state, private agency or other legal issues involved. Using this definition we found that approximately one third (37.3%) of participants were categorized as having legal incentive to enter treatment. These findings were consistent with previous research which showed that between 34% (Niv, Hamilton, Hser, 2009) and 42% (Craddock, Rounds-Bryant, Flynn, & Hubbard, 1997) of the clients enrolled in publicly funded outpatient drug abuse treatment programs are referred by the criminal justice system. Further, the variable was highly correlated with other measures of legal involvement from the Addiction Severity Index including an 84% correlation with "was the treatment admission prompted by the legal system" (y/n). Demographically, participants with legal incentives were generally younger, less likely to be employed and reported less education than those without legal incentives. Additionally, a significantly higher proportion of participants with legal involvement were primary drug users (71.5%). While it is likely that this is a result of the illicit nature of drug use, the legal status variables did not specify the event or events that initiated contact with the legal system (except that they were criminal and not civil).

Motivation for substance abuse treatment is a dynamic construct with a complex myriad of psychosocial problems (Joe, Simpson, & Broome, 1998) and the absence of legal motivation does not preclude an individual from having other extrinsic motivations (e.g. job,

family). Variability across previous studies may come from the fact that when one measures "legal incentive to enter treatment", it is often used as a proxy for extrinsic motivation to enter treatment. Further, this is often used as an absolute measure of patient motivation. That is, based solely on a person's legal status, he/she may be categorized as intrinsically or extrinsically motivated to enter treatment. In this scenario, if a person has a legal reason to seek substance abuse treatment, it is then assumed that he/she cannot be internally self-motivated to enter care.   Clearly a variety of factors can contribute to a person's decision to enter substance abuse treatment. Marlow and colleagues (1996) identified four dimensions of the pressure to enter treatment; the external or internal nature of pressure, the negative or positive quality of the pressure, whether pressure is coercive or noncoercive and the psychosocial life domain from which the pressure emanates. Additionally these factors can come from a variety of sources, such as family members, friends, employers, the legal system, and/or health care providers (Marlow et al., 1996). The belief that someone with legal pressure to seek treatment enters care primarily because of such external factors while oversimplified, has guided many segments of the addiction treatment community. The majority of people coming to treatment have some external factors likely to be motivating them into treatment. Legal incentive is one that can more easily be measured and tied to clearer consequences than other forms of external motivation.

Some studies find legally pressured clients do better in substance abuse treatment than voluntary clients (Kelly, Finney & Moos, 2005) while others report the opposite (Kelley et al., 2005). The present study hypothesized that if legal incentives to enter treatment create a state of high extrinsic motivation, patients in this group may benefit more from an intervention designed to focus specifically on stages of change and guiding a person toward

greater self-motivation (internal) to change behavior. This was not the case as rates of substance use were comparable for MET and TAU.

According to Ryan et al. (1995), legal status can be interpreted as an internal or external motivation based on the perception of these events by the individual as either being controlling or informative. Events perceived to be controlling will be attributed to external forces whereas informative events will be interpreted as internally motivating. Individual interpretation is the ultimate decision in how legal incentive is interpreted regardless of how it may seem to outside observers. As such, it is important to recognize that the underlying motivation is not clear and is likely more complex and not unidemensional.

Client legal status, including pressure to enter treatment, effects the length of treatment stay as clients with legal involvement are more likely to, stay in treatment for longer periods of time (Hubbard et al., 1989; Simpson, 1993), and successfully complete treatment (Hser et al., 2004; Maglione, Chao, & Anglin, 2000) than those without legal involvement. This was supported by the current study as legal status was found to significantly impact treatment retention. Participants with legal incentives are almost twice as likely as those without legal incentive to still be in treatment at study completion. Retention within the current study was exceptionally high for an outpatient substance abuse programs. It is this higher retention overall that may have resulted in not seeing a main effect for MET. Given these higher rates of retention, it is possible that a ceiling effect may be leading to the mistaken conclusion that MET had no effect. These higher rates of retention may be the results of many things, including, exceptional programs with well trained staff (in part due to the training and oversight of the CTN) or because of enhanced attention as a result of being a part of this study.

Treatment retention is one of the strongest predictors of abstinence at twelve month follow up (Simpson, Joe, Brown, 1997). Treatment retention is also a potent and consistent predictor of positive treatment outcomes such as decreases in drug and alcohol use (Chou et al., 1998; Etheridge, Hubbard, Anderson, Craddock, & Flynn, 1997), decreases in criminal activity (Etheridge, Hubbard, Anderson, Craddock, & Flynn, 1997; Hser, Evans, Huang, and Anglin, 2004; Roffman, Klepsch, Wertz, Simpson, & Stephens, 1993) and improved social functioning (Hser, Evans, Huang, and Anglin, 2004; Roffman, Klepsch, Wertz, Simpson, & Stephens, 1993; Simpson & Joe, 2004; Simpson, Joe, and Rowan-Szal, 1997; Simpson & Sells, 1982). The present study and much of the existing literature supports the fact that patients with legal incentives to enter treatment are retained in treatment longer than participants who are not legally incentivized. Given that participants in this study with legal incentives to enter treatment are almost twice as likely to still be in treatment at 16 week post enrollment, it was not surprising that they also reported lower rates of primary substance use. It was somewhat surprising that the type of intervention (MET or TAU) made no difference. It is possible legal incentives, as they were measured in the current study, were so compelling that they overshadowed any potential treatment effects. It is also worth noting that the overall retention rates of the current study were higher (69%) than is normally seen in an outpatient treatment program (25-40%) (Justus et al., 2006; Sayre et al., 2002; Siqueland et al., 2002; Wickizer et al., 1994) and this potentially made it more difficult to observe any treatment effects that may have been present.

Motivation. In psychology, motivation is often defined as "the process that initiates, guides and maintains goal-oriented behaviors" ("Merriam-Webster's", 2003). In the field of addiction, it is considered by many to be integral to the recovery process. A client's level of

motivation at treatment onset has also been found to be positively associated with therapeutic participation and therapeutic alliance (Brocato, 2004; Brocato & Wagner, 2008; Joe et al., 1999), which also appears to be related to increased retention and engagement (Brocato & Wagner, 2008; Simpson, Joe, Rowan Szal, & Greener, 1997). In traditional 12-Step focused recovery programs, motivation is often viewed as a trait; something an individual possesses when he/she enters drug abuse treatment. In contrast, the principles of motivational interviewing that form the basis for MET view motivation as a state that is subject to change and that therapists can help to guide individuals in the direction of change.

In contrast to such internal motivation, legal issues that prompt (or even require) that a person seek drug abuse treatment, are seen as a marker for extrinsic motivation to seek care. Some might argue such external pressure to enter treatment undermines internal self-motivation (Brecht, Anglin, & Wang, 1993; Shearer & Ogan, 2002) such that persons with strong external pressure to enter treatment are, for all practical purposes, incapable of being self-motivated to change. The present study explored this issue using a categorical measure that classified participants as having either high or low motivation to change based on URICA Readiness to Change scores.

While the present study affirmed a relationship between legal incentives to enter treatment and low readiness to change, with nearly three-fourths of legally incentivized participants categorized as low readiness to change (71.4%), it was not absolute. That is more than one fourth (28.6%) of those entering treatment with legal pressure to do so nonetheless reported high motivation to change. This is an interesting group that warrants further study. In particular, it would be important to compare the congruent and incongruent

90

cases so that demographic and psychosocial correlates may be identified. Such correlates may be useful in treatment planning and relapse prevention.

For the sake of simplicity, a mean separated readiness to change score was used (high readiness to change, low readiness to change) to establish participants baseline motivation. The findings from the current study showed that the dichotomous Readiness to Change score had comparable cut off scores to the ATCC algorithm. The ATCC algorithm (Callahan, Taylor, Moore, Jungerman, Vilela & Bundy, 2008) suggests that precontemplation range from -2 to 10.15. The mean separation resulted in a low motivation (comparable to precontemplation) ranging from -2 to 10.16. Using mean separation, a total of 225 participants were categorized as low motivation, while 226 were categorized as high motivation. The decision to mean separate the Readiness to Change score into high and low resulted in an almost identical split point, suggesting that using the mean separation scores was appropriate.

Using the URICA readiness to change score as a measure of motivation, the current study looked at level of substance use and treatment retention. The readiness to change score is based on the Transtheoretical Model of Change (discussed in greater detail in the literature review) and attempts to classify individuals through the stages of change; precontemplation, contemplation, preparation, action (Callahan, Taylor, Moore, Jungerman, Vilela & Bundy, 2008). Greater treatment gains were predicted for individuals in the MET condition who had low motivation scores but this was not the case. Instead, the readiness to change score was not predictive of treatment outcome as measured by substance use and retention. The existing body of research focused on the predictive validity of the URICA readiness to change score has found mixed results. There is a growing body of research to suggest that the URICA is

not an adequate tool for use as a predictive measurement (Callahan, Taylor, Moore, Jungerman, Vilela & Bundy, 2008; Blanchard et al., 2003; Callaghan et al., 2007; Diclemente et al., 2004; Kinnaman, Bellack, Brown, & Yang, 2007; Pantalon, Nich, Frankforter, & Carroll, 2002; Pantalon & Swanson, 2003). Additionally, several studies have shown that readiness to change scores were not related to changes in frequency or intensity of substance use and that baseline scores could not predict subsequent improvements in drug use outcomes (Callahan, Taylor, Moore, Jungerman, Vilela & Bundy, 2008; Blanchard et al., 2003; Callaghan et al., 2007; Diclemente et al., 2004; Kinnaman, Bellack, Brown, & Yang, 2007; Pantalon, Nich, Frankforter, & Carroll, 2002). Findings from the current study show that baseline motivation does not result in different outcomes in substance use or treatment retention.

Given the existing body of research in support of motivation at treatment outset being predictive of treatment participation it was surprising that no predictive effects were present in the current study. This suggests the possibility that the URICA measure may assess readiness to change but not readiness for treatment. Readiness for treatment is different from readiness to change in that it suggests an openness to treatment participation. A large body of research has focused on readiness for treatment rather than readiness to change, and although these two constructs are likely related, they remain distinct (DiClemente et al., 1999). For example, a client may want to change a specific behavior but may not be open to the idea of treatment assisting in that process. Although measurement of readiness to change from the URICA was not found to be predictive, it does not mean that motivation is not related to decreases in substance use and retention in treatment. It may be that the measure

92

used in the current study (URICA Readiness to Change score) did not adequately assess the clients' motivation for treatment.

Study Strengths, Limitations, and Future Directions

Strengths. The current study has a number of strengths. First, this was a large multi-site study with a heterogeneous group of community treatment programs. As part of the NIDA CTN, these were actual programs that typically did not participate in randomized clinical trials. This is important, because previously conducted clinical trials have been limited by so many inclusion/exclusion criteria, that final study participants bore little resemblance to the substance abuse patients served by programs through the USA. The present study kept exclusion criteria to a minimum, making every effort to maintain study representativeness and generalizability.

Secondly, study assessments used standardized measures with well established reliability and validity. Staff training in their administration was rigorous with ongoing monitoring for fidelity throughout the study. For this study, in particular, data were abstracted from the Addiction Severity Index (ASI 'lite') and the Substance Use Calendar, both of which have been shown to be reliable and valid for measuring changes in substance use and other outcomes over time (McLellan, et al., 1992; Sobell & Sobell, 1992; Miller and Dleboca, 1994; Fals-Stewart et. al. 2000). This ensured that information was gathered accurately and consistently with minimal experimenter error across participating study sites.

Third, both MET and TAU were delivered by actual therapists from the participating treatment programs. None had prior allegiance to, or experience with, MET. Therapist training was rigorous with certification and careful fidelity monitoring of both the experimental (MET) and control (TAU) interventions.

93

Fourth, a randomized clinical trial was used to compare MET and TAU in the context of ongoing outpatient substance abuse treatment. Urn randomization was used to minimize chance differences in demographic and other variables between study groups.

Finally, the data set had been carefully monitored throughout study administration. At study completion, quality assurance procedures were in place to review files for data accuracy. In addition, prior to testing current study hypotheses, a rigorous set of procedures were undertaken to replicate not only the descriptive tables for the primary outcome paper, but also the main study results. Ultimately, this effort brought to light the difference in the pattern of findings over the course of the 16 week study period. That is, one of the primary outcome variables (days of substance use), when examined concurrently for the 4 study groups (legal incentive/MET; legal incentive/TAU; no legal incentive/MET; no legal incentive/TAU) showed a different pattern during the initial phase (weeks 1-4) as compared to what was seen in the subsequent phase (weeks 5-16). In fact, not only was the pattern of use dissimilar for the two phases, but in some cases the trend was an opposite direction. When data were analyzed as originally proposed, hypothesis testing yielded negative results. However, in the exploratory analyses that arose following replication of the primary paper results, significant interactions were found between MET and the presence or absence of legal incentives to enter treatment.

Clearly, further research is needed to better understand the interactions that were found and the different patterns of substance use found across the 4 groups of participants in the 2 phases of the study. Since the first phase could be considered treatment engagement (weeks 1-4) and the second phase might be considered early treatment retention (weeks 5-16), this is worthy of study as these are the two targets of MET. Since this was the first time

94

research had been blended with ongoing clinical practice at these sites, the varied patterns could in part be the result of increased time and attention contributed by the presence of RAs and more frequent monitoring and assessment.

   Limitations. It is important to also recognize the limitations of this study. First, as a secondary data analytic study, testing of the hypotheses for the present study was done within the confines of available measures and how information was entered into the computer database for analysis. In some cases, creation of new variables presented problems or required modifications to proposed analyses. Related to this, a second limitation was the focus on primary substance used. While this categorization was supported in the literature (Ball et al., 2007; Carroll et al. 2006) it does not tell the full story. Types of substances used can change for a number of reasons (e.g. being drug tested and fearing consequences, availability) and by focusing on only the primary substance used at study enrollment we potentially missed changes in substance used.   A third limitation was sample size. Clearly an N of 461 was sufficient for the primary clinical trial comparing MET to TAU, as well as subsequent comparisons of participants with primary alcohol versus other drug(s). The present study, however, proposed further sub grouping and further reductions in cell counts created limitations in variables that could be created to capture legal incentives to enter treatment and baseline levels of motivation to change.   Related to this, the fourth limitation was the use of a dichotomous variable to represent legal incentive to enter treatment. Clearly, a more refined measure was preferred, and a 3-category variable was considered (mandated to treatment, other legal involvement, no legal involvement, reductions in subgroup sample sizes made this less feasible. Nonetheless, while using a trinomial variable seemed to have merit, there was nonetheless also support in the literature for the

dichotomous measure used in this study (Niv, Hamilton, Hser, 2009; Craddock, Rounds-Bryant, Flynn, & Hubbard, 1997).

A fifth limitation is the better than expected overall outcomes for all study participants. For example, while between 60-75% of outpatients in substance abuse treatment tend to drop out during the first few months of care (Justus et al., 2006; Sayre et al., 2002; Siqueland et al., 2002; Wickizer et al., 1994), only one-third (31%) did so in the current study sample. This may have created a ceiling effect for the outcome variable of treatment retention, measured at 16 weeks post-study enrollment. It is unclear why the current study had higher rates of participant retention than traditional outpatient programs report. It is possible that in this study the retention was higher because of the additional focus and attention provided because of the research study (e.g. study visits, contact with the RA).

Future Directions. While much of the research has focused on client characteristics, future directions should also focus on programmatic factors. Multi-site trials, such as this, lend themselves to just such an assessment of programmatic factors. Clearly not all programs and not all treatments are created equally. A focus on programmatic factors associated with improved retention and decreases in primary substance use for legally involved clients could be an important step towards gaining a better understanding of the predictors of treatment retention, while also helping to provide a more complete picture of the occurrence of substance treatment drop-out among this population.

More than one fourth of those entering treatment with legal pressure did so while reporting high motivation to change. This is an interesting group that warrants further study. Measures, such as the URICA, are useful but they may not tell the whole story. While

96

qualitative approaches are seldom employed within substance abuse treatment research they may provide a better way to understand the characteristics of this group. Employing a qualitative component to a quantitative investigation could prove quite useful in determining factors related to retention.

From the current study it appears that the role of legal incentives didn't strengthen MET. Theory suggests that a motivationally enhancing program, with exceptional training and fidelity monitoring as seen in the CTN, should result in differences in substance use and retention.   Further research is needed to assess what, if any, role that MET can have with this population. Findings from the exploratory analysis present one future area where this could be assessed. Results from the exploratory analyses show a different response to MET at different time points (intervention, post-intervention) among those with and without legal incentives. This transition point is worth further exploration.

Consistent with many previous studies, the present study affirmed an association between legal incentives to enter care and treatment outcomes of substance use and treatment retention.   That is, participants who were legally encouraged to enter treatment displayed a more rapid and steeper reduction than those without legal encouragement. Legally encouraged participants also had retention rates two times higher than those without legal involvement. What remains unclear, however, is what happened to substance use for these individuals after the legal incentives are no longer present. It is possible that treatment effects may not hold if an individual is motivated to complete treatment to satisfy a court order rather than an internal desire to alter the substance use? Research in support of this comes from Brecht, Anglin & Whang (1993) who showed that client relapse rates can increase significantly once monitoring probation programs end. While relapse may occur

97

after the removal of legal incentives, this is not necessarily a negative outcome in all cases. For example, from a harm reduction standpoint, reductions in substance use and engagement in treatment during the time a person has active legal issues should not be ignored.

References

Anglin, D., Prendergast, M., & Farabee, D. (1998). The Effectiveness of Coerced Treatment for Drug-Abusing Offenders. *Paper presented at the Office of National Drug Control Policy's Conference of Scholars and Policy Makers, Washington, D.C.,* March 23-25, 1998.

Babor, T. F. (2004) Brief treatments for cannabis dependence: Findings from a randomized multi-site trial. *Journal of Consulting and Clinical Psychology,* 72, 82-93

Ball, S., Martino, S., Nich, C., Frankforter, T., Van Horn, D., Crits-Christoph, P., Woody, G., … Carroll, K. (2007). Site matters: Multisite randomized trial of motivational enhancement therapy in community drug abuse clinics. *Journal of Consulting and. Clinical Psychology*, 75, 556−567.

Battjes, R. J., Onken, L. S., & Delany, P. J. (1999). Drug abuse treatment entry and engagement: Report of a meeting on treatment readiness. *Journal of Clinical Psychology*, 55, 643–657.

Bien, T.H., Miller, W.R., & Tonigan, J.S. (1993). Brief interventions for alcohol problems: A review. *Addiction*. 88, 315–336.

Belding, M., Iguchi, M., & Lamb, R.(1996). Stages of change in methadone maintenance: Assessing the convergent validity of two measures. *Psychology of Addictive Behaviors*. 10(3).

Blanchard, K. A., Morgenstern, J., Morgan, T. J., Labouvie, E., & Bux, D. A. (2003). Motivational subtypes and continuous measures of readiness for change: Concurrent and predictive validity. *Psychology of Addictive Behaviors*, 19.

Brecht, M., Anglin, D. M., & Whang, J. (1993). Treatment effectiveness for legally coerced versus voluntary methadone maintenance clients. *American Journal of Drug and Alcohol Abuse, 19,* 89-106.

Brittingham, A., Schildhaus, S., & Gfroerer, J. (1999). SAMHSA Office of Applied Studies. OAS Working Paper

Brocato, J. (2004) Predictors of client retention in alternative-to-prison substance abuse programs. Dissertation. Florida International University.

Brocato, J. & Wagner, E. F. (2008). Predictors of retention in an alternative-to-prison substance abuse treatment program. *Criminal Justice and Behavior, 35,* 99-119.

Broome, K. M., Flynn, P. M., & Simpson, D. D. (1999). Psychiatric comorbidity measures as predictors of retention in drug abuse treatment programs. *Health Services Research, 34*, 791-798.

Brown, J. M., & Miller, W. R. (1993). Impact of motivational interviewing on participation and outcome in residential alcoholism treatment. *Psychology of Addictive Behaviors*, 7(4), 211-218.

Brown, T. G., Dongier, M., Ouimet, M. C., Tremblay, J., Chanut, F., Legault, L., et al. (2010). Brief motivational interviewing for DWI recidivists who abuse alcohol and are not participating in DWI intervention: a randomized controlled trial. Alcoholism, clinical and experimental research, 34(2), 292-301.

Bureau of Justice Statistics (2009). Probation and Parole in the United States, 2008 (Publication No. NCJ 228230). Washington, DC U.S. Department of Justice, Bureau of Justice Statistics.

Bureau of Justice Statistics (2004). Prisoners in 2004 (Publication No. NCJ 210677). Washington, DC U.S. Department of Justice, Bureau of Justice Statistics.

Bureau of Justice Statistics. (1998). Correctional Populations in the United States, 1998 (Publication No. NCJ 192929). Washington, DC U.S. Department of Justice, Bureau of Justice Statistics.

Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: a meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology*, 71(5), 843-61.

Callaghan, R. C., Taylor, L., & Cunningham, J. A. (2007). Does progressive stage transition mean getting better? A test of the transtheoretical model in alcoholism recovery. *Addiction*, 102.

Callaghan. R., Taylor, L., Moore, B., Jungerman, F., Vilela, F., & Budney, A. (2008) Recovery and URICA stage-of-change scores in three marijuana treatment studies. *Journal of Substance Abuse Treatment*. 35(4):419-26.

Carroll, K. M., D, P., Libby, B., Sheehan, J., & H, N. (2001). Motivational Interviewing to Enhance Treatment Initiation in Substance Abusers : An Effectiveness Study. *American Journal on Addictions*, 10(4), 335- 339.

Carroll, K., Ball, S., Crits-Cristoph, P., Farentinos, C., McLellan, T., Morgenstern, J., Obert, J., Polcin, D., & Woody, G. (2001). Clinical Trial Network (CTN) OOO4 Protocol: Motivational Enhancement Treatment to improve treatment engagement and outcome in individuals seeking treatment for substance abuse. National Institute of Drug Abuse.

Carroll, K. M., Farentinos, C., Ball, S. A, Crits-Christoph, P., Libby, B., Morgenstern, J., et al. (2002). MET meets the real world: design issues and clinical strategies in the Clinical Trials Network. *Journal of Substance Abuse Treatment*, 23(2), 73-80.

Carney, M., & Kivlahan, D. (1995). Motivational subtypes among veterans seeking substance abuse treatment: Profiles based on stages of change. *Psychology of Addictive Behaviors*. 1995;9(2).

Chou, C., Hser, Y., & Anglin, M. D. (1998). Interaction effects of client and treatment program characteristics on retention: An exploratory analysis using hierarchical linear models. *Substance Use & Misuse, 33*, 2281-2301.

Compton, W. M., Thomas, Y. F., Stinson, F. S., & Grant, B. F. (2007). Prevalence, correlates, disability, and comorbidity of DSM-IV drug abuse and dependence in the United States: Results from the National Epidemiological Survey on alcohol and related conditions. *Archives of General Psychiatry, 64*, 566-576.

Craddock, S. G., Rounds-Bryant, J. L., Flynn, P. M., & Hubbard, R. L. (1997). Characteristics and pretreatment behaviors of clients entering drug abuse treatment: 1969 to 1993. *American Journal of Drug and Alcohol Abuse*, 23, 43– 59.

Curran, P. J., West, S. G, & Finch, J. F. (1996). The robustness of test statistics to non normality and specification error in confirmatory factor analysis. *Psychological Methods*, 1(3).

Curry, S., Wagner, E. H., & Grothaus, L. C. (1990). Intrinsic and extrinsic motivation for smoking cessation. *Journal of Consulting and Clinical Psychology*, 58(3), 310-6.

D'Amico, E.J., Miles, J.N., Stern, S.A., & Meredith, L.S. (2007). Brief motivational interviewing for teens at risk of substance use consequences: a randomized pilot study in a primary care clinic. *Journal of Substance Abuse Treatment*. 35(1), 53-61.

De Leon, G., Melnick, G., & Tims, F. M. (2001). The role of motivation and readiness in treatment recovery. In F. M. Tims, C. G. Leukfeld, & J. J. Platt (Eds.), *Relapse and recovery in addiction* (pp. 143-171). London: Yale University Press.

De Leon, G., Melnick, G., & Kressel, D. (1997) Motivation and readiness for therapeutic community treatment among cocaine and other drug abusers. *American Journal of Drug and Alcohol Abuse,* 23, 169-190.

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), Nebraska Symposium on Motivation: Vol. 38. *Perspectives on motivation*, pp. 237-288. Lincoln: University of Nebraska Press.

Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Washington, DC, American Psychiatric Association, 2000.

DiClemente, C. C. (1999). Motivation for change: Implications for substance abuse treatment. Psychological Science, 10(3), 209-213.

DiClemente, C. C., Bellino, L. E., & Neavins, T. M. (1999). Motivation for change and alcoholism treatment. *Alcohol Research & Health, 23*, 86-92.DiClemente, C. C.,

Dunn, C., Deroo, L., & Rivara, F. P. (2001). The use of brief interventions adapted from motivational interviewing across behavioral domains: a systematic review. *Addiction,* 96(12), 1725-42.

Etheridge, R. M., Hubbard, R. L., Anderson, J., Craddock, S. G., & Flynn, P. M. (1997). Treatment structure and program services in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 244-260.

Feldstein, S. W., & Ginsburg, J. I. D. (2006). Motivational Interviewing With Dually Diagnosed Adolescents in Juvenile Justice Settings. *Brief Treatment and Crisis Intervention*, 6(3), 218-233.

Fals-Stewart, W., O'Farrell, T.J., Freitas, T.T., McFarlin, S.K., & Rutigliano, P., 2000. The Timeline Followback Interview for substance abuse: psychometric properties. *Journal of Consulting and Clinical Psychology,* 68.

Fingarette, H. (1988). Heavy drinking: The myth of alcoholism as a disease. Berkeley: University of California Press.

Finney, J.W., Moos, R.H. (1992). The long-term course of treated alcoholism, II: predictors and correlates of 10-year functioning and mortality. *Journal of Studies on Alcohol and Drugs*, 53, 142-153.

Grichting, E., Uchtenhagen, A., Rehm, J. (2002). Modes and impact of coercive and inpatient treatment for drug-related Conditions in Switzerland. *European Addiction Research* 8:78–83.

Harper, R., & Hardy, S. (2000). An evaluation of motivational interviewing as a method of intervention with clients in a probation setting. *British Journal of Social Work, 30,* 393-400.

Hasin, D. S., Stinson, F. S., Ogburn, E., & Grant, B. F. (2007). Prevalence, correlates, disability, and comorbidity of DSM-IV Alcohol Abuse and Dependence in the United States: Results from the National Epidemiologic Survey on alcohol and related conditions. *Archives of General Psychiatry, 64*, 830-842.

Harrison, L. (2001). The revolving prison door for drug-involved offenders: Challenges and opportunities. *Crime & Delinquency*, 47, 462– 485.

Hedden, S., Guard, M., & Arndt, S. (2011). Jail-Based substance abuse treatment program: annual Outcome evaluation report. Iowa City, IA: Iowa Consortium for Substance Abuse Research and Evaluation.

Henderson, M., Saules, K., & Galen, L. (2004) The predictive validity of the University of Rhode Island Change Assessment questionnaire in a heroin-addicted polysubstance abuse sample. *Psychology of Addictive Behaviors*. 2004;18(2).

Hettema, J., Steele, J., & Miller, W. R. (2005). Motivational interviewing. Annual review of clinical psychology, 1, 91-111.

Howard, D.L., & McCaughrin, W.C. (1996). The treatment effectiveness of outpatient substance misuse organizations between court-mandated and voluntary clients. *Substance Use & Misuse, 31(7).*

Howard, D. L., McCaughrin, W. C. (1996). The treatment effectiveness of outpatient substance misuse treatment organizations between court-mandated and voluntary clients. *Substance Use and Misuse* 31(7):895–926.

Hubbard, R. L., Marsden, M. E., Rachal, J. V., Harwood, H. J., Cavanaugh, E. R., & Ginzburg, H. M. (1989). *Drug abuse and treatment: A natural study of effectiveness.* Chapel Hill: University of North Carolina Press.

Hser, Y., Evans, E., Huang, D., & Anglin, D. M. (2004). Relationship between drug treatment services, retention, and outcomes. *Psychiatric Services, 55*, 767-774.

Hser, Y. I., Anglin, M. D., Liu, Y. A. (1991). Survival analysis of gender and ethnic differences in responsiveness to methadone maintenance treatment. *International Journal of Addictions* 25(11A):1295–1315.

Isaac, P., Heatley, M., & Savoie, J. (1998) Rates of Drug Detection in Urine Samples from Various Populations. *Clinics in Laboratory Medicine*, 10(2)

Jason, L. & Ferrari, J. (2010). Oxford House recovery homes: Characteristics and effectiveness. *Psychological Services*, 7.

Joe, G. W., Simpson, D. D., & Broome, K. M. (1999). Retention and patient engagement models for different treatment modalities in DATOS. *Drug and Alcohol Dependence, 57*, 113-125.

Justus, A. N., Burling, T. A., & Weingardt, K. R. (2006). Client predictors of treatment retention and completion in a program for homeless veterans. *Substance Use &Misuse, 41*, 751-762.

Kelly, J., Finney, J., & Moos, R. (2005)Substance use disorder patients who are

mandated to treatment: Characteristics, treatment process, and 1- and 5-year outcomes. *Journal of Substance Abuse Treatment*, (28)3.

Kinnaman, J. E., Bellack, A. S., Brown, C. H., & Yang, Y. (2007). Assessment of motivation to change substance use in dually-diagnosed schizophrenia patients. *Addictive Behaviors*, 28(3).

Klag, S., O, Callaghan, F., & Creed, P. (2005). The Use of Legal Coercion in the Treatment of Substance Abusers: a An Overview and Critical Analysis of Thirty Years of Research. *Substance Use & Misuse*, 40(12), 1777-1795.

Koestner, R., Losier, G. F., Vallerand, R. J., & Carducci, D. (1996). Identified and interjected forms of political internalization: Extending self-determination theory. *Journal of Personality and Social Psychology,* 70, 1025-1036.

Krupski, A., Sears, J.M., Joesch, J.M., Estee, S., He, L., Dunn, C., Huber, A., Roy-Byrne, P., & Ries, R. (2010). Impact of brief interventions and brief treatment on admissions to chemical dependency treatment. *Drug and Alcohol Dependence*, 110(1-2):126-36.

Langan, P. A., & Levin, D. J. (2002). Recidivism of prisoners released in 1994 (Publication No. NCJ-193427). Washington, DC7 U.S. Department of Justice, Bureau of Justice Statistics.

Lawrence, A. (2008). Probation and Parole Violations State Responses, National Conference of State Legislatures

Lemke, S., & Moos, R. H. (2002). Prognosis of older patients in mixed-age alcoholism treatment programs. *Journal of Substance Abuse Treatment*, 22, 33– 43.

Lincourt, P., Kuettel, T. J., & Bombardier, C. H. (2002). Motivational interviewing in a group setting with mandated clients: a pilot study. *Addictive Behaviors*, 27(3), 381-91.

Lundahl, B. W., Kunz, C., Brownell, C., Tollefson, D., & Burke, B. L. (2010). A Meta-Analysis of Motivational Interviewing: Twenty-Five Years of Empirical Studies. *Research on Social Work Practice*, 20(2), 137-160.

Madras, B. (2010). Office of National Drug Control Policy; A scientist in drug policy in Washington D.C. *Annals of the New York Academy of Sciences,* 2.

Maglione, M., Chao, B., & Anglin, M. D. (2000b). Correlates of outpatient drug treatment drop-out among methamphetamine users. *Journal of Psychoactive Drugs,32*, 221-228.

Maglione, M., Chao, B., & Anglin, M.,(2000) Correlates of outpatient drug treatment drop-out among methamphetamine users. *Journal of Psychoactive Drugs*. 32(2).

Mammo, A., & Weinbaum, D. F. (1993). Some factors that influence dropping out from outpatient alcoholism treatment facilities. *Journal of Studies on Alcohol, 54*, 92-101.

The Marijuana, Treatment Project (2004). Brief treatments for cannabis dependence: findings from a randomized multisite trial. *Journal of Consulting and Clinical Psychology*, 72(3), 455-66.

Marlowe, D., Kirby, K., Bonieskie, L., Glass, D., Dodds, L., Husband, S., Platt, J., & Festinger, D. (1996). Assessment of coercive and noncoercive pressures to enter drug abuse treatment. *Drug and Alcohol Dependence*, 42, 77-84.

Martino, S., D, P., Carroll, K. M., Malley, S. S. O., & Rounsaville, B. J. (2000). Motivational Interviewing with Psychiatrically Ill Substance Abusing Patients. *The American Journal on Addictions,* 9, 88-91.

McLellan A.T., & McKay J. (1998) The treatment of addiction: what can research offer practice? In: Lamb S, Greenlick M, McCarty D, eds. *Bridging the Gap: Forging New Partnerships in Community-Based Drug Abuse Treatment.* Washington, DC: National Academy Press; 1998.

McLellan, A.T., Alterman, A.I., Cacciola, J., Metzger, D., & O'Brien. (1992). A new measure of substance abuse treatment: Initial studies of the Treatment Services Review. *Journal of Nervous and Mental Disease*, 180, 101-110.

McLellan, A. T., Kusher, H., Metzger, D., Peters, R., Smith, I., Grissom, G., et al. (1992). The Fifth Edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment, 9,* 199-213.

McLellan, T., Lewis, D., O'Brien, C., & Kleber, H. (2000) Drug Dependence, a Chronic Medical Illness Implications for Treatment, Insurance, and Outcomes Evaluation. *Journal of the American Medical Association*, 284(13).

Merriam-Webster's collegiate dictionary (11th ed.). (2003). Springfield, MA: Merriam-Webster.

Miele, G., Carpenter, K., Cockerham, M., Trautman, K., Blaine, J., & Hasin, D. (2000) Concurrent and predictive validity of the Substance Dependence Severity Scale (SDSS). *Drug and Alcohol Dependence*. 59.

Miller, W. R. and Rollnick, S. (1991). Motivational Interviewing: preparing people to change addictive behavior. New York: Guilford Press.

Miller, W.R., Zweben, A., DiClemente, C. & Rychtarik, R. (1992). *Motivational Enhancement Therapy: A Clinical Research Guide for Therapists Treating Individuals with Alcohol Abuse and Dependence.* Project MATCH Monograph Series, Vol. 2,

DHHS Publication No. (ADM) 92–1894. Washington, DC, Department of Health & Human Services.

Miller, W. R., Benefield, R. G., & Tonigan, J. S. (1993). Enhancing motivation for change in problem drinking: a controlled comparison of two therapist styles. *Journal of Consulting and Clinical Psychology,* 61(3), 455-61.

Miller, W.R. & Del Boca, F.K. (1994) Measurement of drinking behavior using the Form 90 family of instruments. *Journal of Studies on Alcohol, 12*, 112-118.

Miller, W. R. and Rollnick, S. (2002). Motivational Interviewing: preparing people for change(2nd ed.). New York: Guilford Press.

Miller, W. R., Yahne, C. E., & Tonigan, J. S. (2003). Motivational interviewing in drug abuse services: a randomized trial. *Journal of Consulting and Clinical Psychology*, 71(4), 754-63.

Miller, W. R. & Carroll, K. M. (2006). *Rethinking substance abuse: What science shows, and what we should do about it.* New York: Guilford Press.

Miller, W. R., & Rollnick, S. (2009). Ten things that motivational interviewing is not. *Behavioral and Cognitive Psychotherapy*, 37(2), 129-40.

Monti, P. M., Colby, S. M., Barnett, N. P., Spirito, a, Rohsenow, D. J., Myers, M., et al. (1999). Brief intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *Journal of Consulting and Clinical Psychology*, 67(6), 989-94.

Nathan, P. E., Skinstad, A. E., Langenbucher, J. W. (1999). Substance abuse: Diagnosing, Comorbidity, and psychopathology. In T. Milon, P. H. Blaney, & R. D. Davis (Eds.), *Oxford Textbook of Psychopathology* (pp.227-248). New York: Oxford University Press.

Neff, J.A., & Zule, W.A. (2002) Predictive validity of a measure of treatment readiness for out-of-treatment drug users: enhancing prediction beyond demographic and drug history variables. *American Journal of Drug and Alcohol Abuse*, 28,147–169.

Neighbors, C.J., Barnett, N.P., Rohsenow, D.J., Colby, S.M., & Monti, P.M. (2010). Cost effectiveness of a brief intervention for alcohol-involved youth in a hospital emergency department. *Journal of Studies on Alcohol and Drugs, 71,* 384-394.

Pantalon, M. V., Nich, C., Frankforter, T., & Carroll, K. M. (2002). The URICA as a measure of motivation to change among treatment-seeking individuals with concurrent alcohol and cocaine problems. *Psychology of Addictive Behaviors*, 16, 299−307.

Pantalon, M. V., & Swanson, A. J. (2003). Use of the University of Rhode Island Change Assessment to measure motivational readiness to change in psychiatric and dually diagnosed individuals. Psychology of Addictive Behaviors, 17(2), 91–97.

Prochaska, J. Q, & DiClemente, C. C. (1983). Stages and processes of self-change in smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 5, 390-395.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change. Applications to addictive behaviors. The *American Psychologist*, 47(9), 1102-1114.

Project MATCH Research Group (1997a). Matching alcoholism treatments to client heterogeneity: Project MATCH post treatment drinking outcomes. *Journal of Studies on Alcohol*, 58, 7–29.

Project MATCH Research Group (1997b). Project MATCH secondary *a priori* hypotheses. *Addiction*, 92, 1655–1682.

Project MATCH Research Group (1998). Matching alcoholism treatments to client heterogeneity: Project MATCH three-year drinking outcomes. *Alcoholism: Experimental & Clinical Research*, 22, 1300–1311.

Riper, H., van Straten, A., Keuken, M., Smit, F., Schippers, G., Cuijpers, P. (2009). Curbing problem drinking with personalized-feedback interventions: a meta-analysis. *American Journal of Preventative Medicine*, 36(3), 247-55.

Roffman, R., Klepsch, R., Wertz, J.S., Simpson, E.E., & Stephens, R.S. (1993). Predictors of attrition from an outpatient marijuana dependence counseling program. *Addictive Behaviors*, 18, 553-566.

Rubak, S., Sandbaek, A., Lauritzen, T., & Christensen, B. (2005). Motivational interviewing: a systematic review and meta-analysis. *The British Journal of General Practice : The Journal of the Royal College of General Practitioners*, 55(513), 305-12.

Ryan, R., & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.

Ryan, R., Plant, R., & O'Malley, S. (1995) Internal motivations for alcohol treatment: Relations with patient characteristics, treatment involvement, and dropout. *Addictive Behavior*. 20(3).

Sackett, D. L., Rosenberg, W. M., Gray, J. A., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: What it is and what it isn't. *British Medical Journal*, 312, 71 72.

Saunders, B., Wilkinson, C., & Phillips, M. (1995). The impact of a brief motivational intervention with opiate users attending a methadone program. *Addiction*, 90(3), 415-424.

Sayre, S. L., Schmitz, J. M., Stotts, A. L., Averill, P. M., Rhoades, H. M., & Grabowski, J. J. (2002). Determining predictors of attrition in an outpatient substance abuse program. *American Journal of Drug and Alcohol Abuse, 28*, 55-72.

Schlundt, D., & Gemmell, L. (2004). Readiness and stages of change in addiction treatment. American Journal on Addictions, 13, 103−119.

Sheldon, K. M., Ryan, R. M., Rawsthorne, L., & Ilardi, B. (1997). Trait self and true self: Cross-role variation in the Big Five traits and its relations with authenticity and subjective well-being. *Journal of Personality and Social Psychology*, 73, 1380-1393.

Shearer, R. A., Ogan, G. D. (2002). Voluntary participation and treatment resistance in substance abuse treatment programs. *Journal of Offender Rehabilitation* 34(3):31–45.

Simpson, D. D. (1993). Drug treatment evaluation research in the United States. *Psychology of Addictive Behaviors, 7*, 120-128.

Simpson, D. D., Joe, G. W., Broome, K. M., Hiller, M. L., Knight, K., & Rowan-Szal, G. A. (1997). Program diversity and treatment retention rates in the drug abuse treatment outcome study (DATOS). *Psychology of Addictive Behaviors, 11*, 279-293.

Simpson, D., Joe, G., Brown, B. (1997) Treatment retention and follow-up outcomes in the Drug Abuse Treatment Outcome Study (DATOS). *Psychology of Addictive Behaviors*, 11(4).

Simpson, D. D., & Joe, G. W. (2004). A longitudinal evaluation of treatment engagement and recovery stages. *Journal of Substance Abuse Treatment, 27*, 89-97.

Simpson, D. D., Joe, G. W., Rowan-Szal, G. A., & Greener, J. M. (1997). Drug abuse treatment process components that improve retention. *Journal of Substance Abuse Treatment, 14*, 565-572.

Simpson, D. D. & Sells, S. B. (1982). Effectiveness of treatment for drug abuse: An overview of the DARP research program. *Advances in Alcohol and Substance Abuse, 2,* 7-29.

Siqueland, L., Crits-Christoph, P., Gallop, R., Barber, J. P., Griffin, M. L., Thase, M. E., et al. (2002). Retention in psychosocial treatment of cocaine dependence: Predictors and impact on outcome. *The American Journal on Addictions, 11*, 24-40.

Sobell, L.C., & Sobell, M.B., (1992). Timeline followback: A technique for assessing self-reported alcohol consumption. In R.Z. Litten & J. Allen (Eds.), *Measuring alcohol*

consumption: Psychosocial and biological methods, pp. 41-72. New Jersey: Humana Press.

Sobell, M.B., Sobell, L.C., & Gavin, D.R. (1995). Portraying Alcohol Treatment Outcomes: Different Yardsticks of Success. *Behavior Therapy, 26,*643-669.

Stephens, R. S., Roffman, R. a, & Curtin, L. (2000). Comparison of extended versus brief treatments for marijuana use. *Journal of Consulting and Clinical Psychology*, 68(5), 898-908.

Stotts, A., Schmitz, J., Rhoades H., & Grabowski, J. (2001) Motivational Interviewing With Cocaine-Dependent Patients: A Pilot Study. *Journal of Consulting and Clinical Psychology*, 69(5)

Substance Abuse and Mental Health Services Administration. (2007). *Results from the 2006 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-32, DHHS Publication No. SMA 07-4293). Rockville, MD.

Substance Abuse and Mental Health Services Administration (2009). *Results from the 2008 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-36, HHS Publication No.SMA 09-4434). Rockville. MD.

Substance Abuse and Mental Health Services Administration. (2010a). *State Estimates of Substance Use from the 2007-2008 National Surveys on Drug Use and Health* (Office of Applied Studies, NSDUH Series H-37, HHS Publication No. SMA 10-4472). Rockville, MD.

Substance Abuse and Mental Health Services Administration. (2010b). *Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings* (Office of Applied Studies, NSDUH Series H-38A, HHS Publication No. SMA 10-4856Findings). Rockville, MD.

Sullivan, M., Birkmayer, F., Boyarsky, B., Frances, R., Fromson J., Galanter, M., Levin, F., Lewis, C., Nace, E., Suchinsky, R., Tamerin, J., Tolliver, B., & Westermeyer, J. (2008) Uses of Coercion in Addiction Treatment: Clinical Aspects. *The American Journal on Addictions,* 17(1)

Swanson, A.J., Pantalon, M.V., & Cohen, K.R. (1999). Motivational interviewing and treatment adherence among psychiatric and dually diagnosed patients. *Journal of Nervous and Mental Disorders,* 187

Tabachnick, B. G., & Fidel, L. S. (1996). Using multivariate statistics. NY: Harpers Collins.

Tai, B., Sparenborg, S., Liu, D., & Straus, M. (2011) The National Drug Abuse Treatment Clinical Trials Network: Forging a Partnership between Research Knowledge and Community Practice. *Substance Abuse and Rehabilitation*, 2:21-28.

Taxman, F., Young, D., Wiersema, B., Rhodes, A., & Mitchell, S. (2007) The National Criminal Justice Treatment Practices survey: Multilevel survey methods and procedures. Journal of Substance Abuse Treatment. 32(3).

Taxman, F.S., Perdoni, M., & Harrison, L. (2007). Treatment for adult offenders: A Review of the state of the state. *Journal of Substance Abuse Treatment*, 32(3): 239-254.

Ward, J., Mattick, R,. & Hall, W. (1992) *Key issues in methadone maintenance treatment*. Edited by Jeff Ward, Richard P. Mattick and Wayne Hall Kensington: New South Wales University Press.

Wickizer, T., Maynard, C., Atherly, A., & Frederick, M. (1994). Completion rates of clients discharged from drug and alcohol treatment programs in Washington State. *American Journal of Public Health, 84*, 215-221.

Wild, C., Enzle, M., Nix, G. & Deci., E. (1997) Perceiving others as intrinsically or extrinsically motivated: Effects on expectancy formation and task engagement. *The Society for Personality and Social Psychology,* 23.

Wild, C. (2006) Social control and coercion in addiction treatment: towards evidence-based policy and practice. *Addictions,* 101.

Williams, G., Saizow, R., & Ryan, R. (1999) The importance of self-determination theory for medical education. *Academic Medicine,* 74(9).

Wilson, D. B., Mitchel, O., & MacKenzie, D. L. (2006). A systematic review of drug court Drug Court Protocol effects on recidivism. *Journal of Experimental Criminology*, 2, 459–487.

Winhusen, T., Kropp, F., Babcock, D., Hague, D., Erickson, S. J., Renz, C., et al. (2008). Motivational enhancement therapy to improve treatment utilization and outcome in pregnant substance users. *Journal of Substance Abuse Treatment*, 35(2).

Vita

Thomas Burton Moore was born on July 14, 1980 in Arlington, Virginia, and is an American citizen. He graduated from Yorktown High School in Arlington, Virginia in 1998. He received a Bachelor of Arts in Psychology from The Evergreen State College in Olympia, Washington in 2003. He earned a Master of Science in Counseling Psychology from Northeastern University in Boston, Massachusetts in 2007. He began his graduate training in Clinical Psychology at Virginal Commonwealth University in Richmond, Virginia in 2009.