ABSTRACT

Title of Document:	PSYCHOLINGUISTIC INDICATORS OF MOTIVATION FOR SUBSTANCE ABUSE BEHAVIOR CHANGE AMONG INDIVIDUALS WITH SERIOUS MENTAL ILLNESS
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The co-occurrence of mental illness and substance use disorders (termed "dual diagnosis") represents a significant public health issue and is associated with significant impairment and negative health consequences, particularly among individuals with serious mental illness. Given the negative consequences associated with dual diagnosis, researchers have sought to identify treatment components that would improve outcomes among individuals with serious mental illness. Therefore, significant efforts have been made to increase motivation for change within severe mental illness populations using Motivational Interviewing, a client-centered therapy. The primary mechanism underlying the effect of Motivational Interviewing on behavior change is hypothesized to be the selective reinforcement of change talk by the therapist with the aim of reducing ambivalence. Change language has been found to predict substance use treatment outcomes; however, it is not clear if change language has similar predictive utility in

individuals with serious mental illness. Therefore, the current study sought to validate change language as an indicator of motivation among 45 individuals with serious mental illness and co-occurring substance use disorders. Overall, we found that change language could be reliably coded in this sample. Evidence supported the predictive utility of Ability language (i.e., statements regarding self-efficacy) in prospectively predicting long term substance use treatment outcomes (i.e., six months after the Motivational Interview session) above and beyond negative symptoms, depressive symptoms, and substance use severity. These findings suggest that the investigation of client language during MI represents a promising avenue for understanding motivational processes underlying substance use treatment outcomes among individuals with serious mental illness. Specifically, elicitation of client statements regarding self-efficacy to reduce or stop substance use is particularly important in predicting favorable outcomes in this population. Future studies should evaluate the utility of incorporating treatment components aimed at cultivating self-efficacy for substance use behavior change among individuals with serious mental illness.

PSYCHOLINGUISTIC INDICATORS OF MOTIVATION FOR SUBSTANCE USE
BEHAVIOR CHANGE AMONG INDIVIDUALS WITH SERIOUS MENTAL
ILLNESS

By

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DEDICATION

To my mother, sister, father, and Wanda, who have witnessed this long journey. In 1998, I would have never envisioned being where I am now; and without you I could not have made it from darkness into the light. Also to my mentors, cheerleaders, and friends, Sherry and Chi-Ah who talked me through the insanity of this thing called graduate school and gave me the reminders, guidance, and friendship that I needed to get through. Finally, I need to give thanks to Kobe and my graduate school compadres, Amy, Bryann, and Christina, who were part of my daily life support system.

Table of Contents

List of Tables

Chapter 1: Introduction

Dual Diagnosis

Approximately five million adults in the United States have a serious mental illness and a co-occurring substance use disorder (SAMHSA, 2006). This comorbidity, otherwise known as dual diagnosis, occurs at greater than chance levels both in the United States and around the world (Grant & Harford, 1994; Kessler, 1997; Kessler, Aguilar-Gaxiola, Andrade, Bijl, Borg, Caraveo-Anduaga et al., 2001; Regier, Farmer, Rae, Locke, Keith, Judd et al., 1990). For example, the United States National Comorbidity Survey (NCS) found that in a national sample of 10,000 randomly sampled individuals in the general population, approximately 51% of individuals with any lifetime substance use disorder also met DSM-III-R criteria for at least one other psychiatric disorder.

Comorbid psychiatric disorders with substance use disorders is associated with a host of negative health and societal outcomes. Often, co-occurrence is associated with increased severity of substance use, the co-occurring disorder, or both. For example, dual diagnosis has been found to be associated with increased cocaine dependence severity (Ford, Gelernter, DeVoe, Zhang, Weiss, Brady, et al., 2009) and increased severity of psychiatric disorders in general (Cacciola, Alterman, McKay, & Rutherford, 2001; Compton, Thomas, Conway, & Colliver, 2005b; Kidorf, Disney, King, Neufeld, Beilenson, & Brooner, 2004, Mills, Teesson, Ross, & Darke, 2007; Skinstad & Swain, 2001; Watkins, Hunter, Wenzel, Tu, Paddock, Griffin et al., 2004). Thus, individuals

with serious mental illness[1] such as major depressive disorder, bipolar disorder, and schizophrenia face significant social and occupational impairment.

Individuals with schizophrenia face a host of unique problems associated with drug use which adversely impact the course of the illness (Kessler et al., 1994) as well as response to treatment. Specifically, among individuals with schizophrenia, substance use disorders have been found to be associated with increased medication non-compliance (Fenton, Blyler, & Heinssen, 1997; Olfson, Mechanic, Hansell, Boyer, Walkup, & Weiden, 2000), symptom exacerbation (Corcoran, Kimhy, Stanford, Khan, Walsh, Thompson, et al., 2008; Drake, Osher, & Wallach, 1989; Pristach & Smith, 1990;), hospitalizations (Leon, Lyons, Christopher, & Miller 1998; Seibyl, Satel, Anthony, Southwick, Krystal, & Charney, 1993), departure from supported independent living programs (Lee, Wong, & Rothbard, 2009), risk of homelessness, unemployment (Kooyman, Dean, Harvey, & Walsh, 2007), Human-Immunodeficiency Virus risk (Himelhoch, McCarthy, Ganoczy, Medoff, Dixon, & Blow, 2007), violent crimes (Fazel, Langstrom, Hjern, Grann, & Lichtenstein, 2009), and suicide risk (Limosin, Loze, Philippe, Casadebaig, & Rouillon, 2007). Furthermore, families of dually diagnosed patients, who are often caregivers, face significant burden, distress, and familial conflict (Cleary, Hunt, Matheson, & Walter, 2008).

In clinical settings, co-occurring major depressive disorder and substance use disorder represents the most common comorbidity. Approximately one-third of

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[1] The National Institute of Mental Health defines serious mental illness as those psychiatric disorders that meet the following criteria: (1) are non-organic psychosis or personality disorder, (2) have long histories of previous hospitalization or outpatient treatment, and (3) are associated with dangerous or disturbing social behavior and significant impairment in social and occupational functioning and mild impairment in basic needs (Ruggeri, Leese, Thornicroft, Bisoffi, & Tansella, 2000). Others define serious mental illness are less conservative, not requiring the psychosis component, yet require long treatment history and severe social and occupational impairment.

individuals with major depressive disorder have a substance use disorder (Davis, Uezato, Newell, & Frazier, 2008). This comorbidity is associated with increased risk for suicide and increased social impairment. One study found that co-occurring major depressive disorder and alcohol dependence was associated with a 20-fold increase in risk for suicide during the year prior to assessment compared to individuals with neither disorder (Currie, Patten, Williams, Wang, Beck, El-Guebaly, et al., 2005). In another study (Aharonovich, Liu, Nunes, & Hasin, 2002), co-occurring major depressive disorder and substance use disorder was associated with the number and severity of suicide attempts. Furthermore, Currie et al. (2005) found that major depressive disorder and co-occurring substance use disorders were associated with a 3.1-6.4 increase in use of mental health services. Those with these co-occurring disorders also benefit less from 12-Step groups than those without co-occurring disorders (Kelly, McKellar, & Moos, 2003).

In patients with bipolar disorder and a co-occurring alcohol use disorder, alcohol use is associated with an increased risk of a depressive episode (Jaffee, Griffin, Gallop, Meade, Graff, Bender, et al., 2009). Moreover, bipolar disorder with co-occurring SUDs has been linked to increased social dysfunction and increased manic symptoms compared to those with bipolar and no substance use disorder (Mazza, Mandelli, Di Nicola, Harnic, Catalano, Tedeschi, et al., 2009).

Dual Diagnosis and Substance Use Treatment

Given the negative consequences associated with dual diagnosis, researchers have sought to identify treatment components that would improve outcomes among individuals with serious mental illness. Research advocating integrated treatment approaches has identified various areas that should be targeted in order to maximize treatment

effectiveness. While a full discussion of the various identified treatment targets and strategies is beyond the scope of the current study (although see Appendix A for a more detailed discussion of integrated dual diagnosis treatment) one consistent treatment barrier has been identified. Specifically, dually diagnosed clients seeking treatment for psychiatric problems are often not ready to seek treatment for their substance use, or do not recognize their substance use as needing to be addressed. This problem is enhanced in those with psychosis, who are often difficult to engage in treatment and who are at increased risk for dropout (Barrowclough, Haddock, Lowens, Allott, Earnshaw, Fitzsimmons, et al., 2007).

A key factor underlying poor treatment outcomes among individuals with serious mental illness has been hypothesized to be low motivation (Barrowclough, Haddock, Fitzsimmons, & Johnson, 2006). Specifically, negative symptoms are the core features which reflect motivational deficits in schizophrenia. They include avolition, anhedonia, amotivation, alogia, apathy, and flat affect (McGlashan & Fenton, 1992). Such symptomatology can potentially restrict the behavioral repertoire of patients seeking treatment and thus undermine motivation during the complex series of actions required to seek treatment and maintain abstinence from substances. Therefore, significant efforts have been made to increase motivation for change within serious mental illness populations. One approach has been through the use of motivational enhancement techniques. To this end, Motivational Interviewing has emerged as a promising method of improving treatment outcomes among individuals with serious mental illness.

The current review will focus on the foundations of the Motivational Interviewing approach (Miller, 1983; Miller & Rollnick, 1991) followed by a brief discussion of

Motivational Interviewing treatment components. Then, I will summarize the findings concerning the effectiveness of Motivational Interviewing in dually diagnosed populations. Finally, I will discuss the mechanisms by which this treatment works, namely, the role of motivational change language in accounting for substance use treatment outcomes.

Motivational Interviewing

Motivational Interviewing is a client-centered, directive therapeutic style (directive in that the therapist directs the course of therapy by intervening to ask questions and offer interpretations) aimed at enhancing readiness for behavior change (Miller, 1983; Miller & Rollnick, 1991). Motivational Enhancement Therapy is a variant of Motivational Interviewing designed as a treatment for use in Project Match (a large-scale alcohol treatment study, see Project Match Research Group, 1993). In Motivational Enhancement Therapy, a personalized feedback component is integrated into the sessions. Although Motivational Interviewing and Motivational Enhancement Therapy were initially used for addictive behaviors, they have spread rapidly as an effective non-prescriptive approach to enhancing motivation for behavior change with respect to a variety of health behaviors (Hettema, Steele, & Miller, 2005).

Motivational Interviewing was initially developed as a method to assist clients in resolving their ambivalence regarding behavior change and eventually reach a point where they may commit to change (Miller, 1983). Although Motivational Interviewing was not founded on theory (Miller & Rollnick, 2004), it borrows from Rogerian client-centered therapy (Rogers, 1959). The principles of Motivational Interviewing (explained in subsequent sections), were outlined prior to any empirical support or theory. A

substantial theoretical contribution has been within the framework of Prochaska and DiClemente's (1982) Transtheoretical Model of Change, which describes the progression from ambivalence regarding behavior change to a commitment to change, and then finally into taking active steps to change.

Rogerian patient-focused treatment. Carl Rogers, a humanistic psychologist, embraced the importance of an empathetic and warm therapeutic style (Rogers, 1959). Empathy is the ability of the therapist to put himself/herself in the situation of the client and to understand the experience of the patient without imposing judgment. Warmth is defined as unconditional positive regard for the client, which is conveyed through positive affect and body language. Rogers also emphasized the importance of the therapist to be oneself and feel comfortable in the therapeutic relationship (*genuineness*), and to react to the client in the moment (*immediacy*).

Client-centered therapy seeks to "meet the client where they are at." To this end, the therapist seeks to understand what changes, if any, the patient is ready to make, rather than the therapist imposing his/her views of what types of changes the patient should be making. In all, the client-centered approach relies on the client's perception of the problem and the therapist's role is to collaborate with the client to address problems. The acceptance and egalitarianism inherent in the client-centered approach to therapy was appealing to Miller; hence, the Rogerian approach to therapy is ever-present in Motivational Interviewing.

MI assumes all of the aforementioned principles of client-centered therapy; however, the point of departure between the two approaches is in the directive nature of MI. This is in contrast to client-centered therapy, in which the therapist assumes a non-

directive role; it is assumed that the client will eventually reach self-actualization and move toward change. In MI, the therapist actively moves the client toward positive change, and points out inconsistencies in his/her behavior in order to build motivation for change. This is achieved through various therapist skills outlined in subsequent sections. Nevertheless, advice is not given unless the client agrees to hear it.

Transtheoretical model of change. Another substantial influence on Motivational Interviewing was Prochaska and DiClemente's (1982) Transtheoretical Model of Change, which describes the process through which individuals who are recovering from addiction move through various stages of change as they resolve their difficulties with substance use. The Transtheoretical Model of Change, developed in parallel with motivational approaches to changing health behaviors, was a large influence on Miller's development of the Motivational Interviewing approach. Specifically, motivation is seen as the springboard which propels clients through the six stages of change, which are Precontemplation, Contemplation, Preparation, Action, and Maintenance.

In the *Precontemplation* stage, the substance user has no interest in changing substance use behavior. If a sense of concern arises, the individual is thought to move to the *Contemplation* stage, wherein the benefits and drawbacks to changing behavior are considered. In the *Preparation* stage (Pantalon, Nich, Franckforter, & Carroll, 2002), the individual is thought to commit and begin planning to change. In the *Action* stage, the individual takes specific steps to execute the plan to change. In the final stage, *Maintenance*, the reduction of, or abstinence from, substance use becomes habitual. Although theorists hypothesize individuals may move back and forth through the stages,

they propose individuals do not skip stages when moving forward (DiClemente, Schlundt, & Gemmell, 2004).

During Motivational Interviewing sessions, and consistent with the Transtheoretical Model of Change, clients are seen as agents of change and therapists are to "meet the client where they are," rather than attempting to convince them that they need to change. Motivational Interviewing techniques are designed to allow the client to explore their ambivalence regarding change at each stage. Although some individuals make it to the maintenance stage and remain abstinent from substances, most progress through these stages repeatedly throughout their lifetime.

Principles of Motivational Interviewing

In recent years, Motivational Interviewing has been used as a standalone intervention or as a complement to other substance use treatment approaches. The number of Motivational Interviewing sessions provided depends on the goals of the intervention, the treatment setting, and whether it is being integrated with other treatment components. Therefore, the number of sessions may be as few as one. Also, session lengths can vary from 20 minutes in Brief Motivational Interviewing to 90 minutes in some contexts.

The "spirit of MI" is conveyed through principles that are adhered to by the therapist using what are called Motivational Interviewing microskills. Also, there are specified strategies that therapists must use in order to increase intrinsic motivation to change. The principles, microskills, and Motivational Interviewing strategies are discussed below.

The four principles of Motivational Interviewing are (1) express empathy, (2) develop discrepancy, (3) roll with resistance, and (4) support self-efficacy (Miller, Zweben, DiClemente, & Rychtarik, 1992). These principles work in concert with the factors that encompass the "spirit of MI," which are collaboration, evocation or eliciting (rather than imparting wisdom), and autonomy (in contrast to making, allowing, or permitting the client, etc.).

Empathy. With respect to empathy, it is believed that when clients feel that the therapist understands them, they are more likely to share their deepest thoughts and feelings and less likely to deny problems. In this way, the therapist creates a space that is conducive to change. Therefore, empathy is thought to facilitate behavior change. Empathy is achieved through the use of the therapeutic skill of reflective listening, wherein the therapist shows the client that his/her feelings and beliefs are valid without criticism, judgment, or blame (Miller & Rollnick, 2002). This is in sharp contrast to many confrontational substance use treatment approaches wherein clients are constantly sent messages that they are somehow defective and have to change. This confrontational approach has actually been found to hinder change processes in some contexts (Finney, Wilbourne, & Moos, 2007). Instead, the therapist seeks to understand the client within their context (i.e., his/her environment and experiences), and convey to the client that their behavior makes sense within his/her context.

Develop discrepancy. This principle represents the directive portion of Motivational Interviewing. Whereas traditional client-centered therapy is non-directive, Motivational Interviewing seeks to direct clients toward resolving ambivalence. One way is through developing discrepancy between what the client's current behavior is and what

their goals are. It is believed that when individuals see their present circumstances as being inconsistent with their goals, positive behavior change is more likely to occur. Therefore, in Motivational Interviewing discrepancies are magnified until the client sees the target behavior as something that they should strive to change.

Roll with resistance. The concept of rolling with resistance is consistent with non-confrontational approaches. Indeed, according to this framework, it would be counterproductive for the therapist to encourage change while the client disputes it (Miller, 2002). Instead, the therapist involves the client in the resolution of ambivalence regarding change. This is in line with encouraging autonomy. Moreover, resistance is not a signal that there is something wrong with the client; rather, it signifies that the therapist should change approaches.

Self-efficacy. By supporting and encouraging the client's belief in his or her ability to reduce or abstain from substance use and encouraging autonomy, the client's confidence in coping with obstacles to his/her substance use goals increases. In this way, change is intrinsically motivated, rather than externally imposed. Again, this is in direct contrast to approaches such as 12-Step oriented recovery, wherein the substance user is convinced that he/she is powerless and has no control over their use; rather, only through belief in a higher power can his/her substance use issues be resolved.

Microskills and Strategies

There are four Motivational Interviewing microskills that therapists use to ensure that the principles of Motivational Interviewing are adhered to. These are the use of open-ended questioning, reflective listening, using affirmations, and summarizing the patient's statements in a balanced fashion. Furthermore, Motivational Interviewing strategies are

techniques used by the therapist to build intrinsic motivation to change. These include (1)

increasing awareness of the client's problems using open-ended questions, (2) using

decisional balance matrices (i.e., discussing the pros and cons of using and

reducing/stopping substance use), (3) providing supportive feedback regarding the

client's thoughts and actions, and (4) pointing out discrepancies between the client's

goals and current behavior in a non-patronizing manner.

In discussing the principles and therapist techniques used in MI, it becomes

apparent that motivation is indeed a salient factor in progression through the stages of

change and is a vital mechanism that determines whether one succeeds in performing a

given behavior (Bandura, 1986), including changing substance use patterns (Miller,

1985). During each stage of the Transtheoretical Model of Change, motivational factors

are involved in projecting the client from one stage to the next. Specifically, one's

concerns regarding behavior change, perceived needs to change, intentions, and

commitment to change may all be subsumed under the umbrella of the concept of

motivation (DiClemente, Schlundt, & Gemmell, 2004). With respect to substance use

treatment engagement, motivation is involved in participating in treatment activities and

being compliant in treatment. Motivation also drives the ability to maintain goals

regarding substance use. In support of this notion, numerous studies have found that

motivation for treatment predicts treatment engagement and retention. Furthermore,

increased motivation has been associated with reduced substance use (Carbonari &

DiClemente, 2000; DeLeon, Melnick, & Kressel, 1997; DeLeon, Melnick, Thomas,

Kressel, & Wexler, 2000; Joe, Simpson, & Broome, 1998; Project MATCH Research

Group, 1997; Pantalon et al., 2002; Simpson & Joe, 1993; Stotts, Schmitz, Rhoades, & Grabowski, 2001).

The Relevance of Motivation in Serious Mental Illness

According to the Transtheoretical Model of Change framework, moving through the readiness stages requires significant motivation in that it necessitates engagement in a variety of behaviors in order to begin and maintain change. In this way, intentional behavior change associated with reducing substance use requires significant insight, decision-making processes, planning, evaluation of pros and cons, sustained focus on goals, and evaluation of one's self-efficacy. Individuals with serious mental illness frequently have cognitive impairments which interfere with these processes (Blume, Davis, & Schmaling, 1999). Moreover, some psychiatric disorders, particularly those on the schizophrenia spectrum, have core features which reflect deficits in motivation in the form of negative symptoms (e.g., avolition, anhedonia, amotivation) (Brown & Pluck, 2000; Weinberger, 1987). Furthermore, psychotic disorders are also associated with positive symptoms (e.g., hallucinations) and disorganization which could impact the ability to evaluate various options to achieve behavior change. Thus, motivational issues are a particularly salient complication in the treatment of dually diagnosed individuals. Such difficulties are evident in their lack of treatment engagement when compared to non-dually diagnosed substance users (Bender, Springer, & Kim, 2006). Those with schizophrenia, a particularly impaired group among those with dual diagnosis, exhibit even greater difficulties with treatment engagement due to motivation (Ziedonis & Trudeau, 1997).

The significance of motivation in treating substance use among individuals with serious mental illness has been addressed by numerous researchers (Bellack, 2007; Carey, Carey, Maisto, & Purnine, 2002; Martino, 2007). In response to the call to address this issue, motivational interventions have been adapted for individuals with serious mental illness for use in integrated treatments (e.g., Bennett, Bellack, & Gearon, 2008; Bennett, Bellack, & Gearon, 2001; Carey, Leontieva, Dimmock, Batki, & Maisto, 2007). Drake, Mueser, Brunette, and McHugo (2004) found that among the seven interventions commonly used for dual diagnosis, those that incorporated treatment components which target stages of motivation appear to be most effective. Furthermore, motivation has been found to predict substance use treatment engagement and outcomes in dual diagnosis samples (Miller & Tonigan, 1996; Ries & Ellingson, 1990; Zhang, et al., 2004). Nevertheless, in some studies, motivation was not found to predict engagement or treatment retention (Pantalon & Swanson, 2003; Ziedonis & Trudeau, 1997). Although these conflicting findings could be attributable to methodological issues, it could also indicate that internal motivation may not be as strongly tied to substance use outcomes within this population as other factors such as external motivators. Moreover, given negative symptoms and their impact on motivation in individuals with serious mental illness, it is not clear precisely how symptomatology may influence research findings. Also, it would be fruitful to explore behavioral indicators of lack of motivation (such as lack of expressivity during therapy sessions) in individuals with serious mental illness. Therefore, further investigation into the precise nature of motivational processes and their relationship with serious mental illness symptomatology is necessary. A review of

Motivational Interviewing, an intervention which has been used to target lack of motivation, is provided in the next section.

Motivational Interviewing for Substance Use in Dually Diagnosed Individuals

MI has evidenced effectiveness in improving treatment engagement and reducing substance use in non-serious mental illness populations (Hettema et al., 2005; Vasilaki, Hosier, & Cox, 2006). Although there are fewer studies examining the effectiveness of Motivational Interviewing in dually-diagnosed populations, there is promising evidence that Motivational Interviewing is effective as a standalone treatment, as well as an adjunct to other approaches, in improving treatment engagement and outcome. Most integrative treatments for dually diagnosed individuals incorporate a motivational enhancement element in combination with behavioral approaches (e.g., Bellack, et al., 2006; Carey, 1996; Martino, Carroll, Kostas, Perkins, & Rounsaville, 2002). In these studies, it is not possible to determine the relative contributions of each treatment component (e.g., Barrowclough, Haddock, Terrier, Lewis, Moring, O'Brien, et al., 2001); however, a few controlled studies have investigated the utility of Motivational Interviewing in improving treatment engagement and outcomes. These studies are discussed below.

Swanson, Pantalon, and Cohen (1999) conducted a randomized study examining the effect of Motivational Interviewing on outpatient substance use treatment adherence. Patients were assigned to a treatment as usual or to treatment as usual with MI. Patients were given a brief motivational assessment early in hospitalization and then underwent an hour-long Motivational Interviewing session shortly before being discharged. Results indicated that a significantly greater proportion of individuals in the treatment as usual

plus Motivational Interviewing group attended the first outpatient appointment. This effect was significantly greater among individuals who were dually diagnosed.

A pilot study (Martino, Carroll, O'Malley, & Rounsaville, 2000) compared the efficacy of Motivational Interviewing to standard pretreatment interviewing in preparing patients for partial hospitalization. The sample consisted of drug or alcohol dependent individuals with mood or psychotic disorders. Patients were randomly assigned to a 45-60 minute Motivational Interviewing session or to a standard pre-admission interview. Those in the Motivational Interviewing group exhibited less tardiness to groups, fewer early departures, and attended more partial hospital program days than those in the standard interviewing group. Furthermore, individuals with psychosis had better outcomes overall on these measures than those with mood disorders. Although there was not enough power in the study to examine diagnostic differences by treatment group, these findings hint that enhancing motivation in a psychotic population may produce better outcomes. The above studies suggest that treatment attendance can be improved with MI, but do not address substance use reduction.

Graeber, Moyers, Griffith, Guajardo, and Tonigan (2003), assessed patients with schizophrenia and alcohol use disorders and randomly assigned individuals to receive three one-hour sessions of Motivational Interviewing or an Educational Treatment intervention. Follow-ups at 4, 8, and 24 weeks indicated that patients in the Motivational Interviewing group had significantly fewer drinking days and increased abstinence rates at the 8- and 24-week follow-up compared to those in the ET group. Notably, despite a small sample size, (n = 30) the between-group effect size at week 24 was 1.29, indicating a large effect (Cohen, 1988).

A study investigating the effectiveness of Motivational Interviewing in reducing alcohol and drug use among psychiatric hospital inpatients (Baker, Lewin, Reichler, Clancy, Carr, Garrett, et al., 2002) randomly assigned patients to either a single session of Motivational Interviewing or a self-help condition. Follow-up assessments were conducted at 3, 6, and 12 months. Approximately 38% of the sample met criteria for schizophrenia, 28% for mood disorders, 13% for other disorders, and 21% did not meet criteria for any disorder. Although the effect of Motivational Interviewing on reductions in alcohol, cannabis, or amphetamines use were not significant, there was a modest effect of Motivational Interviewing in reducing polysubstance use at the 3-month follow-up. No diagnostic relationships to outcome were explored. Consistent with these null findings, Hulse and Tait (2003) compared the 5-year outcomes of individuals in an inpatient psychiatric hospital who were assigned to receive either one Motivational Interviewing session or given an information package that was designed to encourage the reduction of alcohol use. Results revealed no differences between the two conditions in terms of the occurrence of alcohol-related incidents.

Martino, Carroll, Nich, and Rounsaville (2006) conducted a pilot randomized controlled trial comparing Motivational Interviewing to standard psychiatric interviews among patients with psychotic and drug use disorders. Results at 4-, 8-, and 12-week follow-ups indicated no benefit of either condition; however, among cocaine users, those who received Motivational Interviewing demonstrated significantly greater reduction in use than those who received the standard psychiatric interview. Among marijuana users, the reverse was found. Those who received the standard psychiatric interview reported significantly greater reductions in use than those in the Motivational Interviewing group.

These results did not differ after considering baseline motivation for change scores. However, the group as a whole had high levels of motivation to change based on their stage of change profile. This may have affected the effectiveness of Motivational Interviewing which has been found to work better in individuals with low motivation (Miller & Rollnick, 2002).

The aforementioned studies provide equivocal evidence for the effectiveness of Motivational Interviewing among populations of diagnostically heterogeneous samples. Moreover, few have examined the benefit of Motivational Interviewing for individuals with serious mental illness or, more specifically, the relative benefit for individuals with schizophrenia or schizoaffective disorder. Also, the clinical characteristics of the sample are often not described and if they are, the sample often contains individuals with various disorders, thus not allowing for adequate power to explore the impact of specific symptomatology on Motivational Interviewing outcomes and motivational processes. It is possible that by examining potential moderators, such as symptomatology or indicators of motivation, the results could have been better accounted for.

Another potential explanation for these equivocal findings regarding the effectiveness of Motivational Interviewing may be found by investigating *how* the process of change works among individuals with serious mental illness. Given the cognitively complex process of moving from initiating treatment, engaging in behavioral activities necessary to progress through treatment, and to maintaining change, the process of intentional change in this cognitively impaired population remains unclear. Also, given the features of serious mental illness which affect motivation (e.g., symptoms of avolition, anergia), it could be that external reinforcers are what drive the behavior

change process more than in those without co-occurring disorders (Bellack & DiClemente, 1999). To this end, it would be fruitful to examine the relationship of symptomatology to change processes and whether such change processes work in the same fashion among individuals with serious mental illness as they do among populations without serious mental illness.

Significant research has been conducted on motivational processes involved in reducing substance use using various indicators of readiness to change among individuals without serious mental illness. Among dually-diagnosed individuals, numerous measures of motivation change have been validated (see DiClemente, Nidecker, & Bellack, 2008) and support has been lent to the idea that dually diagnosed individuals do indeed utilize intentional behavior change processes (DiClemente, Nidecker, & Bellack, 2008). The examination of motivational processes has largely been achieved through the use of self-report measures. Specifically, measures that tap readiness to change (e.g., University of Rhode Island change Assessment – Maryland, DiClemente & Hughes, 1990; Cartoon Stages of Change Measure, Clark, Wells, Peterson, Jackson, & Stanton, 1996), the confidence the client has in their ability to resist drugs and alcohol (e.g., Drug and Alcohol Abstinence Self-Efficacy Scales, DiClemente, Carbonari, Montgomery, & Hughes, 1994), the client's perceived costs and benefits of using drugs and drinking alcohol (e.g., Decisional Balance Scales, Velicer, DiClemente, Prochaska & Brandenburg, 1985), and the behavioral processes that clients use in order to resist the use of drugs and alcohol (e.g., Processes of Change Scale, DiClemente, Carbonari, Addy & Velasquez, 1996), have all been associated with changes in smoking, drinking, and drug use (Carbonari & DiClemente, 2000; Naar-King, Wright, Parsons, Frey, Templin, &

Ondersma, 2006; Schumann, Meyer, Rumpf, Hannover, Hapke, & John, 2005) and have been validated in a sample with serious mental illness and substance use disorders (Nidecker, et al., 2006).

An alternative approach to examining self-report measures of motivation is to look at behavioral indicators of motivation and to examine how motivation is manifested linguistically during the therapeutic process. Specifically, motivational language offers insights into change processes during substance use treatment and allows for hypotheses regarding motivation. Motivational language has been the focus of recent studies examining substance use behavior change processes, but has not been examined in individuals with serious mental illness. An overview of the significance of self-motivational statements, or change talk, in therapeutic processes is provided below, as well as a review of studies investigating the role of change language in predicting the modification of substance use behavior.

Change Language as an Indicator of Motivation to Change

A prominent idea that has been discussed since Freud's time is that language during psychotherapy is associated with behavior during therapy (Russell, 1987). Out of the numerous psychotherapeutic constructs and processes that have been codified across the many therapeutic orientations (e.g., the emergence of specific themes, repetition of particular utterances thought to be indicative of subconscious processes, changes in verbal intonation), measurement of the changing of target behaviors emerged as an indicator that is key in understanding the relationship between therapeutic processes and outcome (Greenberg & Pinsof, 1986). Indeed, intention to change is the basis for the Transtheoretical Model of change (Prochaska & DiClemente, 1982), the dominating stage

model of substance use behaviors. Therefore, the measurement of indicators of intention to change behavior is also useful in examining therapeutic processes.

Amrhein (2004) proposed a Motivational Interviewing process model based on natural language indicators of clients' intentions to change. As such, the codification of natural language is based on speech act theory (Schiffrin, 1994; Searle, 1969), which underscores the intentional function of certain utterances during conversation. This has direct applications to the long-held approach by therapists of various orientations to promote the client's commitment to change troubling behaviors during "talk therapy". Also, from the perspective of cognitive dissonance theory (Festinger, 1957), committing oneself to a certain action in public creates an obligation to perform the act, else face a sense of cognitive dissonance. To tap into this process of "talking oneself into change," (Miller & Rollnick, 2004), Amrhein indicated (1992) that instead of relying on checklists and self-report measures of commitment to change, a seemingly more valid method of assessment is through the psycholinguistic analysis of client language during Motivational Interviewing sessions. To this end, the client's stated desire and self-efficacy regarding the reduction of substance use serve as indicators of commitment to change, or change talk. Some have used the phrase "ready, willing, and able" to characterize each of the components underlying commitment to change: desire, ability, need, reasons and readiness (Amrhein, 1992; Amrhein, Miller, Yahne, Plamer, & Fulcher, 2003; Miller & Rollnick, 1991).

The primary mechanism underlying the effect of Motivational Interviewing on behavior change is hypothesized to be the selective reinforcement of change talk by the therapist with the aim of reducing ambivalence (Miller& Rollnick, 2002). Furthermore, in

order to increase the likelihood of change, rather than resistance, non-confrontational

language by the therapist is thought to create a supportive therapeutic environment. Both

of these elements are captured by coding client and therapist behaviors (language) using

the Motivational Interviewing Skills Code (MISC; Miller, Moyers, Ernst, & Amrhein,

2003) to analyze the frequency of change talk. For the therapist, adherence to the spirit of

Motivational Interviewing is captured through coding on various dimensions based on the

principles and strategies of Motivational Interviewing (e.g., using non-confrontational

responses, not giving unsolicited advice). For the patient, language that indicates

commitment to change is coded as well as statements that indicate an inclination not to

change. Additionally, language that indicates that the patient is taking steps to change is

coded. For all of the aforementioned codes, the valence (i.e., for or against behavior

change) and strength of the language is also coded.

      Another psycholinguistic technique is to perform a sequential analysis of

behavior, using the Sequential Code for Process Changes behavioral coding system,

which is derived from the MISC (Miller et al., 2003). In sequential analysis, the

occurrence of change talk is coded as a function of therapist behavior in order to

elucidate the contingency between therapist and client behavior. Numerous studies have

found that MI-consistent therapist behaviors are more likely to be followed by client

change language (Gaume, Gmel, Faozi, & Daeppen, 2008; Gaume, Bertholet, Faouzi,

Gmel, & Daeppen, 2010; Glynn & Moyers, 2010; Moyers, Martin, Houck, Christopher,

& Tonigan, 2009; Vader, Walters, Prabhu, Houck, & Field, 2010), thereby highlighting

the impact of therapist behaviors on client language.

A logical question that arises when considering the potential impact of change language on behavior change is whether it is the mere act of producing the language that produces change or whether change language is an indicator of some deeper process that affects both change language and behavior change. Also, given the significant impact of therapist empathy in general on client outcomes (Miller, Taylor, & West, 1980), and more specifically, on long-term drinking outcomes (Miller & Baca, 1983), the specificity of the effect of Motivational Interviewing on substance use outcomes is easily called into question. One study (Aharonovich, Amrhein, Bisaga, Nunes, & Hasin, 2008) found that increased commitment language during cognitive behavioral treatment for substance use predicted reduced use among cocaine users. This suggests an effect of therapist behavior on client behavior that is not specific to MI. However, Miller proposes that Motivational Interviewing works through the combination of therapist empathy and factors that are specific to MI, such as the resolution of ambivalence through the selective reinforcement of change language. Consistent with this proposal, in a study by Sellman et al. (2001), the resolution of ambivalence regarding drinking was found to be attributable to the differential reinforcement of client change language.

Further evidence of the effect of MI-specific strategies on therapy processes comes from separate studies which support the hypothesis that Motivational Interviewing influences client behavior during therapy (Moyers & Martin, 2006; Moyers, Miller, & Hendrickson, 2005), increases change language (Gaume, Gmel, Faozi, & Daeppen, 2008; Glynn & Moyers, 2010), decreases resistance (Miller, Benefield & Tonigan, 1993), and that verbal commitment to change predicts drug use outcomes (Amrhein, Miller, Yahne, Palmer, & Flucher, 2003). Nevertheless, the notion that the elicitation of change

language during Motivational Interviewing *causes* behavioral change cannot be concluded; however, what is known is that Motivational Interviewing elicits change language, which in turn precedes and predicts behavior change. Three separate studies examining the effect of Motivational Interviewing skills on change language used sequential analysis to provide support this proposed causal chain for Motivational Interviewing (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Vader, Walters, Prabhu, Houck, & Field, 2010). Also, work by Amrhein (2003), Baer, Beadnell, Garrett, Hartzler, Wells, & Peterson (2008), and Vader et al. (2010) have honed in on specific patterns of change language during Motivational Interviewing sessions that are predictive of outcomes. These and other studies examining therapist behaviors, client change language, and substance use outcomes are reviewed below.

Miller et al. (1993) randomly assigned problem drinkers to either Motivational Interviewing or to a confrontational counseling condition. Those in the Motivational Interviewing group exhibited significantly more change language and significantly less resistance compared to those assigned to the confrontational group. More direct evidence for the impact of Motivational Interviewing on eliciting change talk in clients comes from within-subject designs, which use probability analyses to examine therapist-client interactions. Two sequential analysis pilot studies designed to examine the effect of therapist behavior on client language and subsequent substance use behavior change during Motivational Enhancement Therapy (Moyers, Martin, Christopher, Houck, Tonigan, 2007) found that Motivational Interviewing-consistent behavior was more likely to be followed by change language. A later study by the same research group (Moyers et

al., 2009) found support for a meditational role of client language wherein the relationship between MI-consistent therapist behavior and positive drinking outcomes was mediated by change language. Furthermore, evidence suggested that selective reinforcement of change language by therapists is a key mechanism underlying the effectiveness of Motivational Interviewing.

Additional evidence of the ability of Motivational Interviewing therapist skills to elicit change language in patients comes from two studies by Gaume, et al. (2008) and Gaume, et al. (2010). In Gaume, et al. (2008), a sequential analysis of therapist and patient language during brief Motivational Interviewing sessions targeting alcohol use (in an at-risk sample) was performed using the psycholinguistic codes provided in the Motivational Interviewing Skill Code, version 2.0 manual. The study found that Motivational Interviewing-consistent therapist behaviors were significantly more likely to be followed by client change language than Motivational Interviewing-inconsistent behaviors. These findings were replicated in a separate study (Gaume, et al., 2010) using a sample of young adults during Brief Motivational Interviewing in a nonclinical setting.

A study examining the impact of therapist language and personalized feedback on client language and subsequent drinking outcomes among college students (Vader, et al., 2010) provides additional evidence of the link between therapist skills and change talk. Participants were assigned to either an Motivational Interviewing session only (MIO) or to an Motivational Interviewing session with personalized feedback (MIF). In the MIF condition, greater Motivational Interviewing-consistent therapist skills were associated with more change language (but not counter-change language). In the MIO condition, greater MICO skills were associated with greater change language and counter-change

language. In addition to suggesting the importance of feedback sessions in "tipping the balance" toward change language rather than toward counter-change language, these findings provide further support for the link between therapist MICO skills and client change language.

Finally, using an ABAB experimental design, Glynn et al. (2010) manipulated the therapeutic context in order to examine the effect of treatment modality on the elicitation of client change language. Specifically, the prevalence of change language was compared in a condition resembling Motivational Interviewing and in a functional analysis condition. In the Motivational Interviewing condition, the therapist's primary focus was the selective reinforcement of change language. As hypothesized, greater percentage of change talk during the session was associated with the Motivational Interviewing condition in comparison to the functional analysis condition, thus providing further evidence for the potential causal mechanism of differential reinforcement of change language by the therapist during MI.

The aforementioned studies provide support for the idea that Motivational Interviewing-specific therapist skills indeed elicit change language from the client. Additional studies, discussed below, provide evidence that change talk predicts substance use outcomes.

Using data from a large clinical trial (Project MATCH Research Group, 1997) Moyers, et al. (2007) found that change language accounted for a significant amount of variance in drinking outcomes. In another study, Vader, et al (2010) examined the effect of client language during Motivational Interviewing on drinking short- and long-term outcome (3- and 6-month follow-up) in a sample of students at-risk for alcohol abuse.

Among those receiving Motivational Interviewing with personalized feedback, greater frequency of counter-change language predicted poorer alcohol use outcomes, while greater frequency of change language predicted positive drinking outcomes at both short- and long-term follow-ups.

In order to examine the role of specific types of change language, Amrhein, et al. (2003) investigated commitment language during Motivational Interviewing sessions among a sample of substance abusing individuals undergoing Motivational Interviewing. The sessions were coded for the frequency and strength of motivationally-relevant utterances across entire Motivational Interviewing sessions. While other studies rely on a dichotomous conceptualization of change language (i.e., statements for or against change), this study codified statements which indicated desire, ability, need, and commitment to change. Each language category was counted and assigned a strength value. Based on the percentage of days abstinent at 3, 6, 9, and 12 month follow-ups, four group clusters (i.e., maintainers, changers, strugglers, and discrepants) emerged with varying patterns of commitment language frequency and strength during the Motivational Interviewing session. Furthermore, the four groups differed with respect to the mean commitment strength across the session, but did not differ with respect to frequency or strength of statements indicating desire, ability need, or reasons to change.

Finally, with respect to substance use outcomes, Amrhein et al. (2003) found that commitment language strength exhibited toward the end of the session (when discussing a plan for change) was a powerful predictor above and beyond baseline substance use, while the other language categories did not significantly predict outcome. Nevertheless, consistent with prior research suggesting that desire, ability, need, and reasons to change

are underlying dimensions of commitment (Amrhein, 1992), this study did indeed find that these language categories accounted for significant unique variance in commitment strength. This study not only highlighted the predictive utility of the strength of commitment language in substance use treatment outcomes, but it also explained the null findings by Miller, Benefield, and Tonigan (1993), in which commitment *frequency* during the first twenty minutes of session was used as a predictor of outcome. Amrhein et al. (2003) demonstrated the predictive power of examining language *strength* across the *entire* session.

In order to assess the role of cognitive abilities and change language in substance use treatment outcomes, Aharonovich, Amrhein, Bisaga, Nunes, and Hasin (2008) examined commitment language during Cognitive Behavioral Therapy (CBT) and cognitive functioning as predictors of treatment retention and substance use. While commitment language predicted substance use, cognitive functioning predicted treatment retention, suggesting that change language and cognitive functioning contribute differentially to treatment engagement and substance use after treatment. Furthermore, although the clinical composition of this sample was not indicated, these findings highlight the importance of considering the role cognitive functioning in treatment outcome.

In contrast to the findings of Amrhein et al. (2003) and Aharonovich (2008), a study by Baer, Beadnell, Garrett, Hartzler, Wells, and Peterson, (2008) found that commitment language did not predict rates of substance use in homeless adolescents undergoing brief Motivational Interviewing. Rather, desire, ability, and reasons for change were prospectively predictive of substance use. Specifically, negative comments

about substance use behavior change were predictive of poor outcome. It should be noted, however, that commitment language in the Amrhein et al. (2003) study occurred largely during the portion of the Motivational Interviewing session in which an action plan for changing substance use is discussed; this component was not a part of the Baer et al. (2008) Motivational Interviewing sessions. Furthermore, the low intraclass correlations evident in ratings of commitment language in this study suggest that this category of change language may be difficult to characterize in adolescents. Nevertheless, the predictive utility of the other categories of change language suggests that there may be differing components of change language that are important in determining outcome according the sample's characteristics.

The assessment of change talk represents a valuable tool in understanding motivational processes underlying substance use behavior change and represents a promising alternative to self-report measures. Change language is potentially more proximal to behavior change in that it has direct links with the substance use outcome in Motivational Interviewing. Although self-report measures of motivation have demonstrated some utility in serious mental illness samples, an additional assessment tool for understanding motivational processes during Motivational Interviewing would be useful in informing therapists working in this population; however, it is not yet known whether change language can be reliably and validly measured in individuals with serious mental illness. Furthermore, because one of the goals in Motivational Interviewing is to elicit change language in the patient, the impact of symptomatology on change talk dimensions would be informative from the therapist's perspective when treating patients with serious mental illness.

Rationale and Aims

Substance use among individuals with serious mental illness is a significant problem associated with various negative health and societal outcomes, including increased severity of both disorders (Cacciola et al. 2001; Compton et al., 2005b; Ford et al., 2009; Kidorf et al., 2004; Mills et al., 2007; Skinstad et al., 2001; Watkins et al., 2004), and poor substance use treatment outcomes (Barrowclough et al., 2007). Motivation among individuals with serious mental illness appears to be a significant factor in accounting for substance use treatment engagement and outcome (Barrowclough et al., 2006). Therefore, Motivational Interviewing is frequently used in this population as a standalone or to augment other substance use treatment components and has demonstrated effectiveness in improving treatment outcomes. Resonant with the framework provided by the Transtheoretical Model of Change, the Motivational Interviewing approach provides a client-centered therapeutic atmosphere in which the client's self-efficacy and motivation with respect to changing substance use behavior are reinforced. This in turn is thought to facilitate change from one stage of change to the next.

The importance of the elicitation of self-motivational statements during Motivational Interviewing inspired researchers to examine the effect of Motivational Interviewing-consistent therapist behaviors on eliciting client statements regarding the desire, ability, need, reasons, and commitment to change (Gaume et al., 2008; Gaume et al., 2010; Glynn et al., 2010; Miller et al., 1993; Moyers et al., 2007; Moyers et al., 2009; Vader et al., 2010). The effect of change language on substance use outcomes has also been examined (Amrhein et al., 2003; Baer et al., 2008; Moyers, et al., 2009; Vader et al.,

2010). In this way, psycholinguistic analyses of patient language during Motivational Interviewing sessions have provided insight into motivational processes associated with substance use behavior change. The language categories which were predictive of outcome differed by study, suggesting that perhaps differing components of change language are important in determining outcome according to sample characteristics. Furthermore, low intraclass correlations of raters' language coding in an adolescent sample (Baer et al., 2008) suggested that some language categories may be difficult to rate reliably depending on sample characteristics. Nevertheless, these studies provided initial support for the importance of change language in Motivational Interviewing and its relation to substance use outcomes among individuals undergoing MI.

The precise nature of motivational processes during substance use treatment is not well understood in individuals with serious mental illness, who experience significant cognitive impairments and symptoms related to motivational deficits. These symptoms could potentially impact the client's ability to effectively evaluate various options to achieve change, as well as engage in the complex set of behaviors necessary to make and maintain change. Furthermore, since one key component of Motivational Interviewing is the selective reinforcement of change language, it would be informative to understand the relationship between symptomatology, specifically negative symptoms, and the occurrence of change language among individuals with serious mental illness.

Research has delineated the prognostic utility of change language with respect to substance use treatment outcomes. To this end, the analysis of language during Motivational Interviewing allows for a clear examination of motivation and how it is expressed behaviorally. To date, there have been no studies of change language among

individuals with serious mental illness. Furthermore, it is not clear how symptomatology may relate to linguistic indicators of motivation. For instance, it may be the case that individuals with increased negative symptoms may exhibit lessened occurrences of motivational language during Motivational Interviewing sessions. Also, the strength of change language would be expected to diminish with increasing negative symptoms.

Change language has been reliably measured in studies that have not delineated the clinical characteristics of their samples; therefore, the validity and reliability of change talk measurement has not been established in individuals with serious mental illness. The interrelationships among change language components have been demonstrated in prior research (Amrhein, et al., 2003; Baer, et al., 2008); yet these relationships have not been elucidated serious mental illness samples. Furthermore, although the relationships of change language components to substance use treatment outcomes have been demonstrated in other samples, it is not clear whether change language has similar prognostic significance among individuals with serious mental illness.

Another informative area to examine is the relationship between symptomatology and therapist behavior. Due to negative symptoms such as alogia and amotivation, it would be expected that therapists would have to exert more energy in order to engage the client, thus resulting in more verbosity on the part of the therapist with increasing negative symptoms in the patient. To date, the relationship between therapist verbosity and symptomatology has not been elucidated. Finally, given prior studies which found a link between therapists' increased use of Motivational Interviewing-consistent behaviors and favorable substance use treatment outcomes (e.g., Moyers et al., 2009), the

examination of this association in a serious mental illness sample would provide further validation of the proposed causal mechanisms underlying Motivational Interviewing.

The current study sought to characterize change language in patients with serious mental illness undergoing Motivational Interviewing for substance use and to examine the extent to which change talk could be measured reliably and validly in this sample by examining the relationship of change language to self-report measures of motivation to change. To this end, data was used from the Motivational Interviewing component of a randomized trial comparing the Behavioral Treatment for Substance Abuse in Schizophrenia (BTSAS; Bellack, Bennett, & Gearon, 2006) to treatment as usual among individuals with serious mental illness and co-occurring substance abuse problems. Specifically, psycholinguistic coding of Motivational Interviewing sessions were carried out and assessed for reliability. Also, measures of readiness to change, self-efficacy in reducing substance use, decisional balance, and processes of change measures were be explored for convergence with change language strength across the categories of ability to change, reasons for change, need for change, and commitment to change. Additionally, the relationship of symptomatology to change language will be examined in order to better elucidate the potential effect of negative symptoms on behavioral indicators of motivation.

Given the overlap of negative symptoms and depressive symptoms such as avolition, anhedonia, and amotivation, the unique contribution of negative symptoms were examined. Indeed, numerous studies have found that depression and anhedonia can be measured independently among individuals with schizophrenia (Loas, Noisette, Legrand, & Boyer, 1996; Kirkpatrick, Buchanan, Breier, & Carpenter, 1994; Malla,

Takhar, Norman, Manchanda, Cortese, Haricharan, Verdi et al., 2002). Therefore, the current study will examine the unique contribution of negative symptoms to change language variables.

In order to better understand patient-therapist dynamics in relation to symptomatology, therapist language was coded and examined in relation to negative symptoms. Also, given that prior studies have found increased MICO therapist behaviors and change language to be related to better treatment outcomes, we conducted preliminary examinations of these relationships. Finally, we will conduct analyses to examine the relationship of self-reported motivation to change and MICO therapist behaviors to substance use treatment outcomes. Specific hypotheses are outlined below.

Reliability

1. We hypothesized that psycholinguistic coding of change language would yield fair or better intra-class correlation coefficients (ICCs) for frequencies and strengths of each language category. Based on Cicchetti's (1994) guidelines for evaluating interclass correlation coefficients (ICCs), the following standards were used: below .40, poor; .40 to .59, fair; .60 to .74, good; above .75, excellent.

Validity

1. Consistent with a prior study (Amrhein et al., 2003), commitment language should evidence underlying dimensions of desire, ability, needs, and reasons. Therefore, it was hypothesized that the strength of each of these language categories would exhibit significant positive partial correlations with commitment strength.

2. Language categories should be correlated with self-reported measures of

   readiness for change, self-efficacy, and decisional balance, and action toward

   change. Hypotheses were constructed such that each language component would

   be hypothesized to be most related to the self-report measure which shares face

   validity. Therefore, the hypotheses are as follows:

   a. The mean strengths of each language category will be significantly

      positively correlated with a total readiness score yielded from self-

      reported measures of readiness for change. Additionally, language

      strengths will be negatively correlated with *Precontemplation* scores and

      positively correlated with *Contemplation, Action,* and *Maintenance* scores.

   b. Ability language strength will show a preferential positive correlation with

      self-efficacy measures over other measures of motivation.

   c. Reasons and need for change language will show a preferential positive

      correlation with decisional balance measures over other measures of

      motivation.

   d. Commitment language will show a preferential positive correlation with

      processes of change measures (those that assess strategies used in pursuit

      of reducing substance use) over other measures of motivation.

   e. Commitment language will be significantly positively correlated with the

      total readiness score, and each of the *Contemplation, Action,* and

      Maintenance scores. Also, commitment language will be significantly

      negatively correlated with *Precontemplation* scores.

Relationship between symptomatology and change language components

1. Negative symptoms (independent of depressive symptoms) will be significantly negatively correlated with the counts and mean strength of each language category such that greater negative symptoms will be associated with less change language.

2. Negative symptoms (independent of depressive symptoms) will be significantly negatively correlated with verbosity, as indexed by Motivational Interviewing session word counts, such that greater negative symptoms will be related to less language output.

Therapist behavior and patient symptomatology

1. Negative symptoms (independent of depressive symptoms) will be significantly positively correlated with therapist utterances such that increased negative symptoms will be associated with a greater number of therapist utterances.

   a. The symptom of alogia will exhibit a preferential relationship with therapist utterances.

2. Motivational Interviewing-consistent therapist behaviors will be positively correlated with greater change language such that increased Motivational Interviewing-consistent behaviors will be associated with greater change language (i.e., desire, ability, reasons, readiness, needs, and commitment statements).

Change language as a predictor of short- and long-term substance use treatment outcomes

1. Short-term attendance: Increased change language strength will predict greater treatment session attendance during the subsequent two weeks, controlling for baseline substance use severity, negative symptoms, and depressive symptoms. This time frame was chosen to represent "short-term" outcome in order minimize the confounding effects of attendance at other treatment components on treatment engagement.

2. Long-term attendance: Increased change language strength will predict greater treatment session attendance during the subsequent six months, controlling for baseline substance use severity, negative symptoms, and depressive symptoms. This time frame was chosen to represent "long-term" outcome as it is the endpoint of the accompanying behavioral treatment for the parent study.

3. Short-term substance use: Increased change language strength will predict the absence of substance use two weeks after the Motivational Interviewing session, controlling for substance use severity, negative symptoms, and depressive symptoms.

4. Long-term substance use: Increased change language strength will predict the absence of substance use six months after the Motivational Interviewing session, controlling for substance use severity, negative symptoms, and depressive symptoms.

The relationship of self-reported motivation to change and short- and long-term substance use treatment outcomes

1. We hypothesized that higher self-reported motivation to change would be significantly associated with increased short- and long-term treatment attendance.

2. We hypothesized that higher self-reported motivation to change would be significantly associated with decreased short- and long-term substance use.

Therapist MI-Consistent behavior as a predictor of short- and long-term substance use treatment outcomes

1. Short-term attendance: Increased therapist MICO behaviors will predict greater treatment session attendance during the subsequent two weeks, controlling for baseline substance use severity, negative symptoms, and depressive symptoms.

2. Long-term attendance: Increased MICO therapist behaviors will predict greater treatment session attendance during the subsequent two months, controlling for baseline substance use severity, negative symptoms, and depressive symptoms.

3. Short-term substance use: Increased therapist MICO behaviors will predict the absence of substance use two weeks after the Motivational Interviewing session, controlling for substance use severity, negative symptoms, and depressive symptoms.

4. Long-term substance use: Increased MICO therapist behaviors will predict the absence of substance use six months after the Motivational Interviewing session, controlling for substance use severity, negative symptoms, and depressive symptoms.

Exploratory Aim: Therapist-prompted language

1. As an exploratory aim, we proposed to examine therapist-prompted language (i.e., acquiescent replies by the client in response to therapist questions reflecting behavior change rather than explicit client statements). Therefore, inter-rater reliability of therapist-prompted language and all proposed exploratory analyses are provided in Appendix B.

Chapter 2: Method

Participants

Participants for the current study were individuals who received Motivational Interviewing as part of a larger randomized clinical trial comparing the Behavioral Treatment for Substance Abuse in Schizophrenia (BTSAS; Bellack, Bennett & Gearon, 2006) [2] to treatment as usual among individuals with serious mental illness and co-occurring substance abuse. Participants were recruited from outpatient mental health programs operated by the University of Maryland School of Medicine Department of Psychiatry, Division of Community Psychiatry, and the Baltimore campus of the Veterans Administration Maryland Health Care System. Qualified participants were those who met DSM-IV criteria for both Substance Abuse or Dependence (for opiates, cocaine, or cannabis) and serious mental illness (schizophrenia, schizoaffective disorder, major depression, bipolar disorder, or other psychotic disorder). Other inclusion criteria included being between 18 and 55 years and being able to provide consent for participation.

In this study, psycholinguistic analyses were performed on baseline Motivational Interviewing sessions for the 45 individuals for whom videotape of the first Motivational Interviewing session was available. They represented an analyzable subset of patients who were randomly assigned to receive BTSAS, which included a Motivational Interviewing session prior to the start of other treatment components.

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[2]   BTSAS components included Motivational Interviewing, social skills training, problem solving, coping skills training, psychoeducation regarding substance use, and contingency management. All components except Motivational Interviewing were conducted in group format. Patients met twice weekly for 52 weeks. Two additional Motivational Interviewing sessions were conducted at 3 and 6 months after the baseline session.

Procedure

All diagnostic assessments were conducted by clinical interviewers with at least Master's-level experience in psychology. Supervision was provided by doctoral-level psychologists. All interviews were videotaped and randomly checked for reliability. To address issues of uncorrected vision problems and low literacy rates in this population, all paper-pencil questionnaires were administered as structured interviews. Furthermore, paraphrasing amidst patient confusion and probing for comprehension, without biasing responses, were used to address difficulties with comprehension and attention.

The first Motivational Interviewing session was conducted in the first week of treatment. During this session, the purpose was to identify a few key reasons to decrease drug use and to develop short and long-term goals for decreasing use. Participants then proceeded to the group component for the rest of the treatment session. Before the second week's session began, patients provided a urine sample, which was screened for the presence of heroin, cocaine, and marijuana.

Motivational Interviewing Session

The Motivational Interviewing session lasted approximately 20-35 minutes and was videotaped. The therapist began by discussing the patient's progress in changing substance use to date, followed by a discussion of the negative consequences associated with use. Then, individualized feedback was given based on the patient's endorsement (on a likert-type scale) of self-motivational statements during the baseline assessment. Specifically, discussion centered on the following University of Rhode Island Change Assessment (URICA) items:

1) At times my problem is difficult, but I'm working on it

2) I have a problem and I really think I should work on it

3) Even though I'm not always successful in changing, at least I'm working on it

4) I wish I had some more ideas about how to solve my problem

5) I'm actively working on my problem

After a discussion of these items, the patient and the therapist set short-term goals for substance use, addressed potential obstacles, and brainstormed ways to achieve those goals by the next therapy session.

The videotapes were transcribed and parsed by M.N.S. then coded for psycholinguistic indicators of motivation by a graduate student and a trained undergraduate research assistant using procedures described by Amrhein (2009, personal communication) and Miller, Moyers, Ernst, and Amrhein (2003). Raters were blind to participants' diagnoses and to all self-report measures.

Measures

The measures for the current study were categorized into five domains: (1) screening and diagnostic assessment (2) substance use, (3) treatment engagement, (4) motivational measures, and (5) change language coding.

Domain		Measure	Purpose
Screening and Diagnostic Assessment		Structured Clinical Interview for DSM-IV (SCID-IV)	To assess for psychiatric disorders
		Positive and Negative Syndrome Scale (PANSS)	To assess positive, negative, and general distress symptoms
Substance Use		Addiction Severity Index	To assess baseline substance use severity
		Urinalysis	To screen for use of cocaine, heroin, or marijuana
Treatment Engagement		BTSAS attendance	To determine treatment engagement following Motivational Interviewing session
Self-Report Motivation Measures	Readiness for Change	University of Rhode Island Change Assessment (URICA)	To assess stages of change
		Cartoon Stages of Change Measure (C-SOC)	
	Abstinence Self-efficacy	Drug Abstinence Self-Efficacy Scale (DASE)	To assess the patient's self-efficacy in reducing drug and alcohol consumption
		Alcohol Abstinence Self-Efficacy Scale (AASE)	
	Decisional Balance	Decisional Balance Scale –Drug Version (DBD)	To assess the individual's weighing of pros and cons of reducing drug use
	Processes of Change	Processes of Change – Drug Version (POC-D)	To assess the strategies individuals use to resist drug use
Therapist Behavior Coding		Manual for Motivational Interviewing Skills Code – Version 2.0 (MISC 2.0)	Therapist behavior coding manual for Motivational Interviewing session
Change Language Coding		DARN-C: A Training Manual for Coding Client Commitment Language	Client language coding manual for Motivational Interviewing session

Screening and Diagnostic Assessments

Structured Clinical Interview for DSM-IV (SCID-IV; First, Spitzer, Gibbon, &

Williams, 1997). The SCID-IV was administered to assess for psychiatric disorders.

Twenty percent of videotaped interviews were randomly selected for reliability checks in

the parent study.

Positive and Negative Syndrome Scale (PANSS*;* Kay, Flszbein, & Opfer, 1987).

The PANSS (see Appendix C) is a rating scale administered in interview format. It yields

separate ratings for positive symptoms, negative symptoms, and general

psychopathology. A depressive symptoms score was derived based on prior factor

analytic research (Aghababian, Llorca, Bernard, & Auquier, 1999; Bell, Lysaker, Beam-

Goulet, & Millstein, 1994; Lindenmayer, Grochowski, & Hyman, 1995; Lykouras, Oulis,

Psarros, Daskalapoulou, Botsis, Christodoulou , & Stefanis, 2000). The PANSS has good

reliability and validity with interrater reliability ranging from .83 to .87 and Cronbach

alpha reliabilities ranging from .73 to .83 (Kay et al., 1987).

Substance Use

Urinalysis. Results from analysis of urine samples for the presence of recent

substance use was used. Urine tests were conducted as part of a contingency incentive

system in the larger study. Urine was analyzed using the Syva Rapid Test, which

provided results in five minutes. Assays were performed for cocaine, cannabinoids, and

opiates twice weekly. Each test is sensitive to substance use over the prior three days. For

the current study, the first four urinalyses of the study were used to assess for substance

use during the first two weeks of treatment. Long term substance use outcomes were

indexed by the total number of clean urine samples provided by the participant

throughout the full course of treatment.

Addiction Severity Index (ASI; McClellan, Kushner, Metzger, Peters, Smith,

Grissom, et al., 1992). The ASI (see Appendix D) is a semi-structured interview

designed to address problem areas in substance-abusing patients, including medical

status, employment and support, drug use, alcohol use, legal status, family/social status,

and psychiatric status. In the current study, ASI Lifetime Substance use was used as an index of addiction severity.

Treatment Engagement

Treatment engagement was indexed as the number of BTSAS sessions attended after the first Motivational Interviewing session. For short-term attendance, the number of days out of a possible four sessions was used. For long-term attendance, the total number of BTSAS sessions during the six-month period was used (a possible 52 sessions).

Self-Reported Motivational Measures

University of Rhode Island Change Assessment - Maryland (URICA-M). The URICA (see Appendix E) was initially developed to assess readiness to change in the area of smoking, but was modified for use with alcohol-dependent patients (DiClemente & Hughes, 1990), substance using patients, and then modified for use in individuals with serious mental illness (Nidecker, DiClemente, Bennett, & Bellack, 2008). Specific modifications included reading items aloud, simplifying questions, and shortening the measure to include 24 items.

The URICA-M yields four subscales: (1) Precontemplation, (2) Contemplation, (3) Action, and (4) Maintenance. It also yields a total readiness score by subtracting the sum of the Precontemplation and Contemplation scores from the sum of the Action and Maintenance scores. The URICA-M has demonstrated good reliability and validity among individuals with serious mental illness, with Cronbach's alphas ranging from .72-.81 (Nidecker, et al., 2008).

Cartoon Stages of Change Measure (C-SOC; Clark, Wells, Peterson, Jackson, & Stanton, 1996). The C-SOC (see Appendix F) was developed in order to assess stages of change among individuals with cognitive and reading impairments. It utilizes a series of cartoon panels conveying characters engaged in precontemplation, contemplation, action, and maintenance. The participant indicates whether each panel is or is not like them now, and which panel is most like them. Each stage of change is depicted by three cartoons, allowing for similar calculations as the URICA (one total score for each stage of change and a total readiness score derived by subtracting the sum of the Precontemplation and Contemplation scores from the sum of the Action and Maintenance scores).

Abstinence Self-Efficacy. The Drug Abstinence Self-Efficacy Scale (see Appendix G) and Alcohol Abstinence Self-Efficacy Scale (see Appendix H) (DiClemente, Carbonari, Montgomery, & Hughes, 1994) were used to assess participants' confidence in their ability to resist drugs and alcohol and the extent to which they feel tempted to use drugs or drink. Using a 5-point Likert-type scale, participants rated their self-efficacy and degree of temptation. Each scale yields eight subscales, indicating self-efficacy and temptation in four contexts (Negative Affect, Social/Positive Influences, Physical and Other Concerns, and Withdrawal and Urges). The ASE had excellent internal consistency among those with serious mental illness and substance use disorders, with a Cronbach alpha of 0.91.

Decisional Balance Scales. The drug version of the Decisional Balance Scale (see Appendix I) (Velicer, DiClemente, Prochaska, & Brandenburg, 1985) was used to measure the participant's perceived costs and benefits of using drugs and drinking

45

alcohol. Additional items were added to reflect frequently encountered situations faced by clients in this population (e.g., court control of children, release from jail being contingent on abstinence, eviction from an apartment). Items are rated on a 5-point Likert-type scale. Internal consistency in individuals with serious mental illness and substance use disorders was been found to be 0.85 (Nidecker et al., 2008).

Process of Change. The drug version of the Processes of Change scale (see Appendix J) (DiClemente, Carbonari, Addy, & Velasquez, 1996) was used to assess the experiential and behavioral processes that participants use in order to resist the use of drugs. The 20-item measure asks participants to rate on a 5-point Likert-type scale the frequency with which they use various strategies. The scale yields two subscales, Experiential and Behavioral, which have demonstrated good internal consistency among serious mental illness and substance use disordered individuals (Cronbach alphas = 0.76 and 0.81, respectively).

Change Language and Therapist Language Coding

Manual for Motivational Interviewing Skills Code – Version 2.0 (MISC 2.0; Williams, Moyers, Ernst, & Amrhein, 2003). The training of coders and coding procedures for categorizing therapist behaviors during Motivational Interviewing sessions was performed according to procedures outlined in the MISC 2.0 (see Appendix K), which were initially designed to assist in performing quality assessment from the videotapes and audiotapes of Motivational Interviewing sessions. One of the recent uses of the manual is to conduct psychotherapy process research using psycholinguistic coding.

DARN-C (Desire, Ability, Reasons, Need, and Commitment): A Training Manual for Coding Client Commitment Language (Amrhein, 2009). Additional guidance for the training of coders and the coding procedures for categorizing client language during the Motivational Interviewing sessions were performed according to procedures outlined in the DARN-C manual (see Appendix L). This coding procedure allows for a richer assessment of client language than the MISC 2.0, and contains additional material to consider in the training of coders. Because this manual only addresses client language, the MISC 2.0 was used as an adjunct for therapist behavior coding and for general coder training procedures.

Videotape transcription and coding. Each client was videotaped during each of three Motivational Interviewing sessions. Due to significant participant attrition from the study, the current study used only the first session. The sessions lasted from 20-30 minutes. Videotapes were labeled with the participant number, session number, and the therapist conducting the session.

The videotapes were transcribed without knowledge of the identity or outcome measures of the clients and blind to the diagnostic status of the clients. The transcription was then parsed into utterances, which are those statements which represent a full thought either in response to a therapist's question, or those that are unsolicited and said spontaneously. Although the Motivational Interviewing Skill Code, version 2.0 manual indicates that acquiescent replies to the therapist's statements should be omitted, such replies were coded and analyzed, for the purpose of examining some supplementary analyses given the severe verbal and cognitive deficits in this population. Therefore, the

data was analyzed with and without the inclusion of acquiescent replies (see Appendix B for re-analysis of the data considering acquiescent replies).

Codable utterances are complete thoughts that can be characterized as language reflecting commitment, desire, ability, need, reasons, and taking steps toward substance use reduction or abstinence. An utterance ends upon the completion of a thought or when another speaker begins speaking.

After being categorized, each statement was assigned a strength and valence value from -5 to +5. Ratings of "0" are given for those statements that do not indicate any intention to move toward or away from change. Negative values indicate statements that support continued substance use, while positive values indicate statements that support reduction or discontinuation of use. Strength value is determined by the content, tone, or context of each utterance (MISC 2.0, 2003). The stronger the statement, the higher the strength value. Examples of coded utterances are provided below.

Category	Strength
Commitment	
"I guarantee that I can stop using."	**+5**
"I plan to cut down my drinking."	**+3**
"I don't intend to stop drinking."	**-4**
Desire	
"For the most part, I want to quit."	**+2**
"I kind of enjoy drinking."	**-1**
"Pretty much, yes, I like drinking."	**-2**
Ability	
"I am positive that I could quit."	**+5**
"I have a little trouble sticking to things"	**-1**
"It's just impossible."	**-5**
Need	
"I absolutely have to stop using cocaine."	**+5**
"I guess I need to cut down."	**+1**
"I can't go without my cocaine."	**-3**

Reasons	
"I'll be in trouble if I turn in another positive urine."	**+4**
"I guess I'd be a bit healthier if I stopped drinking."	**+1**
"I probably would have trouble sleeping without it."	**-2**
Taking Steps	
"I stayed away from friends who I know use all week."	**+3**
"I didn't take my Antabuse."	**-3**
"I completely blew it this week trying to drink."	**-5**

Therapist behavior coding was consistent with studies examining Motivational Interviewing-consistent and –inconsistent behaviors (e.g., Gaume, et al., 2008; Moyers et al., 2007). Specifically, the therapist behaviors of affirming, emphasizing personal choice, seeking permission to give advice/information, and offering support are considered Motivational Interviewing-consistent behaviors. Advising without permission, confronting, directing, raising concern without permission, and warning are considered Motivation Interviewing-inconsistent behaviors. In order to assess therapist verbosity, the number of utterances during the session was tabulated.

Training and reliability of raters. Two raters were utilized who were extensively trained in the categorization and rating of client utterances, with a total training time of about 42 hours. A stepped learning process was utilized to train coders. After training on the types of utterances, a testing phase began, wherein examples of utterances were given to raters to categorize client change language categories. After each rater was able to classify 90% of the statements correctly, additional examples were given to code for the strength of statements. After an ICC of at least .85 was reached, six transcripts that were not used for the purposes of this study were coded and assessed for reliability. A Kappa reliability coefficient was used to assess rater agreement for the categorization of client and therapist utterances across all training transcripts. A Kappa of

.82 was achieved, indicating "excellent" agreement. ICCs were used to assess agreement for strength ratings. Each category for each transcript was treated as a data point in the assessment of reliability. For instance, the mean ratings for desire, ability, reasons, readiness, need, and commitment were treated as six separate data points. Therefore, across the six training transcripts, there were 36 possible data points across which to assess rater reliability. An ICC of .76 was reached, indicating excellent agreement. After the training phase, each coder rated all transcripts. Bi-weekly meetings were held to discuss scoring difficulties. Additionally, the current author was available for questions which arose in between meetings. Both coders were kept informed of each others' questions throughout the coding period.

Chapter 3: Results

Descriptive Data

Of the available Motivational Interviewing tapes ($n = 55$), 45 were audible and complete (i.e., some of the VHS tapes were of poor quality due to wear and some did not capture the full MI session due to equipment failure); these tapes constituted the Motivational Interviewing sessions used in this study. Descriptives for demographic data are presented in Table 1. Clinical characteristics, including psychiatric disorders, PANSS symptoms, and substance use variables are presented in Table 2.

Table 1
Descriptives for demographic data.

Demographic Variable	
Gender (male)	58%
Mean age (*SD*)	44 (6.45)
Ethnicity	
Black/African-American	77.8%
White/Caucasian	17.8%
Hispanic	4.4%
Education	
Mean years (*SD*)	11.6 (1.8)
Marital Status	
Single	44.4%
Divorced	22.2%
Widowed	13.3%
Separated	11.1%
Married	6.7%

Table 2

Clinical characteristics of the sample.

Psychiatric Disorders	Percentage
Bipolar	51.1
Major Depressive	17.8
Schizoaffective	15.6
Psychosis Not Otherwise Specified	11.1
Schizophrenia	2.2
Post Traumatic Stress/ Other Anxiety	2.2
PANSS Symptoms	**Mean (*SD*)**
Negative	12.1 (4.7)
Positive	12.4 (4.2)
General	28.7 (5.7)
Substance Use Disorders	**Percentage**
Drug Abuse	86.7
Drug Dependence	48.9
Alcohol Abuse	0.0
Alcohol Dependence	15.6
Drug of choice / Goal Drug	**Percentage**
Cocaine	71.1
Opioids	22.2
Marijuana	6.7

Reliability of Client Language Coding

The full sample of 45 tapes was coded by two independent raters (a Master's level graduate student and an undergraduate research assistant). Using the Motivational Interviewing therapy session transcript, coders identified the occurrence of each of 6 client change language categories (Desire, Ability, Reasons, Readiness, Need, and Commitment) and gave each change language statement a strength rating.

Frequency and strength ratings were assessed for reliability across using Intraclass Correlation Coefficients (ICCs; Shrout & Fleiss, 1979). Note that the ability to calculate ICCs, and the magnitude thereof, are heavily influenced by base rates of occurrence due to low power to assess agreement. Therefore, lower base rates are associated with lower reliability. Desire, Ability, Reasons, and Commitment language occur at least once in a

high percentage of the sample (49%-100%); however, Readiness language occurs at least

once in a relatively lower percentage of the sample (7%). Furthermore, although Need

language occurs at least once in 20% of the sample, this percentage drops to 0% when

considering its occurrence at least two times in the sample. Low base rates greatly

restricted the range of these variables, and in turn affected the reliability and

interpretability of any results involving Readiness and Need language. Therefore, we

were not able to conduct analyses involving these two variables. The base rates of client

change language at various frequencies of occurrence are presented in Table 3 for

reference.

Table 3
Base rates of client change language.

Change Language Category	At least one time	At least two times	Three times or more
Desire	49%	13%	13%
Ability	100%	33%	33%
Reasons	98%	98%	98%
Readiness	7%	2%	2%
Need	20%	0%	0%
Commitment	88.9%	86.7%	66.7%

Although no specific hypotheses were delineated regarding ICCs, we used the

guidelines outlined by Cicchetti (1994), who suggested that reliability coefficients below

.40 are poor, those between .40 and .59 are fair, those between .60 and .74 are good, and

those .75 and above are excellent. These guidelines have been used in prior studies

examining change language during Motivational Interviewing (e.g., Baer, et al., 2008;

Moyers, 2009).

Reliability of frequency ratings. According to the aforementioned guidelines, ICCs for Desire (.75), Ability (.83), Reasons (.82), and Commitment (.89) were excellent according to Cicchetti's (1994) guidelines. The minimum, maximum, mean, and ICCs of frequency ratings are presented in Table 4.

Table 4
Summary data and ICCs for mean client language frequency ratings.

Summary Variable	Min	Max	*M*	*SD*	ICC
Desire	0.00	7.00	0.98	1.47	0.75
Ability	0.00	9.00	2.18	2.70	0.83
Reasons	0.00	27.00	12.91	6.98	0.82
Commitment	0.00	19.00	3.69	4.68	0.89

Note. Min = Minimum mean of coders' ratings, Max = Maximum of mean of coders' ratings; means and standard deviations calculated on mean of coders' ratings.

Reliability of strength ratings. The strength of Ability (.66) and Reasons (.66) language qualified as having good inter-rater agreement according to Cicchetti's (1994) guidelines. The reliability of Desire and Commitment language strength (.03 and .22, respectively) did not reach an acceptable level, evidencing poor agreement. Therefore, subsequent analyses involving the strength of Desire and Commitment language were not able to be performed, as any yielded findings would have been unreliable. Summary data and ICCs for mean client language strength ratings are presented in Table 5.

Table 5
Summary data and ICCs for mean client language strength ratings.

Summary Variable	Min	Max	*M*	*SD*	ICC
Desire	1.00	5.00	4.20	1.09	0.03
Ability	-5.00	5.00	-1.71	2.13	0.66
Reasons	1.60	5.00	4.38	0.76	0.66
Commitment	1.00	5.00	3.63	1.01	0.22

Note. Min = Minimum mean of coders' ratings, Max = Maximum of mean of coders' ratings; means and standard deviations calculated on mean of coders' ratings.

An issue that affected the ability to assess language strength reliability was that of missing data cells. When clients did not make a statement belonging to a certain language category, a frequency of zero was assigned. In contrast, strength ratings are missing in this case, as a strength rating cannot be designated for utterances which did not occur. This results in missing data cells. Therefore, strength ratings are not able to be provided for a subset of the sample in categories which the client did not make a statement. This resulted in a drastic reduction in sample size for many of the proposed analyses. Due to this issue and to the low reliabilities for strength ratings, we conducted all analyses using frequency language. We used this approach because change language frequencies yielded higher reliabilities and contained no missing data cells, thus allowing the use of all data and for more power to detect effects. Furthermore, since Amrhein's (2002) findings, which found effects using change language strength, another research group (see Moyers, 2009) has been unable to yield reliable strength ratings and has used frequency ratings instead. Proposed analyses involving change language strength for Ability and Reasons (categories which achieved acceptable reliability and did not present with the issue of missing cells) are presented at the end of the Results section.

Inter-relationships among change language frequency categories. Due to aforementioned issues with yielding reliable strength ratings, frequency ratings were used to examine whether the inter-relationships among change language categories reflect patterns of prior research which found that (1) all language categories were significantly correlated with Commitment language, and (2) Commitment language reflects the underlying dimensions of Desire, Ability, Need, and Reasons change language (Amrhein, et al., 2003; Baer, 2003). That is, each underlying dimension exhibited unique

relationships with Commitment language. Therefore, each underlying dimension should account for unique variance in Commitment language, with each language category exhibiting significant positive partial correlations with commitment strength. For reasons stated earlier, the unique relationship of Need and Readiness language to Commitment language was not able to be examined.

Zero-order intercorrelations of all language variables are presented in Table 6. Commitment language frequency was significantly positively correlated with Desire, Ability, and Reasons frequency, indicating that increased statements during the Motivational Interviewing session related to the client's desire, self-efficacy, and reasons for reduction/abstinence were related to increased statements of commitment. Partial correlations with Commitment language frequency revealed that Reasons ($pr = .31$, $p < .05$) and Ability language frequency ($pr = .63$, $p < .001$) accounted for unique variance in Commitment language frequency. The partial correlation with Desire was not significant ($pr = .22$, $p > .05$); therefore, prior findings that Desire, Ability, Need and Reasons strength underlie Commitment was only partially supported. The frequency of statements related to reasons and perceived ability to reduce/stop substance use accounted for unique variance in the frequency of commitment language.

Table 6
Intercorrelations of language variables.

	Desire	Ability	Reasons	Commitment
Desire	---	$.48^{**}$	.26	$.52^{**}$
Ability	---	---	.06	$.70^{***}$
Reasons	---	---	---	$.30^{*}$
Commitment	---	---	---	---

$^{+}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Relationship of Change Language Frequencies with Self-Report Measures of

Motivation. We hypothesized that each change language component would

demonstrate significant correlations with self-reported general motivation, as assessed by

the URICA and C-SOC. To test this hypothesis, we conducted zero-order correlations of

change language frequency with the URICA and C-SOC. There were no significant

correlations, suggesting that change language frequency as measured by patient

statements within therapy sessions is not associated with general self-reports of

motivation to reduce/stop substance use. These results are presented in Table 7.

Table 7
Correlations of URICA and C-SOC with change language frequency.

	Desire	Ability	Reasons	Commitment
Readiness to Change				
URICA Total	-.15	.06	.15	-.05
URICA Precontemplation	.02	-.17	-.21	.00
URICA Contemplation	-.01	.08	.23	.14
URICA Action	-.03	.05	.14	-.09
URICA Maintenance	-.27	-.13	-.13	-.18
C-SOC Total	.22	.11	.11	-.03
C-SOC Precontemplation	-.27	-.14	.02	-.04
C-SOC Contemplation	-.17	-.17	.00	.08
C-SOC Action	-.01	-.07	.15	-.08
C-SOC Maintenance	.22	.08	.22	.06

$^+ p < .10,$ $^* p < .05,$ $^{**} p < .01,$ $^{***} p < .001.$

We also hypothesized that each change language component would demonstrate a

preferential positive correlation with the self-report measure of motivation which shared

face validity. To test this hypothesis, we conducted correlations between Desire, Ability,

Reasons, and Commitment frequency and self-reported drug and alcohol abstinence self-

efficacy, decisional balance, and processes of change. If these correlations were

significant, then tests of preferential correlations would be conducted. For the purposes of these analyses, the total score of each self-report measure was used. Contrary to expectations, Desire, Ability, Reasons, and Commitment frequency were not significantly correlated with self-report measures of readiness for change (URICA and C-SOC), drug and alcohol abstinence self-efficacy (DASE and AASE), decisional balance, drug version (DBD), and processes of change, drug version (POC-D) (all $ps > .05$). Thus, there was no evidence of any preferential relationships of the frequency of any change language category and any self-report of motivation. These results are presented in Table 8.

Table 8
Correlations of DASE, DBD, and POC-D with change language frequency.

	Desire	Ability	Reasons	Commitment
Abstinence Self-Efficacy				
DASE Total	.18	.11	.09	.11
AASE Total	.20	.23	.4	.04
Decisional Balance - Drugs				
DBD - Pros	-.21	-.24	.02	-.21
DBD - Cons	-.05	-.20	.11	-.16
Processes of Change				
POC-D	-.06	.05	.15	.04

$^+p < .10$, $^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Negative Symptoms and Client Language

Negative symptoms and change language. We hypothesized that negative symptoms (independent of depressive symptoms) would be significantly negatively correlated with the frequencies of each language category such that greater negative symptoms would be associated with less change language frequency. Thus, partial correlations were conducted between negative symptoms and change language frequencies (controlling for depressive symptoms).

Our hypothesis was not supported. Negative symptoms were not significantly correlated with any change language category frequencies ($ps > .05$). Therefore, the amount of change language generated during Motivational Interviewing was not related to clients' negative symptoms[3]. Zero-order and partial correlations are presented in Table 9.

Table 9
Correlations of PANSS negative symptoms and change language frequencies and partial correlations (controlling for depressive symptoms).

		Language Category Frequency			
	Mean (*SD*)	Desire	Ability	Reasons	Commitment
Zero-order	1.73 (.67)	-.09	-.15	-.24	-.10
Partial		-.09	-.24	-.26[+]	-.17

$^{+}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Negative symptoms and client verbosity. We predicted that negative symptoms (independent of depressive symptoms) would be significantly negatively correlated with client verbosity. We also predicted that the symptom of alogia would exhibit a preferential relationship with client verbosity. Therefore, we conducted separate Pearson partial correlations (controlling for depression) between client verbosity and negative symptoms. We also did so for the PANSS item which reflected alogia (i.e., "lack of spontaneity and flow of conversation"). Client verbosity was not related to negative symptoms ($pr = -.08$, $p = .60$) or to alogia ($pr = -.24$, $p = .11$); therefore, neither increased

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[3]   These correlations remained non-significant regardless of whether or not depressive symptoms were also included in the analyses.

negative symptoms nor increased alogia was associated with less speech generation during MI[4]. These results are presented in Table 10.

Table 10
Zero-order and partial correlations (controlling for depressive symptoms) of PANSS negative symptoms and alogia with client verbosity.

	Client Verbosity
Negative Symptoms Zero-order	-.03
Negative Symptoms Partial	-.08
Alogia Zero-order	-.09
Alogia Partial	-.24

$^+ p < .10, ^* p < .05, ^{**} p < .01, ^{***} p < .001$.

Therapist Behavior, Negative Symptoms, and Change Language

Therapist verbosity and PANSS negative symptoms. We hypothesized that negative symptoms (independent of depressive symptoms) would be significantly positively correlated with therapist verbosity. Therefore, zero-order and Pearson partial correlations (controlling for depressive symptoms) between negative symptoms and therapist verbosity were conducted. Negative symptoms were not significantly related to therapist verbosity ($pr = .15, p = .34$), even when controlling for depressive symptoms ($pr = .12, p = .43$).

We also hypothesized that the PANSS item reflecting the negative symptom of alogia would exhibit a preferential positive relationship with therapist verbosity over other symptoms. This hypothesis was not supported, as alogia was not significantly related to therapist verbosity ($pr = .15, p = .34$), even when controlling for depressive symptoms ($pr = .15, p = .32$). Contrary to our hypotheses, these findings indicate that

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[4]   These correlations remained non-significant regardless of whether or not depressive symptoms were also included in the analyses.

neither greater negative symptoms nor the symptom of alogia was associated with more speech generation in therapists during MI[5].

Motivational Interviewing-consistent (MICO) behaviors and change language frequency. We hypothesized that MICO behaviors by the therapist would be positively correlated with greater change language frequencies in clients. In order to test this hypothesis, the frequency of the 13 MICO behaviors (i.e., Advise with permission, Affirm, Emphasize Control, Facilitate, Filler, Giving Information, Open Question, Raise concern with permission, Simple reflection, Complex reflection, Reframe, Support, Structure) was averaged across both raters. The minimum and maximum frequency of each therapist behavior across participants, mean of the frequency of MICO behaviors, and the ICC across raters are presented in Table 11.

To examine the relationship between Motivational Interviewing-consistent (MICO) therapist behaviors and client change language, we conducted correlations between the number of MICO behaviors and change language frequencies. MICO behaviors were significantly positively correlated with Reasons language frequency ($r = .53$, $p < .001$). Contrary to our prediction, there were no other significant correlations (all ps > .05). These results indicate that therapists' increased use of MI-consistent behaviors were associated with greater frequency of Reasons language from the patient, but therapist Motivational Interviewing-consistent behaviors were not related to patients' Desire, Ability, or Commitment language. All correlations are presented in Table 11.

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[5]   These results remain non-significant when not controlling for depressive symptoms.

Table 11

Summary data and ICC for Motivational Interviewing-Consistent (MICO) therapist behaviors and correlations of MICO behaviors with change language strength and frequency.

MICO Behaviors	Min	Max	*M*	*SD*	ICC	Language Frequency			
						D	A	R	C
	40.00	154.00	83.18	28.68	.996	$.28^+$	.18	**.53*****	$.22^+$

Note. Min = Minimum mean of coders' ratings, Max = Maximum of mean of coders' ratings; means and standard deviations calculated on mean of coders' ratings. D = Desire; A = Ability; R = Reasons; C = Commitment. $^+p < .10$, $^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Change Language Frequency as a Predictor of Substance Use Treatment Outcomes

We examined the relationship of change language frequency to short- and long-term treatment attendance and substance use, above and beyond depressive symptoms, negative symptoms, and substance use severity. Short-term outcomes were defined as the two weeks of treatment after the Motivational Interviewing session. There were four possible sessions clients could attend during this time. Long-term attendance was defined as the full length of treatment, which was attendance at a possible 52 treatment sessions in the BTSAS sessions that followed the MI. Also, urinalyses performed at BTSAS sessions indicated the presence or absence of the client's goal drug (i.e., cocaine, heroin, or marijuana). In order to examine whether increased change language frequency would predict short and long term substance use treatment outcomes, we conducted four separate hierarchical regression analyses (with short- and long-term attendance and short- and long-term substance use as criterion variables), controlling for negative symptoms, depressive symptoms, and substance use severity (as indexed by the ASI Lifetime Substance Use). Negative symptoms, depressive symptoms, and substance use severity were entered into the first step and change language frequencies for Desire, Ability, Reasons, and Commitment were entered into the second step.

Short-term treatment attendance. The overall model was not significant [$F(7,32) = 1.78$, $R^2 = .28$, $p = .13$]. As revealed by the regression coefficients significance tests, none of the change language categories uniquely predicted short-term treatment attendance (all ps > .05).

Short-term substance use. The overall model was not significant [$F(7, 32) = 1.54$, $R^2 = .25$, $p = .19$]. As revealed by the regression coefficients significance tests, none of the change language categories uniquely predicted substance use (all ps > .05). These findings indicate that change language frequencies did not predict increased short-term substance use after the Motivational Interviewing session.

Long-term treatment attendance. The overall model was significant [$F(6,37) = 2.36$, $R^2 = .37$, $p < .05$]. An examination of regression coefficients revealed that Ability language frequency uniquely predicted long-term treatment attendance ($\beta = .52$, $t(32) = 2.38$, $sr^2 = .11$, $p < .05$). These results indicate that greater frequency of statements related to perceived ability to reduce/stop substance use during Motivational Interviewing uniquely predicted a greater amount of sessions clients attended above and beyond depressive symptoms, negative symptoms, and substance use severity. Additionally, increased depressive symptoms ($\beta = .42$, $sr^2 = .14$, $p = .01$) and substance use severity ($\beta = .33$, $sr^2 = .09$, $p = .04$) predicted increased long term treatment attendance in the final model. These results are presented in Table 12. We also considered the fact that Motivational Interviewing sessions occurred at different intervals after the first BTSAS treatment session. Therefore, we ran the same analyses considering only those after the Motivational Interviewing session, rather the total amount of sessions. These results did not change when considering only those sessions after the Motivational Interview.

Long-term substance use. The omnibus ANOVA indicated that the full model was significant [$F(7, 32) = 2.51$, $R^2 = .36$, $p < .05$]. An examination of regression coefficients revealed that Ability language frequency approached significance as a significant unique predictor ($\beta = .42$, $sr^2 = .07$, $p = .07$) of substance use after the Motivational Interviewing session. These results are presented in Table 13. These results did not differ when considering only the sessions which occurred after the Motivational Interviewing session.

Table 12
Hierarchical regression analysis of change language frequency predicting long term treatment attendance.

Variable	b	SE	sr^2	p
Step 1[+]				
Negative symptoms	2.74	4.50	.00	.55
Depressive symptoms[*]	**1.38**	**.66**	**.10**	**.04**
Substance Use Severity[+]	10.61	5.60	.08	.07
Step 2[*]				
Negative symptoms	4.40	4.26	.02	.31
Depressive symptoms*	**1.86**	**.69**	**.14**	**.01**
Substance Use Severity[*]	**11.28**	**5.31**	**.09**	**.04**
Ability[*]	**2.91**	**1.22**	**.11**	**.02**
Desire	-2.14	1.77	.03	.24
Reasons	-.32	.32	.02	.32
Commitment	-.44	.84	.01	.60

[+]$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Table 13

Hierarchical regression analysis of change language frequency predicting long term substance use (as indexed by the number of clean urinalyses).

Variable	b	SE	sr^2	p
Step 1[**]				
Negative symptoms	-6.10	4.55	.04	.19
Depressive symptoms[**]	**1.95**	**.67**	**.17**	**.01**
Substance Use Severity	8.07	5.66	.04	.16
Step 2[**]				
Negative symptoms	-4.44	4.62	.02	.34
Depressive symptoms[**]	**2.44**	**.75**	**.22**	**.00**
Substance Use Severity	8.22	5.76	.04	.16
Ability[+]	2.51	1.33	.07	.07
Desire	-1.99	1.92	.02	.31
Reasons	.13	.34	.00	.71
Commitment	-.46	.91	.00	.62

[+]$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

The Relationship of Self-Report Measures of Motivation to Substance Use

Treatment Outcomes

Correlations between self-report measures of motivation and treatment outcomes are provided in Table 14. Increased readiness to change scores on the C-SOC were significantly associated with increased short-term attendance and clean urines. There were no other significant correlations. We then examined the relationship of readiness to change as indexed by the C-SOC to short-term treatment attendance and substance use, above and beyond depressive symptoms, negative symptoms, and substance use severity. Therefore, we conducted two separate hierarchical regression analyses (with short-term attendance and substance use as criterion variables), above and beyond negative

symptoms, depressive symptoms, and substance use severity (as indexed by the ASI Lifetime Substance Use). Negative symptoms, depressive symptoms, and substance use severity were entered into the first step and C-SOC total score was entered into the second step.

Short-term attendance. The overall model was significant [$F_{(4,39)} = 4.41$, $R^2 = .34$, $p < .01$]. An examination of regression coefficients indicated that C-SOC scores uniquely predicted short-term treatment attendance ($\beta = .34$, $t(39) = 2.44$, $sr^2 = .11$, $p < .05$). These results indicate that greater self-reported readiness to change, as indexed by the C-SOC, uniquely predicted better short-term treatment attendance above and beyond depressive symptoms, negative symptoms, and substance use severity.

Short-term substance use. The overall model was significant [$F_{(4,39)} = 4.58$, $R^2 = .59$, $p < .01$]. An examination of regression coefficients indicated that C-SOC scores uniquely predicted short-term substance use ($\beta = .33$, $t(39) = 2.34$, $sr^2 = .10$, $p < .05$). These results indicate that greater self-reported readiness to change, as indexed by the C-SOC, uniquely predicted less substance use in the short-term above and beyond depressive symptoms, negative symptoms, and substance use severity.

Table 14
Correlations between self-report measures of motivation tto change and substance use treatment outcomes.

| | Treatment Outcomes | | | |
	Short-term attendance	Short-term use	Long-term attendance	Long-term use
Readiness to Change				
URICA Total	.10	.25	-.08	.21
C-SOC Total	**.30**[*]	**.39**[**]	-.02	.22
Abstinence Self-Efficacy				
DASE Total	-.04	.07	-.10	-.00
AASE Total	.10	.13	-.08	.08
Decisional Balance - Drugs				
DBD - Pros	-.15	-.07	-.10	-.06
DBD - Cons	.03	.21	-.08	.10
Processes of Change				
POC-D	-.00	.28	-.19	.12

*$p < .05$; **$p < .01$; Note: "Substance use" is defined as number of clean urines

The Relationship of MI-Consistent Therapist Behaviors to Substance Use Treatment Outcomes

Correlations between MICO therapist behaviors and treatment outcomes are provided in Table 15. We examined the relationship of MICO therapist behaviors to short- and long-term treatment attendance and substance use, above and beyond depressive symptoms, negative symptoms and substance use severity.

In order to examine whether increased MI-consistent therapist behaviors would predict short and long term substance use treatment outcomes, we conducted four separate hierarchical regression analyses (with short- and long-term attendance and

substance use as criterion variables), above and beyond negative symptoms, depressive

symptoms, and substance use severity (as indexed by the ASI Lifetime Substance Use).

Negative symptoms, depressive symptoms, and substance use severity were entered into

the first step and total MICO therapist behaviors was entered into the second step.

MICO therapist behaviors did not significantly predict outcomes in any of the

four regression models (all ps > .05). These results indicate that MICO therapist behavior

did not significantly predict short- or long-term attendance or substance use.

Table 15
Correlations between MICO therapist behaviors and substance use treatment outcomes.

	Treatment Outcomes			
	Short-term attendance	Short-term use	Long-term attendance	Long-term use
MICO Behaviors	-.19	-.29	-.11	-.19

Note: "Substance use" is defined as number of clean urines

Proposed Analyses Using Strength Ratings

Relationship of Change Language Strength with Self-Report Measures of Motivation

Change language strength and readiness for change. We hypothesized that the

mean strengths of each language category would be significantly positively correlated

with self-reported total motivation scores yielded from the URICA and the C-SOC. We

also hypothesized that change language strengths would be negatively correlated with

Precontemplation scores and positively correlated with Contemplation, Action, and

Maintenance scores. Correlations of self-reported readiness for change scales with

language strength are presented in Table 16. Due to the inability to use strength ratings

for Desire, Readiness, Need, and Commitment, only hypotheses related to Ability and Reasons strength were able to be examined.

Contrary to our hypotheses, there were no significant correlations of the strength of Desire and Ability language with self-reported readiness to change, Precontemplation, Contemplation, Action, or Maintenance subscales of the URICA and the C-SOC. These results indicate that client statements regarding self-efficacy and reasons to reduce/stop substance use did not relate to self-reported measures of readiness to change or any of the stages of change.

Preferential associations between change language strength and self-reported readiness to change, self-efficacy, decisional balance, and processes of change. We hypothesized that each change language component would demonstrate a preferential positive correlation with the self-report measure of motivation which shared face validity. For the purposes of these analyses, the total score of each self-report measure was used. Due to the aforementioned issues with strength data available for analyses, we were only able to examine the hypothesized preferential relationships of Ability and Reasons language strength with self-reported self-efficacy and decisional balance, respectively. We first conducted zero-order correlations of Ability and Reasons language strength with self-reported drug abstinence self-efficacy, alcohol abstinence self-efficacy, decisional balance (pros and cons subscales), and processes of change (DASE, AASE, DBD-Pros, DBD-Cons, and POC-D, respectively). We then assessed preferential correlations using tests of the equality of correlations outlined by Cohen, Cohen, Aiken, and West (2002); however, it should be noted that this study did not have enough power to detect medium effect size differences between correlations. Therefore, the lack of significant differences

among correlations should be interpreted in this context. The correlations of change

language strength and assessments of readiness to change, self-efficacy, decisional

balance, and processes of change are presented in Table 16.

 Ability language strength and self-efficacy. We predicted that Ability language

strength would show a preferential positive correlation with self-efficacy measures (over

other measures of motivation). The correlation of self-reported drug and alcohol

abstinence self-efficacy scores (DASE and AASE) with Ability language strength were

.52 and .55 (ps < .01), respectively. The correlation of the Drug Decisional Balance Pros

scale (DBD-Pros) with Ability language strength was -.44 (p < .05). The correlations of

Ability language strength with the total readiness for change (as indexed by the URICA

and the C-SOC), Drug Decisional Balance Cons (DBD-Cons), and the Processes of

Change – Drug (POC-D) total scores were not significant (ps > .05).

 Although the correlations Ability language strength with DASE and AASE total

scores was significantly greater than that with the URICA, C-SOC, DBD-Cons and POC-

D total scores, the magnitude of the correlation did not differ significantly from the

correlation with the DBD-Pros score. Therefore, Ability language strength during

Motivational Interviewing did not preferentially correlate with self-reported self-efficacy

to reduce or stop drug use, but did evidence a higher correlation than with other self-

report measures of motivation. Again, given sufficient power, the correlation magnitude

of Ability language with self-efficacy measures (r =.52 and r = .55) may have been

significantly different from that with decisional balance measures (r = -.44).

Reasons language strength and decisional balance. We predicted that Reasons language strength would show a preferential positive correlation with the Decisional Balance Pros and Decisional Balance Cons scales over other measures of motivation.

Reasons strength did not demonstrate a significant correlation with the Decisional Balance – Drug scales. Therefore, contrary to our hypothesis, the strength of statements indicating Reasons for change during Motivational Interviewing was not preferentially related to self-reports of pros and cons of drug use over other assessments of motivation.

Table 16
Correlations of readiness to change measures with change language strength.

	A (n = 29)	R (n = 44)
Readiness to Change		
URICA Total	.05	.14
URICA Precontemplation	-.31	-.09
URICA Contemplation	.16	.21
URICA Action	.06	.05
URICA Maintenance	-.34	.04
C-SOC Total	.34$^+$	.10
C-SOC Precontemplation	-.25	.07
C-SOC Contemplation	-.22	.06
C-SOC Action	.15	.14
C-SOC Maintenance	.29	.21
Abstinence Self-Efficacy		
DASE Total	**.52****	.21
AASE Total	**.55****	.16
Decisional Balance - Drugs		
DBD - Pros	**-.44***	.19
DBD - Cons	-.20	.14
Processes of Change		
POC-D	.31	.23

Note. Sample size on which each correlation was conducted indicated in parentheses. A = Ability; R = Reasons. Shaded cells indicate hypothesized correlations, with gridded cells indicating hypothesized preferential correlations. $^+p < .10$, $*p < .05$, $**p < .01$, $***p < .001$.

Negative Symptoms and Client Language

Negative symptoms and change language strength. We hypothesized that

negative symptoms (independent of depressive symptoms) would be significantly

negatively correlated with the mean strengths of each language category such that greater

negative symptoms would be associated with less change language strength. Thus, zero-

order and partial correlations (controlling for depressive symptoms) were conducted

between negative symptoms and change language strengths. These results are presented

in Table 17.

Table 17
Correlations and partial correlations (controlling for depressive symptoms) of negative
symptoms with change language strength.

	Desire	Ability	Reasons	Commitment
Negative Symptoms	-.24	-.30	-.18	-.22
Negative Symptoms (partialled)	-.25	**-.39***	-.19	-.21

$^{+}p < .10, ^{*}p < .05, ^{**}p < .01, ^{***}p < .001.$

Our hypothesis was partially supported. Negative symptoms demonstrated a

significant negative partial correlation with Ability strength ($n = 29$, $r = -.39$, $p < .05$), but

not Reasons strength ($n = 44$, $r = -.19$, $p = .12$). These results indicate that more negative

symptoms are related to lower strength of statements related to ability to reduce/stop drug

use among those who made ability statements.

Motivational Interviewing-consistent (MICO) behaviors and change

language strength. We hypothesized that MICO behaviors would be positively

correlated with greater change language strength. To examine the relationship between

(MICO) therapist behaviors and client change language strength, we conducted

correlations between the number of MICO behaviors and Ability and Reasons strength.

MICO behaviors were not significantly correlated with the strength of Ability ($r = -.12$, $p > .05$) or Reasons ($r = -.12$, $p > .05$) language. Contrary to predictions, these results indicate that therapists' increased use of MI-consistent behaviors is not associated with the strength of any change language category.

Change Language Strength as a Predictor of Substance Use Treatment Outcomes

We examined the relationship of Reasons and Ability change language strength to short- and long-term treatment attendance and substance use, above and beyond depressive symptoms, negative symptoms and substance use severity. In order to examine whether increased change language frequency would predict short and long term substance use treatment outcomes, we conducted four separate hierarchical regression analyses (with short- and long-term attendance and substance use as criterion variables), above and beyond negative symptoms, depressive symptoms, and substance use severity (as indexed by the ASI Lifetime Substance Use). Negative symptoms, depressive symptoms, and substance use severity were entered into the first step and Reasons and Ability language strength were entered into the second step.

Short-term treatment attendance. The full model was not significant [$F(5, 20) = 1.58$, $R^2 = .28$, $p = .21$]. As revealed by the regression coefficients significance tests, none of the change language categories uniquely predicted treatment attendance; however, Ability strength ($\beta = .41$, $t(19) = 1.93$, $sr^2 = .13$, $p = .07$) approached significance. This finding should be interpreted in the within the context of the sample size it was conducted ($n = 25$); Ability language strength, given a larger sample size, may have emerged as significant whereby increased strength of statements during the

Motivational Interviewing session related to the client's perceived self-efficacy to reduce/stop substance use would predict treatment attendance during the subsequent two weeks.

Short-term substance use. The full model was not significant [$F(5, 20) = 2.15$, $R^2 = .35$, $p = .10$]. As revealed by the regression coefficients significance tests Ability language strength uniquely predicted short-term substance use during the subsequent two weeks of treatment ($\beta = .43$, $t(19) = 2.11$, $sr^2 = .15$, $p < .05$). These findings indicate that increased strength of statements during the Motivational Interviewing session related to the client's perceived self-efficacy to reduce/stop substance use predicted substance use during the subsequent two weeks of treatment above and beyond depressive symptoms, negative symptoms, and substance use severity.

Long-term treatment attendance. The full model was significant [$F(5, 20) = 1.49$, $R^2 = .27$, $p = .24$]. An examination of regression coefficients revealed that neither Reasons ($\beta = .38$, $t(19) = 1.80$, $sr^2 = .12$, $p < .09$) nor Ability ($\beta = .09$, $t(19) = .43$, $sr^2 = .01$, $p = .67$) language strength significantly uniquely predicted long-term treatment attendance. Of note, Reasons language strength did approach significance; given a larger sample size, Reasons language strength may have emerged as significant whereby increased strength of statements during the Motivational Interviewing session related to reasons for reducing/stopping substance use would predict treatment attendance during the duration of treatment.

Long-term substance use. The full model was not significant [$F(5, 20) = 2.40$, $R^2 = .38$, $p = .07$]. Also, none of the predictors emerged as unique significant predictors (all ps > .05); however, Reasons language strength approached significance in predicting

the total number of clean urine samples obtained after the Motivational Interviewing

session ($\beta = .40$, $t(19) = 2.06$, $sr^2 = .13$, $p = .05$).

Chapter 4: Discussion

The current study was the first of its kind to examine whether motivational change language, an important factor in predicting treatment outcomes, could be reliably characterized in individuals with serious mental illness, and the extent to which change language is associated with self-reported measures of motivation. Given the potential impact of symptomatology on therapy dynamics and processes, we examined whether negative symptoms are associated with change language and therapist behavior during Motivational Interviewing sessions. We also investigated the utility of change language in predicting substance use treatment outcomes. Finally, since clients' negative symptoms could lead to increased therapist effort to facilitate client statements, we examined the potential role of therapist-prompted client language in Motivational Interviewing as an exploratory aim (see Appendix B). The following sections provide a detailed description of the findings, including limitations that were encountered and their implications in interpreting the current study's results.

Reliability of Change Language Ratings

Overall, we found that change language *frequency* can be reliably rated across the language categories with sufficient data cells (Desire, Ability, Reasons, and Commitment), but that reliable *strength* ratings are difficult to ascertain in all of the change language categories except Ability and Reasons.

Desire, Ability, Reasons, and Commitment language frequencies yielded "excellent" reliability according to Cicchetti's (1994) guidelines; however, the reliability of strength ratings was extremely variable, ranging from "poor" to "good." Low base rates of Need and Readiness language precluded the assessment reliability of frequency

and strength ratings for these language categories. There are numerous potential reasons for the lack of emergence of Need and Readiness language. It is possible that these particular language categories do not emerge frequently among individuals with serious mental illness receiving MI. Another possibility is that the particular structure of this Motivational Interviewing session did not lend itself to the client expressing the need and readiness to change substance use behavior, resulting in low frequencies of these language categories. Finally, raters may have had difficulty categorizing statements in these two categories. In many cases, there is ambiguity among types of change language statements. For instance, the statement, "I really need to stop using because I want to get my children back," could have potentially been coded as a Need or Reasons statement. Similarly, "This time, I'm really ready to do what I need to do to stay clean," may have been coded as a Readiness or Commitment statement. In turn, these difficulties in categorization of client statements may have lead to decreased frequency of Readiness and Need language.

Prior studies suggest that Readiness and Need language are infrequently uttered or are difficult to code. Findings by Amrhein (2003) indicated that both Need and Readiness language exhibited the lowest frequencies (mean occurrences per session were .68 and .16, respectively), suggesting similar difficulties in categorizing these statements. A study by Baer (2008) did not code Need or Readiness language (but did code Desire, Ability, Reasons, and Commitment language). Though not explicitly stated, it is possible that the research group encountered low Need and Readiness language frequencies, and therefore did not include them in the analyses.

Although Ability and Reasons language strength evidenced good reliability, low base rates may have affected reliability of strength ratings for Desire and Commitment language. With respect to Desire language strength, an examination of the distribution of base rates revealed that there may not have been sufficient power to determine a reliable estimate of inter-rater agreement. Desire language only occurred twice or more in 13% (n = 6) of the sample. Whereas frequency ratings can be assessed for the full sample of 45, strength ratings can only occur for a subset of the sample (i.e., when the language actually occurred). Therefore, while low base rates have an impact on the reliability of frequency ratings, they have even greater impact on strength ratings, where the data available to calculate an ICC is significantly lessened. Also, the low sample size of the study most likely impacted our ability to yield reliable ratings, thereby compounding the issue of low base rates.

Numerous studies reported using the MISC manual to code client language or reported coding numerous change language categories (Gaume, et al., 2008; Glynn, 2010; Magill, 2010; Moyers, 2006; Moyers, et al., 2007; Vader, et al., 2010). Such an approach would yield both frequency and strength ratings across all change language categories. Nevertheless, all of these studies dichotomized client language into change and counter-change language categories and did not report findings on language strength. One study (Gaume, et al., 2008) explicitly indicated that low base rates led to the decision to use the dichotomous approach for change language frequencies, yet no findings were reported with respect to strength ratings. Another study (Baer, et al., 2008) reported findings incorporating reasons, commitment, and desire/ability, thereby combining categories. Instead of strength ratings, each category was dichotomized. This is peculiar in light of

frequent reference in these studies to Amrhein's (2003) research, in which language frequency and strength were utilized in the analyses. This pattern of reporting suggests that base rates may have been an issue in prior studies. Moreover, Moyers et al. (2009), indicated that her research group has encountered repeated difficulty obtaining reliable strength ratings; however, potential reasons for this were not discussed.

Despite these limitations, our findings support the idea that client change language can be reliably measured in this population when language frequency is considered, but that coding the strength of change language may prove difficult for coders.

Aside from the observed issues with base rates in this study, there are numerous other possible reasons for the difficulty to reliably rate change language strength that are related to the coding procedures, namely the use of transcripts, the nature of the strength rating scale, coder training issues, and frequency of reliability assessment. Also, the study which achieved excellent change language strength reliability across all language categories (Amrhein, et al., 2003) utilized potentially problematic data analytic strategies which may have impacted the yielded reliabilities. Finally, sample characteristics may have contributed to difficulty coding language strength. Taken together, these issues potentially contributed to significant variability in change language strength scores in the current study, thus reducing reliability estimates. These issues are discussed below.

One issue which may have affected strength rating reliability was the use of transcripts for coding rather than viewing live therapy sessions. Indeed, statements that are direct (e.g., "I am really gonna do it this time") are easily judged as stronger than indirect statements (e.g., "There is no question about how important it is for me to stop

using"); however, the magnitude of the strength difference may be difficult to characterize on a 10-point scale without hearing the client's statement. In this way, it is difficult to assess the language strength from transcripts, as there are numerous other aspects of language that could potentially be used to judge the strength of expressed attitudes (Searle, 1969) which cannot be captured in a transcript, such as voice inflections, prosody, facial expressions and gestures.

Anecdotally, the raters reported having difficulty making strength ratings and indicated that it would have been easier to make strength ratings had the scale had a smaller range (e.g., -3 to +3 instead of -5 to +5). They also reported frequently using strength ratings of +3 and +4, thus artificially, although not intentionally, restricting the range of scores. Therefore, while it is easy to distinguish between change talk and counter-change talk, it is difficult to distinguish between a strength rating of, say, +2 or +3 when using transcripts. Amrhein, et al.(2003) used transcripts and reported an ICC of .83 for the mean strength across categories; however separate ICCs were not reported for each language category. Therefore, it is not clear whether poor strength ratings may have been encountered in some language categories and not in others. Other studies which used transcripts (Magill, 2010; Moyers, et al., 2006; Moyers, et al., 2007) did not report on strength ratings despite reporting having used coding procedures which incorporate language strength. Another study (Moyers, et al., 2009) utilized a combination of transcripts and audiotape and explicitly emphasized that their research group uses this approach consistently. Nevertheless, they reported having difficulty obtaining reliable strength ratings across numerous studies, suggesting that perhaps the use of audiotape does not present added benefit.

Another issue which may have affected the reliability of strength ratings is coder training. The transcripts that were not used in the current study (i.e., transcripts from a Motivational Interview that was conducted at a later point in the parent study) were used to train coders until an acceptable reliability level was maintained over six transcripts. Furthermore, a more stringent method of assessing coder reliability was used during the training period than for the study. Specifically, we used utterance-by-utterance agreement rather than the agreement between raters on the mean frequencies and strength of each (as was used in past studies). Nevertheless, the sample transcripts differed from the study transcripts in ways that may have affected reliability. For instance, the transcripts used were from a second Motivational Interviewing session conducted 3 months into the parent study. The nature of this Motivational Interviewing session differs in that the central focus is on maintaining abstinence achieved to that point or on problem-solving failed abstinence/reduction attempts, rather than on the broader topics of consequences of substance use, feedback, and goal setting, which were the focus of the current study's Motivational Interviewing sessions. Therefore, the language may have been easier to code or there may have been less heterogeneity in emerging language, thus yielding better reliability. An alternative approach to the current study's training approach might have been to create artificial transcripts which resembled the study's transcripts in focus and scope.

Another issue related to training was the frequency of rater meetings. In the current study, meetings were held bi-weekly to discuss general coding issues. Additionally, the author was available via email to address issues between meetings. In order to make sure that both coders had access to the same information, any responses to

questions were forwarded to both coders. Despite efforts to prevent rater drift, weekly meetings may have served to keep coders consistent.

A final issue which may have affected inter-rater consistency was the fact that once the study transcripts were provided to raters for coding, no other efforts were made to assess consistency for the duration of the study. An alternative approach would have been to determine ICCs at various points during coding and address issues that arose. In the current study, such an approach was not used as it could potentially introduce variability in ratings across time because coders could potentially change their conceptualization of various aspects of the coding procedure.

Finally, uncertainty regarding making strength ratings may have introduced significant variability to the data, thus reducing the observed agreement between raters. Again, prior studies which examined change language dichotomized ratings into change talk and counter-change-talk (Baer, et al., 2008; Gaume, et al., 2008; Gaume, et al., 2010; Glynn, et al., 2010; Magill, et al., 2010; Moyers, et al., 2003; Moyers, et al., 2007; Moyers, et al., 2009; Vader, et al., 2010), thus reducing the amount of potential variation and clarifying rating distinctions for raters. Again, this pattern of reporting also brings into question whether these studies may have originally attempted to use the full range of strength ratings, but did not indicate whether attempts to rate language strength were unsuccessful.

Another factor that may have impacted the pattern of findings with respect to strength language across studies is Amrhein's (2003) method of addressing missing cells for language strength ratings. Amrhein's research group imputed data values for strength of categories using an expectation-maximization algorithm, but did not report the base

rates of change language. This approach is typically used in self-report measures where there is missing data and missing values can be inferred from the values present in the data set. The use of this data imputation method is problematic when considering ratings of client language strength, particularly if there were large amounts of missing values due to low base rates of change language frequencies. Essentially, imputed values would represent strength ratings for change language which did not occur. Moreover, it was not clear whether a base rate threshold was set in order to allow for imputation of data; therefore, the percentage of data that was imputed was not clear. In the current study, values for strength ratings were not imputed due to the aforementioned limitations of this approach, therefore, Amrhein's (2003) data analytic approach may have explained why this study and others (see Moyers, 2009) failed to yield reliable strength ratings. It is possible that the ratings may not have been reliable if this artificial correction were not applied.

A final factor which might have impacted strength reliability is sample characteristics which differed from Amrhein's (2003) study. It is possible that clinical, sociodemographic or substance use-related characteristics could have impacted the way that language unfolded over the course of the Motivational Interviewing session, making language more difficult to code. With respect to clinical characteristics, perhaps there are aspects of having serious mental illness which could interfere with the ability to garner strength ratings. The current study had a high percentage of individuals with bipolar disorder, which during mania, is characterized by flight of ideas. This could have made strength ratings more difficult. Furthermore, the high sample composition of individuals with schizophrenia spectrum disorders may have introduced such complicating factors as

loosening of associations and dissociation. Although the clinical composition of Amrhein's sample was not specifically delineated, and likely did include individuals with psychiatric problems, the study was likely not comprised of individuals with serious mental illness.

With respect to sociodemographic factors, the current study was similar to the prior study in that the sample was a low income inner-city sample with average education of about 12 years. Where the two studies diverge is in the ethnic composition (Amrhein's study was more diverse) and in the distribution of individuals who abuse various drugs (cocaine, crack, heroin, and "other"). The current study is composed primarily of crack-cocaine users. While the nature of the impact of these differences cannot be theoretically derived, it is possible that these differences introduced variance which may have impacted strength ratings.

Relationships among Change Language Categories and to Self-Report Measures of Motivation

In order to establish evidence of validity of change language ratings, we examined, (1) whether the interrelationships of change language dimensions reflected that of prior studies and, (2) whether the pattern of convergence of change language categories on self-reported measures of motivation to change occurred as would be expected according to their face validity. Overall, there was little evidence of concordance between change language and self-reported measures of motivation, except in the case of the Ability language strength, which demonstrated significant, high magnitude relationships with self-report measures of drug and alcohol abstinence self-efficacy.

We examined whether the structure of relationships among change language categories reflected that of a prior study (Amrhein et al., 2003) in which Desire, Ability, Reasons, and Need language strength each accounted for unique variation in Commitment language. According to these findings and research by other groups (Hall, Havassy, & Wasserman, 1990; Marlatt, Curry, & Gordon, 1988; McKay, Alterman, Cacciola, O'Brien, Koppenhaver, & Shepard, 1999; Mussell, Mitchell, Crosby, Fulkerson, Hoberman, & Romano, 2000), increasing the client's will (desire), perceived ability (self-efficacy), need, and reasons to change should result in increases in commitment to change. Although the frequency of statements related to a client's will to change substance use behavior was not uniquely related to commitment language in this study, clients' statements of perceived ability and reasons for change were uniquely related to commitment language frequency, accounting for 40% and 10% of unique variance (respectively) in the frequency of commitment statements. These findings suggest that the generation of statements regarding self-efficacy and reasons to reduce/stop substance use are unique indicators of the client's stated commitment to change. The fact that Desire statements did not account for a significant amount of variance in Commitment strength may be due to the overlap of shared variance between Desire and Ability. Therefore, these results are largely consistent with Amrhein et al. (2003), in which Commitment statements were found to be comprised of the underlying dimensions of Desire, Ability, and Reasons.

We found little evidence of agreement between change language categories and self-reported measures of motivation to change. With respect to language frequencies, there were no relationships between change language and self-reported assessments of

general readiness to change, drug and alcohol abstinence self-efficacy, decisional balance, or processes of change. There was, however, evidence of a preferential relationship of increased Ability language strength with increased self-reported drug and alcohol abstinence self-efficacy. Indeed, the magnitude of the association of Ability language strength to self-efficacy was not significantly greater than that to self-reported decisional balance (pros); however, due to the lack of power, it is reasonable to suggest that given a sufficient sample size, that this difference may have been significant. The fact that Ability language strength is related at such a high magnitude to self-efficacy measures suggests that Ability language is indeed tapping an aspect of motivation specifically associated with clients' self-efficacy to reduce/stop drug use in this sample.

One possible explanation for the lack of agreement between self-report measures of motivation and change language is the fact that self-report measures are completed one to two weeks before the Motivational Interviewing session. It is possible that motivation may change during this time frame. Another possibility is that the method of assessment (self-report versus interview by a therapist) played a role in obtaining differing appraisals of motivation. Nevertheless, this is the first study to examine concordance between self-report measures of motivation and change language; therefore, further research is needed to make firmer conclusions in this area.

Relationships among Change Language, Therapist Behavior, and Negative Symptoms

We sought to examine the potential relationship between negative symptoms and the emergence of change language during MI. Of note is that there was a restriction of range of negative symptoms in this sample. Specifically, the mean number of negative

symptoms was low for most participants. This may be attributable to the measurement instrument or to the diagnostic composition of the sample. In the current study, we used the PANSS to assess negative symptoms, which presents numerous limitations in validly measuring negative symptoms (see Blanchard, Kring, Horan, & Gur, 2011), including content validity. Therefore, it is possible that negative symptoms which were truly present in the current sample were not detected by the measurement instrument.

Another possibility is that there was truly a lack of negative symptoms in the sample. Schizophrenia, which is partially characterized by the presence of negative symptoms, was only present in one participant. Both schizoaffective disorder and psychosis, which accounted for 26.7% of the sample, are associated with significantly fewer negative symptoms than in schizophrenia (Bora, Yucel, & Pantelis, 2009). Furthermore, bipolar disorder, which constituted most of the sample (51.1%), is also associated with the presence of significantly fewer negative symptoms than schizophrenia (Barrett, Mulholland, Cooper, and Rushe, 2009). Furthermore, the mean negative symptoms in the current study were significantly lower (1.7 standard deviations) than in a large multi-center study of individuals with schizophrenia (Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE), 2005). This suggests that negative symptoms were severely limited in this study, thus possibly contributed to the restriction of range and the resulting inability to detect relationships between negative symptoms and change language. Therefore, the current findings must be interpreted within this context. The current sample does not reflect a true sample of individuals with a range of negative symptoms. If this were not the case, there might have been a relationship between negative symptoms and change language.

In understanding the relationship between negative symptoms and Ability language, the context in which Ability statements were made must be understood. Most Ability statements were made during the portion of the Motivational Interviewing session when a plan for change and potential obstacles (e.g., risky situations and triggers) were discussed. Therefore, one possible explanation for the association between negative symptoms and Ability language is that those with increased negative symptoms expressed less confidence in their ability to either plan for change or navigate risky situations surrounding substance use. This would be consistent with research which has found robust associations between increased negative symptoms and decreased social and cognitive functioning (e.g., Blanchard, Horan, & Collins, 2005; Bozikas, Kosmidis, Kioperlidou, & Karavatos, 2004), which in turn are critical to effectively evaluate various options to achieve change, engender the necessary social support system for recovery, as well as engage in the complex set of behaviors necessary to resist substance use and make and maintain change.

There was no evidence of an association between increased negative symptoms and decreased frequency of any language category or Reasons language strength. Moreover, there was no relationship between negative symptoms and therapists' use of MI-consistent behavior. These findings may have been due to the aforementioned restriction of range issues. Another possible explanation is the link between MI-consistent therapist behavior and frequency of client language. Therapists' use of Motivational Interviewing skills were associated with client statements related to reasons for reducing/stopping substance use and marginally linked to expressed desire and commitment to reduce/stop. Indeed, in prior research, the emergence of change language

has been found to be contingent upon the therapists' use of MI-consistent skills (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Moyers, Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Vader, Walters, Prabhu, Houck, & Field, 2010). In this way, it was thought that perhaps therapists execute more MI-consistent skills when a client does not seem to be engaging, such as might be the case in individuals with increased negative symptoms; however, the current study found no relationship between MI-consistent therapist behaviors and negative symptoms or the specific symptoms of alogia. Again, this finding has limited interpretability given the lack of range of negative symptoms in this sample.

The current study found evidence of the impact of therapists' use of MI-consistent skills on the emergence of client change language. Sequential analysis approaches to examining therapists' use of Motivational Interviewing skills and change language have found that MI-consistent behaviors precede the emergence of change language (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Moyers, Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Vader, Walters, Prabhu, Houck, & Field, 2010). In the current study, there was evidence that therapists' increased use of MI-consistent behaviors was associated with increased frequency of statements related to reasons for reducing/stopping substance use. Taken together with past findings, this suggests that therapists can indeed elicit change language in clients with serious mental illness by practicing Motivational Interviewing therapist skills. Nevertheless, therapists' increased use of MI-consistent behaviors was not associated with either substance use treatment outcomes or Ability language, which did in fact predict outcome. This finding is inconsistent with the idea that hypothesized mechanism by which MI affects treatment

outcome is through the therepist's elicitation of change language, which in turn is an indicator of favorable outcomes. Indeed, this study's use of correlational rather than contingency analyses limits the ability to draw firm conclusions regarding mechanisms underlying MI as they relate to therapist behaviors and their relations to change language and outcome.

Although the current study elucidated some univariate associations among change language, therapist behavior, and negative symptoms, more work is needed to better characterize these associations and capture the interactional nature of therapist Motivational Interviewing skills, client behavior, and symptomatology.

Change Language as a Predictor of Substance Use Treatment Outcomes

Given the size of the effects for those relationships which did not quite reach significance and the low achieved power of this study (approximately 40% and 27% for frequency and strength ratings, respectively), we discuss here statistically significant as well as marginal effects, as we feel that given adequate power, these marginal effects might have been significant.

The number of client statements regarding self-efficacy in changing substance use behavior emerged as a prospective predictor of attendance at the 6-month behavioral treatment program which followed the Motivational Interviewing session. Specifically, increased *frequency* of Ability language predicted better long-term treatment engagement, accounting for 11% of the variance. Ability frequency also marginally predicted long-term substance use (7% of the variance).

Despite reduced availability of data for strength analyses, the strength with which clients made Ability statements predicted substance use two-weeks after the Motivational

Interviewing session (and marginally predicted short-term attendance). Increased *strength* of Ability language predicted less short-term (two weeks after the Motivational Interviewing session) substance use (15% of the variance) and marginally predicted better short-term attendance (13% of the variance). Finally, greater strength of statements related to Reasons language marginally predicted better long-term treatment engagement (12%) and less substance use (13%). Of note is that the incremental validity of these language predictors in predicting substance use treatment outcomes was above and beyond other known predictors in prior research (i.e., depressive symptoms, negative symptoms, and substance use severity). However, a major limitation of the finding with respect to substance use outcome is that the index of substance use in the current study is confounded by treatment engagement. Specifically, the total number of clean urine samples provided was contingent upon participants' treatment attendance.

In contrast to studies which found that Commitment language *strength* was the target language component in determining treatment outcomes (Aharonovich, et al., 2009; Amrhein et al., 2003), the current study revealed the importance of Ability language *frequency* in this sample. Also, despite a significant association between Ability and Commitment language statements, the current study found ability statements to be predictive of outcome, while the aforementioned studies found support for commitment language to be an indicator of outcome. Therefore, the relevance of commitment language to substance use outcomes in the current study is not clear. However, these findings are consistent with a study (Mann-Wrobel, Bennett, Weiner, Buchanan, & Ball, in press) which found self-efficacy to quit smoking to be more central to cessation efforts than readiness for change alone.

The Relationship of Self-Reported Motivation to Change to Substance Use

Treatment Outcomes

Consistent with previous findings in the larger parent study sample which found

that the C-SOC was associated with increased treatment utilization and decreased

substance use, (Strong-Kinnaman, Bellack, Brown, & Yang, 2007), readiness for change,

as measured by the C-SOC, emerged as a significant predictor of increased short-term

treatment attendance and decreased substance use. Nevertheless, other self-report

measures of motivation did not significantly predict outcome. This may speak to the

utility of the C-SOC in assessing motivation for change in serious mental illness over

other measures. The C-SOC was not related to long-term outcomes. This is not surprising

given the timing of the assessment in relation to the measurement of the outcome (i.e.,

self-report measures were administered once at the beginning of the study). Given that

motivation to change is thought to wax and wane over time, it is possible that one

assessment of motivation that is not sufficient to predict longer-term outcomes.

The Relationship of MI-Consistent Therapist Behaviors to Substance Use

Treatment Outcomes

In contrast to a study which found an effect of Motivational Interviewing skills on

alcohol use outcome (Moyers et al., 2009), the current study found no such link.

Therefore, taken together with the findings that Ability statements were predictive of

outcomes, but that MICO therapist behaviors were not linked to Ability statements, the

proposed causal chain for Motivational Interviewing is not supported in this study. One

possible reason for this may be that there were numerous confounds between the time of

the Motivational Interview and the measurement of outcomes, the most likely of which

was a behavioral treatment for substance use. It may be the case that in a more controlled study, the impact of MICO therapist behaviors on outcome would have emerged.

The Context of Client Change Language Statements and Implications for Substance Use Treatment

The context in which these statements happen are important in better understanding the relevance of Ability language to substance use treatment outcomes in this sample. A close examination of the data revealed that most of the Ability language generated in this sample was during the part of the session when clients discussed risky situations and triggers and that most of these statements were of negative strength. This means that most clients who generated Ability language identified situations in which they found it difficult to resist using drugs. This, in turn, was predictive of long-term engagement and short-term substance use (and possibly long-term substance use).

Perhaps it is the case that the more risky situations/triggers the client identifies (hence more Ability statement generation), the more they are able to practice handling those situations, which would result in less substance use throughout treatment. Also, perhaps it is the case that because clients are aware that they have numerous difficulties resisting drug use, they are more likely to attend treatment sessions and find them useful, thus accounting for the predictive utility of Ability language for treatment attendance.

This study's findings regarding the predictive utility of Ability language in both treatment engagement and substance use outcomes speak to the importance of discussing risky situations and triggers for substance use during Motivational Interviewing sessions for individuals with serious mental illness; however, it is not clear at this point whether it is the mere discussion and/or the client's awareness of risky situations and triggers which

is the underlying mechanism. Indeed, discussing situations in which clients find it difficult to resist substances would generate increased Ability language. This discussion would then allow for the subsequent dialog about how to handle these situations. This would particularly be the case given the nature of the Motivational Interviewing sessions in the current study. As part of this manualized treatment, therapist were trained to discuss risky situations and then to help the client generate ideas on how the client would handle these situations. Furthermore, during the behavioral treatment which followed the Motivational Interviewing session, specific drug refusal skills were practiced that were tailored to clients' specific triggers and identified risky situations.

While Ability language frequency may represent the number of situations a client can identify as risky situations, Ability language strength may represent the extent to which clients express self-efficacy in handling risky situations. For each Ability statement, the rater provided a strength rating, which may be interpreted as the confidence (or lack thereof) with which the client said that they could or could not handle a risky situation/trigger. For example, "I may be able to deal with my brother if he offers me marijuana," would be rated lower than, "I would definitely be able to say no to my brother if he offers me marijuana." Along these lines, those with more confidence evidenced less short-term, but not long-term substance use; therefore, perhaps confidence in and of itself is not sufficient in maintaining long-term abstinence, but may be enough for the client to abstain for two weeks. It is also possible that confidence is not stable over the course of treatment, thus is only a useful construct to consider in the short-term.

Other Predictors of Substance Use Treatment Outcome

A final point regarding the prediction of treatment outcomes is that within this sample, depressive symptoms and substance use severity predicted favorable treatment outcomes. That is, contrary to prior findings which demonstrate a consistent relation of poor treatment outcomes to greater substance use severity (e.g., Ahmadi, Kampman, Oslin, Pettinati, Dackis, & Sparkman, 2009; Hanlon, O'Grady, & Bateman, 2000) and higher levels of depressive symptoms (Brewer, Catalano, Haggerty, Gainey, & Fleming, 1998; Carroll, Power, Bryant, & Rounsaville, 1993), higher depressive symptoms and higher substance use severity predicted better long-term treatment attendance. Also, higher depressive symptoms significantly predicted less long-term substance use. Despite this, depressive symptoms and self-reported levels of distress have been associated with positive treatment outcomes among substance abusers (Dackis & Gold, 1987; Kosten & O'Connor, 2003), suggesting the role of subjective distress in treatment-seeking and retention. Also, baseline depressive symptoms may be secondary to substance use and withdrawal symptoms, and have been found to decline throughout treatment (Glasner-Edwards, Marinelli-Casey, Hillhouse, Ang, Mooney, & Rawson, 2009) thereby potentially reducing the negative effects of symptoms on outcome as treatment progresses. However, given the current sample of individuals with serious mental illness, depressive symptoms are more likely to be explained by pre-morbid psychopathology rather than symptoms secondary to substance use or withdrawal symptoms. In the current study, post-treatment depressive symptoms were not considered, thereby limiting our ability to assess the stability of depressive symptoms throughout treatment and its interaction with treatment outcomes. However, the behavioral treatment which followed

the Motivational Interviewing session (BTSAS; Bellack et al., 2006) addressed dual diagnosis issues; therefore, it is possible that symptoms either decreased during treatment or the impact of symptoms on substance use issues decreased throughout treatment. Also, because there were specific treatment modules focused on depression and coping with substance use problems, those with increased depressive symptoms (and perhaps increased awareness of their symptoms) may have experienced additional benefit from the treatment, thereby improving treatment outcome for these individuals. Many individuals were also seeking concurrent psychiatric care, a factor which has been associated with substance use treatment success (see Appendix A for a brief review of integrated treatment for individuals with serious mental illness). Perhaps those with more severe symptoms were among those who were more likely to seek such care and therefore experienced more favorable treatment outcomes.

The finding with respect to substance use severity predicting treatment attendance may be attributable to the way that this variable was operationalized. Past studies have utilized a composite derived from the Addiction Severity Index to characterize severity, which includes the areas of substance use, medical, legal, family, vocational, and psychiatric problems. The ASI has been found to be reliable and valid among individuals with a concurrent psychiatric disorder (Hodgins & El-Guebaly, 1992); however, the reliability of the domains of legal, family, and employment were unfavorable. Furthermore, some specific questions were not useful in characterizing substance use among individuals with serious mental illness (Course, Herschinger, & Zanis, 1995) Due to these issues the composite score was not used, but rather the single self-report item of years of past substance use. This method could have been limited in its ability to capture

the full scope of the construct of substance use severity and thus not replicating the previous findings regarding the prediction of treatment outcomes. Another possibility is that among individuals with serious mental illness, substance use severity serves as a protective factor in motivating individuals to attend treatment consistently once contact with a treatment center is made.

Limitations and Future Directions

Despite the informative findings regarding motivational statements during treatment for substance use among individuals with serious mental illness, there are numerous limitations which must be addressed. Specifically, issues related to (1) sample size, (2) clinical characteristics, (3) potential confounding factors, (4) the Motivational Interviewing session structure, (5) coding methods, (6) methods of determining substance use treatment success, and (7) not exploring the contingency between therapist behavior and client change language may have limited our ability to garner firmer interpretations of the data.

The small sample size greatly limited many aspects of the study. The power to detect effects, particularly for change language strength data, was extremely low. Therefore, is not clear whether the low occurrence Need and Readiness language reflected difficulty in identifying and coding these categories, lower likelihood of occurrence in this sample compared to other samples, or just a consequence of the low sample size. Furthermore, because ICCs are affected by sample size, it is not clear whether the inadequate reliability ratings yielded for change language strength was truly due to difficulty making strength ratings, or whether given an adequate sample size, these ratings might have reached an acceptable level. Low power due to small sample size may

have limited the ability to detect relationships between change language and self-report measures of motivation. Also, this problem likely impacted our ability to detect preferential correlations between change language categories and self-report measures of motivation, and also to detect effects of predictors of substance use treatment outcome. Future studies should ensure adequate sample size so that the aforementioned issues may be avoided.

Clinical characteristics of the current study also presented a limitation. Negative symptoms are a feature of schizophrenia spectrum disorders, primarily among individuals with schizophrenia, who comprised only 2.2% of the sample. Therefore, a limited amount of the sample exhibited elevated levels of negative symptoms. This in turn hindered our ability to reliably test hypotheses regarding the relationship among negative symptoms, client language, and therapist behavior. The sample was comprised primarily of individuals with bipolar disorder, which presents with its own unique set of characteristics which could hinder motivation and attempts to change substance use behavior. The sample was not large enough to conduct analyses to investigate potential differences in change language according to diagnostic category. Future studies should include more individuals with schizophrenia in order to be able to evaluate the impact of negative symptoms on motivation to change substance use behaviors. Furthermore, in order to expand the generalizability of future studies, a sample which includes adequate sample sizes of individuals with various diagnoses should be included.

The current findings cannot be generalized to all individuals receiving Motivational Interviewing for substance use due to other components of the treatment which may influence outcome. Specifically, after the Motivational Interviewing session,

participants attend a behavioral treatment for substance use twice a week for six months. This treatment includes a contingency management component. Therefore, external motivators may act as a confound on substance use treatment outcomes in the current study, thereby limiting generalizability.

Tailoring Motivational Interviewing therapy sessions to individuals with serious mental illness required the imposition of increased structure upon the Motivational Interviewing session in order to better accommodate individuals with cognitive difficulties. This, in turn, may have changed the patterns and frequencies of language which manifest compared to other studies. For instance, during the feedback portion of the session, some of the client's answers to self-report items are reviewed and the client is reinforced for the steps they have taken to change substance use behavior. This is in contrast to the more common Motivational Interviewing approach of providing comparative feedback to the client regarding the amount of substance use he/she is engaged in and having a discussion about it. In the current study, the feedback section generated very little change language across all language categories compared to the other two sections. One could potentially see how a discussion about the client's substance use might generate not only more change language, but also more counter-change language.

The imposed structure on the Motivational Interviewing session is in contrast to the more free-flowing nature of Motivational Interviewing sessions that are not tailored for those with serious mental illness. This may have impacted the emergence of change language in that the therapist more strictly determines the nature of the conversation by having a set of specific goals for the session (i.e., discussing consequences of substance

use, providing reinforcing feedback, discussing triggers/risky situations, and goal setting). Therefore, for instance, discussing hypothetical situations that could potentially hinder abstinence makes it almost certain that Ability statements will occur, whereas this is not necessarily so during a less structured session. Nevertheless, the structured nature of these sessions may contribute to increasing the signal to noise ratio by reducing the variance in overall language (noise) and thus allow for more refined detection of differences in the frequencies and strengths of these language categories (signal).

Another effect that the structure of the Motivational Interviewing session could have had on the emergence of change language is that the disadvantages of changing substance use behavior were not explored. Such discussion typically occurs during a part of the session when the therapist guides the client in decisional balance exercises (i.e., weighing the pros and cons of changing and not changing). Only the pros of change and the cons of not changing were explored during the part of the session when consequences of use were discussed. This generated Reasons change language, but not Reasons counter-change language. This may have impacted findings regarding the association between Reasons language and self-report decisional balance measures by limiting the scope of discussion surrounding decisional balance and also by limiting the range of the Decisional Balance scales. Therefore, taken together with the aforementioned issues related to the structure of the current study's Motivational Interviewing session, it can be concluded that it is difficult to compare the findings of the current study to other studies examining change language. More studies using the current protocol are needed to confirm the salience of specific change language categories during Motivational Interviewing sessions for individuals with serious mental illness.

Another characteristic of the Motivational Interviewing session protocol which posed a limitation was that not all clients engaged in a discussion with the therapist about triggers/risky situations and goal setting. Ability statements were most frequently exhibited during this time. Sometimes this part of the session was done during the behavioral group which followed the Motivational Interviewing session. Therefore, only a subset of clients engaged in the portion of therapy which garnered the most Ability statements. Future studies should employ a standardized protocol for Motivational Interviewing sessions in order to ensure that all change language categories have equal probability of emerging for every client. Due to sample size restrictions, it was not possible to do analyses separately for those who received this part of the session and those who did not.

The coding method of using transcripts greatly limited the coders' ability to make strength ratings. Language structure is one of many dimensions which could be used to make a reliable strength rating (e.g., inflections, prosody, facial expressions, body language). Therefore, future studies should use video to provide language ratings so that more information is available to coders to provide ratings.

In the current study, substance use "success" was defined by a clean urine toxicology screen, which detects any substance use in the past three days. Therefore, we were not able to measure success for those clients whose goal was to cut down on substance use. High concordance has been found between self-reports of substance use and urine analysis (Zanis, 1994); therefore future studies should consider using a combination of self-report and urine screens so that harm reduction goals may be considered in addition to abstinence goals.

Prior studies of therapeutic processes underlying Motivational Interviewing have suggested that it is the resolving of ambivalence that is the operative mechanism underlying treatment success. In terms of client language, ambivalence manifests as change language "sandwiched" in between counter-change language (Moyers, 2009). The current study did not use sequential analysis to get a better sense of the longitudinal pattern of change language in order to investigate this idea. Future studies should consider using sequential analysis methods in order to understand the unfolding of change language patterns among individuals with serious mental illness.

Despite these limitations, the current study has provided a preliminary characterization of change language in a sample of individuals with serious mental illness. As such, reliable ratings were yielded for Desire, Ability, Reasons, and Commitment language frequency and for the strength of Ability and Reasons language. Ability language emerged as a significant factor in predicting substance use treatment outcomes, which suggests that client statements regarding self-efficacy to reduce or stop substance use are particularly important among individuals with serious mental illness. Future studies should seek to determine *why* Ability language is salient. Specifically whether it is the client's insight into their triggers/risky situations that is the key mechanism, or whether it is the subsequent ability to navigate these situations which accounts for favorable outcomes. Also, an investigation of the relationship among symptomatology, client change language, and therapist behavior is warranted in order to better understand motivation among individuals with serious mental illness.

Appendix A: Treatments for Dual Diagnosis

The traditional method of treating dually diagnosed patients was in a sequential manner, whereby patients are treated for psychiatric problems on an inpatient basis and then through outpatient mental health treatment combined with 12-Step meetings (Alcoholics Anonymous [AA] and/or Narcotics Anonymous [NA]). In the parallel approach to treatment, both substance abuse and psychiatric problems are treated at the same time, albeit by different providers. In individuals with SMI, both of these approaches fall short of being effective (Judd, Thomas, Schwartz, Outcalt, & Hough, 2003; Fletcher, Cunningham, Calsyn, Morse, & Klinkenberg, 2008)**.** A complicating factor which prevents the combination of psychiatric and substance abuse treatment is the fact that these programs have different foci (Tsuang & Fong, 2004). Mental health programs emphasize symptom reduction, the importance of empathy, the use of pharmacotherapy, and crisis management. In contrast, substance use treatment is often based on the attendance of 12-step groups, where the prevailing philosophy is based in "tough love" and is often not supportive of the use of pharmacotherapy.

A more seamless and effective approach to dual diagnosis treatment, integrated care (Mueser & Drake, 2007), addresses both disorders using a multidisciplinary treatment staff. Integrated treatment often involves various types of mental health professionals, is designed to address the complex needs of dually diagnosed clients, and often includes the modification of interventions to incorporate components to address substance use, mental illness, and their interaction (Drake, Essock, & Shaner, 2001).

Individuals with schizophrenia present with negative symptoms and cognitive deficits, which can interfere with substance use treatment engagement. Within the context

of the traditional substance abuse treatment model, negative symptoms such as amotivation and avolition may be interpreted by providers as denial or something that the patient actually has control of when this is not the case. As a result, there can be increased instances of confrontation with treatment staff (Tsuang & Fong, 2004). Further, cognitive deficits such as diminished attention, and poor verbal fluency can make engagement in treatment difficult. In integrated treatment, such considerations necessitate the protraction of substance use therapy to accommodate these factors. Also, treatments may be altered to encourage much needed additional social support or to address medication compliance issues.

Integrated treatment for individuals with depression and anxiety often involves cognitive, behavioral and cognitive-behavioral approaches. These may include helping the client to understand comorbidity, teaching coping strategies, incorporating behavioral activation strategies (Daughters, Braun, Sargeant, Reynolds, Hopko, & Blanco, et al., 2008), thereby seeking to reduce both psychiatric symptoms and substance use (Hesse, 2009). In many cases, pharmacotherapy is incorporated.

Ultimately, the main goal of the integrated approach is to help patients manage both illnesses such that they may attain their life goals. Patients' unique contexts are considered in the provision of services. Emerging from this integrated approach was the need for motivational interventions that could address the needs of dually diagnosed clients who either were not ready to seek treatment for their substance use or did not recognize either their substance use or mental illness as needing to be addressed.

Numerous empirically supported psychosocial treatments exist for dual diagnosis. The most commonly used and effective treatments include case management / assertive

community treatment, cognitive behavioral therapy (CBT), relapse prevention (which is based on CBT principles), 12-Step programs and facilitation, social skills training, and contingency management. To address the client's needs with respect to their family relationships, family training and education is often implemented as well. As a complement to these treatments, and consistent with an integrative model of dual diagnosis treatment, motivational approaches are often used and are effective in addressing issues related to lack of engagement in treatment among individuals with severe mental illness (Drake, et al., 2004).

Appendix B: Therapist-prompted and Unprompted language

As an exploratory aim, we proposed to analyze all data including change language that was prompted by the therapist. For instance, the therapist might say, "Would you say that your family is one reason that you want to stop using drugs?" In this case, the client may respond, "Yes, my family is a reason to stop." This is in contrast to the therapist asking, "What is one reason that you want to stop using drugs?" and the client responding, "I would say one big reason is because of my family." It is not yet clear at this time whether it is the verbal declaration present in change language which is the active ingredient, or whether it is the case that change language is an indicator of some underlying processes that are driving motivation to reduce/stop substance use. If it is indeed the act of declaring commitment to changing substance use behavior that is the key component, then including therapist-prompted language should yield comparable results to when only completely spontaneous client language (unprompted) is analyzed. Descriptive data and summaries of these findings in comparison to considering only unprompted language statements are provided below.

Base Rates of Language Occurrence. Paired samples t-tests indicated that the mean frequency of Desire, Ability, Reasons, Readiness, and Commitment language increased significantly when also considering acquiescent language (all $ps < .05$). Nevertheless, the base rates of Readiness and Need language were still too low to provide adequate power for analyses.

Coder reliability. Similar ICCs were obtained for frequency across language categories (Desire, Ability, Reasons, and Commitment; .82-.95). For strength ratings, Reasons language yielded acceptable reliability (.77), but Ability language strength

decreased from .66 to .39, suggesting that when considering therapist-prompted language, the strength of client statements referring to their perceived ability to reduce/stop substance use are more difficult for coders to rate reliably. The strength of client statements related to reasons for changing substance use behavior maintained adequate reliability when considering prompted language.

Inter-relationships among language categories. Zero-order intercorrelations among language categories when considering therapist-prompted language were similar to those yielded for unprompted language. Also identical to findings using unprompted language, Reasons and Ability language frequency (but not Desire) accounted for unique variance in Commitment language frequency.

Relationship between change language and self-reported measures of motivation. There were few notable differences in patterns of relationships between change language and self-reported measures of motivation when considering therapist-prompted language. One exception was the relationship between Reasons language strength and URICA Total ($r = .36$, $p < .05$) and Contemplation ($r = .50$, $p < .01$) scores, which became significant when considering prompted language. Additionally, the correlation of Reasons language strength with processes of changes subscales C-SOC Action ($r = .36$, $p < .05$) and Maintenance ($r = .36$, $p < .01$) scores became significant. These findings suggest that when considering reasons clients give for stopping/reducing substance use that are prompted by the therapist, the strength with which those reasons are given are positively related to self-reported measures of readiness for change, contemplation, action, and maintenance. Despite these slight differences in patterns of correlations, there was no evidence of preferential correlations between the strength of

change language and self-reported measures of motivation that were consistent with our hypotheses.

Negative symptoms and client language. There were a couple notable differences in findings with respect to negative symptoms and change language. When considering acquiescent client language, negative symptoms were not related to the frequency of any change language category (all ps > .05); however, the previously evidenced relationship with Ability strength became non-significant and the relationship with Desire ($r = -.53$, $p < .01$) and Reasons ($r = -.42$, $p < .01$) became significant. When considering both therapist-prompted and unprompted change language statements, more negative symptoms were associated with a lower strength of statements related to desire and reasons to reduce/stop substance use; however, when considering only statements that are not prompted by the therapist, only the strength of statements related to the client's perceived ability to reduce/stop substance use are related to negative symptoms. There was no relationship of the change language with alogia.

MICO behaviors and change language. The pattern of relationships between MICO behaviors and change language changed significantly when considering prompted client language. The relationship of MICO behaviors to the frequency of Desire ($r = .75$, $p < .001$) and Commitment ($r = .34$, $p < .05$) became significant; Reasons language stayed significant ($r = .75$, $p < .001$), and Ability language approached significance ($r = .29$, $p = .06$). Therefore, when considering both therapist-prompted and unprompted change language statements, therapists' increased use of MICO behaviors are associated with increased frequency of client statements related to desire, reasons, and commitment

(and possibly Ability) to reduce/stop substance use; however, when only considering unprompted language, only increased Reasons language is related.

Discussion

The current study supports the idea that the frequency of change language is rated reliably whether unprompted or prompted language is considered. Reliable strength ratings were difficult to ascertain when considering prompted or unprompted language. There were few notable differences with respect to the remaining analyses. The differences that did emerge may have been a result of increased available data (because both prompted and unprompted statements were analyzed) and therefore increased power to detect effects. Further research is warranted to garner more solid conclusions regarding the role of therapist-prompted client statements.

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126

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    multisite clinical trial matching patients to alcoholism treatment. *Alcoholism:*

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Watkins, K. E., Hunter, S. B., Wenzel, S. L., Tu, W., Paddock, S. M., Griffin, A. et al. (2004). Prevalence and Characteristics of Clients with Co-Occurring Disorders in Outpatient Substance Abuse Treatment. *American Journal of Drug and Alcohol Abuse, 30*(4), 749-764.

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Ziedonis, D. M. (2004). Integrated Treatment of Co-Occurring Mental Illness and Addiction: Clinical Intervention, Program, and System Perspectives. *CNS Spectrums, 9*(12), 892.

Ziedonis, D. M., Smelson, D., Rosenthal, R. N., Batki, S. L., Green, A. I., Henry, R. J., et al. (2005). Improving the Care of Individuals with Schizophrenia and Substance

Use Disorders: Consensus Recommendations. *Journal of Psychiatric Practice, 11*(5), 315-339.

Ziedonis, D. M., & Stern, R. (2001). Dual recovery therapy for schizophrenia and substance abuse. *Psychiatric Annals, 31*(4), 255-264.

Ziedonis, D. M., & Trudeau, K. (1997). Motivation to Quit Using Substances Among Individuals With Schizophrenia: Implications for a Motivation-Based Treatment Model. *Schizophrenia Bulletin, 23*(2), 229-238.

CURRICULUM VITAE

MARSHA N. SARGEANT

EDUCATION

2011	**Ph.D. in Clinical Psychology**, University of Maryland, College Park, Clinical Psychology Program, Accredited by the American Psychological Association

Dissertation: Psycholinguistic Indicators of Motivation for Substance Use Behavior Change among Individuals with Serious Mental Illness (*Advisor*: Jack J. Blanchard, Ph.D.)

2010-present	**Psychology Intern**, Veterans Affairs Medical Center, Long Beach, Accredited by the American Psychological Association

Rotations: Substance Abuse Treatment Center, Assessment and Psychotherapy, Spinal Cord Injury, PTSD/Substance Abuse, and Outpatient Mental Health Clinic (*Supervisors*: Henry Benedict, Ph.D., Kenneth Cole, Ph.D., Linda Mona, Ph.D., Deirdre Lopez, Ph.D., and Anna McCarthy, Ph.D.)

2008	**Master of Science in Psychology**, University of Maryland, College Park

Thesis: Biobehavioral Mechanisms Underlying Emotionality in Antisocial Personality Disorder and the Role of Psychopathic Traits among Treatment-Seeking Substance Users (*Advisor*: Carl W. Lejuez, Ph.D.)

2005	**Bachelor of Arts in Psychology**, California State University, Long Beach Graduated with Honors

Thesis: Locus of Control in a Sample of Alcoholics Anonymous Members (*Advisor*: Sherry Span, Ph.D.)

GRANTS

Title: Attention Deficit Hyperactivity Disorder, Depression, Anxiety, and Substance Abuse
Agency: California State University Chancellor's Office – Chancellor's Doctoral Incentive Program Mini-grant Mechanism
Period: 11/2010-11/2011
Total costs: $1,899

Title: Behavioral Technologies for Predicting HIV Risk: Minority Supplement
Agency: National Institute of Drug Abuse R01 DA18647
Period: 7/1/05-6/30/08
Total costs: $100,000+

RESEARCH PUBLICATIONS

Sargeant, M. N., Daughters, S. B., Curtin, J., Schuster, R., & Lejuez, C. W. (in press). Unique roles of antisocial personality disorder and psychopathic traits in distress tolerance. *Journal of Abnormal Psychology.*

Blanchard, J. J., Aghevli, M. Wilson, A., & **Sargeant, M.N.** (2010). Developmental instability in social anhedonia: An examination of minor physical anomalies and clinical characteristics. *Schizophrenia Research*, *118*, 509-524.

Daughters, S. B., **Sargeant, M. N.**, Gratz, K. L., Bornovolova, M. A., & Lejuez, C. W. (2008). The relationship between distress tolerance and antisocial personality disorder among male inner-city treatment seeking substance users. *Journal of Personality Disorders, 22,* 509-524.

Daughters, S. B., Braun, A. R., **Sargeant, M. N.**, Reynolds, E. K., Hopko, D. R., Blanco, C., & Lejuez, C. W. (2008). Effectiveness of a brief behavioral treatment for inner-city illicit drug users with elevated depressive symptoms: the Life Enhancement Treatment for Substance Use (LETS Act!). *Journal of Clinical Psychiatry, 69,* 122-129.

Daughters, S. B., Stipleman, B. A., **Sargeant, M. N.**, Schuster, R., Bornovalova, M. A., Lejuez, C. W. (2008). The interactive effects of antisocial personality disorder and court-mandated status on substance abuse treatment dropout. *Journal of Substance Abuse Treatment, Vol 34(2),* 157-164.

Reynolds, E. K., **Sargeant, M. N.**, & Rooney, M. (2008). Actively assessing fit when applying to Ph.D. programs in clinical/counseling psychology: the applicant's perspective. *The Behavior Therapist, 31,* 57-62.

SUBMITTED MANUSCRIPTS

Sargeant, M. N., Bornovalova, M. A., Trotman, A. J. M., & Lejuez, C. W. Facets of impulsivity in the relationship between antisocial personality and abstinence.

PRESENTATIONS

Sargeant, M. N., Bornovalova, A. J. M., Miller-Jacobs, S., & Lejuez, C. W. (2009, May). *Duration of longest abstinence attempt among inner-city drug users with antisocial personality disorder: the mediating roles of various facets of impulsivity.* Poster presented at the Association for Psychological Science, San Francisco, CA.

Sargeant, M. N. & Blanchard, J. J. (2009, April). *A preliminary investigation into the roles of family environment, personality, and positive schizotypy in predicting*

substance use disorders in social anhedonics and controls. Poster presented at the International Congress on Schizophrenia Research, San Diego, CA.

Sargeant, M. N., Daughters, S. B., Schuster, R., Gorka, S., & Lejuez, C. W. (2008, September). *Antisocial personality disorder and distress tolerance: the role of psychopathic traits in a substance use treatment-seeking sample.* Poster presented at the Society for Research in Psychopathology.

Sargeant, M. N., Daughters, S. B., Schuster, R., Gorka, S., & Lejuez, C. W. (2008, June). *Antisocial personality disorder, distress tolerance, and hypothalamic pituitary adrenal axis functioning: the role of psychopathic traits.* Poster presented at the 69th annual meeting of the College on Problems of Drug Dependence, San Juan, Puerto Rico.

Schuster, R.M., Daughters, S. B., **Sargeant, M. N.,** Forst, C., Lejuez, C., & Sinha, R. (2008, June). *Gender differences in cortisol reactivity among African-American cocaine users.* Poster presented at the 69th annual meeting of the College on Problems of Drug Dependence, San Juan, Puerto Rico.

Sargeant, M. N., Daughters, S. B., Schuster, R., & Lejuez, C. W. (2007, November). Distress tolerance in treatment-seeking substance users with Antisocial Personality Disorder. In A. Bernstein & A. A. Vujanovic (Chairs), *Affect Tolerance: Clinical Implications of Emerging Basic Research.* Symposium conducted at the 41st annual convention of the Association for Behavioral and Cognitive Therapies, Philadelphia, Pennsylvania.

Sargeant, M. N., Daughters, S. B., Schuster, R., Hickman, A., & Wesley, L. (2007, November). *Distress tolerance: A behavioral manifestation of a biological vulnerability factor in treatment-seeking substance users.* Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Philadelphia, PA.

Reynolds, E.K., Gratz, K.L., **Sargeant, M.N.,** Daughters, S.B., Lejuez, C.W. (2007, November). *The relationship between emotional abuse and risk taking behavior in a community sample of youth.* Poster presented at the 41st annual Association for Behavioral and Cognitive Therapies convention, Philadelphia, PA.

Daughters, S.B., **Sargeant, M.N.,** Hickman, A., Schuster, R., Sinha, R., & Lejuez, C.W. (2007, November). Distress tolerance and stress induced changes in hypothalamic-pituitary-adrenal response among drug dependent African-Americans currently receiving residential treatment. In A. Bernstein and A.A. Vujenovic (Co-Chairs), *Affect Tolerance: Clinical Implications of Emerging Basic Research.* Symposium conducted at the 41st annual convention of the Association for Behavioral and Cognitive Therapies, Philadelphia, Pennsylvania.

Reynolds, E.K., Daughters, S.B., **Sargeant, M.N.,** McFadden, M., Cummings, A., & Lejuez, C.W. (2007, November). An examination of distress tolerance as a vulnerability for substance use, delinquent behavior, and internalizing symptoms in youth. In J.D. Buckner (Chair), *Distress Tolerance and Its Relation to Anxiety and Substance Use Pathology: Clinical Implications for Empirical Work.* Symposium conducted at the 41st annual convention of the Association for Behavioral and Cognitive Therapies, Philadelphia, Pennsylvania.

Sargeant, M.N., Reynolds, E.K., Cummings, A., Hall, T., & Lejuez, C.W. (2007, August). *The interactive effects of ethnicity, socioeconomic status, and risk propensity on risk behaviors in adolescents.* Poster presented at the NIDA Early Career Investigators Poster Session, American Psychological Association Annual Convention, San Francisco, CA.

Sargeant, M.N., Daughters, S. B., Reynolds, E. K., Danielson, C. K., & Lejuez, C. W. (2007, May). *Development of a behavioral measure of distress tolerance to identify adolescent externalizing and internalizing problems.* Poster presented at the 15th annual meeting of the Society for Prevention Research, Washington, DC.

Reynolds, E.K., **Sargeant, M.N.**, Daughters, S.B. & Lejuez, C.W. (2007, May). *Reliability and validity of the youth version of the Balloon Analogue Risk Task (BART-Y) in the assessment of risk-taking behavior among inner-city adolescents.* Poster presented at the 15th annual meeting of the Society for Prevention Research, Washington, D.C.

Reynolds, E.K., **Sargeant, M.N.**, McFadden, M.E., McIntyre, S.A., Lejuez, C.W. (2007, May). *Relationship between parent and child risk taking propensity as indexed by the Balloon Analogue Risk Task (BART).* Poster presented at the 19th annual meeting of the Association for Psychological Science, Washington, D.C.

Daughters, S.B., Lejuez, C.W., Danielson, C.W., & **Sargeant, M.N.** (2006, November). The use of an adolescent-appropriate computerized measure of distress tolerance to identify alcohol use among early adolescents. In E.W. Leen-Feldner (Chair), *State-of-the-Art Methodology and Technology for the Study of Psychopathology among Youth: A Discussion of Contemporary Approaches for the Active Researcher.* Symposium conducted at the 40th annual convention of the Association for Behavioral and Cognitive Therapies, Chicago, Illinois.

Daughters, S. B., Braun, A. R., **Sargeant, M. N.**, Reynolds, E.R., Hopko, D., Blano, C., Nunes, E., & Lejuez, C.W. (2006, November) Evaluation of a novel depression treatment for inner-city individuals in residential substance use treatment: The Life Enhancement Treatment for Substance Use (LETS ACT!). In **M.N. Sargeant** (Chair), *Cutting edge behavioral treatments for substance abuse.* Symposium at the annual meeting of the Association for Behavioral and Cognitive Therapies, Chicago, IL.

Sargeant, M. N., Daughters, S. B., Lejuez, C. W., Bornovalova, M. A., & Gratz, K. L. (2006, June). *The relationship between distress tolerance and Antisocial Personality Disorder among male inner-city residential treatment-seeking substance users.* Poster presented at the 68th annual meeting of the College on Problems of Drug Dependence, Scottsdale, Arizona.

Braun, A. R., Daughters, S. B., **Sargeant, M. N.**, Reynolds, E. K., & Lejuez, C. W. (2006, June). *Development of a novel depression treatment for inner-city depressed substance users currently receiving residential substance abuse treatment.* Poster presented at the 68th annual meeting of the College on Problems of Drug Dependence, Scottsdale, Arizona.

Daughters, S.B., Lejuez, C.W., Danielson, C., **Sargeant, M.N.**, Reynolds, E., Bornovalova, M.A., & Schulzinger, D. (2006, June). *Distress tolerance as a*

predictor of adolescent substance use. Poster presented at the 68th annual meeting of the College on Problems of Drug Dependence, Scottsdale, Arizona.

Lejuez, C. W., Daughters, S. B., **Sargeant, M. N.**, Bornovalova, M. A., & Kohrt, B. A. (2006, June). *Treatment dropout among inner-city residential treatment seeking substance users as a function of the interaction between antisocial personality disorder and court mandated treatment status.* Poster presented at the 68th annual meeting of the College on Problems of Drug Dependence, Scottsdale, Arizona.

Span, S. A., **Sargeant, M. N.**, & Benedict, H. C. (2005, April). *Confirming the factor structure of ADHD in a substance-abusing sample.* Poster session presented at the Western Psychological Association Convention, Portland, OR.

Sargeant, M. N. & MacDonald, A. (2004, November). *Personality correlates of antisocial behavior in economic decision-making.* Poster session presented at the Career Opportunities in Research Education and Training Colloquium, San Juan, Puerto Rico.

Sargeant, M. N. & Span, S. A. (2004, April). *General and drinking-related locus of control in a sample of Alcoholics Anonymous members.* Poster session presented at the Western Psychological Association Convention, Phoenix, AZ.

Sargeant, M. N. (2003, November). *Depression symptoms and gambling behaviors of low-risk, problem, and pathological gamblers: A secondary analysis of the 1997 gambling impact and behavior study.* Poster session presented at the Career Opportunities in Research Education and Training Colloquium, Washington, DC.

SUPERVISED CLINICAL EXPERIENCE

2010-2011   **Psychology Intern,** *VA Long Beach Healthcare System, Long Beach,* CA. Rotations include: Substance Abuse Treatment Center, Assessment/Psychotherapy, PTSD/Substance Abuse, Spinal Cord Injury, and Outpatient Mental Health Clinic.

Supervisors: Henry Benedict, Ph.D., Kenneth Cole, Ph.D., Deirdre Lopez, Ph.D., Linda Mona, Ph.D., and Anna McCarthy, Ph.D. Duties: Conduct group and individual therapy for individuals who have depression, anxiety, and substance use disorders. Administer psychological assessments. Co-developed and facilitated stress management group. Weekly group and individual supervision with seminars and case conferences. Participation in interdisciplinary substance abuse treatment team meetings. Developed programming for residential substance use treatment program for Spinal Cord Injury unit. Developed VA training module on substance use for caregivers of spinal cord injured patients.

Therapeutic Approaches: Cognitive-Behavioral, Motivational Interviewing, Acceptance and Commitment, Mindfulness, Prolonged Exposure, Cognitive Processing Therapy, Interpersonal, Relapse Prevention for Substance Abuse, Dual Diagnosis.

2009-2010	**Extern,** *Baltimore Veterans Affairs Medical Center and University of Maryland School of Medicine*

Supervisor: Melanie Bennett, Ph.D.
Conducted Social/Coping skills groups for individuals with severe mental illness in the Psychosocial Rehabilitation and Recovery Center. Facilitated social skills groups for individuals with severe mental illness and substance use disorders. Trained in Motivational Interviewing approaches to conducting therapy. Trained in substance use assessment (e.g., Addiction Severity Index and Substance Use Event Survey for Severe Mental Illness). Attended group supervision meetings for all activities listed and for behavioral smoking cessation groups.

2008-2009	**Clinical Practicum Therapist**, *Child Assessment and Therapy, University of Maryland, College Park.*

Supervisors: M. Colleen Byrne, Ph.D., Andres DeLos Reyes, Ph.D. and Lea Dougherty, Ph.D.
Conducted psychoeducational assessments and synthesized reports for children with learning disabilities and Attention Deficit Hyperactivity Disorder (ADHD). Assessment included the Kiddie Schedule for Affective Disorders for School-Aged Children, DSM-IV Interview, Wechsler Individual Achievement Test, 2nd Edition, and the Wechsler Intelligence Scale for Children, 4th Edition. Provided Parent Behavioral Training for ADHD to parents of one child with ADHD and one child with ADHD and Oppositional Defiant Disorder (ODD). Provided coping skills training to a child with ADHD and ODD. Provided consultation and psychoeducation to teachers, counselors, and parents for child's Individualized Education Plan meeting. Attended weekly group and individual supervision.

2006-2009	**Clinical Practicum Therapist,** *Adult Therapy, University of Maryland, College Park.*

Supervisors: M. Colleen Byrne, Ph.D., Lea Dougherty, Ph.D., Andrea Chronis-Tuscano, Ph.D., and Andres De Los Reyes, Ph.D.
Provided weekly individual therapy to adult clients for a variety of presenting problems including depression, anxiety, sexual abuse issues, and ADHD. Supervision included theoretical grounding based in cognitive-behavioral and interpersonal principles. Training also provided in Motivational Interviewing techniques, preparing intake reports, treatment plans, and progress reports.

2006-2009	**Clinical Practicum Student,** *Adult Assessment, University of Maryland, College Park.*
	Supervisors: M. Colleen Byrne, Ph.D., Jeff Wilken, Ph.D., and Andres DeLos Reyes, Ph.D. Conducted neuropsychological and psychoeducational assessments for adults, interpreting results, report writing, and providing feedback to clients. Assessment battery included Adult Intelligence Scales, 3rd and 4th Editions, Wechsler Individual Achievement Test, 2nd Edition, California Verbal Learning Test, 2nd Edition, Wisconsin Card Sorting Task – Computerized Version, Conners' Continuous Performance Test, 2nd Edition, and Trails A and B.
2006-2007	**Therapist, Treatment Outcome Studies,** *Center for Addictions, Personality, and Emotion Research (CAPER), Harbor Light Salvation Army, Washington D.C., and University of Maryland, College Park.*
	Supervisors: Carl W. Lejuez, Ph.D. and Stacey B. Daughters, Ph.D. Lead therapist in a treatment outcome study examining the effectiveness of a group format brief behavioral activation treatment for depression in depressed substance users currently receiving residential substance use treatment. Provided therapy and trained graduate students on the treatment protocol. Served as liaison between treatment center staff and CAPER lab. Therapist for study investigating the utility of a behavioral treatment in reducing health risk behaviors in college freshmen.

RESEARCH EXPERIENCE

2008-present	**Dissertation Research,** *Veterans Affairs Medical Center, Baltimore and University of Maryland Medical School.* Anticipated defense: December 2010.
	Supervisors: Jack Blanchard, Ph.D. and Melanie Bennett, Ph.D. Psycholinguistic content coding to examine self-motivational statements during a Motivational Interviewing intervention for substance use among individuals with severe mental illness. Investigated whether self-motivational statements could be reliably and validly measured in this population. Examined the relationship between symptomatology and self-motivational statements. Explored the relationship between these statements and substance use treatment engagement and outcome. Transcribed therapy sessions, trained research assistants to perform psycholinguistic

coding, wrote SPSS syntax to manage and aggregate large data sets. Performed all statistical analyses.

2008	**Research Assistant,** *Laboratory of Emotion and Psychopathology Research, University of Maryland, College Park.* *Supervisor:* Jack J. Blanchard, Ph.D, Professor and Clinical Program Director

Examined personality and socio-environmental predictors of substance use patterns in schizotypy and social anhedonia within the context of the Maryland Longitudinal Study of Schizotypy.

2005-2008	**Research Assistant,** *Center for Addictions, Personality, and Emotion Research (CAPER), University of Maryland, College Park*

Supervisors: Carl W. Lejuez, Ph.D. and Stacey B. Daughters, Ph.D.
Project coordinator of a research study examining the role of distress tolerance in substance use treatment outcomes. Project assistant for NIDA-funded R01 grant examining drug choice and risky sexual behavior; duties included assessment coordination and data management. Conducted original research examining the biobehavioral mechanisms underlying Antisocial Personality Disorder and the role of psychopathic traits in treatment-seeking substance users. Co-developed behavioral intervention (and accompanying manual) that aimed to reduce health risk behaviors in freshman entering the University of Maryland. Developed treatment manual and was the lead therapist for study examining the utility of a Behavioral Activation intervention in reducing depressive symptoms among treatment-seeking substance users. Research assistant on a prospective longitudinal study evaluating the utility of the Balloon Analogue Risk Taking task as a predictor of adolescent risk behaviors.

2003-2005	**Research Assistant,** *Veterans Affairs Medical Center, Long Beach and California State University, Long Beach*

Supervisors: Sherry Span, Ph.D. and Henry Benedict, M.D.
Investigated the relation among cognitive functioning, Attention Deficit Hyperactivity Disorder (ADHD), and drinking habits. Conducted independent research examining general and drinking-related locus of control within the 12-Step paradigm of Alcoholics Anonymous. Examined the factor structure of Attention Deficit Hyperactivity Disorder (ADHD) symptoms in adults.

2004	**Research Experience for Undergraduates,** *Translational Research in Cognitive and Affective Mechanisms Laboratory University of Minnesota, Department of Psychology*
	Supervisor: Angus MacDonald, Ph.D. Investigated personality correlates of decision-making in economic games. Specific tasks included performing analyses on data obtained from economic games and on Multidimensional Personality Questionnaire data using SPSS and Sigma Plot.
2003	**Independent Research,** *Career Opportunities in Research and Education Laboratory, California State University, Long Beach*
	Supervisors: John R. Jung, Ph.D. and Chi-Ah Chun, Ph.D. Performed a secondary analysis of the Gambling Commission's *1997 Gambling Impact and Behavior Study* investigating depressive symptoms and problem gambling behaviors in pathological, problem, and low-risk gamblers.

TEACHING EXPERIENCE AND INVITED LECTURES

Spring 2011	**Instructor,** *Community Psychology,* California State University, Long Beach.
November 2010	**Invited Guest Lecturer,** *Schizophrenia,* Abnormal Psychology, California State University, Long Beach.
April 2010	**Psychology Department Colloquium Speaker,** *Conducting Meta-analyses,* University of Maryland, College Park.
October 2009	**Invited Guest Lecturer,** *General Psychopathology,* Introduction to Behavioral Science, University of Maryland, University College.
Fall 2009- Spring 2010	**Teaching Assistant,** *Introduction to Psychology,* University of Maryland, College Park. Prepared and gave lectures on general topics in psychology.
October 2006	**Invited Guest Lecturer,** *Etiology and Phenomenology of Conduct Disorder, Antisocial Personality Disorder, and Psychopathy,* Abnormal Psychology, University of Maryland, College Park.

PROFESSIONAL SERVICE AND ACTIVITIES

| October 2010-
present | **Ad-Hoc Reviewer,** *Personality Disorders: Theory, Research, and Treatment.* |
| August 2010-
present | **Editorial Board Member,** *The New School Psychology Bulletin.* |

January 2006	**Student Reviewer,** *Personality and Individual Differences.*
January 2009- May 2010	**Student Consultant,** *Design and Statistical Analysis Laboratory,* University of Maryland, College Park. Under the direction of Dr. Kevin O'Grady, provided statistical design and analysis consultation to faculty and students.
2008-2009	**Mentor,** *Achieving College Excellence Learning Community Mentorship Program*, University of Maryland, College Park.
2008	**UMD Clinical Psychology Program Student Representative,** *APA Roundtable Discussion with APA President, Alan Kazdin.* APA Headquarters, Washington D.C.
2007	**Faculty Search Committee Student Representative,** Clinical Psychology Program, University of Maryland, College Park.
2006	**Community Outreach Leader,** *Boys and Girls Club of Germantown and University of Maryland Terpquest Day Camp.* Co-developed and administered health risk behavior prevention workshops for children and adolescents.

AWARDS AND HONORS

2005- present	**Sally Casanova Pre-Doctoral Scholar,** California State University Chancellor's Office.
2008	**Multicultural Excellence National Summer Institute Fellow**, University of Denver, Denver, CO.
2007	**National Institute on Drug Abuse Early Career Investigators Travel Award**, American Psychological Association Convention, San Francisco, CA.
2006	**1st Place in PROMISE Research Symposium Poster Competition**, University of Maryland (Baltimore and College Park).
2005	**Most Outstanding Graduate in the Department of Psychology,** California State University, Long Beach.
2005	**Outstanding Graduate in the College of Liberal Arts,** California State University, Long Beach. Selected to give commencement speech at graduation ceremony.
2003-2005	**National Institute of Mental Health Career Opportunities in Research Education and Training (COR) Scholar (T34 grant),** California State University, Long Beach. Selected through a competitive process to participate in training program for undergraduates seeking to pursue careers in the area of mental health.

2004	**Distinguished Student,** Fall Convocation, California State University, Long Beach. Selected based on excellent academic record and research activities.
2004	**2nd Place in California State University Statewide Research Competition,** California State University System.
2004	**2nd Place in California State University, Long Beach Research Competition.**