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**Implicit Beliefs About The Malleability Of Substance Abuse:
Implications For Treatment Motivation And Outcome**

Anne Morgenthau Grand

**Submitted in partial fulfillment of the requirements for
the degree of Doctor of Philosophy
under the Executive Committee of the Graduate School of
Arts and Sciences**

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ABSTRACT

Implicit Beliefs About The Malleability Of Substance Abuse: Implications For Treatment Motivation And Outcome

Anne Morgenthau Grand

This study was designed to address the problem of early dropout from substance abuse treatment. A randomized clinical trial was devised to determine if a brief group motivational intervention (GMI) would increase substance abusers' treatment session attendance specifically by bringing about favorable changes in key motivational cognitions and affects. Primary hypotheses of the study were that there would be a group of patients, identifiable by their implicit belief in the unchangeable nature of their substance abuse problems (*entity* belief), who would be more vulnerable to early treatment dropout specifically because of low motivation for treatment, and who would thus gain greater benefit from the motivational intervention than patients who believe their substance problems to be changeable (*incremental* belief). These primary hypotheses were largely confirmed. *Entity* substance abuse theorists differed from *incremental* theorists by entering the study treatment with less confidence in their self-competence to cope with substance problems (self-efficacy); less confidence in treatment effectiveness; less positive feelings; and more concern about the costs of changing. *Entity* theorists who received the GMI intervention, attended more sessions than the *entity* theorists who received standard treatment.

Some key hypotheses about motivational treatment intervention were also confirmed. All hypothesized motivational processes (confidence in treatment; confidence in self-competence (self-efficacy); positive moods; negative moods; perception of costs of change and benefits of change (ambivalence)) changed in expected directions during the treatment trial. However, changes in only two motivational processes, positive and negative mood, predicted treatment attendance for all patients; and, GMI predicted greater changes than standard treatment in only one motivational process, treatment confidence. For GMI treatment patients, greater increases in treatment confidence predicted greater treatment attendance. For standard treatment patients, only lower baseline depression predicted greater attendance. Contrary to the hypothesis, GMI patients did not attend more treatment sessions than standard treatment patients. Uncontrolled aspects of the treatment setting may have confounded these results.

Study results are consistent with implicit theory research and of clinical interest. Implicit beliefs appear to offer a parsimonious way to identify substance abuse patients who may be vulnerable to early treatment dropout and who might benefit from a motivational intervention.

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AMG

For Martha Pattridge Morgenthau

1919-1972

Chapter I

INTRODUCTION

Substance abuse treatment is characterized by high rates of early patient dropout and repeated relapses to use. A growing body of research identifies motivation as a key mediator of substance abuse treatment compliance and outcome. Motivational treatments have been designed specifically to address these frustrating treatment failures; and empirical evidence indicates that they are successful. Group Motivational Intervention (GMI) (Foote, DeLuca, Magura, Warner, Grand, Rosenblum & Stahl, 1998) is one such addiction intervention. GMI aims to improve treatment outcomes by enhancing treatment motivation, self-efficacy, and persistence and by helping patients to consider ambivalence about treatment. GMI extends the Motivational Interviewing (MI) approach (Miller and Rollnick, 1991), which is an individually conducted 1- or 2- session alcoholism intervention, to a group format, 4-session introduction to ongoing addiction treatment. Preliminary findings from a clinical trial suggest that GMI helps to cause desirable shifts in critical treatment motivational processes, such as treatment ambivalence and perception of autonomy support, which in turn promote increases in self-efficacy, and longer treatment persistence than standard treatment (Foote, Deluca, Magura, Grand, Warner, & Geller, 1998; Grand, Foote, Magura, DeLuca, Warner, & Geller, 1998).

Little is known about whether there are groups of patients who are particularly vulnerable to poor treatment persistence or for whom motivational treatments are

particularly effective. The implicit beliefs model of motivation was developed chiefly in the field of intellectual achievement motivation (Dweck & Leggett, 1988; Dweck, Burhans, & Dweck, 1995; Dweck, Chiu, & Hong, 1995). It identifies two distinctive patterns of intellectual goal pursuit under the conditions of failure and frustration, one of which, notably, is associated with poor persistence. The two patterns, “mastery orientation” and “helpless orientation” are generated by implicit beliefs, which are core assumptions about the changeability of human attributes, in this case, intelligence. There are two major implicit beliefs: 1) an *incremental* belief that human attributes are changeable or developable, which is associated with the mastery orientation; and 2) an *entity* belief that human attributes are fixed, static, and trait-like, which is associated with the helpless orientation. These implicit beliefs, then, affect individuals’ patterns of cognitions, affects, and behaviors. For example, in the face of failure or frustration, a person who has an *incremental* belief about intelligence, is likely to exhibit a pattern of intellectual goal pursuit that is characterized by: positive affects; attributions for failure to lack of effort; emphasis on learning- related goals; and persistent striving. This mastery pattern, is characterized not only by prolonged striving but also by more productive and strategic striving, and better outcomes. In contrast, in the face of failure, a person who has an *entity* belief is likely to display a pattern of intellectual goal pursuit characterized by: negative affects; attributions for failure to intellectual ability; emphasis on performance related, evaluative goals; and lack of persistence. This helpless pattern is characterized not only by lack of persistent striving but also by less productive and strategic striving

and performance decrements.

These two intellectual motivation patterns of affect, cognition, and behavior are independent of individuals' actual level of intellectual ability. Incremental and entity theorists who score equally well on standardized measures of intelligence, perform with marked differences on achievement tasks in failure and frustrating situations. The patterns are, however, impacted by individuals' confidence in their ability to perform a certain task. For example after early failures, an incremental theorist, who believes that his intelligence is developable, is likely to display the mastery pattern.¹ He will persist in trying to solve a trigonometry problem, continuing to generate new strategies and remaining positive, until he succeeds in finding a solution. An entity theorist, who believes that his intelligence is a fixed trait, but who is particularly confident in his ability at trigonometry, is likely to appear mastery oriented (like an incremental theorist) when trying to solve trigonometry problems, but to appear helpless (stop trying, discontinue strategizing, become negative, reach no solution) when working on algebra problems. Finally, there is empirical evidence that these implicit beliefs not only are related to different patterns of response but also are causal. When implicit theories are manipulated under experimental conditions, the distinctive, differential patterns of cognitions, affects, and behaviors, described above, do in fact result.

In sum, the implicit theory model of intellectual motivation is a model of persistent goal pursuit under conditions of frustration and failure. It identifies groups of

¹ Throughout this paper when gender is unspecified, the masculine form of the third person singular pronoun will be used.

individuals who are disposed by their core beliefs (*incremental* versus *entity*) toward different patterns of pursuit (mastery versus helpless) and different outcomes. And, notably, it identifies not only individuals who are vulnerable to less persistence but also conditions which enhance persistence. Thus, the implicit beliefs motivation model seems particularly well suited for investigating substance abuse treatment. As noted above, substance abuse treatment is pursued under the frustrating and failure conditions of frequent relapse and early drop out; motivation is a key mediator of treatment persistence; and motivational interventions enhance treatment outcomes. It would be valuable to identify those substance abuse patients who, under specific conditions, become exceptionally vulnerable to relapse and drop out, and for whom motivational treatment would be especially advantageous.

The aims of the GMI clinical trial were to identify cognitive and affective processes which mediate treatment persistence, and to determine if GMI is associated with greater treatment changes compared to standard treatment. A further goal was to identify vulnerable patients for whom a motivational intervention might be particularly beneficial. This study sought to extend the implicit beliefs model of motivation to the domain of substance abuse treatment; and specifically, to determine if substance abusers' implicit beliefs about the malleability of addiction are associated with distinctive patterns of treatment response. The study examined the impact of implicit belief (*incremental* versus *entity*) on treatment motivational process variables in the context of a randomized clinical trial of the Group Motivational Intervention (GMI) discussed above. It was

hypothesized that GMI would improve treatment motivation and persistence compared to standard treatment. In line with previous research on non-addicted populations in other domains, it was also hypothesized that an incremental theory of addiction would be associated with a pattern of treatment pursuit characterized by more positive affects and more persistence in treatment; while an entity theory would be associated with a pattern characterized by more negative affects and less persistence in treatment. It was expected that two process variables, identified as “confidence in personal ability to manage substance use (self-efficacy)” and “confidence in treatment”, would affect these response patterns. That is, entity theorists who are confident either in their ability to manage their substance use and/or in the ability of treatment to help with substance problems, would more likely exhibit a pattern of treatment pursuit similar to that hypothesized for incremental theorists. It was also hypothesized that treatment condition (GMI versus Standard Treatment (ST)) would interact with implicit belief type. Those who hold incremental theories would not have treatment outcomes that are significantly affected by treatment condition, since their implicit beliefs are related to sustained motivation. While those who hold entity theories would be likely to persist longer in the GMI treatment, which is designed to promote motivational shifts and greater self-efficacy, than in the control condition, which does not include a motivational element.

Chapter II

LITERATURE REVIEW

Group Motivational Intervention

This section will review the development of motivational treatments for substance abuse. Despite evidence that a variety of chemical dependency treatments lead to reductions in use, the treatment field continues to grapple with the problems of high rates of early drop out and repeated relapses to use (Bien, Miller and Tonigan 1993; Project MATCH Research Group, 1997). Findings suggest that one third to one half of substance treatment patients fail to complete a treatment program and fifty to ninety percent of patients relapse following treatment (Wickizer, Maynard, Atherly, Frederick, Koepsell, Krupski, & Stark, 1994; Ball & Ross, 1991).

Treatment motivation, defined in various ways, has been identified in research as a critical component in substance abuse treatment outcomes (Miller, 1985). Several brief, free standing interventions aimed at shifting motivation for change have been found effective (Bien, Miller & Tonigan, 1993). One such intervention, Motivational Enhancement Therapy (MET), was employed as one of the primary interventions in a recent NIAAA-sponsored treatment matching study (Project MATCH Research Group, 1997).

Miller and Sanchez (1994) reviewed interventions in the alcoholism field and derived six common motivational elements from empirically tested successful treatments,

which they described with the acronym "FRAMES." These elements are: use of objective feedback, stressing of client responsibility, use of therapist objective advice, offering clients a menu of options, use of empathy, and fostering self-efficacy. To date, motivational treatments which utilize these elements have been conducted as individual interventions, most notably within a specific approach termed Motivational Interviewing (MI) (Miller and Rollnick, 1991). MI generally consists of a 1 or 2-session individual interview, during which alcohol use data is collected and reflective feedback given. The aim is to help clients identify and resolve ambivalence. Empirical evidence suggests that MI is effective in reducing clients' resistant behavior in treatment and alcohol use. MI has also been used as a preamble to treatment. Evidence suggests that MI had a positive effect on treatment outcomes specifically by increasing treatment involvement (Brown & Miller, 1993). MI, used in an HIV risk reduction setting, has demonstrated the effectiveness of exploring ambivalence in a more structured and goal oriented setting (Carey, Maisto, Kalichman, Forsyth, Wright, & Johnson, 1997).

Group Motivational Intervention (GMI) is an extension of such promising individual approaches to a group format (Foote, DeLuca, Magura, Warner, Grand, Rosenblum & Stahl, 1999) GMI is a brief (4-session), manual-driven, small group adaptation of many of the FRAMES motivational elements. This treatment translates the essence of a motivational approach, i.e., consideration of ambivalence, lowering resistance (by fostering a shift from externalized motivation to internalized autonomous motivation), and promoting self-efficacy and readiness for change, to a group setting.

GMI draws conceptually on "self-determination theory" (Deci & Ryan, 1985), which conceives of motivation as either internal/autonomous or external/controlled. Empirical evidence indicates that individuals, in diverse study populations, will judge as valuable and persist longer in behaviors which they perceive as internally or autonomously driven. (Deci & Ryan, 1985; Ryan, Plant, & O'Malley, 1995). These findings are salient to substance abuse treatment, where the issue of persistence in recovery behavior, including treatment participation, is paramount. Studies indicate that a greater sense of autonomous/internal motivation for acting can be fostered or undermined by environmental and interpersonal factors, including the treatment setting and the nature of the therapeutic relationship (Deci, Connell, & Ryan, 1989). Many interpersonal factors have been found to be autonomy-supportive, such as: a) providing information without pressure for a particular outcome; b) positive feedback concerning competence; c) absence of pressure to act in a certain way or achieve a particular outcome; d) acknowledgment and acceptance of the other's perspective; e) provision of choice; and f) provision of a meaningful rationale (Deci, Connell and Ryan, 1989; Williams, Grow, Freedman, Ryan and Deci, 1996). The empirically driven FRAMES model, which apparently was developed independently of self-determination theory, encompasses these elements. Consequently, self-determination theory offers an important theoretical foundation for the clinical techniques in FRAMES-based motivational interventions.

GMI is a promising use of FRAMES elements in two ways: 1) as the basis for a brief group treatment modality, where no previous work has been reported; and 2) as

motivational induction to further outpatient treatment, an area where encouraging results have already been noted with individual MI (Bien et al. 1993; Brown and Miller, 1993). GMI , through the FRAMES elements, is thought to affect specific internal processes, which in turn lead to changes in such outcomes as improved retention. Those processes are patients' "treatment ambivalence" (defined as perceived costs and benefits of change), and perceptions of "autonomy supportiveness" of the treatment setting and of "self-efficacy" (defined as confidence in personal ability to manage substance abuse). Empirical evidence from pilot data suggests that GMI promotes greater shifts in perception of the treatment environment as autonomy supportive and in evaluation of costs of changing a substance problem than standard treatment (Foote, DeLuca, Magura, Grand, Warner & Geller.1998; Grand, Foote, Magura, DeLuca, Warner & Geller, 1998). There is no evidence yet that GMI promotes greater treatment persistence directly. However, both perceptions of autonomy support and cost evaluations do predict positive treatment outcomes (better treatment attendance and lengthened stays). In addition, if after four treatment sessions, patients experience the treatment climate as more autonomy supportive, they are more confident about their personal ability (self-efficacy) and evaluate the costs of change as lower. Thus findings indicate that GMI effects the intended changes in motivational processes. Creating an autonomy supportive environment is vital to a patient's sense of autonomy in choosing to take such significant actions as sustaining treatment involvement, moving toward reduction of use or the harm of use and continuing to consider the difficult issues involved in recovery. More realistic

recognition of the costs and benefits of changing is crucial to lowering patient resistance to taking action.

In sum, research in substance abuse has identified treatment persistence or retention as a critical problem and treatment motivation as a key process. New interventions, developed specifically to enhance treatment motivation and persistence have been shown to be effective. One such intervention, GMI, uses a group format, in which substance abuse treatment is generally conducted, and serves as an introduction to ongoing standard treatment. It appears that GMI is effective in promoting favorable shifts in some vital substance abuse treatment motivational processes.

Implicit Theories

This section will review the general theory of implicit beliefs including three areas where implicit beliefs have been explored empirically. Implicit theories are the two contrasting beliefs which people hold about the malleability of human attributes: 1) an incremental belief that human attributes are changeable or developable; and 2) an entity belief that human attributes are fixed, static, and trait-like. Recent research in cognitive and social psychology, primarily by Dweck and her colleagues, has documented the role of implicit theories as core assumptions, which organize affective, cognitive, and behavioral responses in several domains, which include intelligence, personality and moral character, and world view. In each of these domains, the belief that attributes are changeable or developable (incremental theory) leads to an understanding of human

behavior and outcomes as resulting from personal effort, strategy, or situational mediators; while the belief that attributes are fixed (entity theory) leads to an understanding of human behavior and outcomes as resulting from fixed traits. Thus, when interpreting human behavior, holding different theories (incremental versus entity) leads to differential emphasis on specific situational variables versus personal traits. For example, in the domain of moral judgment, an incremental theorist, focused on situational variables, might judge a person, who failed to repay a loan in a timely fashion, as someone who usually has paid on time (prior behavior); promised to pay as soon as possible (intention); or needed money for unusually high bills (needs). An entity theorist, focused on personal traits might judge that same person as untrustworthy or thieving. Focus on context rather than traits also promotes differential responses to failure and frustration. Incremental theorists, who attribute intellectual failure to lack of effort or poor strategy, tend to become mastery oriented following failure, challenge, or stress: they remain positive, formulate new strategies and continue to try. Entity theorists tend to become helpless in response to intellectual failures, challenges, or stresses; they make negative judgments about their intelligence, exhibit negative mood and little perseverance (Dweck & Leggett, 1988; Dweck, Chiu, and Hong, 1995a.). It is these differences in remaining positive, strategic, and effortful that are of particular interest in this study.

Implicit Theories of Intelligence

Implicit theories predict the intellectual goals which individuals pursue, the way they pursue them, and the effectiveness with which they pursue them. For example,

Dweck and Leggett (1988) asked students to select tasks to work on. Incremental theorists tended to choose tasks in which the goal was learning something new. Entity theorists tended to opt for performance tasks, in which the goal was evaluating or documenting their ability.

In studies with elementary school students, junior high school students, college students, and adults, individuals react to achievement setbacks in two different ways. If they believe intelligence is developable (incremental theory), they blame situational factors such as lack of effort. If they believe intelligence is a trait and thus is fixed (entity theory), they blame their intellectual ability (Henderson and Dweck, 1990).

Burhans and Dweck (1995) demonstrate that some individuals (particularly very young children) make attributions for failure not to ability but to self-worth, defined globally. Thus their self-worth depends on successful performance and goal achievement. Such contingent self-worth promotes emphasis on self-evaluation goals and makes individuals particularly vulnerable to helplessness. The most helpless failure responses result when a theoretical attribute is believed to be both fixed and related to self-worth. Burhans & Dweck (1995) find that incremental theorists are less likely than entity theorists to make global self-derogations following failure or frustration. For example, if an individual holds an incremental theory of intelligence, he might respond to misspelling one word on a spelling quiz by concluding he used the wrong strategy and by trying to think of a mnemonic device for remembering the spelling. If an individual holds an entity theory of intelligence, he may also believe that his value as a person depends on

being intelligent, and then he is likely to respond to misspelling one word on a spelling quiz by evaluating himself as a complete failure and giving up.

Individuals' judgments following failures are in no way related to their actual levels of ability. However, a belief in personal ability at a specific task can promote the mastery pattern (of positive affects, attributions for failure to effort rather than ability, and persistent striving) regardless of implicit theory (Dweck & Leggett, 1988; Burhans & Dweck, 1995). In the example cited above, if that entity theorist also believes he is an excellent speller, he might be less likely to evaluate himself as a global failure and more likely to continue trying.

Studies of students at various ages have documented two different behavioral, coping responses to failure or stressful situations: persistent striving or performance decrements. For example, Henderson and Dweck (1990) tracked elementary students' transition to junior high school, a time of increased academic demand, and found that those with entity theories performed less well than predicted by earlier academic performance, while those with incremental theories performed as well or better than expected.

Mueller and Dweck (1998) report that praise for intelligence versus effort can play a mediating role in achievement motivation. After receiving praise for their intelligence, children were more likely to care more about performance goals, display less task persistence, and describe intelligence as more trait-like than children who received praise for their hard work. This finding has implications for the roles that others may play in

affecting motivation.

Implicit Theories in Other Domains

Dweck and her colleagues have extended their research on implicit beliefs about malleability of attributes to other domains. Findings in studies on personality and moral character echo findings regarding intelligence (Heyman & Dweck, 1998). Incremental theorists tend to make judgments about human behavior and behavioral outcomes the same way in which they respond to their own personal failures: by focusing on mediating or situational variables, such as effort and learning. In contrast, entity theorists tend to make judgments about others the same way in which they respond to personal failures: by focusing on fixed trait inferences, about such things as global ability, made from available information. Erdley and Dweck (1993) and Hong (1994, reported in Dweck, Chiu, & Hong, 1995) found that in the domain of moral behavior, while incremental theorists emphasize specific mediators of behavior, entity theorists make stronger moral trait inferences. Holders of the two contrasting theories differ not only in their judgments of others' behaviors but also in their reactions to the failures of others. Incremental theorists focus on learning from the situation, while entity theorists tend to emphasize retribution and punishment for misdeeds (Chiu and Dweck, 1994 in Dweck et al., 1995). Incremental and entity theorists also tend to differ in their views about the consistency of behaviors related to particular attributes such as honesty. Incremental theorists view behavior as more changeable from situation to situation: A person might be honest in some situations and not in others. Entity theorists see behavior as more stable: An honest person is always

honest. These differences in focus, judgment, and view tend to promote different world views. Entity theory describes a world that is constant and predictable, while incremental theory describes a world that is more variable and more complicated (Dweck et al. 1995).

Implicit theories across domains have been found to be independent of actual ability, confidence in personal or others' abilities, social desirability, optimism, and sociopolitical attitudes (Dweck, Chiu, & Hong, 1995). Confidence in one's ability may act as a mediator of achievement motivation. As mentioned above, an entity theorist, who is confident of personal ability to do an intellectual task, may adopt the mastery pattern of intellectual goal pursuit.

It is believed that implicit theories are not consistent across domains (Dweck, Hong, & Chiu, 1993); it is possible to be an incremental theorist in the intellectual domain and an entity theorist in the moral domain. There is also no implied relationship to better mental health between the two types of implicit theory. Neither an entity theory nor an incremental theory is correct. Each has its advantages, although the benefits of an incremental theory have been more discussed. However, entity theories might spur people on to great intellectual achievement if they are convinced of their superior competence and might promote fast decision making, if necessary, when only a few key facts are available (Dweck, Chiu, & Hong 1995b).

There is some empirical evidence that implicit theories not only predict but cause specific patterns of affects, cognitions, and behaviors. Implicit theories can be manipulated under experimental conditions (Bergen, 1991; Dweck, Chiu, & Hong,

1995a). For example, when subjects are induced by exposure to compelling evidence to adopt an entity theory, they will experience more helpless reactions to failure and make more trait social judgments than those with incremental theories.

No empirical investigation has been reported about implicit theories in the domain of substance abuse. Analysis of pilot data, from a random assignment comparison of Group Motivational Intervention (GMI) versus standard treatment, indicates that individuals do differ in their implicit beliefs about the changeability of substance abuse (assessed following Dweck, Chiu, & Hong (1995) and C.S. Dweck (personal communication, August, 1997)). Thirty-one percent of the pilot study participants endorsed an entity theory; 54% endorsed an incremental theory; and 15% were neutral as to theory. Findings also provide preliminary evidence of a relationship between individuals' implicit theories about the changeability of substance abuse and substance abuse motivational processes and treatment persistence.

Affective states were also assessed in the pilot analyses. They are key processes in achievement motivation, and, because of the frustrating aspects of treatment and recovery from addiction, they appear likely to be influential in this domain as well. Findings indicate that, at treatment entry, holding an incremental theory of substance abuse is associated with more positive mood ($r = .38, p < .01$); lower ratings of the cost of changing a substance abuse problem ($r = .43, p < .01$); and greater confidence both in treatment ($r = .28, p < .05$) and personal ability to manage a substance abuse problem ($r = .39, p < .01$) than holding an entity theory. Implicit theory did not predict treatment

persistence directly. However, more positive mood at baseline did predict persistence (retention in treatment at 1 month ($\beta = .27, p < .05$)). And, ratings of mood, confidence in treatment and personal ability, assessed after 2 weeks of treatment (the end of the GMI introduction), also predicted treatment persistence (variously measured as retention in treatment and number of sessions attended at different time points).

It is not surprising that in the realm of substance abuse, unlike intellectual achievement, an incremental implicit theory is correlated with confidence. In substance abuse motivation, the task is to change the actual attribute about which one holds the theory, while in achievement motivation, the task is to use the attribute to reach a goal. If one believes that an attribute or behavioral characteristic (substance abuse tendency) is changeable, then it makes sense to be more confident about personal ability to change it or about the effectiveness of treatment to change it. In achievement motivation, confidence is more independent. It makes sense that either an incremental or entity theorist could be confident in ability at a particular intellectual task, unless the task is specifically changing one's intelligence. Preliminary findings also indicate that implicit theory about substance abuse is directly related to ambivalence about changing a substance abuse problem. Those with incremental theories rate the costs of change lower than those with entity theories. Again, it makes sense that it would seem less costly to an individual to change a behavior or condition, which is believed to be changeable rather than fixed.

It is noteworthy that while implicit belief style was associated with positive mood

(affective state), it was not associated with a measure of depression ($r = -.19$, $p = .145$ n.s.) or with previous history of substance abuse treatment ($r = .12$, $p = .607$ n.s.). These findings provide support for the validity of implicit theory as an independent construct in the substance abuse domain.

Implications

The implicit beliefs model of motivation has been applied to a variety of psychological processes, most notably intellectual achievement motivation. It appears useful for investigating substance abuse treatment motivation, because both intellectual motivation and substance abuse treatment motivation concern style of reaction to failure, frustration, and negative mood. And, substance abuse treatment motivation, like achievement motivation, may be affected by individuals' confidence in personal ability to manage substance abuse and confidence in treatment effectiveness. Furthermore, preliminary findings suggest that implicit beliefs theory is a valuable tool for describing treatment motivation. Specifically, it provides a model for examining the interaction of personal attributes and situational, psychological processes (Erdley et al. 1997; Mueller & Dweck, 1998). If treatment motivation is indeed a key factor in substance abuse treatment outcome, then implicit theories may offer a parsimonious way to identify both those patients who are vulnerable to poor treatment outcomes and those conditions which mediate such outcomes. That is, if the entity implicit belief style is associated with lack of persistence in the face of failure, then it may be that entity theorists would find it more difficult to negotiate the frustrating task of recovery from substance abuse (with multiple

episodes of relapse). Thus, it is these entity theorists who may then show greater relative response to the intervention aimed at improving persistence by shifting motivation.

Study Aims

Two overall purposes of the GMI clinical trial were: 1) To improve substance abuse treatment persistence behavior specifically by bringing about favorable changes in key cognitive and affective motivational treatment processes (confidence in self to manage problems (self-efficacy), confidence in treatment, ambivalence about change, and positive and negative affect); and 2) To determine whether GMI is superior to standard treatment in bringing about such expected changes. A further aim of this study was to identify patients who may be particularly vulnerable to treatment failures and who subsequently might benefit most from motivational treatment. The implicit theories model of motivation, which consists of two core assumptions, each identified with a distinctive pattern of motivational affects and cognitions which promotes persistence in goal pursuit, seemed well suited to the domain of substance abuse treatment. If core assumptions about the changeability of a substance abuse problem were found to be associated with distinctive patterns of motivational affects and cognitions, which may mediate persistence in treatment, they might offer a parsimonious way of identifying: 1) those patients who are likely to have better treatment outcomes and those who are more vulnerable to treatment failures; 2) those psychological conditions and processes (affective states and cognitions) which are favorable to treatment persistence.

Analysis of pilot data in the GMI trial suggested that GMI was related to greater changes in some motivational processes than standard treatment. Furthermore, pilot data suggested that individuals do, in fact, hold contrasting implicit theories about substance abuse malleability. There appears to be, a significant relationship between implicit theories about substance abuse and distinctive patterns of substance abuse treatment process variables such as: mood, confidence in both treatment and personal ability, and evaluations of costs of changing. Finally, these motivational process variables may be associated with greater persistence in treatment.

This study also aimed to discover if GMI, a motivational treatment designed to enhance treatment motivation and persistence, would differentially affect those with different core assumptions (implicit beliefs) about substance abuse. Specifically, this study investigated whether GMI would be more beneficial to those patients who may be more vulnerable to less favorable outcomes.

Hypotheses

Hypothesis 1

During the course of treatment, favorable changes would occur in variables described as motivational processes: positive moods, confidence in treatment, and confidence in self-competence to handle substance abuse would increase; negative moods would decrease; and treatment ambivalence would shift (benefits of change would increase, costs would decrease)

Hypothesis 2

Motivational processes which change significantly would predict treatment persistence behavior (session attendance during the first two weeks (the period of the GMI intervention) and during the overall 4-month treatment)

Hypothesis 3

GMI would predict greater changes in motivational process variables and subsequently greater persistence than standard treatment.

Hypothesis 4

Implicit belief about substance abuse would be unrelated to demographic and substance use characteristics and would be related to a distinctive pattern of motivational treatment variables at baseline (before treatment). Compared to entity theory, incremental theory would predict more positive mood and less negative mood; greater confidence in treatment and confidence in self; and higher benefits and lower costs of changing a substance abuse problem.

Hypothesis 5

Implicit theory would predict treatment persistence: Incremental theory would predict greater treatment persistence than entity theory.

Hypothesis 6

GMI would have differential impact on those with different implicit theories:

Among entity theorists, GMI would predict better treatment outcomes than standard treatment; among incremental theorists, GMI would predict no significant difference in outcome from standard treatment.

Chapter III

METHOD

Study Setting

Smithers Treatment and Training Center is a private, non-profit, alcohol and drug abuse treatment facility in NYC. The study protocol was approved by the St. Luke's-Roosevelt Hospital Center Institutional Review Board.

Participants

Subjects were recruited from consenting adult males and females who come to the Smithers Center for substance abuse evaluation and treatment. One hundred thirty-four patients from a broad spectrum of sociocultural backgrounds consented to take part in the study.

Inclusion criteria

Patients must have received a current diagnosis of alcohol dependence or abuse as determined by DSM-IV criteria (may also be other substance dependent), and be eligible for ASAM Level 1 treatment (non-intensive outpatient). Diagnosis was made in the Smithers Evaluation Unit following a comprehensive assessment. Patients were first evaluated for medical complications of substance abuse, with particular attention to withdrawal potential and need for detoxification, by a triage nurse (RN) and licensed

medical office assistant (MOA). Patients were then assessed by Evaluation Unit counselors, either social workers (CSW) or certified alcohol counselors (CASAC), who conducted a structured psycho-social and substance use interview using the Addiction Severity Index (ASI) described below, DSM-IV checklist, and the ASAM patient placement criteria.

Exclusion criterion

Patients were excluded who were eligible for ASAM Level 2, 3 or 4 treatment (intensive outpatient, residential or hospital treatments).

Study Population

Of the 134 patients who agreed to enter the study, 5 were removed by the investigators, as follows: 3 patients were transferred to more intensive levels of treatment and therefore no longer met the inclusion criteria (level 1 non-intensive outpatient treatment); 1 patient was found to have bypassed data collection at baseline, and therefore had no baseline data; and 1 patient, who was deaf, was experiencing such significant problems with his hearing aids, that he was unable to hear the group process. All data for these patients was excluded from the study, which reduced the population to 129.

Another 12 patients who were evaluated at baseline did not show up for treatment, which left a study population of 117. Study patients ranged in age from 19 to 58 years with a mean age of 39.97 years and standard deviation of 11.19. They were mostly male (82.1%), unmarried (68.4%), and Caucasian (58.1%). They ranged broadly in education

level from 5 to 22 years of school with an average of 14.94 years and standard deviation of 3.22. They had a high unemployment rate of 22.2%. Their earnings in the month before entering treatment ranged from \$0.00 to more than \$7000.00 with an average of \$2272.12 and a standard deviation of \$2087.28. As a group, they were somewhat depressed; they had a mean Beck Depression Inventory raw score of 12.65, standard deviation of 9.13 and a wide range of scores from 0 to 42. Most participants, 42.7%, abused only alcohol. Another 31.6% abused both alcohol and other drugs. And 25.6% abused only drugs. Slightly more than one half of the patients, 52.4%, had undergone some previous substance abuse treatment.

Procedure

After an evaluation unit counselor (either CSW social worker or CASAC substance abuse counselor), during the regular Smithers evaluation, determined that patients met the eligibility criteria described above for the study, the counselor asked patients if they would be willing to take part in a study in which, 1) they would be randomly assigned to one of two treatments regularly given at Smithers; and 2) they would be asked to fill out a few questionnaires at the present time and on a few future occasions. It was made clear that patients were neither obligated to participate nor to remain in the study in order to receive treatment at Smithers. Upon agreeing to take part in the study, patients were introduced to a research assistant, gave informed consent to participate (by reading and signing the Informed Consent Form found in Appendix B),

and completed five brief, self-administered research questionnaires (about 25 minutes). The questionnaires were given to each patient in the same order (with implicit belief style being assessed first). Research assistants were volunteer undergraduate and graduate students in psychology, who had been trained in patient interviewing; in the need to maintain strict patient confidentiality; and in the importance of uniform procedure in data collection. Patients were also told that they would be asked to complete 4 brief self-administered questionnaires (about 20 minutes) during the course of the study as follows: at 2 weeks, the end of the initially scheduled 4th session in both conditions; and at 1 month; 2 months, and 4 months post entry. On these later occasions, envelopes containing questionnaires and instructions were given to patients by their group therapists. Patients self-administered the questionnaires, sealed them in the envelopes provided, and placed the sealed envelopes into a designated research mail box.

Patient assignment

Following data collection, consenting patients were randomly assigned to treatment condition by the director of the evaluation unit, (a CASAC.) who was blind to the research data collected and thus specifically to patients' implicit belief style. To reduce the occurrence of uneven "waves" of patient entry into the two conditions, a paired block random assignment method was used.

One hundred seventeen of the 134 patients inducted into the study, took part in the treatment. Of these 117 study patients, 57 (48.7%) were in the control condition, and 60

(51.3%) were in the GMI condition.

GMI condition

Sixty study patients entered a twice weekly, 4-session group for a 2-week period, followed immediately by entry into twice weekly standard group treatment. Patients in the GMI condition were transferred to their ongoing outpatient group at the end of their initially scheduled fourth session, regardless of attendance during the 4-session GMI intervention.

Control condition

Fifty seven study patients entered directly into twice weekly standard group treatment.

Treatment Conditions

Group Motivational Intervention (GMI)

GMI is a 4-session, semi-structured group designed to lower patient resistance to treatment and change. It utilizes written treatment sessions as a "jumping off" point for each session: a therapists' training manual describes the theoretical background for the approach, and a therapists' session guide accompanies each of the 4 sessions. The manual and guide provide detailed instructions for treatment delivery, including philosophy and style of treatment, and guidance in highlighting the central FRAMES elements defining this intervention. Sessions are structured to involve all patients in an active rather than didactic or psycho-educational experience (a sample session is found in Appendix B).

A typical treatment session begins with a brief, collaborative, and non-punitive check-in period, during which slips to use by patients since the previous group are reviewed and alternative abstinence and coping strategies discussed. These tend to be characterized by unusual candor and openness. In the remainder of the session, the treatment handout is read aloud paragraph by paragraph by patients, with pauses so that participants can discuss the content and related substance use issues they may want to raise.

Standard Treatment

Smithers standard outpatient group treatment is an unstructured, eclectic approach, which focuses both on preventing relapse and facilitating 12-Step participation. Treatment is milieu oriented and emphasizes recognizing, understanding, and dealing with the triggers such: as cravings, negative emotions, stress, etc. Counselors primarily facilitate the group discussion and also offer feedback. Patients have access to separate vocational and family counseling.

Study Therapists

All study therapists were blind to subjects' implicit belief style (and status on all other research measures) but were, obviously, not blind to treatment condition.

GMI Condition

The two leaders of the GMI group were advanced doctoral students in clinical psychology who had completed all training as clinical psychologists except for dissertation. Both therapists had also completed a fellowship training year at the Smithers

Center, and as such had had clinical addiction training. Training in GMI consisted of a two-day didactic training with a Ph.D. psychologist, followed by co-facilitating 4 weeks of pilot GMI group. Research therapists received weekly supervision on use of the model and individual patient problems.

Standard Treatment

The leaders of standard group treatment at Smithers all have a CASAC license or equivalent, with the concomitant New York State licensure associated with this degree. Counselors receive weekly supervision from clinical supervisors (psychologists) on individual patient problems and all aspects of group treatment.

Study Measures

Implicit Theories

In this study, implicit theories were assessed with the Implicit Theory Questionnaire (ITQ), a 3-item measure which, following Dweck, Chiu and Hong (1995) and C. S. Dweck (personal mail correspondence, August, 1997), was adapted for substance use. The 3 items are: 1) You have a particular tendency to abuse alcohol and/or other drugs, and you can't really do much to change it; 2) Your tendency to abuse alcohol or drugs is something about you that you can't change very much; 3) You can learn new things, but you can't really change your basic tendency to abuse drugs and/or alcohol. The ITQ was the first questionnaire administered to each patient by the research assistant in the study data collection session.

The ITQ asks respondents to indicate how much they agree or disagree with the statements on a 6-point Likert-type scale from 1 (strongly agree) to 6 (strongly disagree). Scores of the three items are averaged to form an implicit belief score. Individuals are identified as *entity* theorists if they score 3.0 or less, and as *incremental* theorists if they score 4.0 or above. Individuals who score 3.1 through 3.9, usually 15% of subjects, are excluded from study. The remaining 85% is typically (in previous research) divided equally between incremental and entity theorists. In the pilot study, 65 out of 75 patients showed up for treatment. Of these patients, 20 (30.8%) were *entity* theorists, 35 (53.8%) were incremental theorists. Ten patients (15.4%) scored 3.1 through 3.9 and thus were *neutral* as to theory and excluded from the study.

In this study, 117 patients showed up for treatment. Of these patients, 42 (35.9%) were classified as *entity* theorists because of ITQ scores of 3.0 or less; 62 (53.0%) were classified as *incremental* theorists because of ITQ scores of 4.0 or above; and 13 (11.1%) were *neutral* as to theory because of ITQ scores from 3.1 to 3.9. These 13 neutral theorists were removed from the analysis, which left an *implicit theory* study population of 104 patients.

The measure, as used in previous research for intelligence, morality, and person theory, has high established reliability, despite the small number of items, with internal consistency, measured by Chronbach's α from .85 to .98, and test-retest from .80 to .82. In this study, the ITQ for substance abuse had excellent internal consistency, Chronbach's $\alpha = .87$.

A low number of items is used in implicit theory questionnaires, because they assess only one very particular concept. Repeatedly restating the same question would become boring and odd (Dweck, Chiu, & Hong, 1995a; Erdley, Cain, Loomis, Dumas-Hines, & Dweck, 1997). Validity has been established by six validation studies and factor analysis. Validity studies demonstrate, in particular, that disagreement with entity statements may be taken as agreement with an incremental theory (Henderson, 1990; Dweck et al, 1995a). Subjects who are asked to explain their implicit theory questionnaire responses, which disagree with the entity statements about intelligence morality, and person theory, articulate their reasons in clear incremental terms. Furthermore, factor analysis has established that agreement with the items does not represent an acquiescence response set. And finally, studies also establish that implicit beliefs are independent of sociocultural factors, such as race: gender, age, political affiliation, and religious affiliation; and attitudes such as: social desirability, ideological rigidity, and pessimism (Dweck et al., 1995a). Notably, in pilot data for this study, implicit theory was not significantly correlated with depression, $r = -.19$, $p = .15$ n.s. (as measured on the Beck Depression Inventory ((BDI), Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), which provides support for the validity of implicit belief about substance abuse as independent of underlying depression or general pessimism. In this study, implicit theory again was found to be not significantly correlated with depression (BDI), $r = -.06$, $p = .55$ n.s.

Mood

In this study, mood was assessed with the Positive Affect Negative Affect Scale

(PANAS; Watson, 1988; Watson, Clark, & Tellegen, 1988; Bagozzi, 1933). The PANAS is a 20- item, self-report scale designed to measure the factors of positive and negative mood state. Respondents are asked to indicate, on a 5-point scale, to what extent they have felt a particular feeling or emotion, such as “proud” or “ashamed” during the past week. Other periods of time may be used, including “right now”. The past week was selected for this study, to reflect a reasonable period of time during which a respondent might have been making the decision to seek treatment. It is a widely used and highly reliable scale with established internal consistency (Cronbach’s $\alpha = .85$ to $.90$, depending on time period) and test-retest of $r = .84$ to $.90$. Construct validity has been demonstrated in mental health care and other settings. Research has consistently shown the positive and negative affects to be independent dimensions.

Confidence in Self-Competence (or Self-Efficacy (SE))

The Competence Scale (CS) (Williams, Grow, Freedman, Ryam & Deci, 1996), adapted for substance abuse, was used to measure patients’ perceptions of self-competence to handle their alcohol and drug problems. It contains 5 self-report items such as, “I feel confident in my ability to manage my alcohol and/or drug use.” It was administered at baseline, 2 weeks, 2 months, and 4 months. The CS is a reliable instrument, with excellent internal consistency (Cronbach’s alphas from $.80$ to $.94$), which has been validated in health care settings. Construct validity has been established by positive association with measures of self-confidence, autonomous motivation, and perception of treatment setting as promoting competence and autonomy.

Ambivalence

In this study, ambivalence was operationalized as relative benefits and costs of changing an alcohol or drug problem. It was assessed with the Alcohol and Drug Consequences Questionnaire (ADCQ) (Cunningham, Gavin, Sobell, Sobell, & Breslin, 1997). The ADCQ contains 29 items in response to the stem, "If I stop or cut down..." such as: "I will feel better physically" (benefit), and "I will feel frustrated and anxious" (cost). In this study, it was administered at baseline, 2 weeks, 2 months, and 4 months. The ADCQ is a reliable measure, with reported internal consistency for the benefits subscale (Chronbach's $\alpha = .85$ to $.90$) and the costs subscale (Chronbach's $\alpha = .89$ to $.92$). It was designed for and validated with substance use populations. Construct validity has been established by relationship to measures of: the impact of achieving alcohol and drug treatment goals; 12-month follow-up of drinking behavior; Timeline Follow-back; and other cost and benefits assessments.

Treatment Confidence

A subscale of the Treatment Motivation Questionnaire (TMQ) (Ryan, Plant & O'Malley, 1995) was used to measure the motivational variable Treatment Confidence. Factor analysis with ASAM level I & II patients yielded 5 factors (Warner, Foote, Magura, DeLuca, Grand, & Geller, 1998): 1) autonomous motivation (AUT), 2) guilty motivation (GLT), 3) external motivation (EXT), 4) interpersonal help-seeking (HLP), 5) confidence in treatment (Tx Conf). The measure consists of 28 Likert-type items, with stems such as "I came for treatment because", and responses such as "I am confident this

program will work" (treatment confidence) and "I want to make changes" (autonomous motivation). In this study it was administered at baseline, 2 weeks, 2 months, and 4 months. The TMQ has been established to be reliable and valid instrument for measuring motivation constructs of self-determination theory in health care and substance abuse settings. The treatment confidence subscale, in particular, has been positively associated with measures of involvement in treatment and self-referral, and negatively related to early drop-out. In previous research, the scale has had excellent internal consistency with Chronbach's α ranging from .70 to .98. In this study internal consistency was demonstrated by a Chronbach's alpha at baseline of .74.

Treatment Persistence

Treatment persistence was operationalized as: number of sessions attended at 2 weeks (completion of GMI) and at 4 months overall (completion of treatment).

Addiction Severity Index (ASI)

The ASI (McLellan, Parikh, Braff, Cacciola, Fureman, & Incmikoski, 1990) is employed as part of the comprehensive assessment given to all patients by counselors (CSWs and CASACs) in the Smithers Evaluation Unit to make a substance use diagnosis. Counselors receive specialized training to assure uniform administration of the ASI. It is a widely used standardized interview for measuring the background and functioning of addicts over time. Separate composite scores are computed for: medical, alcohol and drug, family and social, employment, legal, and psychological status. It has been updated

to include such features as: crack use, drug injection, polydrug use, and homelessness (McLellan, Kushner, Metzger, & Smith. 1992).

Beck Depression Inventory (BDI)

The BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is employed, as part of the regular psychosocial assessment of patients in the Smithers Evaluation Unit, specifically to assess current suicidality. It is a widely used, reliable, and valid instrument, which allows subjects to rate cognitive, affective, somatic, behavioral-vegetative symptoms of depression on 4-point scales.

Statistical Analyses

Differences on demographic variables and on motivational variables between treatment condition groups and between implicit theory groups were analyzed by t test (continuous variables) and by chi-square (categorical variables). Differences between motivational variables at baseline and at later times in treatment were analyzed by t test. Consistent with the study hypotheses (about changes in mediating variables and prediction of treatment persistence), the dependent variables, both the outcome variables (treatment persistence measures) and process or mediating variables (such as mood and confidence) were regressed on the expected predictors (such as treatment condition and implicit theory) for each hypothesis. A correlation matrix of all independent and dependent variables was calculated. Demographics, which were found to be correlated with the dependent variables, were included in the regression analyses. When the

dependent measure had a corresponding baseline measure (most process variables), that baseline measure was also included in the regression analysis.

Power Analysis

This study had 134 subjects who agreed to participate. According to Cohen (1992), with a probability level of .05 and a power level of .80, the required number of subjects (N) for a medium effect size ranges from N = 63 for 2 variables to N = 107 for 8 variables; the required number of subjects for a large effect size ranges from N = 30 for 2 variables to N = 50 for 8 variables.

Attrition

As noted above, 134 subjects consented to the study and completed baseline data collection; 5 were removed from the study, and 12 failed to show up for treatment, which left a baseline treatment study population of 117. After 2 weeks of treatment, the length of the GMI intervention, 92 participants (78.6% of the treatment study population) remained. After 2 months of treatment, 46 participants (39.3%) remained. And, after 4 months of treatment, the total length, only 22 participants (18.8%) remained.

Chapter IV

RESULTS

Preliminary Analyses

Randomization

Patients were assigned to treatment groups using a random block method. Several analyses were conducted to test the success of the randomization. Results of chi-square analysis of the number of patients assigned to each condition were not significant ($\chi^2 (1) = .077, p = .782$), which suggests that an equivalent number of patients were treated in each condition. Table 1 presents the results of t tests performed to identify significant differences between treatment groups in continuous baseline demographic characteristics.

TABLE 1

Baseline Characteristics (Continuous Variables) of 117 Study Participants by Treatment Condition

Variable	Treatment Condition				t (115)
	GMI n = 60		Standard Tx n = 57		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Age ^a	40.18	11.62	39.75	10.83	.21 n.s.
Education (Yrs.) ^b	15.02	3.46	14.86	2.97	.26 n.s.
1 Mos Income (\$) ^c	2072.18	1948.46	2482.58	2221.91	-1.06 n.s.
Depression (BDI) ^d	12.47	9.48	12.84	8.83	- .22 n.s.

^a Possible range of values ≥ 18 , actual range from 19 to 58. ^b Possible range of values ≥ 0 , actual range from 5 to 22 years. ^c Possible and actual range of values of Income Earned in Last Month from \$ 0.00 to \geq \$ 7000.00. ^d BDI possible raw scores range from 0 to 63, actual raw scores range from 0 to 42.

There were no significant differences between the treatment groups in age, years of education, earned income, or depression. Table 2 presents the results of chi-square analysis performed to identify significant differences between treatment groups on categorical baseline demographic and substance use characteristics.

TABLE 2

Baseline Characteristics (Dichotomous Variables) of 117 Study Participants by Treatment Condition

Variable	Treatment Condition		χ^2 (1)
	GMI	Standard Tx	
	$n = 60$	$n = 57$	
	%	%	
Some Previous Subs Tx	45.5	50.0	.043 n.s.
Employed	76.7	78.9	.088 n.s.
Female	13.3	22.8	1.781 n.s.
Minority Ethnicity	36.7	47.4	1.375 n.s.
Married	30.0	33.3	.150 n.s.
Drug of Abuse:			.679 n.s.
Alcohol Only	40.0	45.6	
Alcohol & Drug	35.0	28.1	
Drug Only	25.0	26.3	

There were no significant differences between the GMI treatment group and the standard treatment group in experience of previous treatment, employment status, gender,

ethnicity, marital status, or substance use category. Table 3 presents the results of analysis by t test of baseline motivational measures by treatment condition.

TABLE 3

117 Patients' Standing on Cognitive and Affective Motivational Treatment Variables and Implicit Theory at Baseline by Treatment Condition

Variable	Treatment Condition				$t(115)$
	GMI $n = 60$		Standard Tx $n = 57$		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Confidence in Tx ^a	3.98	.78	4.10	.74	-.83 n.s.
Confidence in SE ^b	5.64	1.10	5.62	1.25	.07 n.s.
Cost ^c	1.85	1.06	1.81	1.16	.18 n.s.
Benefit ^d	3.83	1.27	3.94	.87	.59 n.s.
Pos Mood ^e	30.97	10.02	30.28	9.40	.38 n.s.
Neg Mood ^f	24.28	10.53	22.30	9.19	1.09 n.s.

^a Confidence in Treatment possible scores range from 1 to 5; actual scores range from 1.8 to 5.0.

^b Confidence in Self-Competence possible and actual scores range from 1 to 7.

^c Cost of Change possible scores range from 0 to 5; actual scores range from 0 to 4.4.

^d Benefit of Change possible scores range from 0 to 5.0; actual scores range from 1.6 to 5.0.

^e Positive Mood possible scores range from 1 to 50; actual scores range from 3 to 50.

^f Negative Mood possible scores range from 1 to 50; actual scores range from 10 to 44.

No significant differences were found between the treatment groups on baseline measures of the motivational variables: treatment confidence, self-efficacy confidence, costs of change, benefits of change, positive mood, and negative mood. Table 4 presents the results of analysis by chi square, which was performed to identify potential significant differences between the two treatment groups on implicit theory

TABLE 4

104 Patients' Standing on Implicit Theory at Baseline by Treatment Condition

Variable	Treatment Condition		χ^2 (1)
	GMI n = 51	Standard Tx n = 53	
	%	%	
Implicit Theory			.376 n.s.
Entity	31.4	49.1	
Incremental	68.6	50.9	

There were no significant differences between patients in the two treatment groups in implicit theories. Taken together, the demonstrated lack of significant differences between patients in the GMI treatment group and patients in the standard

treatment group in demographic characteristics, motivational variables, and implicit theory, provides evidence for the success of the randomization.

Study Participants

Analysis of continuous variables by t test and of categorical variables by chi square revealed no significant differences between the “no-show” patients and the “show” (treatment entering) patients on any baseline demographic and substance use characteristics. There was only one significant baseline motivational treatment variable difference between the two groups: “no-show” patients had less positive affect at baseline than “shows” ($t(127) = -2.08, p < .05$). There were no significant differences in implicit theory.

Distribution of Baseline Variables

All baseline measures of demographic, drug screening and motivational treatment variables, except Income in the Previous Month, History of Previous Substance Abuse Treatment, and Benefits of Change, were distributed approximately normally. Income in the Previous Month was positively skewed. A logarithmic transformation failed to increase normality, because of twelve scores of zero. Therefore, raw (dollar) scores were used with the two highest, outlying scores (\$25,000 and \$15,000) recoded to values of “greater than or equal to \$7,000” (the third highest score). History of Previous Substance Abuse Treatment was also positively skewed, because approximately one-half the sample had had no previous treatment, and the other half was distributed among one to four

treatments. "History of Previous Substance Treatment" was therefore transformed to a dichotomous variable ("Some Previous Substance Treatment" and "No Previous Substance Treatment"). Benefits of Change was negatively skewed. Within a range possible scores from 0 to 5, one-half of the participant scores were 4.2 or above, and there were ten scores of 5. Thus, it appears that the skew reflected a ceiling effect in patients' responses to this questionnaire. The variable was explored in the analysis, but significant results were not expected.

Missing Data

Twenty-four data points (less than 1%) were missing. Following Tabachnick and Fidell (1983), data was estimated by using prior knowledge ("well educated guesses"), when available, and by inserting appropriate group means (incremental, entity, or "neutral"), when other information was not available. Thirteen scores (means) were missing because 1 or more items on a measure had been omitted. These scores were estimated by taking the mean score of available items. Eleven scores were missing because the entire questionnaire was omitted. The scores were estimated by using the appropriate group means (incremental, or entity).

Hypothesis 1

It was hypothesized that patients' standing on motivational treatment process variables would change significantly in desirable directions during the course of treatment: Patients' confidence in treatment, confidence in self-efficacy, evaluation of

benefits of change, and positive mood would increase; patients' evaluation of costs of change and negative mood would decrease. Table 5 presents the results of *t* tests analyzing the difference in motivational scores at baseline and after 2 weeks of treatment.

TABLE 5

Patients' Standing on Cognitive and Affective Motivational Treatment Variables
by Treatment Time (Baseline and 2 Weeks) N = 92

Variable	Treatment Time				<i>t</i> (91)
	Baseline		2 Weeks		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Tx Conf	4.09	.76	4.17	.79	-.98
SE Conf	5.62	1.19	5.66	.99	-.34
Cost	1.78	1.15	1.87	1.13	-1.03
Benefit	3.87	1.12	4.10	1.00	-2.67**
Pos Mood	30.40	10.07	34.32	9.64	-3.38**
Neg Mood	23.08	10.17	21.48	9.74	1.71 [†]

p* < .01. *p* < .001. [†] *p* < .05, 1-tailed.

Benefits of change and positive mood increased significantly from baseline to 2 weeks in treatment. Negative mood decreased significantly (one-tailed). Table 6 presents the results of t tests analyzing the differences in motivational scores at baseline and after 2 months of treatment.

TABLE 6

Patients' Standing on Cognitive and Affective Motivational Treatment Variables by Treatment Time (Baseline and 2 Months) (N = 46).

Variable	Treatment Time				$t(45)$
	Baseline		2 Months		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Tx Conf	4.33	.56	4.37	.66	-.43
SE Conf	5.81	1.02	5.85	.94	-.20
Cost	1.17	1.08	1.78	1.12	.12
Benefit	3.85	1.00	4.08	.84	- 3.08**
Pos Mood	28.72	10.27	33.67	8.59	- 3.84***
Neg Mood	23.17	9.80	19.99	8.96	2.61*

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

Benefits of change and positive mood increased significantly from baseline to 2

months in treatment. Negative mood decreased significantly from baseline to 2 months in treatment. Table 7 presents the results of t tests analyzing the differences in motivational scores at baseline and after 4 months of treatment.

TABLE 7

Patients' Standing on Cognitive and Affective Motivational Treatment Variables by Treatment Time (Baseline and 4 Months) (N = 22)

Variable	Treatment Time				t (21)
	Baseline		4 Months		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Tx Conf	4.18	.62	4.59	.45	- 3.49**
SE Conf	5.70	1.12	6.19	.98	- 2.09*
Cost	1.62	.89	1.14	.97	1.04
Benefit	3.67	1.07	3.90	.88	-1.59
Pos Mood	31.60	11.18	37.23	8.92	-2.04*
Neg Mood	25.46	10.68	20.55	10.06	1.96

* $p \leq .05$.

** $p < .01$.

*** $p < .001$.

Addendum: Cost changed significantly from 2-weeks treatment time ($\underline{M} = 1.83$, $\underline{SD} = .1.22$) to 4-months treatment time ($\underline{M} = 1.44$, $\underline{SD} = .97$). Value of t (21) = 2.30, $p < .05$.

Treatment

confidence, confidence in self-competence, and positive mood increased significantly

from baseline to 4 months in treatment. Despite the appearance of sizable changes in costs of change scores, the analyses yielded no significant results. Therefore one more t test was performed, which analyzed the difference in costs scores from 2 weeks to 4 months. Over this period of treatment, costs of change did decrease significantly.

Therefore, Hypothesis 1 was confirmed. The motivational treatment variables did change significantly in the expected directions at some time point during the 4-month course of treatment. Patients' confidence in treatment, confidence in self-competence, evaluation of benefits of change, and positive mood all increased significantly from baseline to some other time in treatment. Patients' negative mood decreased significantly (1-tailed) from baseline to 2 weeks in treatment and from baseline to 2-months in treatment, and their evaluation of the costs of change decreased significantly from 2 weeks in treatment to 4 months in treatment.

Hypothesis 2

It was hypothesized that the motivational processes which changed significantly during the course of treatment, as found in hypothesis 1, would predict treatment persistence behavior (session attendance during the first two weeks, the period of the GMI intervention, and during the overall 4-month treatment). Treatment persistence behavior (number of sessions attended during the first 2 weeks and total number of session attended) was regressed on motivational variables. Baseline demographic, psychiatric, and substance abuse correlates of treatment persistence were identified to be

included as predictors in the regression analysis. Table 8 presents the correlation matrix of treatment persistence and baseline demographic and substance use characteristics.

TABLE 8

Correlations Between Treatment Persistence and Baseline Demographic, Psychiatric Characteristics, and Substance Abuse (N = 117).

Variable	1	2	3	4	5	6	7	8	9
1. Sessions-2wks	--	.67**	.07	.16	-.15	-.09	-.13	.04	-.26**
2. Total Sessions		--	.05	.22*	-.09	-.06	-.07	.04	-.21*
3. Age (Yrs.)			--	.04	.01	.09	-.01	.03	.04
4. Minority Ethnicity (%)				--	.01	-.06	-.26**	-.36**	-.25**
5. Female (%)					--	-.03	.09	-.03	.08
6. Marital Status (% Married)						--	.20*	.05	-.12
7. Net Income Last Month (\$)							--	.38**	.01
8. Education (Yrs.)								--	.03
9. Depression (BDI)									--
10. Employed/Full time Student (%)									
11. Subst of Abuse (%)									
12. Some Previous Substance Tx (%.)									

* $p < .05$.** $p < .01$.

TABLE 8 Continued.

Correlations Between Treatment Persistence and Baseline Demographic, Psychiatric and Substance Abuse Characteristics (N = 117)

Variable	10	11	12
1. Sessions-2wks	.08	-.13	-.05
2. Total Sessions	.18*	-.04	-.16
3. Age (Yrs.)	.06	-.35**	.19
4. Minority Ethnicity (%)	.04	.09	-.04
5. Female (%)	-.07	-.15	.14
6. Marital Status (% Married)	.05	.01	.02
7. Net Income Last Month (\$)	.44*	.13	-.40
8. Education (Yrs.)	.02	-.08	-.05
9. Depression (BDI)	-.15	-.01	.12
10. Employed/Full time Student (%)	--	-.04	-.16
11. Subst of Abuse (%)		--	.07
12. Some Previous Substance Tx (%.)			

* $p < .05$. ** $p < .01$.

Depression (BDI raw score) was significantly correlated with sessions attended at 2 weeks and was included in the regression as an independent variable. Depression (BDI),

minority ethnicity, and employment status (employed or full-time student) were significantly correlated with total sessions. Therefore, total sessions attended was regressed on BDI, minority ethnicity, and employment status. Results are presented in Table 9.

TABLE 9

Summary of Regression Analysis for Demographic Variables Predicting Total Number of Session Attended (N = 117)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				4.044**
BDI	-.162	.105	-.145 n.s.	
Minority Ethnicity	3.627	1.905	.176 n.s.	
Employed/Full-Time Student	3.799	2.216	.155 n.s.	

Note. $R^2 = .097$

** $p < .01$.

When the predictor variables were entered simultaneously, the model was significant but no individual predictors were significant. So the regression was repeated using a stepwise method. Table 10 presents the results of the stepwise regression.

TABLE 10

Summary of Stepwise Regression Analysis for Demographic Variables Predicting Total Number of Session Attended (N = 117)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				5.674*
Minority Ethnicity	4.480	1.881	.217*	

Note. $R^2 = .047$.

Variables excluded were: Depression (BDI) and Employment Status.

*** $p < .05$**

Minority ethnicity was the only significant predictor in the stepwise model, all other predictor variables were excluded. Therefore, minority ethnicity was the only demographic variable included as a predictor of total session attendance in the regression analysis.

In separate regression analyses, session attendance at 2 weeks was regressed on depression and on the motivational variables which changed significantly from baseline to 2 weeks. Table 11 presents the results of the separate regression analysis for benefits of change as a predictor of 2-week treatment attendance.

TABLE 11

Summary of Regression Analysis for Benefits of Change at 2 Weeks as a Predictor of Number of Session Attended During First 2 Weeks of Treatment (N = 92)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				1.575 n.s.
Depression	-.012	.011	-.128 n.s.	
Benefits-Baseline	-.205	.139	-.209 n.s.	
Benefits-2 Wks	.132	.115	.157 n.s.	

Note. $R^2 = .051$.

Benefits of change at 2 weeks of treatment was not a significant predictor of treatment attendance. Table 12 presents the results of the separate regression analysis for positive mood as a predictor of 2-week treatment attendance.

TABLE 12

Summary of Regression Analysis for Positive Mood at 2 Weeks as a Predictor of Number of Session Attended During First 2 Weeks of Treatment (N = 92)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				1.837 n.s.
Depression	-.021	.011	-.215 n.s.	
Positive Mood-Baseline	-.014	.010	-.171 n.s.	
Positive Mood-2 Wks	.014	.010	.161 n.s.	

Note. $R^2 = .059$.

The model was not significant. Positive mood after 2 weeks was not a predictor of treatment attendance. Table 13 presents the results of the separate regression analysis for negative mood as a predictor of 2-week treatment attendance.

TABLE 13

Summary of Regression Analysis for Negative Mood at 2 Weeks as a Predictor of Number of Session Attended During First 2 Weeks of Treatment (N = 92)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				3.085*
Depression	-.008	.012	-.081	
Negative Mood-Baseline	-.008	.012	.096	
Negative Mood-2 Wks	-.028	.011	-.321*	

Note. $R^2 = .095$.

* $p < .05$.

Of the motivational variables which changed significantly from baseline to 2 weeks, only negative mood at 2 weeks (a significant decrease from negative mood at baseline) significantly predicted session attendance during the first 2 weeks. Increases in benefits of change and positive mood were not found to be predictive.

To identify predictors of session attendance at 2 months and at 4 months, a similar series of separate multiple regressions was performed. Total number of sessions was regressed separately on minority ethnicity and each of the motivational variables which changed significantly at 2 months and at 4 months. Table 14 presents the results of the analysis for benefits of change.

TABLE 14

Summary of Regression Analysis for Benefits of Change at 2 Months as a Predictor of Total Number of Sessions Attended Overall (N = 46)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				1.271 n.s
Minority Ethnicity	3.177	1.875	.251 n.s.	
Benefits-Baseline	-1.826	2.065	-.240 n.s.	
Benefits-2 Mos	1.475	2.078	.193 n.s.	

Note. $R^2 = .083$.

The model not significant. Benefits of change at 2 months of treatment was not a significant predictor of treatment attendance. Table 15 presents the findings of the regression analysis with positive mood as a predictor.

TABLE 15

Summary of Regression Analysis for Positive Mood at 2 Months as a Predictor of Total Number of Sessions Attended Overall (N = 46)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				3.571*
Minority Ethnicity	2.720	1.786	.215	
Pos Mood-Baseline	.009	.107	.014	
Pos Mood-2 Mos	.272	.126	.365*	

Note. $R^2 = .203$.

* $p < .05$.

Patients' positive mood at 2 months, a significant increase over positive mood at baseline, significantly predicted overall session attendance. Table 16 presents the results of regression analysis for negative mood as a predictor.

TABLE 16

Summary of Regression Analysis for Negative Mood at 2 Months as a Predictor of Total Number of Session Attended Overall (N = 46)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				1.247 n.s.
Minority Ethnicity	3.606	1.948	.285 n.s.	
Neg Mood-Baseline	.106	.126	.163 n.s.	
Neg Mood-2 Mos	-.075	.143	-.105 n.s.	

Note. $R^2 = .082$.

The model was not significant. Negative mood at 2 months was not a significant predictor. Table 17 presents the findings of the regression with treatment confidence as a predictor.

TABLE 17

Summary of Regression Analysis for Treatment Confidence at 4 Months as a Predictor of Total Number of Session Attended Overall (N = 22)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				1.945 n.s.
Minority Ethnicity	4.152	2.358	.366 n.s.	
Tx Conf-Baseline	1.464	2.161	.164 n.s.	
Tx Conf-4 Mos	1.934	2.951	.157 n.s.	

Note. $R^2 = .245$.

The model not significant. Treatment confidence was not a predictor of treatment attendance. Table 17 presents the results of regression analysis with confidence in self-efficacy as a predictor.

TABLE 18

Summary of Regression Analysis for Confidence in Self-Competence (SE) at 4 Months as a Predictor of Total Number of Sessions Attended Overall (N = 22)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				2.856 n.s
Minority Ethnicity	5.164	2.346	.456	
SE Conf-Baseline	-.139	1.159	-.028	
SE Conf-4 mMos	2.313	1.283	.406	

Note. $R^2 = .322$.

The model was not significant. Self-efficacy confidence was not a significant predictor. Table 19 presents the regression of overall attendance with positive mood as a predictor.

TABLE 19

Summary of Regression Analysis for Positive Mood at 4 Months as a Predictor of Total Number of Session Attended Overall (N = 22)

Variable	<u>B</u>	<u>SE B</u>	β	F
Minority Ethnicity	4.629	2.379	.409 n.s.	2.244 n.s.
Pos Mood-Baseline	-.021	.107	-.042 n.s.	
Pos Mood-4 Mos	.204	.128	.326 n.s.	

Note. $R^2 = .272$.

The regression model for positive mood was not significant. Table 20 presents the results of the regression analysis with costs of change as a predictor of overall session attendance.

TABLE 20

Summary of Regression Analysis for Costs of Change at 4 Months as a Predictor of Total Number of Session Attended Overall (N = 22)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				7.228**
Minority Ethnicity	2.415	1.901	.213	
Costs-2 Wks	-2.529	1.161	-.554*	
Costs-4 Mos	-.653	1.412	-.114	

Note. $R^2 = .546$.

* $p > .05$. ** $p > .01$.

Of the six motivational variables, which changed during the course of treatment, only positive mood at 2 months significantly predicted total sessions attended overall. (Lower costs at 2 weeks was also a significant predictor of greater total session attendance, but did not represent a significant decrease from costs at baseline.)

Therefore, Hypothesis 2 was partially confirmed: Two motivational variables, which changed significantly during the course of treatment, significantly predicted treatment persistence. As expected, decreases in negative mood from baseline to 2 weeks predicted greater attendance at 2 weeks; and increases in positive mood from baseline to 2 months predicted greater total attendance at 4 months.

Hypothesis 3

It was hypothesized that GMI treatment condition compared to standard treatment would predict greater changes in motivational process variables and subsequently greater treatment persistence. Baseline demographic, psychiatric, and substance abuse correlates of motivational treatment variables were identified to be included as predictors in the regression analysis. Table 21 presents the results of the correlation matrix.

TABLE 21

Correlations Between Baseline Motivational Variables and Baseline Demographic, Psychiatric, and Substance Abuse Characteristics (N = 117)

Variable	1	2	3	4	5	6	7	8	9
1. Tx Conf	--	.42**	-.49**	.07	.17	-.23*	.19*	.26**	.00
2. Se Conf		--	-.53**	.02	.29*	-.33**	.27**	.15	-.06
3. Costs			--	.12	-.32**	.41**	-.13	-.33**	.05
4. Benefits				--	.00	.31**	.02	-.07	-.12
5. Pos Mood					--	-.30**	.29**	.25**	.03
6. Neg Mood						--	-.15	-.24*	.06
7. Age (Yrs)							--	.04	.01
8. Min Ethnicity (%)								--	.01
9. Female (%)									--
10. Married (%)									
11. Income Last Mo (\$)									
12. Education (Yrs)									
13. Depression (BDI)									
14. Employed (%)									
15. Substance of Abuse									
16. Some Previous Substance Tx (%)									

* $p < .05$.** $p < .01$.

TABLE 21 Continued.

Variable	10	11	12	13	14	15	16
1. Tx Conf	-.02	-.11	-.07	-.18*	.00	.03	-.10
2. Se Conf	.09	-.06	-.09	-.30**	.05	.06	-.31
3. Costs	-.07	.15	.17	.35**	.02	-.19	.13
4. Benefits	-.15	-.23*	-.09	.25**	.05	.05	.19
5. Pos Mood	.05	-.11	-.17	-.30**	-.12	-.06	-.01
6. Neg Mood	-.22*	-.03	.07	.64**	.03	.07	-.02
7. Age (Yrs)	.09	-.01	.03	-.04	-.06	-.35**	.19
8. Minority Ethnicity (%)	-.06	-.26**	-.36**	-.25*	.04	.09	.04
9. Female (%)	-.03	-.09	-.03	.08	-.07	-.15	.14
10. Married (%)	--	.19*	.05	-.12	.05	.01	.02
11. Income Last Mo (\$)		--	.38*	.01	.44**	-.13	-.40
12. Education (Yrs)			--	.03	.02	-.08	.05
13. Depression (BDI)				--	-.15	.01	.12
14. Employed (%)					--	.04	-.16
15. Substance of Abuse						--	.07
16. Some Previous Subst Tx (%)							--

* $p < .05$.** $p < .01$.

Motivational treatment variables, measured at 2 weeks, 2 months, and 4 months, were regressed on treatment condition, on their respective baseline measures, and on baseline demographic or substance use correlates. Table 22 presents the results of the regression analysis predicting increases in treatment confidence after 2 weeks of treatment.

Table 22

Summary of Regression Analysis for Prediction of Increases in Treatment Confidence at 2 Weeks by GMI Treatment Condition (N = 92)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
GMI Treatment	.295	.136	.188*	9.755****
Tx Conf-1	.545	.095	.524****	
Age	.012	.007	.168	
Minority Ethnicity	-.047	.143	-.030	
BDI	-.004	.008	-.046	

Note. $R^2 = .362$

* $p < .05$.

**** $p < .0001$

Compared to standard treatment, GMI treatment significantly predicted greater increases in treatment confidence after 2 weeks (the time period of the GMI introductory

treatment). GMI was not a significant predictor of changes in other motivational variables. Results of the non-significant regression analyses are not presented.

T tests were performed to determine if persistence (treatment session attendance at 2 weeks and at 4 months) differed by treatment group. Table 23 presents the t test results.

Table 23

Treatment Persistence by Treatment Group

Variable	Treatment Groups				t (115)
	GMI n = 60		Standard Tx n = 57		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Sessions-2 Wks ^a	3.08	1.08	2.77	1.13	1.520 n.s.
Sessions-4 Mos ^b	12.40	9.71	12.35	10.85	.026 n.s.

^a Possible and actual range of values for Sessions-2 Weeks was 1 to 4.

^b Possible and actual range of values for Sessions-4 Months was 1 to 35.

There were no significant differences in attendance rates by treatment group.

Contrary to expectation, GMI does not appear to predict greater treatment persistence directly.

Consistent with Hypothesis 3, GMI was related to an increase in the motivational

variable treatment confidence from baseline to two weeks. Regression analyses were performed to determine if the increase in treatment confidence did predict greater persistence (treatment attendance) during the first two weeks of treatment and during the overall 4 month period. Included as the predictors in the regression were treatment condition and the demographic correlates of treatment confidence and session attendance at the two time points. The results of the analysis for prediction of session attendance during the first 2 weeks of treatment are presented in Table 24.

Table 24

Summary of Regression Analysis for Prediction of Treatment Attendance at 2 Weeks by Changes in Treatment Confidence (N = 92)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				1.819 n.s.
Tx Conf-2 Wks	.202	.137	.188 n.s.	
Tx Conf-Baseline	-.025	.142	-.023 n.s.	
GMI Treatment	.205	.178	.122 n.s.	
Age	.010	.008	.129 n.s.	
BDI	-.012	.010	-.124 n.s.	
Minority Ethnicity	.132	.182	.078 n.s.	

Note. $R^2 = .114$

Contrary to expectation, an increase in treatment confidence at 2 weeks, which was significantly predicted by GMI treatment condition, did not significantly predict treatment session attendance at 2 weeks. The results of the analysis for prediction of session attendance during the total 4 months of treatment are presented in Table 25.

Table 25
Summary of Regression Analysis for Prediction of Total Treatment Attendance by Changes in Treatment Confidence from baseline to 2 weeks (N = 92)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				2.198*
Tx Conf-2 Wks	2.758	1.585	.220 n.s.	
Tx Conf-Baseline	1.124	1.640	.086 n.s.	
GMI Treatment	-1.262	2.055	-.064 n.s.	
Age	.003	.097	.003 n.s.	
BDI	-.098	.118	-.088 n.s.	
Minority Ethnicity	3.015	2.101	.153 n.s.	

Note. $R^2 = .134$. All predictors entered simultaneously.
 * $p \leq .05$

When all predictors were entered simultaneously, the model was significant, but no individual predictors were significant. A stepwise regression was performed to determine which of the predictors contributed significantly to the variance in the

dependent variable. Results are presented in Table 26.

Table 26

Summary of Stepwise Regression Analysis for Prediction of Total Treatment Attendance by Changes in treatment Confidence from baseline to 2 weeks (N = 92)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				7.817**
Tx Conf-2 Wks	3.547	1.269	.283**	

Note. $R^2 = .080$ All other predictor variables (Tx Conf-baseline, GMI Treatment, Age, BDI, and Minority Ethnicity) were excluded from the equation.

** $p < .01$.

As hypothesized, increases in the motivational variable treatment confidence from baseline to 2 weeks, which were significantly predicted by GMI treatment condition, significantly predicted overall treatment session attendance. To examine further the relationship between changes in treatment confidence, overall session attendance and GMI treatment, stepwise regressions predicting overall attendance were performed on the treatment groups separately. The results of the regression analysis performed for patients in the GMI treatment only are presented in Table 27.

Table 27

Summary of Stepwise Regression Analysis for Prediction of Total Treatment Attendance by Changes in Treatment Confidence from baseline to 2 weeks for GMI Patients Only (N = 50)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				7.537**
Tx Conf-2 Wks	4.412	1.607	.368**	

Note. $R^2 = .136$. All other predictor variables (Tx Conf-baseline, Age, BDI, and Minority Ethnicity) were excluded from the equation .

****** $p < .01$.

Consistent with the hypothesis, for patients in the GMI treatment condition, increases in treatment confidence from baseline to 2 weeks, significantly predicted higher overall treatment session attendance. Results of the regression analysis for patients in the standard treatment condition are presented in Table 28.

Table 28

Summary of Stepwise Regression Analysis for Prediction of Total Treatment Attendance by Changes in Treatment Confidence from baseline to 2 weeks for Standard Treatment Patients Only (N = 42)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				5.409*
BDI	-.414	.178	-.345*	

Note. $R^2 = .119$. All other predictor variables (Tx Conf-2wks, Tx Conf-baseline, Age, and Minority Ethnicity) were excluded from the equation .

** $p < .01$.

In the standard treatment condition, only lower depression scores (BDI) at baseline significantly predicted greater overall treatment session attendance. For these patients, changes in treatment confidence after 2 weeks did not significantly predict overall session attendance.

Hypothesis 3 was therefore partially confirmed. Contrary to expectation, GMI treatment condition did not predict treatment persistence directly. Yet, as hypothesized, it did significantly predict an increase in the motivational variable treatment confidence from baseline to 2 weeks, which, in turn, significantly predicted greater overall treatment persistence. There was a significant difference between predictors of session attendance for patients in the two groups. For patients in GMI, an increase in their confidence in treatment after 2 weeks, predicted greater attendance during the entire 4-month treatment

period. Whereas, for patients in the standard treatment, no changes in motivational variables predicted attendance. Only the depression scores at treatment baseline predicted attendance.

Hypothesis 4

It was hypothesized that patients with different implicit theories would not differ on baseline demographic characteristics and substance use measures but would differ significantly on baseline standing on motivational variables. Following Dweck, Chiu and Hong (1995), individuals were identified as *entity* theorists, if they scored 3.0 or less on the implicit theory questionnaire, and as *incremental* theorists, if they scored 4.0 or above. Thirteen patients who scored from 3.1 to 3.9 were removed from the analysis, which left an implicit theory study population of 104. T tests performed to identify significant differences in continuous baseline demographic characteristics and in baseline motivational measures by implicit theory group. Chi-square tests were performed to identify significant differences in dichotomous baseline demographic characteristics. Results of the t-test analyses are presented in Table 29.

Table 29

Baseline Demographic and Substance Use Characteristics (Continuous Variables) of 104 Study Participants by Implicit Theory Group

Variable	Implicit Theory Groups				t (102)
	Incremental n = 62		Entity n = 42		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Age ^a	38.69	10.34	40.74	11.95	-.93 n.s.
Education (Yrs.) ^b	14.83	3.15	14.54	2.98	.47 n.s.
Income Last Mo(\$) ^c	1959.57	1966.47	2414.17	2000.21	1.15 n.s.
Depression (BDI) ^d	11.73	9.37	12.81	8.48	-.60 n.s.

^a Possible range of values ≥ 18 , actual range from 19 to 58. ^b Possible range of values ≥ 0 , actual range from 5 to 22 years. ^c Possible and actual range of values of Income Earned in Last Month from \$ 0.00 to \geq \$ 7000.00. ^d BDI possible raw scores range from 0 to 63, actual raw scores range from 0 to 42.

Consistent with the hypothesis, there were no significant differences in age, education, income earned in the previous month, or depression between patients with entity and incremental theories. Results of the chi-square analysis of categorical variables are presented in Table 30.

Table 30

Baseline Demographic and Substance Use Characteristics (Dichotomous Variables) of 104 Study Participants by Implicit Theory Group

Variable	Implicit Theory Groups		$\chi^2(1)$
	Incremental <u>n</u> = 62	Entity <u>n</u> = 42	
	%	%	
Employed/Student (%)	72.6	85.7	2.51 n.s.
Female (%)	21.0	19.0	.06 n.s.
Minority Ethnicity (%)	40.3	47.6	.54 n.s.
Married (%)	32.3	31.0	.02 n.s.
Some Previous Subs Tx (%)	45.5	62.5	.54 n.s.
Drug of Abuse:			3.42 n.s.
Alcohol Only (%)	32.3	50.0	
Alcohol & Drug (%)	35.5	28.6	
Drug Only (%)	32.3	21.4	

As hypothesized, there were also no significant differences between entity theorists and incremental theorists in employment status, gender, ethnicity, marital status,

history of previous substance abuse treatment, and substance of abuse. T tests were performed to identify significant differences between entity and incremental theorists in motivational variables before treatment. Results of the analyses are presented in Table 31.

Table 31

Baseline Standing on Motivational Variables of 104 Study Participants by Implicit Theory Group

Variable	Implicit Theory Groups					t(102)
	Incremental n = 62		Entity n = 42			
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Confidence in Tx	4.16	.70	3.86	.86	1.96	
Confidence in SE	5.94	1.01	5.28	1.37	2.67**	
Cost	1.57	1.03	2.12	1.25	-2.43*	
Benefit	3.87	1.15	3.87	1.04	.00	
Pos Mood	32.24	10.14	27.88	9.53	2.20*	
Neg Mood	23.26	10.02	22.55	9.67	.36	

^a Confidence in Treatment possible scores range from 1 to 5; actual scores range from 1.8 to 5.0. ^b Confidence in Self-Competence possible and actual scores range from 1 to 7.

^c Cost of Change possible scores range from 0 to 5; actual scores range from 0 to 4.4. ^d Benefit of Change possible scores range from 0 to 5.0; actual scores range from 1.6 to 5.0.

^e Positive Mood possible scores range from 1 to 50; actual scores range from 3 to 50. ^f Negative Mood possible scores range from 1 to 50; actual scores range from 10 to 44.

*P ≤ .05. **P < .01.

Compared to patients in the entity theory group, patients in the incremental theory group

had significantly higher measures of confidence in treatment, confidence in self-competence (SE), and positive mood, and they had significantly lower measures of costs of change. There were no significant differences for benefits of change and negative mood.

Consistent with the hypothesis, patients with entity theories had less confidence in treatment, less confidence in self-efficacy, and higher appraisals of costs of change than patients with incremental theories. To determine which motivational variables contributed most to classification in the incremental or entity theory group, a logistic regression was performed. Implicit theory group was the dependent variable, and all motivational variables, on which the 2 groups differed significantly (confidence in self-competence, costs of change, positive mood, and confidence in treatment) were the predictor variables. The predictors were entered in Backward Likelihood Ratio Method (backward stepwise elimination), which has the least risk of failing to find a relationship. Results of the logistic regression are presented in table 32.

Table 32

Summary of Logistical Regression Results of Motivational Variables Predicting Implicit theory (N = 104)

Variable	<u>B</u>	Wald <u>SE</u>	χ^2	<u>p</u>	<u>R</u>	95% CI OR	(Odds)
SE Confidence	.483	.184	6.892	.008	.187	1.620	1.130 – 2.322

Note. Model $\chi^2 (1) = 7.697$, $p < .01$, 68.27% correct overall classification (87.10% incrementals, 40.48% entities).

All other variables (Costs of Change, Positive Mood, Confidence in Treatment) were removed from the equation.

SE = Standard error; OR = odds ratio; CI = confidence interval.

The regression model was significant, $\chi^2 (1) = 7.697$, $p < .01$, with only one variable, confidence in self-competence, remaining in the final step, and 68.27% overall correct implicit theory group classification. For each unit of increase in self-competence, the odds were 1.6 times greater that patients would have an incremental rather than an entity theory.

Hypothesis 4 was confirmed. Patients with different implicit theories did not differ significantly on baseline demographic and substance use characteristics; they did differ significantly on four baseline motivational variables. Compared to incremental theorists, entity theorists entered treatment with significantly less positive mood, less confidence in treatment and in self-efficacy and lower evaluations of costs of change.

Differences in confidence in self-efficacy alone significantly distinguished incremental from entity theorists.

Hypothesis 5

It was hypothesized that implicit theory would predict treatment persistence: Patients in the implicit incremental theory group would attend more treatment sessions at 2 weeks and more total sessions in 4 months than patients in the entity theory group. T tests were performed on the two persistence measures (session attendance at 2 weeks and session attendance at 4 months) by implicit theory group. Results of the analysis are presented in Table 33.

Table 33

Session Attendance by 104 Study Participants by Implicit Theory Group

Variable	Implicit Theory Groups				<u>t</u> (102)
	Incremental <u>n</u> = 62		Entity <u>n</u> = 42		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Sessions-2 Wks ^a	2.82	1.14	3.00	1.13	-.783 n.s.
Sessions-4 Mos ^b	12.85	10.84	11.05	9.32	.882 n.s.

^a Sessions-2 weeks possible and actual range of values was 1-4.

^b Sessions-4 months possible and actual range of values was 1-35.

There were no significant differences in treatment persistence (number of treatment sessions attended at 2 weeks and overall) between patients with different implicit theories. Hypothesis 5 was not confirmed. Implicit theory did not predict treatment persistence as measured by session attendance.

As noted above in Hypothesis 4, patients' implicit theory was significantly related to baseline motivational processes. Regression analysis was performed to determine if those baseline measures of motivational processes (confidence in treatment, confidence in self-competence, costs of change, and positive mood) predicted treatment attendance. Depression (BDI), a significant correlate of session attendance at 2 weeks was included in the regression analysis for that dependent variable. Minority ethnicity a significant correlate of overall session attendance at 4 months was included in the regression for that dependent variable. Results of the regression analysis for attendance after 2 weeks are presented in Table 34.

Table 34

Summary of Regression Analysis for Prediction of Treatment Attendance at 2 Weeks by Baseline Motivational Variables Related to Implicit Theory (N = 104)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				2.767*
BDI	-.037	.013	-.297**	
Tx Conf	.310	.162	.214	
SE Conf	.054	.109	.057	
Cost	.184	.121	.186	
Pos Mood	-.014	.012	-.126	

Note. $R^2 = .124$

* $p < .05$. ** $p < .01$.

No baseline motivational variables related to implicit theory significantly predicted treatment attendance at 2 weeks. Only depression (BDI), a baseline characteristic, significantly predicted treatment attendance at 2 weeks. Results of the regression analysis for total attendance are presented in Table 35.

Table 35

Summary of Regression Analysis for Prediction of Overall Treatment Attendance at 4 Months by Baseline Motivational Variables Related to Implicit Theory (N = 104)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				2.978*
Tx Conf	2.564	1.470	.195 n.s.	
SE Conf	1.486	.977	.175 n.s.	
Cost	-.295	1.080	-.033 n.s.	
Pos Mood	-.129	.104	-.127 n.s.	
Minority Ethnicity	1.833	1.162	.154 n.s.	

Note. $R^2 = .132$

* $p < .05$.

The regression model was significant, but all predictor variables were not significant. A stepwise regression analysis was performed to determine which predictor variables accounted for the model variance. Results are presented in Table 36.

Table 36

Summary of Stepwise Regression Analysis for Prediction of Overall Treatment Attendance at 4 Months by Baseline Motivational Variables Related to Implicit Theory (N = 104)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
				9.087**
Tx Conf	3.757	1.246	.286**	

Note. $R^2 = .081$

Variables excluded were SE Confidence, Costs, Positive Mood, and Minority Ethnicity.

** $p < .01$.

Patients who were more confident in treatment at baseline attended significantly more treatment during the overall 4-month treatment.

Contrary to Hypothesis 5, implicit theory did not predict differences in treatment persistence directly. However, consistent with the Hypotheses 4 and 5, implicit theory did predict patients' baseline confidence in treatment, which in turn significantly predicted session attendance at the end of 4 months.

Hypothesis 6

It was hypothesized that GMI would have differential impact on those with different implicit theories. Among entity theorists, GMI would predict better treatment attendance than standard treatment. Among incremental theorists, GMI would predict no

significant difference in attendance from standard treatment. T tests were performed on entity theorists separately and on incremental theorists separately to identify significant differences in treatment persistence (session attendance at 2 weeks and at 4 months) by treatment type. Results of the analyses for entity theorists are presented in Table 37.

Table 37

Session Attendance by 42 Entity Theory Study Participants by Treatment Condition

Variable	Treatment Condition				t(40)
	GMI n = 16		Standard Treatment n = 26		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Sessions-2 Wks	3.44	.96	2.73	1.15	2.051*
Sessions-4 Mos	11.25	7.53	10.92	10.41	.120

* p < .05.

Consistent with the hypothesis, among entity theorists, patients in the GMI condition attended a significantly greater number of sessions at 2 weeks (the length of the GMI intervention) than patients in the standard treatment. Results of the analysis for incremental theorists are presented in Table 38.

Table 38

Session Attendance by 62 Incremental Theory Study Participants by Treatment Condition

Variable	Treatment Condition				t (60)
	GMI n = 35		Standard Treatment n = 27		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Sessions-2 Wks	2.80	1.13	2.85	1.17	.176 n.s.
Sessions-4 Mos	12.29	10.57	13.59	11.34	.468 n.s.

Consistent with the hypothesis, among incremental theorists, there were no significant differences in session attendance by treatment group.

Regression analysis was then performed to determine if the treatment group difference in session attendance at 2 weeks, for entity theorists, was independent of other explanations. Depression (BDI), a baseline demographic correlate of session attendance at 2 weeks, was included in the model as an independent variable. Results are presented in Table 39.

Table 39

Summary of Regression Analysis for Prediction of Entity Theorists' Session Attendance at 2 weeks (N = 42)

Variable	<u>B</u>	<u>SE B</u>	β	<u>F</u>
GMI Treatment	.664	.333	.290*	4.212*
BDI	-.038	.019	-.288	

Note. $R^2 = .178$

* $p \leq .05$.

Among entity patients only, GMI treatment condition predicted significantly greater session attendance during the first 2 weeks than standard treatment.

Hypothesis 6 was partially confirmed. As expected, among entity patients, GMI predicted significantly better treatment attendance at 2 weeks than standard treatment.

Also as expected, among incremental theory patients, there were no significant differences in attendance between the two treatment conditions. Contrary to expectation, there were no significant differences between entity and incremental theorists in overall attendance for the 4-month treatment period.

Chapter V

DISCUSSION

This study was designed to address the problem of early dropout from substance abuse treatment. A randomized clinical trial was devised to determine if a brief group motivational intervention (GMI) would increase substance abusers' treatment session attendance specifically by bringing about favorable changes in key motivational cognitions and affects. Primary hypotheses of the study were that there would be an identifiable group of patients (entity theorists), who would be more vulnerable to early treatment dropout specifically because of low motivation for treatment and change, and who would thus gain greater benefit from the motivational intervention. These primary hypotheses were largely confirmed. These central findings will be discussed first.

Consistent with hypothesis 4, substance abuse patients' implicit beliefs about their substance abuse problems were related to a distinctive pattern of treatment motivational cognitions and affects. Those patients who, before entering treatment, regarded their own substance problem as something about them which was trait-like, fixed, and unchangeable (entity theorists) were identifiably different in their attitudes and affects from patients who regarded their substance abuse as something changeable (incremental theorists). Specifically, entity substance abuse theorists were less confident in the likelihood that the treatment they were entering would work for them (Tx Conf); they were less confident in their own ability to handle their substance abuse problems and do

what was required in treatment and recovery (SE Conf); they anticipated more costly and negative consequences from giving up or cutting back substance use (Costs); and they entered treatment experiencing less positive moods (Pos Mood). Confidence in self-competence alone reliably distinguished entity substance abuse theorists from incremental substance abuse theorists in more than two out of three cases.

Most importantly, consistent with the expectations of hypothesis 6, substance abuse patients' implicit beliefs about their substance abuse problems were also related to a distinctive pattern of treatment attendance behavior. In this study, entity patients who received the GMI intervention attended more sessions during the first 2 weeks of treatment, which was the period of the GMI intervention, than entity patients who received the standard treatment.

It is important to note that, these study findings could not be attributed to other explanations. Belief by entity patients in the unchangeability of their problems does not appear to be a by-product of previous failures in treatment. Findings in hypothesis 4 of this study indicate that there was no significant relationship between implicit belief and previous substance abuse treatment history. Nor does the entity belief appear related to the hopelessness or helplessness of depression. Findings in hypothesis 4 also established that entity patients did not score higher on the Beck Depression Inventory, a measure of clinical depression, than incremental patients. Finally, and most importantly, no study variable other than treatment condition significantly predicted treatment attendance for entity patients. Findings in hypothesis 6 established that higher attendance by entity

patients was predicted solely by participation in GMI rather than standard treatment.

Taken together, the study findings confirming hypotheses 4 and 6 offer support for both the utility of the implicit beliefs theory in the domain of substance abuse and for the central tenets of the motivational treatment approach. First, it appears that there is indeed an identifiable group of patients, who, at treatment entry, are less motivated for substance abuse treatment and change, and who gain more from a brief motivational intervention, designed to increase attendance by improving motivation, than from standard treatment. Just as in other domains, participants in this study were reliably distinguished by their implicit beliefs about substance abuse changeability (entity versus incremental), which were related to a characteristic pattern of: attitudes toward treatment and change; moods upon embarking on treatment and change; and treatment persistence behavior. Second, it appears that the motivational intervention (GMI) was more effective than standard treatment in addressing the problem of early patient dropout with a population of patients (entity substance abuse theorists), who were distinguished from other patients by their low levels of treatment motivational cognitions and affects.

These findings are clinically significant in several ways. First, unlike most assessment instruments and evaluation tools, the Implicit Theory Questionnaire (ITQ), which is used to distinguish entity from incremental theorists, is an extremely brief, 3-item, self-administered questionnaire. It takes no more than 5 minutes for even the least sophisticated patient to complete independently. It can be administered by persons who have only brief training and no more than a high school education. No specialized,

certification, or professional education is required. The items are so consistent (Chronbach's alpha of .87), that conceivably only one item could be used. Thus the ITQ appears to be a parsimonious way to identify those patients with the potential for low treatment motivation, who would benefit most from a brief motivational intervention. Furthermore, in many treatment centers, clinicians have received different kinds of training and work and feel comfortable in different modes of treatment. Despite an overall treatment orientation, a center might in reality have clinicians who work best in different ways and might offer different treatment options. The ITQ can be efficiently used to identify patients who may respond better to a motivational treatment approach and to match patient to treatment and treatment provider. The importance of such treatment matching was underscored by the recent treatment improvement protocol published by the Center for Substance Abuse Treatment (Barry, 2000), which cites, as a research priority, the identification of groups of patients for whom motivational treatment is most effective.

Second, these study findings offer support for some central clinical features and goals of the motivational approach. The GMI intervention was designed to foster self-efficacy and address ambivalence. The treatment sessions explicitly discuss patients' feelings both about being overwhelmed by the prospect of entering treatment and making changes in substance use and also about both the positive and negative consequences of treatment and recovery. In this study, it appears that GMI contributed more to increased attendance than standard treatment, for those very patients (entity theorists) whose most

significant distinguishing attitude was low confidence in their self-competence to make changes in treatment, and whose perception of the costs of giving up substance abuse was greatest.

Third, these findings may help explain why standard treatment has not been effective for all patients. Despite the literally hundreds of thousands of recovery success stories, research has consistently shown that from 50 to 90% of patients drop out of substance abuse treatment before the 2-month mark. A central feature of the standard, 12-step approach to substance abuse treatment is the construct of addiction as a disease rather than as a bio-psychosocial problem. The disease model posits that addiction is an incurable illness similar to diabetes or a genetic defect, which one can learn to manage but can not cure or appreciably alter. It is assumed that this addiction model is helpful to the addict by freeing him from self-blame and the accompanying negative affects, such as guilt and shame. The widespread acceptance of the 12-step model appears to support this assumption. However, it is possible that an alternative view is true for some of the great percentage of patients who fail to persist in standard treatments. It seems likely that the notion of having an incurable, unchangeable condition could overwhelm many substance abusers and renders them vulnerable to poor outcomes.

The patients in this study were not specifically asked whether they endorsed a disease model of addiction. Instead they were asked about their beliefs about the changeability of their substance abuse, which is a key construct underlying the disease model. Specifically, it seems likely that the disease model, like the entity theory, might

lead some people to feel incompetent to handle their unchangeable substance abuse problem and to perceive the costs of changing their unchangeable problem to be enormous. They might lack both confidence in the likelihood of treatment success and positive feelings upon entering treatment.

The findings about the entity theorists in this study support this alternative view of the disease model as being potentially disheartening to a significant number of patients. Study entity theorists, who believed their problems were unchangeable (like a chronic disease), began treatment experiencing low levels of positive feelings, low levels of confidence in themselves and in treatment, and high levels of ambivalence. They attended fewer sessions of standard treatment, which relies on the concept of addiction as unchanging; and they attended more sessions of GMI treatment, which fosters motivation for change.

It seems reasonable to conclude that standard substance abuse treatment with its emphasis on the unchanging nature of addiction, is a poor match for entity theory patients. Rather than relieving entity substance abuse theorists of the burden of shame and guilt, it is likely that the disease model validates their underlying, fundamental beliefs and may be related to their low confidence in both treatment and self-competence, low level of positive feelings, and high ambivalence about change, and may ultimately lead to their lower session attendance in standard treatment.

It is important to note that, although entity patients in the GMI treatment condition attended more sessions during the first two weeks of treatment than entity patients in the

standard treatment, there were no significant differences in treatment attendance for entity patients in the two treatments over the 4-month period. One possible explanation for this may be found in the experimental design itself. After completing the 4-session GMI introduction to treatment, patients in the experimental treatment condition, were transferred to treatment in ongoing standard treatment groups. They were dispersed into a number of existing standard groups run by different counselors. Patients in the control condition began treatment in ongoing standard treatment groups and made no transfers. Experimental condition patients had to cope with an interruption in treatment and a change to a new group, a new group leader, and a new treatment philosophy. It is likely that despite getting off to a good start in GMI treatment, a significant number of entity patients failed to make the transition successfully. Future research might consider other treatment design models, which do not include such transfers, but which are also feasible in busy treatment centers with a daily stream new of patients entering treatment.

Hypothesis 5 posited that incremental substance abuse theorists would attend more treatment sessions than entity substance abuse theorists. Contrary to expectation, entity theorists and incremental theorists attended approximately the same number of treatment sessions both during the first two weeks of treatment and during the overall 4-month trial. This unexpected attendance parity may, in part, be explained by the hypothesized finding of hypothesis 6, discussed above, that among the entity theorist patients, the brief motivational introduction to treatment (GMI) appears to have had a substantial impact. Entity patients who received the GMI intervention attended more

sessions during the first 2 weeks of treatment, which was the period of the GMI intervention, than entity patients who received the standard treatment. In other words, entity patients who might otherwise have been highly vulnerable to poor treatment attendance, because of low levels of motivation for change, appear to have been more encouraged by GMI treatment than by standard treatment to attend sessions. Thus the potential disparity between number of sessions attended by entity theorists and incremental theorists may have failed to materialize specifically because the experimental treatment (GMI) was, in fact, as also hypothesized, particularly effective for one group of potentially poor attending patients. The expectations of hypothesis 6 were not fully accounted for in hypothesis 5. Thus the failure to confirm hypothesis 5 may be partly explained by faulty hypothesizing.

It appears that implicit beliefs are a fertile ground for future substance abuse research. This study was merely a beginning. It did not delve into many important areas that have been a vital part of implicit beliefs research in other domains. For example, the implicit beliefs model is a theory of goal pursuit under the conditions of frustration or failure. This study assumed that the conditions in which people pursue substance abuse treatment are generally frustrating. Substance abusers are bombarded by opportunities and temptations to use substances daily by offers from friends and sellers, by social and recreational events, by advertising and the entertainment media, and by their own cravings. But this study did not examine actual treatment failures or setbacks. Future substance abuse implicit theory research should explore the effects of real-life treatment

failures, like slips or relapse to use, on treatment motivation, persistence, and outcome. This study also did not explore substance abuse patients' attributions for frustrations and setbacks, which have been identified as key motivational processes in implicit theory research in other domains. Future substance abuse implicit theory research should certainly consider these important aspects of motivation. Implicit theories in other domains have been demonstrated to be stable over time. In this study, implicit theory about substance abuse was assessed at baseline only, and therefore change with time and the potential transformative impact of treatment could not be examined. Future research in treatment settings should investigate these vital issues. Finally, this study did not attempt to establish the causality of implicit belief in rendering patients more vulnerable to poor persistence in treatment. Future research should also address this key issue.

Morgenstern (1996) states that it is insufficient in clinical treatment outcome research to focus only on whether substance abuse treatment causes change. One must also examine how the treatment works. Specifically, one must not only identify the processes of change but also determine if the treatment works by effecting the changes it purports to bring about. One of the main goals of the GMI clinical trial was to improve substance abuse treatment attendance specifically by bringing about desirable changes in key treatment motivational variables. Six variables were hypothesized to be key variables, which would change in treatment: Confidence in treatment to change substance abuse problems; confidence in self-competence to deal with such problems and effect change in treatment; perception of benefits of change; perception of costs of change; positive affect

at the time of treatment; and negative affect at the time of treatment.

As expected in hypothesis 1, for all patients, regardless of treatment condition or implicit belief, standing on each of these key variables did change at some point during the course of treatment. There was no particular expectation that standing on these variables would continue to change throughout treatment in a scheduled or fixed pattern. And indeed, no significant, regular increase or decrease was found at each of the measurement points throughout the treatment (2 weeks, 2 months, and 4 months). These findings offer support for the variables as relevant to the process of substance abuse treatment in general, although not to motivational treatment specifically.

Although all motivational variables changed in the hypothesized directions during the course of treatment, only two of these shifts were connected to general treatment outcome. Consistent with hypothesis 2, regardless of implicit belief or treatment condition, patients who experienced lower negative mood after two weeks of treatment, attended more sessions during those two weeks; and patients who experienced more positive mood after 2 months of treatment, attended more sessions during the overall 4 month trial. These findings offer support for these two variables as relevant not only to the process of change but also to the outcome. They are consistent with previous substance abuse research, which has found mood to be predictive of relapse and early treatment dropout (Marlatt & Gordon, 1985; Greeley, Swift, & Heather, 1992). Changes in the other motivational variables in this study were not found to be related to general treatment attendance. This was unexpected but not, in retrospect surprising. Standard

substance abuse treatment does not aim to increase treatment attendance specifically by bringing about shifts in self-efficacy, confidence in treatment, and addressing ambivalence. Therefore, it was unlikely that motivational shifts for all patients regardless of treatment group would be related to treatment attendance outcome.

A different picture emerged when the differences between GMI treatment and standard treatment were explored. Consistent with hypothesis 3, patients in the motivational treatment made greater gains in confidence in their treatment during the first two weeks and also during the overall 4-month period, than patients in the standard treatment. Furthermore, in the GMI condition, the more a patient gained confidence in his treatment, the more apt he was to attend treatment sessions over the 4-month period. Whereas, in the standard treatment, gains in confidence were unrelated to attendance; only patients' baseline levels of depression were predictive of session attendance.

These findings are intriguing for several reasons. First, they offer support for confidence in treatment as a specific mechanism of change in motivational treatment. GMI treatment sessions specifically address the issue of patients' expectations, fears, confusion, and ambivalence about being in treatment. It presents the treatment leader as a well-informed expert, who offers advice but does not direct the patient to take a particular course. This is quite a radical departure from standard 12-step oriented substance abuse treatment. Patients' confidence that their treatment will work is not generally considered a topic useful to successful recovery. Patients' negative feelings about treatment are seen as "denial", which is directly confronted by the leader. This study finding suggests that GMI,

with its specific focus on helping substance abuse patients weigh ambivalence and consider doubts about treatment, does contribute to increases in their confidence in the treatment they receive and in their attendance of treatment sessions.

This finding also supports the interpersonal, interactional nature of treatment motivation. Confidence in treatment is the patient's appraisal of the effectiveness of something outside himself to be helpful to him. Shifts in treatment confidence reflect a reappraisal by the patient, during the treatment trial, of his experience with the treatment and treatment clinician. By contributing to increases in treatment confidence in this study, GMI appears to have been successful in contributing to an interpersonally motivation-supportive, treatment environment, which in turn led to greater treatment persistence.

Second, it should be noted that patients' level of depression on entering treatment was the only predictor of treatment attendance for patients in standard treatment. This is both noteworthy and somewhat ironic, because use of any medication, including psychiatric medication, has been a subject of acrimonious debate in the substance abuse treatment community. Twelve-step programs have only recently and begrudgingly opened the doors to those on medications such as anti-depressants. Yet, this study finding suggests that patients' treatment entry level of depression is a key process in standard treatment attendance over a substantial period of time, which should be addressed in any effort to cut down early patient drop-out. Future substance abuse treatment research should treat depression as a mediating process in treatment outcome and should address the issues of diagnosing and treating depression as part of substance abuse treatment.

Contrary to expectation, in this study, GMI intervention did not prove to be superior to standard treatment in bringing about changes in the five motivational processes other than treatment confidence, and no significant overall differences in attendance were found between patients in the two treatment conditions. This may be partly explained by some limitations of the experimental treatment design and of the overall clinical setting of the study.

First, as mentioned above in connection with implicit theories, patients in the experimental condition transferred from the GMI introduction group to an ongoing standard treatment group at the end of the first two weeks of treatment. This was, in many aspects, an elegant solution to the experimental design problem of creating 2 groups for whom treatment was equivalent except for the inclusion of GMI introduction for one of them. Yet, it also contained some previously discussed pitfalls. Poor transitioning from GMI to standard treatment may have neutralized some expected gains from the experimental treatment.

Second, the clinical trial was an unfunded study set not in a research lab but in a real life, busy, substance abuse treatment and training center. There were no funds to hire clinicians specifically for the study. Standard treatment was provided by regular staff employees and by psychology doctoral fellow trainees. At least one staff member had received training in motivational treatment and had led a GMI group for more than 1 year previous to the study. Both trainees were concurrently receiving training in motivational treatment while co-leading their standard treatment group. The GMI treatment was

provided by two volunteer psychology doctoral candidates who had completed one-year fellowships in standard substance abuse treatment, and who received specific training for GMI. It should be noted that, although GMI is manual driven and topic-focused, the treatment also relies on the leaders' training in motivational technique, which in this writer's experience, develops gradually over time. The clinicians' responses to patients are informed by their motivational stance. It is extremely likely that, despite leading standard study treatment groups in this study, the one staff member and two trainees drew upon the full range of their training and clinical techniques. They were not specifically asked to refrain from making motivational interventions, nor is it likely that they could do so, in reality, if asked. Thus standard treatment in this study was most likely "infected" to some extent by these therapists' experience with motivational treatment, which created a confound of unknown dimension for the study. It is also likely that, despite their GMI training, the motivational intervention group leaders had not fully developed their motivational technique at the beginning of the trial. Thus the GMI group may have been less purely motivational than desired for some unspecified length of time early in the study. Future clinical trials should make every effort to maintain the integrity of the comparison treatment groups. This is extremely difficult to achieve in real-life clinical settings, where the demands of patient care, staff allocation and staff training all compete with those of research. In an upcoming funded study, clinicians, who are unfamiliar with motivational interventions, will be hired to conduct the standard treatment comparison group; and clinicians, who have considerable experience in motivational techniques will

lead the GMI group.

In this study, although there were significant favorable changes in all the motivational variables examined, only shifts in positive and negative mood were connected to greater treatment attendance for all patients; and only increases in treatment confidence were connected to greater treatment attendance for GMI patients. Other researchers on this project found that patients in the GMI treatment, compared to standard treatment, perceived the treatment clinician and setting as more supportive of their autonomy (Foote, DeLuca, Magura, Warner, Grand, Rosenblum & Stahl, 1998). Furthermore, when autonomy support was felt to be greater, patients attended more treatment sessions. Future research should also aim to identify different motivational mechanisms of change, which may be linked to better treatment attendance and other outcomes.

Study Limitations

First, as discussed above, this was an unfunded study, which was conducted in the setting of a real-life treatment center. It was not economically possible to hire staff to expressly for this study. The necessity of using available treatment center staff and volunteers, may have contributed to some confounding of the treatments. Second, the study design included no objective measures of “therapist drift” from the proscribed treatments, therefore there was no way to assess the extent to which that phenomenon may have occurred. Third, although therapists were blind to the results of all patient

assessments, one GMI therapist was not blind to the concepts of implicit beliefs theory. It is possible that she may have unintentionally been more therapeutically responsive to patients who verbalized entity type beliefs about substance abuse in group. It is also possible that entity patients, who profess a belief that their problem is not changeable, naturally elicit more treatment attention from the leader and group members. There was no methodological attempt to assess the relative therapeutic attention given to patients in the study. Fourth, despite coming from a broad range of ethnic and socio-economic backgrounds and despite experiences with a broad range of substances of abuse, study participants met the criteria for only level-one treatment (non-intensive outpatient treatment). Thus the results of this study are not generalizable to those more severe alcohol and drug abusers, who require more intensive levels of care (daily treatment, inpatient rehabilitation, inpatient detoxification). Finally, the clinical trial was designed to increase patients' treatment attendance. It was based on the assumption that more regular attendance and longer patient stays in treatment lead to better outcomes in terms of substance use. Substance use treatment outcomes, such as abstinence, cutbacks, slips and relapses were not included in this study, but they are, most obviously, the ultimate goals of treatment and vital areas for future substance abuse research about both implicit theories and motivational treatment.

Conclusion

This randomized clinical trial sought to test a new group motivational intervention (GMI) for substance abusers, and to determine if the intervention would increase

substance abuse treatment attendance specifically by bringing about favorable changes in six key motivational mechanisms: confidence in treatment; confidence in self to cope with substance abuse problems (self-efficacy); positive moods; negative moods; perception of costs of change and perception of benefits of change (ambivalence). Consistent with the hypotheses, all of the motivational processes thought to mediate treatment outcome did change during the course of treatment. However changes in only two motivational processes, positive and negative affect, were predictive of treatment attendance for all patients regardless of treatment type. GMI contributed to greater changes than standard treatment in only one motivational process, confidence in treatment. Study patients in the GMI treatment, who experienced greater increases in treatment confidence, did attend more treatment sessions. Whereas, for study patients in standard treatment, only lower baseline depression predicted greater treatment attendance.

No overall advantage over standard treatment was found for GMI in increasing treatment session attendance. Uncontrolled aspects of the treatment setting may have rendered the treatment types less distinct and may have confounded these results. A funded clinical trial, which is about to begin, will attempt to rectify the confounding elements.

This study also sought to identify a group of substance abusing patients (entity theorists), vulnerable to early treatment dropout, who would be distinguishable by their implicit belief in the unchangeable nature of their substance abuse problems. It was expected that entity theorists would appear less motivated for substance abuse treatment

at treatment entry than their less vulnerable counterparts (incremental theorists), who believed implicitly in the changeability of their problems. It was also expected that entity theorists would gain more from a brief motivational intervention than from standard treatment.

Most study hypotheses regarding implicit substance abuse beliefs were supported. Entity substance abuse theorists differed from their counterpart incremental theorists by entering the study treatment with less confidence in their ability to cope with their problems; less confidence in the effectiveness of their treatment; less positive feelings; and more concern about the costs of making changes. (Contrary to expectation, entity theorist neither experienced more negative moods nor greater perception of the benefits of change). Most notably, those entity substance abusers who received the GMI intervention, attended more sessions than the entity substance abusers who received standard treatment only.

Implicit beliefs appear to offer a parsimonious way to identify patients who may be vulnerable to early dropout from treatment and who might benefit from a motivational intervention. These results are consistent with implicit theory research in other domains and of considerable clinical interest in the substance abuse domain. Future research should explore the relationship of substance abuse patients' implicit beliefs and their substance use treatment outcomes, such as abstinence, decreased use and relapse to use.

Chapter VI

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Appendix A**SMITHERS GROUP TREATMENT RESEARCH STUDY
PATIENT INFORMED CONSENT****Purpose and Description of Study**

I am being asked to participate in a voluntary treatment research study. The purpose of this study is to determine the effectiveness of a brief group treatment as part of my ongoing group treatment at Smithers. I qualify for participation in this study because I am about to begin outpatient treatment at Smithers Treatment Center.

If I agree to participate I would do the following:

I would be randomly assigned to begin one of the following two treatment programs: #1) twice weekly outpatient group treatment in the Smithers Outpatient Department, or #2) twice weekly introductory group treatment lasting 2 weeks in the Smithers Outpatient Department, followed by entry into #1 above (twice weekly outpatient group treatment, also in the Smithers Outpatient Department). The difference between these two treatments is the inclusion in program #2 of an additional 4 session brief introductory treatment group.

I would complete research questionnaires during the course of the study, at 2 weeks, 2 months, and 6 months after beginning. These will take approximately 15 minutes to complete, and would be given following a normally scheduled group treatment visit. If I should leave this program during the first 2 months, the research staff would

contact me at the planned times to conduct these interviews over the phone. I agree that, during the 6 month period, a family member or other person close to me may be contacted for the purpose only of locating me and not for providing any other information about me.

I understand that I may decline to participate in this study, or may drop out of the study at any time without penalty. If I should withdraw, I could continue in the regular outpatient treatment program at Smithers.

I understand that urinalysis and breathalyzer procedures will be part of my treatment regardless of whether or not I choose to participate in this study. The billing for such services will conform to standard Hospital billing procedures, with no additional costs incurred.

I understand that participation in this study will not result in any additional costs to my treatment.

Confidentiality And Procedures For Minimizing Risks

Every reasonable effort will be made to protect the confidentiality of patients. Research staff will be thoroughly trained in the need to maintain strict confidentiality. Code numbers rather than names will be used whenever possible. Study results will be presented in group format so that no particular individual can be identified.

Potential Risks

There is a slight potential risk to me because of possible accidental disclosure of confidential information. As outlined above, every effort will be made to insure against

this possibility.

Potential Benefits

I understand that this study will provide valuable information on the effectiveness, costs, and benefits of a specialized brief group treatment in preparing patients for outpatient substance abuse treatments and long term recovery from addiction. The results of this study could improve addiction treatment for many patients in the future.

Contact Persons

I may contact Jeffrey Foote, Ph.D., the Principal Investigator, at 212-523-6621 for answers to questions related to the study or to report any research-related problems.

Additionally, I may contact the St.Luke's/Roosevelt Hospital Center patient representative's office at (212) 523-3700.

Consent

I agree to participate in this study and understand that I will receive a copy of this consent form.

Signature of Participant

Date

Signature of Witness

Date

Appendix B

GMI SESSION #3: ROADBLOCKS TO GETTING HELP:

ISOLATION AND HONESTY

For many people, dealing with their addiction becomes an isolated, lonely and vicious struggle. One of the most common features of addiction is the repeated attempt to stop, to "make this the last time", and the experience of finding yourself right back at it again the next day, week or year. This is discouraging and demoralizing, and often leads to a sense of failure, shame and self-loathing. In addition, there is a lot of misunderstanding about the addiction process, and a tremendous stigma attached to addiction. All of this can easily add up to a powerful sense of isolation and a cutting off from the very people who may be able to lend a hand.

Another common feature of addiction is not being truthful. While this is not something people are proud of, it is an almost inevitable part of the addiction process. It is very hard to meet the demands of daily living (e.g. job responsibilities, family and social relationships) while at the same time meeting the demands of an addiction. Usually, something has to give. Often, one of the first things to go is the ability to be honest with others and with ourselves. For example, given the choice, most people would rather tell their boss that they were "out sick" rather than "crashing from yesterdays cocaine binge". Likewise, most people find it easier and less painful to tell themselves: "I'll be able to cut back on my use", rather than: "I thought I could stop two years ago and

I still haven't".

The problem in not sticking with the truth is that it once again leaves you isolated and alone. Not only don't you get to talk about the reality of your life and get some help with the actual problems, you are also left feeling separate and apart. This leaves you with two messages: 1) you are different and don't belong, and 2) no one really understands you.

And finally, all of this separateness and lack of being understood and isolation adds up to relapse. For in fact, one of the central truths of recovery is that you can't do it on your own. Because of this, the degree to which you put up barriers to helping yourself (by isolating or not being truthful) is the degree to which you put yourself in the line of fire of your addiction. Treatment and recovery are for you...let yourself have them.

Questions

1) Have you not been honest about your alcohol/drug use for any of the following reasons?

- a) you are afraid others (or yourself) would be disappointed by you**
- b) you are afraid others (or yourself) would think you are "weak"**
- c) you are afraid of real world consequences (job, relationship loss etc.)**
- d) you feel overwhelmed at the idea of trying to change**
- e) you are afraid you can't change**

2) Have you noticed feeling alone because of these fears?

3) Have you found yourself avoiding others who could be supportive of your recovery?

4) What behaviors and thoughts can you identify that tell you when you are beginning to isolate?

5) What strategies can you use to help make the decision not to isolate?

6) Do you relate to the idea that "if I was stronger, I wouldn't need anyone's help with this anyway"?

Reminder

Partial truths keep you alone in your own world also.

Have you noticed that you:

1) decide to let someone believe a partial truth?

2) tell people what they want to hear?

3) tell people what you wish were true?

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