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MOTIVATION, AUTONOMY SUPPORT, AND ENTITY BELIEFS: THEIR ROLE IN METHADONE MAINTENANCE TREATMENT

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Using both self-determination theory (Ryan & Deci, 2000) and Dweck's (1991) entity versus incremental personality distinction, we examined the role of motivation as a predictor of treatment success in a methadone maintenance program. Specifically, it was predicted that internal motivation and perceived autonomy support would be associated with better treatment adherence as indicated by negative urine tests, attendance, and the attainment of take-home methadone dosages, whereas external motivation was not expected to enhance these outcomes. Results generally supported these hypotheses, yet also indicated that high levels of external motivation coupled with low levels of internal motivation predicted particularly poor treatment outcomes. In addition, patients embracing an entity belief that their addiction was a fixed aspect of self also attained better outcomes. Results are discussed in terms of the dynamics of motivation in addiction treatments.

Opioid dependence represents a formidable problem for both practitioners and society. Approximately 0.7% of adults will meet diagnostic criteria for opioid dependence or abuse at some point in their lives (American Psychiatric Association [APA, 1995]). If untreated, opioid-dependent persons face a high death rate of 10 per 1,000 per year, primarily due to overdoses, accidents, and exposure to disease. Comorbidity for medical, psychiatric, legal, and vocational problems is

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also common (APA, 1995; Hubbard, Marsden, Rachal, Harwood, & Cavanaugh, 1989; Simpson & Sells, 1982).

However, treatment of opioid-dependent persons poses a number of challenges. Opioid abuse is highly resistant to extinction. Even after long periods of abstinence, single dosages can reestablish addictive patterns (Shaham, Rodaros, & Stewart, 1994). In addition, a majority of individuals abusing opiates display polysubstance abuse, with cocaine, sedatives, and alcohol being common (APA, 1995; Fairbank, Duntzman, & Condelli, 1993). Finally, many persons who enter treatment do so only because of external pressure from family or legal authorities. Thus, fostering motivation for treatment and behavior change represents a considerable challenge.

In this study, we investigate patient motivation and adherence within the most common treatment approach to opioid abuse, namely methadone maintenance (MM). Specifically drawing on self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000), we examine how differences in patients' initial autonomy or volition for treatment affect their subsequent involvement in, and compliance within, an MM program. In addition, we examine how the perceived autonomy supportiveness of the treatment staff relates to patient involvement and compliance. Finally, drawing on Dweck's (1991) distinction between entity versus incremental self-theories, we explore whether patients' conception of their addiction as a fixed or as a changeable aspect of themselves is associated with their engagement within an MM approach.

To explicate these hypotheses and the context of our research, we first review some past research concerning MM treatment programs and the potential role of motivation within such programs. We then review tenets of self-determination theory, especially as it has been applied within psychological and health care treatment settings. Finally, because it is an exploratory aspect of this investigation, we discuss Dweck's (1991) distinctions concerning beliefs about personality and change, and apply them to the MM context.

METHADONE MAINTENANCE TREATMENT AND PATIENT MOTIVATION

Because treatment and cure of opioid dependence is both difficult and often unsuccessful, MM has emerged as a standard treatment modality. In MM, methadone is prescribed to persons addicted to heroin and other opiates as a substitute regimen. Although methadone is itself an opiate, its hedonic properties are far less potent than those of heroin and morphine—the most commonly abused opiates. Unfortunately, as an opiate, methadone itself produces physiological dependence with long-term

use, and stepped methadone detoxification may become a latter stage of treatment for some individuals (APA, 1995). Despite this caveat, MM treatments are advocated because they can facilitate rehabilitation by reducing illicit opiate use and its negative impact on vocational, interpersonal, and family functioning (Ward, Mattick, & Hall, 1992).

Patient motivation is often cited as an important factor in addiction treatments (Miller & Rollnick, 2002). However, motivation in the context of MM is a complex issue because patients enter MM programs with motives that range from personal interest in change to external coercion from the criminal justice system (APA, 1995). Accordingly, a number of studies have examined the association of different motives and sources of referral with patient compliance and success.

Studies that have compared the effectiveness of MM treatment when instigated by legal authorities compared to voluntary participation have yielded varied results. Brecht, Anglin, and Wang (1993) categorized patients in six treatment centers into high, moderate, or low coercion levels, based on reported contact and pressure from the legal system and family. The low coercion group was classified as voluntary. On measures of drug involvement and social functioning, no differences were found among the three groups, leading Brecht et al. to conclude that coercion can be as effective as volunteerism as a foundation for MM treatment. Leukefeld and Tims (1990) and Beane and Beck (1991) also found evidence that those who enter treatment under legal compulsion do as well as patients who enter voluntarily. However, Hser, Yamaguchi, Chen, and Anglin (1995) compared those receiving MM without or without legal supervision. The legally supervised group not only scored higher on indices of coercive motivations for treatment; they also showed higher relapse rates.

A closer examination of individual motivations for entering MM treatment might clarify some of the issues in this complex question. Few studies to date have specifically assessed patients' personal reasons for entering treatment. For example, persons who "volunteer" may nonetheless be under considerable interpersonal pressure to change, and those who are legally referred may sometimes truly wish to make a change. Therefore, it may be useful to explicitly assess the patient's own view of his or her motivation, and its relations with treatment adherence.

SELF-DETERMINATION THEORY AND TREATMENT MOTIVATION

To address the issue of motivation as perceived by the patient within MM treatment, we apply a specific model of human motivation, namely,

self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000). SDT suggests that an important determinant of involvement and persistence in treatment concerns whether patients feel autonomous versus controlled in the treatment setting (Williams, Deci, & Ryan, 1998). Autonomous behaviors are those that are experienced as volitional or, in attributional terms, that have a perceived internal locus of causality (Ryan & Connell, 1989). They involve a sense of choicefulness, authenticity, and personal endorsement. Controlled behaviors, in contrast, are those in which the person is motivated by pressures or contingent rewards and punishments, which therefore are accompanied by a perceived external locus of causality. In fact, autonomy versus control is not all or none, and a person can have mixed motives. Indeed, research shows that most individuals report varied motivations that fall along a continuum from more controlled to more autonomous (Ryan, 1995; Vallerand, 1997).

Individuals entering treatment for drug dependence undoubtedly vary in the degree to which their motives are autonomous versus controlled. Some individuals may be engaged in treatment only because legal authorities or family members have coerced them into it, whereas others may seek help out of an inner desire to change. Moreover, some patients may experience both autonomous and controlled sources of motivation simultaneously. According to SDT, the more internal the perceived cause of a person's behavior, the more the person is expected to persist at an activity and, in the case of treatment, to adhere to a therapeutic regimen. Conversely, the more a person's reasons for entering treatment are based exclusively on external regulators, the less persistence and adherence are expected.

In addition to the question of one's reasons for initiating treatment, clinical settings differ in the degree to which they encourage self-motivation or autonomous regulation versus the degree to which they attempt to control patients' behaviors. According to SDT, *autonomy-supportive* approaches encourage the individual to take responsibility for change, which can facilitate long-term compliance and personal growth. Autonomy-supportive climates are those that help patients understand the rationale for treatment, continually engage and acknowledge the patient's feelings and perspective, and emphasize the person's choice (Deci, Eghrari, Patrick, & Leone, 1994; Ryan, 1995). SDT suggests that the more treatment staff are viewed as autonomy-supportive by the individual, the greater the likelihood that the patient will internalize treatment regulations and experience adherence and treatment-related behaviors as autonomous and volitional (Williams, Deci, & Ryan, 1998).

A growing body of research has linked autonomous versus controlled motivations to treatment adherence and improvement in a variety of health care and behavioral treatment settings. For instance, in a study of

treatment for morbid obesity, Williams, Grow, Freedman, Ryan, and Deci (1996) found that both more internalized and autonomous motivation and more perceived autonomy support from treatment, staff facilitated higher program retention rates, more weight loss during treatment and better maintained weight loss at a 2-year follow-up. Similarly, Williams, Rodin, Ryan, Grolnick, and Deci (1998) found that among patients with chronic illnesses, more autonomous motives, as well as perceived autonomy support from prescribing physicians, predicted greater adherence to medication regimens.

Although SDT has not been extensively applied to the field of opiate addiction, some research suggests its applicability. Specifically, Foote et al. (1999) have shown that individuals with opiate or cocaine addictions who were randomly assigned to a group motivational interviewing treatment for chemical dependency informed by SDT perceived their treatment environment to be significantly more autonomy-supportive than those assigned to a "treatment as usual" group. Furthermore, perceptions of autonomy support were significantly related to frequency of attendance during the initial phase of treatment. More recently, Wild, Cunningham, Roberts, and Ryan (2004) examined initial motivation for entering treatment in a mixed substance abuse program in which most patients identified cocaine or opiates as their primary addiction. Wild et al. found that those with more internal motivations as measured by the Treatment Motivation Questionnaire (TMQ) were more engaged in treatment by both client and therapist reports and were more committed to abstinence.

SDT has also been applied in the study of treatments concerning other addictive behaviors. In a longitudinal design, Williams, Gagne, Ryan, and Deci (2002) rated physicians' autonomy supportiveness from tape-recorded interviews and also asked patients to self-report their motives for stopping smoking. Physician autonomy support predicted greater autonomous motivations, which in turn predicted greater cessation at 6-, 12-, and 30-month follow-ups. In another relevant study, Ryan, Plant, and O'Malley (1995) examined patients' internalized (or more autonomous) versus external (or more heteronomous) reasons for entering an alcohol recovery program. It was found that patients remained in treatment longer if their reasons for participation were more internalized. Additionally, it was found that the more autonomous forms of motivation were positively correlated with clinician ratings of involvement. However, it was also found that, on measures of treatment retention, patients high in *both* internal and external motivation did better than all other groups.

In sum, some research suggests that individuals show greater adherence when guided by more internalized or autonomous forms of treat-

ment motivation, as well as when they perceive clinicians as more supportive of their autonomy.

ADDICTION AS A DISEASE: ENTITY VERSUS INCREMENTAL MODELS

In this study, we also investigate the potential role of beliefs or "theories" that addicts have about their own addictive behavior. Specifically, we examine correlates of whether these MM patients see their addiction as a disease entity, as a relatively fixed aspect of their personality, or as a changeable or "incremental" aspect of their personality and behavior.

A disease model of addiction is prevalent among treatment centers across North America and is an integral part of many treatment philosophies and approaches to patient education. In addition, the concept of "addiction as disease" has become commonplace within the broader community (Acker, 1993; Marlatt, 1992; Peele, 1995). Specifically, this model suggests that the disease of addiction exists within the person and is thus a permanent trait to which patients must accommodate for the rest of their lives. The model often suggests that the disease will progress inexorably in the absence of treatment, and that the disease of addiction overrides the individual's capacity to control his or her behavior (Peele, 1993).

Although popular, this model is controversial. For example, Chiauuzzi and Liljegren (1993), in a review addiction treatment protocols, concluded that the adoption of the disease model as a treatment approach contributes little to successful outcomes. In addition, they noted that the label of "disease" or "addict" might actually be counterproductive to a patient's self-image, expectancies, and attributions. Shaffer (1987), Miller (1986), Glass (1993), and others have also argued that the notion of addiction as a disease may negatively affect treatments by reducing patient expectancies of recovery. Thus, some formulations suggest that if patients conceptualize their drug abuse as a manifestation of an underlying disease, decrements in perceived control over their behavior might accrue, and in turn may negatively affect recovery.

A point of interest, however, regarding MM treatment is that the approach itself is not typically oriented toward cure but rather maintenance. Thus, even if these attributional formulations are plausible (which we think they are), those who believe that they are not able to control an addiction might be more, rather than less, amenable to an MM approach. On the other hand, the helplessness that might accompany a belief in the permanency of one's addictive personality may be an undermining factor in treatment motivation.

In this study, we explore the role of disease conceptualization in treatment motivation by drawing from Dweck's (1989, 1991) notion of entity

theories of self. Dweck differentiates between *incremental* and *entity* views of global constructs such as intelligence and personality. For example, an entity view of intelligence reflects an individual's sense that his or her intelligence is fixed and immutable and will not change over time. By contrast, an incremental view suggests that intelligence and achievement can be changed over time, principally through effort. Within the achievement domain, entity views have been associated with more susceptibility to learned helplessness, whereas incremental views are associated with mastery-oriented achievement attitudes and behaviors (Chiu, Hong, & Dweck, 1994; Dweck, 1989, 1991).

By applying Dweck's entity versus incremental distinction to addiction, we might better understand how patients' beliefs and views regarding drug use affect treatment involvement and outcomes. If individuals view their addiction as more fixed and immutable, it is likely that they will see their own behavior as less relevant to recovery. However, in the context of MM, an entity view might paradoxically facilitate adherence because with it patients may be more willing to accept the need for continued treatment to maintain their freedom from illicit drug use.

THE PRESENT STUDY

We examine patients' self-reported motivations, their perceptions of the autonomy supportiveness of the treatment staff, and their beliefs about addiction as a disease as they relate to adherence within an MM program. It was hypothesized that more autonomous motivation for treatment would be associated with lower rates of relapse and higher retention, whereas more external reasons for treatment would negatively predict adherence and involvement. We also hypothesized that patient perceptions of the staff's autonomy supportiveness would predict both more autonomous regulation and the outcome variables of relapse and retention. Finally, we examine the relations between patients' conceptualization of their drug use behaviors and treatment outcome, specifically their acceptance of an entitized view of addiction.

In addition, other factors that have been shown to be predictive of success in MM programs were examined, primarily as controls, and for comparison purposes. Given that some studies have shown legal coercion to have an undermining effect on treatment outcomes, the present study included "referral source" as a variable, which can be related both to our primary motivation variables and to outcomes. Drug abuse history was also examined as a predictive factor. It was expected that both an increased length of current drug use and a greater number of previ-

ous treatment engagements would predict poorer outcomes (APA, 1995).

METHOD

PARTICIPANTS

The sample consisted of 74 individuals, of whom 38 were male. Thirty-nine were Caucasian, 16 were African American, and 19 were Hispanic. The average age was 41.2 years. Further sociodemographic characteristics of the sample are displayed in Table 1.

The sample was drawn on a volunteer basis from an outpatient MM program. In this program, all patients are required to attend weekly group and individual counseling sessions, as well as to submit to random urinalysis. Patients attend the clinic daily for single methadone dosages; however, if attendees are compliant with protocols and are responsive to treatment, some are able to use "take-home" dosages, up to a maximum of 2 weeks.

PROCEDURES

At the clinic's standard preliminary intake meeting, newly admitted people were asked by an individual not employed by the clinic to volunteer for the study. It was explained to potential participants that any data they supplied would not be seen by clinic staff so as to protect their confidentiality and allay concerns about staff awareness of their attitudes toward the program. Those willing to take part were asked to fill out the demographics, motivation, and attribution measures at that time. One measure, the Health-Care Climate Questionnaire (HCCQ), was administered month into the study. All measures filled out by the patients were used in conjunction with the clinic records to account for the outcome measures of relapse and retention, as well take-home dose attainment. Patients were followed for a period of at least 6 months.

MEASURES

The intake package handed out to participants consisted of the following measures:

Treatment Motivation Questionnaire (TMQ). The TMQ is a 25-item scale used to measure autonomous versus controlled reasons for engaging in treatment, adapted from the TMQ used by Ryan et al. (1995). In addition, the TMQ contains factors assessing one's confidence in treatment and one's willingness to seek interpersonal help. In adapting the TMQ,

TABLE 1. Sociodemographic Characteristics of the Study Sample

Variable	Mean	SD	Range	Min	Max	Sum	N
Number of participants employed						16.00	74
Number of participants having legal or social service referral						28.00	74
Number of males						38.00	74
Number of prior addiction treatments	3.58	2.13	8.00	0.00	8.00		74
Years of schooling	12.11	2.30	9.00	7.00	16.00		71
Years of illicit use	21.39	9.05	37.00	4.00	41.00		74
Age	41.23	7.14	28.00	26.00	54.00		74
Days in treatment	595.45	185.87	762.00	68.00	830.00		74

we changed one item to be more specific to the MM program. An example of a statement representing an autonomous reason for engaging in treatment would be "I chose this treatment because it's an opportunity for change." A statement that taps a more controlling reason would be, "I will get in trouble if I don't remain in treatment." All items are rated on a 6-point Likert scale. Reliabilities for the TMQ in this study were moderate but acceptable. For the four subscales, the alphas were .73 for external, .83 for internal, .76 for interpersonal help seeking, and .85 for treatment confidence.

The Health-Care Climate Questionnaire (HCCQ). The HCCQ has previously been used in health care settings as a measure of patient perceptions of the autonomy-supportive versus controlling orientation of providers (Williams, Deci, & Ryan, 1998). It is composed of a 7-point Likert scale. A sample item from the scale is, "My care provider listens to how I would like to do things." Previous use of this scale (e.g., Williams, Rodin, et al., 1998) has yielded a one-factor solution measuring autonomy support. The HCCQ showed good reliability in this sample ($\alpha = .94$).

Addiction-Entitization Scale (AES). This scale was developed for the study at hand as a preliminary measure of how patients conceptualize their addictions, and how such a factor might predict retention and relapse. The scale uses a 7-point Likert rating. Three items were taken directly from Dweck (1991), and an additional three items were written that were theoretically consistent with the scale's objective and met reliability criteria. The original Dweck items produced a scale alpha of .87, and in conjunction with the additional three items, the AES scale had an alpha of .86. AES items can be found in the Appendix.

Outcome Measures. Clinic records were used to obtain measures of relapse, attendance, and take-home status. Relapse represents the percentage of random urine tests that are deemed positive. Attendance represents the percentage of missed attendance (at supportive services). Take-home status is determined by clinic staff based on chart reviews and overall clinical impressions of readiness, and is coded as an estimate of days until take-home doses would be feasible. It should be noted that take-home status is influenced by the fact that clinic staff use employment status and urine samples in their process of determining a patient's eligibility for take-out dosages.

RESULTS

PRELIMINARY ANALYSES

An initial correlational analysis of demographic characteristics and outcome variables was used to identify significant control variables. In ad-

dition, length of current drug use, referral source (referral), and employment status (employed), were explored at this stage, as they related to outcomes. Results of these analyses are presented in Table 2. The only demographic variables that predicted outcomes were employment status and referral source. Employed participants ($n = 16$) had significantly lower rates of positive urine samples ($r = -.31, p < .01$) as well as decreased time until achieving take-out status ($r = -.29, p < .01$).

Those individuals referred by the legal system or social services showed higher rates of positive urine samples ($r = .24, p < .05$). However, the relation between referral status and both attendance and take-out status was not significant. Accordingly, subsequent regression analyses include employment status as a control variable when looking at positive urine rates, attendance, or take-home status outcomes, whereas referral source served as a control variable when examining positive urine outcomes. In addition, a correlation ($r = .38, p < .001$) was found between sex and employment status, such that more males were employed than females. However, sex was unrelated to any of these outcomes. Therefore, when employment status was used as a control variable in later regression analyses, it is possible that the results are skewed toward males.

OUTCOME MEASURES

Overall, this sample had a high retention rate. Of the 74 individuals who entered the study, 60 remained at the time of follow-up—a retention rate of 81%. This is considerably higher than the meta-analytic findings of Ball and Ross (1991), which indicates that outpatient retention rates usually range between 30% and 60% at 2 years. However, it should be pointed out that retention is as much dependent upon patient compliance as it is on a clinic's tolerance of noncompliance. For this sample, patients averaged 593 days in treatment, with a median of 652.

Attendance outcomes were calculated as a percentage of missed appointments at supportive services meetings such as rehabilitation groups and individual counseling sessions. This measure was derived by calculating the total number of meetings scheduled and those missed—all of which are chart-noted by staff—and creating a ratio and percentage. Relapse outcome was determined by the ratio of positive urine samples to total urine samples drawn. Urine samples were deemed positive if they tested positive for heroin, morphine, codeine, other opiates or benzodiazepines. Urines that tested positive for either alcohol or cannabis were not counted in this percentage because that was (a) consistent with the clinic's protocol on relapse and (b) consistent

TABLE 2. Correlations Between Outcomes and Sociodemographic Characteristics

	Age	Employed	% Missed Attend	% Positive Urines	Prior Treatment	Years of School	Sex	Length of Current Use	Referral
Take-out status	-.08	-.29**	.69***	.77***	.06	-.07	-.13	-.04	.09
Age		.15	.08	.02	-.22	.06	.20	.67***	.20
Employed			-.17	-.31**	.09	.39***	.38***	.08	-.20
% Missed Attend				.85***	-.15	.04	-.03	-.00	.19
% Positive Urines					-.02	.01	-.08	-.03	.24*
Prior Treatment						.05	.05	.11	.09
Years of School							.15	-.26*	-.10
Sex								.24*	-.08
Length of Current Use									.31**

* $p < .05$; ** $p < .01$; *** $p < .001$, $n = 74$.

with several studies that have shown that concurrent cannabis or alcohol use alone during MM is not significantly related to opiate relapse (e.g., Hubbard et al., 1989; Ward et al., 1992). Days-until-take-home outcomes were calculated by determining the number of days between entering treatment and the achievement of initial take-home doses. We note again that this clinical rating includes consideration of urine tests and attendance, and is thus not a fully independent outcome.

As expected, these outcome measures were positively interrelated (see Table 2). Individuals with poor attendance at supportive services had a higher percentage of positive urine samples ($r = .85, p < .0001$), and had a longer take-out status ($r = .69, p < .001$). These relations indicate that individuals who decline rehabilitative services are less likely to remain abstinent.

TREATMENT MOTIVATION AND OUTCOMES

Relations between TMQ-internal and TMQ-external motivation and outcomes were initially explored via the correlations in Table 3. Internal motivation was negatively related to missed attendance at supportive services ($r = -.28, p < .01$) and fewer positive urine samples ($r = -.27, p < .05$) and positively related to take-out dose achievement ($r = -.25, p < .05$). External motivation was marginally positively related to both missed attendance ($r = .20, p < .08$) and percentage of positive urine samples ($r = .19, p < .10$) and was unrelated to take-out doses. Further examination of these relations was accomplished using hierarchical regressions, separated by outcomes as follows:

Attendance. In these analyses, external motivation predicted missed attendance, $F(2, 71) = 2.57, p < .05$, whereas internal motivation was significantly negatively associated with this variable, $F(2, 71) = 5.73, p < .05$. Analyses also revealed a significant TMQ-internal \times TMQ-external interaction, $F(3, 70) = 5.26, p < .05$, in predicting attendance.

Relapse. In regressions involving relapse (positive urine rates), both employment status and referral source were entered at Step 1 because, as indicated previously, both variables were significantly related to this outcome. Once employment status, referral source, internal motivation, and external motivation were entered, it was found that high internal motivation was predictive of relapse lower rates, $F(4, 69) = 8.80, p < .01$, whereas external motivation was not significantly related, $F(4, 69) = 1.97, ns$. Also, as in previous analyses, a significant interaction was found between internal and external motivation, $F(5, 68) = 4.02, p < .05$.

Take-Out Dosage. In regressions involving the days-until-take-out dose, employment was entered first as a control variable, followed by

TABLE 3. Correlations Between Outcomes and the Primary Motivation Variables

	Attendance	Relapse	Entitization	Autonomy Support	Treatment Confidence	External Motivation	Internal Motivation	Help Seeking
Take-out Status	.69***	.77***	-.24*	-.25*	-.22	.01	-.25*	-.07
Attendance (% missed)		.85***	-.28**	-.21	-.18	.20	-.28**	-.15
Relapse (% Positive Urines)			-.23*	-.26*	-.27*	.19	-.27*	-.28*
Entitization				-.04	.33**	-.07	.05	-.12
Perceived Autonomy Support					.14	.07	.26*	.11
Treatment Confidence						.12	.19	.23*
External Motivation							-.08	.02
Internal Motivation								.37***

* $p < .05$, ** $p < .01$; *** $p < .001$; $n = 74$.

the motivation variables. Only TMQ-internal motivation was a significant predictor, $F(3, 70) = 7.27, p < .01$, whereas neither TMQ-external motivation nor the interaction between internal and external motivation was significant.

Because the interaction between TMQ-internal motivation and TMQ-external motivation was significant in the prediction of both relapse and attendance, further analyses were undertaken to clarify the interaction. Variables were contrast coded orthogonally, using a median split, and entered into a regression analysis. Results yielded a predicted interaction, such that for positive urine rates, $F(3, 70) = 2.04, p < .05$, and for attendance, $F(3, 70) = 2.06, p < .05$. These interactions are displayed in Figure 1. Those individuals with the dual presentation of both high-external and low-internal motivation were identified as a particularly nonadherent subgroup having the worst outcomes in all three areas, in comparison to the three other potential dual motivational presentations. For days-until-take-home status, this group had a mean of 550.6 days compared to 404.9 for the other three groups; for attendance, they had a mean of 27.67% missed meetings compared to 14.59%; for positive urine samples, they had a mean of 54.99% compared to 28.35%.

Correlational analysis was used to examine the relations between other motivation variables, namely, TMQ-interpersonal help-seeking and TMQ confidence in treatment, as well as outcomes. TMQ-confidence in treatment was unrelated to attendance ($r = -.18, ns$) but was related to relapse rates ($r = -.27, p < .05$). TMQ-confidence in treatment was also marginally related to take-out achievement ($r = -.22, p < .10$). TMQ-interpersonal help-seeking was unrelated to attendance ($r = -.15, ns$) or take-out status achievement ($r = -.07, ns$), but was related to relapse ($r = .28, p < .05$), suggesting that an orientation toward seeking the help of others may facilitate decreased illicit drug use. Interrelations among these TMQ subscales can be seen in Table 3. Interpersonal help-seeking and internal motivation were significantly related ($r = .37, p < .001$), as were TMQ-confidence in treatment and interpersonal help-seeking ($r = .23, p < .05$).

Perceived Autonomy Support. It was hypothesized that perceived autonomy support, as measured by the HCCQ, would be associated with fewer relapse, better attendance, and lower days to take-out status. Correlations supported these hypotheses, with higher perceived autonomy support being associated with lower relapse ($r = -.26, p < .05$), marginally with fewer missed appointments ($r = -.21, p < .10$), and less time to take-out status ($r = -.25, p < .05$). These relations, together with the high mean of HCCQ scores (mean = 5.86, SD = .88, range 4.00–7.00), might partly explain the atypically high retention rate in this sample, such that

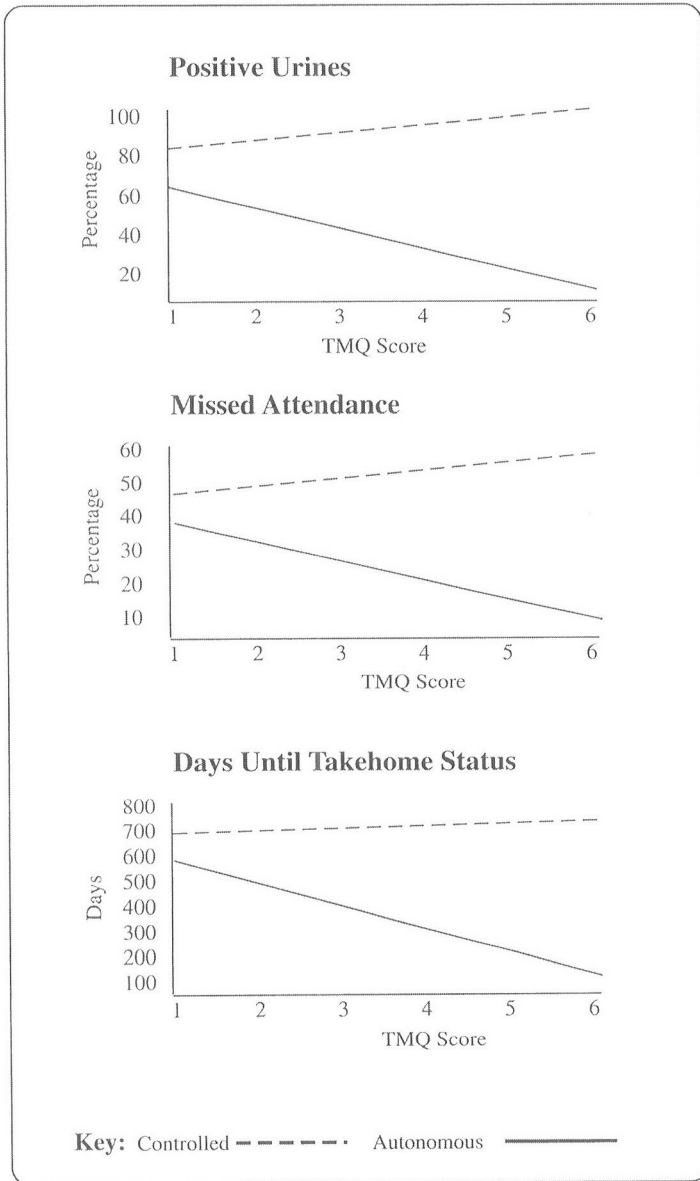


FIGURE 1. Motivation by Outcome

in the presence of an overall autonomy-supportive staff, participants were more likely to remain in treatment.

The role of perceived autonomy support in predicting outcomes was further examined with hierarchical regressions. With respect to relapse, having already entered employment status and referral source as control variables, we found that perceived autonomy support remained a significant predictor, $F(3, 70) = 5.36, p < .05$. Higher HCCQ scores also predicted less time until take-out status, $F(2, 71) = 3.92, p < .05$, with employment status accounted for in the regressions.

TMQ-internal motivation was positively related to perceived autonomy support ($r = .26, p < .05$). This finding suggests that those who initially reported being more autonomous in their motivation also experienced the treatment staff as more autonomy-supportive.

Entitization. The AES scale was significantly positively related to take-out status ($r = -.24, p < .05$), attendance ($r = -.28, p < .01$), and relapse ($r = -.23, p < .05$). However, once control variables were accounted for in regression analyses, AES scores remained only marginally predictive of relapse, $F(3, 70) = 2.29, p < .10$, and achievement of take-out status, $F(2, 71) = 3.40, p < .10$. A separate regression analysis on attendance was not performed because no control variables related to this outcome. The correlational analyses suggest that when individuals perceive themselves and their addiction as disease related and more biological in origin, they may be more likely to be adhere to treatment, as evinced by lower relapse and better attendance.

DISCUSSION

In this study we examined relations between motivation and treatment outcomes in a methadone maintenance program for opioid-dependent patients. Specifically, we investigated patients' initial motivation for engaging in treatment by applying self-determination theory (Ryan & Deci, 2000). Within this framework, motivation is understood as reflecting one's perceived locus of causality for an endeavor, or the individual's sense of autonomy and choice in the face of change.

Results revealed that measures of both internal and external motivation were related to outcomes: Internally motivated individuals had lower relapse rates as indicated by fewer positive urine samples and better attendance, whereas those who were externally motivated for treatment had higher relapse rates and poorer attendance. In addition, motivation was predictive of achieving a clinic judgment-recommendation for take-home methadone dosages, such that individuals whose motivation was of a more internal orientation achieved this recommen-

dation sooner than those who reported more externally oriented motivation.

Previous work on the relations between motivation and maintained behavior change has generally suggested that the presence of both high-internal and low-external motivation is associated with the best outcomes, as found among those attempting weight loss (Williams et al., 1996) or adhering to medication recommendations (Williams, Rodin, et al., 1998). Moreover, self-determination theory suggests that high-internal and low-external motivation is associated with greater persistence and willing adherence. Ryan et al. (1995), however, found a unique result when investigating motivation among those in alcohol treatment, in that outcomes were maximized in the presence of both high-internal and high-external motivation.

In this MM setting, the data also revealed an interaction between internal and external motivation. However, it pointed to a subgroup of noncompliant individuals for whom the presence of high external motivation and low internal motivation severely undermined treatment attendance and was associated with greater relapse. These findings suggest that external motivation, unless accompanied by high levels of internal motivation, may impede the achievement of positive treatment outcomes and represent a resistant profile. At the same time, it remains plausible that high levels of external motivation, although typically obstructive in other areas of behavior change, may actually aid recovery from addiction when also coupled with high levels of internal motivation as Ryan et al. (1995) suggested. In the current study, this was the case for the take-home dosage variable, which was derived in large part by clinical impressions. The nature of addiction to either alcohol or drugs may be such that external forces acting or pressuring the individual to engage and remain in treatment are a useful adjunctive when they converge with an inner desire to change.

Other motivational variables also related to treatment success. Those who were confident in treatment and those who sought the help of others had fewer relapses. Although these two variables were unrelated to attendance, they were positively related to one another and to internal motivation, suggesting that they may be aspects of a receptive orientation toward treatment.

Another focus of this study was the role of perceived autonomy support. Prior research has shown that when patients feel they are listened to, given some choices, and accepted rather than judged, this perception will in turn enhance adherence and treatment outcomes. In this study, it was found that greater perceived autonomy support from clinic staff was associated with lower relapse, fewer missed appointments, and earlier achievement of take-home doses. It is thought that perceived auton-

omy support enhances outcomes by facilitating internalization of treatment goals, a causal pathway that could not be confirmed given the cross-sectional design of the study.

We also examined beliefs concerning addiction and their relation to treatment success by drawing on Dweck's (1991) distinction between entity and incremental beliefs. Prior research suggests that in most settings incremental beliefs are most adaptive because they justify continued effort and protect one from helplessness. However, the MM setting is unique because it is oriented more toward maintaining one's addiction in a more benign form rather than toward cure, and thus adherence may be more supported by a entity view. In accord with this, zero-order correlations showed that entitization scores were associated with better attendance and take-out status, and with lower relapse. Although these relations did not remain significant when controlling for employment and referral sources, they are suggestive that belief in addiction as a disease might facilitate MM treatment success. However, the exploratory nature of these findings suggests a need for both replication and extension to other addictive behaviors. For instance, we suggest that whereas entity beliefs may be helpful in MM or alcohol treatments, they might be counterproductive for issues such as smoking cessation or eating disorders.

In sum, results of this study indicate that both internal motivation for treatment and perceived autonomy support from staff are associated with better treatment engagement and outcomes during MM. In contrast, external motivation by itself does not facilitate positive treatment outcomes. Moreover, it seems that in the presence of both high-external and low-internal motivation, treatment success is considerably less likely, and that those individuals portraying such motivational styles are distinctively noncompliant in comparison to other patients. By contrast, the dual presence of high-internal and high-external motivation may enhance some outcomes. Together, this suggests that external motivation might sometimes aid treatment success, but only when it converges with internal motivation.

By identifying the motivational attributes and addiction-related conceptions of those in MM treatment, it is possible that resources and time can be more effectively allocated to those in need. Moreover, it seems likely that if clinics provide a more autonomy-supportive environment by allowing clients to take a more active role in planning their treatment and by encouraging staff to attend to individual client needs and perceptions, the chances of success may also increase, as other research has suggested (Bein, Miller, & Tonigan, 1993; Maddux, Desmond, & Votsberger, 1995). Individuals present themselves for methadone treatment for a variety of personal and external reasons. A better understand-

ing of how those initial reasons affect treatment, and how they can be addressed during treatment, is relevant to creating more effective treatments for opiate dependence. These conclusions interface well with some recent frameworks for addiction treatment such as motivational interviewing (Foote et al., 1999; Miller & Rollnick, 2002). Indeed, several articles have suggested that the constructs of SDT concerning motivation and autonomy–support may be useful in explaining some of the positive effects of motivational interviewing (see Markland, Ryan, Tobin, & Rollnick, 2003; Vansteenkiste, Soenens, & Vandereycken, in press; Williams, Minicucci et al., 2002).

Despite the interest value of these findings, a few limitations should be noted. First, the study was cross-sectional, and causal relations between motivation and outcomes cannot be drawn. Longitudinal designs such as Williams et al. (1996) would more effectively establish these causal relations. In addition, follow-up studies are helpful because it is maintained engagement or change that is a principle focus of most clinical intervention (Deci & Ryan, 1985). Finally, because we measured only initial motivation assessed at intake, results were not as robust as they might have been if repeated measures were available to look more proximally at the covariance of motivation and adherence. Despite these limitations, this study adds to a growing literature attesting to the importance of encouraging patients to autonomously engage in treatment in clinical settings.

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