

The role of psychiatric distress and sociopathy in aftercare treatment outcome:
A test of “matching hypotheses”

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ABSTRACT

The role of psychiatric distress and sociopathy in aftercare treatment outcome:
A test of “matching hypotheses”

Norman Shields, Ph.D.
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Investigation into matching substance abusers attributes to aftercare treatment has yielded mixed results. The notion that substance abusers with greater psychiatric distress and sociopathy will benefit more from relapse prevention oriented aftercare remains uncertain. Moreover, indices of psychiatric distress during the early stages of intensive substance abuse treatment are suspect as withdrawal symptoms often complicate psychiatric symptom presentation. The present study examined these attributes as aftercare matching variables, including posttreatment degree of psychiatric distress. Additionally, the utility of qualitative appraisals of psychiatric severity and needs in predicting treatment outcome was investigated.

Substance abusers (N = 125; 66% male) were randomly assigned posttreatment to either 10-weekly sessions of Structured Relapse Prevention (SRP) or Twelve-Step Facilitation (TSF) aftercare treatment groups and followed-up over a six-month period. Post-intensive treatment degree of psychiatric distress and sociopathy were measured by the revised Symptoms Checklist-90 (SCL-90-R: Derogatis, 1983) and California Psychological Inventory, Socialization subscale (CPI-So: Gough, 1987), respectively. The Addiction Severity Index (ASI: McLellan et al., 1980) participant severity ratings were used to predict substance use and psychosocial functioning at follow-up.

The results indicated that although greater psychiatric distress and sociopathy contributed to poorer substance use and psychosocial functioning throughout the follow-up period, few interactions with aftercare treatment were noted. In fact, the few interactions noted contradicted the hypothesized effect. Participants with greater psychiatric distress benefited more (i.e., longer latency to lapse) from TSF than SRP. Participants with greater sociopathy reported less legal problems when assigned to TSF than those assigned to SRP. Both of these findings failed to support previous aftercare matching findings (R. Kadden et al., 1989).

The ASI participant severity rating (i.e., patient importance of treatment) for psychiatric status significantly predicted family/social adjustment at follow-up. Moreover, the qualitative appraisals of psychiatric needs were significantly correlated with quantitative psychiatric distress indices (i.e., SCL-90-R), thus contributing to the validity and utility of the ASI patient rating scales. These qualitative appraisals hold both empirical and clinical appeal.

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I would like to dedicate this work to my wife and children. To my loving wife Trina who has sacrificed much during my period of academic, professional, and personal growth; I can't thank you enough. Without your continued love and support, I would not have become the man, husband, and father that I am today. I am eternally grateful and proud that I had you by my side every step of the way. To my daughter Paige and son Jack, you were the fuel I needed on days when "throwing in the towel" was an option. Daddy's home all day now!

It is also my honor to dedicate this work to the memory of my daughter Erika-Marie. Although there is a part of me that will never return, her brief but cherished life continues to inspire and remind me of what really matters. God bless you Erika.

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Relapse following substance abuse treatment is a posttreatment reality (Brown, Seraganian, & Tremblay, 1993). The provision of posttreatment services (e.g., aftercare) has enhanced treatment outcome (Ito & Donovan, 1986; Allsop, Saunders, Phillips, & Carr, 1997). While several treatment approaches have been found effective for specific substance use disorders (Miller & Willbourne, 2002), these treatments help some but not all substance abusers (O'Malley, 2001). Less is known about the effectiveness of aftercare treatment. The research trend over the past two decades has considered the diverse individual attributes of substance abusers as potential moderators of outcome from distinct treatment approaches. The matching hypothesis: "a method of choosing between alternative treatment options based on particular client characteristics that interact differentially with the interventions to produce a more favorable outcome" (Mattson et al., 1994), has guided two decades worth of addiction treatment research. Several large-scale multi-site research trials into client-treatment matching (Project Match Research Group, 1997a; Ouimette, Finney, & Moos, 1997; Kadden, Litt, Cooney, Kabela, & Getter, 2001) failed for the most part to uncover consistent moderators of outcome with specific treatments, leading some investigators to question the utility of the matching hypothesis (Heather, 1999). Nevertheless, degree of psychiatric distress and sociopathy have been identified as promising attributes in need of further investigation (Project Match Research Group).

The following discussion will provide an overview of substance use disorders and treatment outcome. Two prominent addiction theories and related treatment models will be presented as a preamble to the discussion of individual attributes suspected of influencing treatment outcome. Finally, the notion of matching specific treatments to these individual attributes will be addressed.

Overview of Substance Abuse/Dependency, Treatment Prognosis, and Aftercare

Substance use disorders are prevalent and pervasive problems. The diagnostic and statistical manual of mental disorders (DSM-IV; American Psychiatric Association, 1994) has defined substance use disorders with abuse and dependency features. Substance abuse is persistent substance use despite known risks or consequences (e.g., work problems, family problems, etc.). Substance dependence includes several additional features: tolerance to the effects of a substance, loss of control over consumption, experience of withdrawal symptoms upon discontinuation or reduction of use, and/or consumption to relieve withdrawal. Grant and Dawson (1999) reviewed American epidemiological surveys and found that lifetime prevalence rates of alcohol and drug abuse and dependence differed. The prevalence of alcohol abuse and dependence in the United States was estimated at 5% and 13%, respectively. Alcohol abuse was more prevalent in men (7%) than women (3%), and most prevalent in non-black men, aged 18-24 years (9.3%). The combined prevalence of drug abuse and dependence was 6%. Drug abuse was more prevalent in men (4.4%) than women (2%) and most prevalent in adults aged 18-29 years (5.2%).

Specific treatment settings for substance use disorders typically attempt to provide services that are tailored to the severity of dependency symptoms (Wilbourne & Miller, 2002). Moreover, a continuum of service exists to treat different aspects of substance use disorders. Detoxification is a hospital-based treatment that focuses on the management of withdrawal symptoms associated with discontinuing substance use. Physical (e.g., tremors) and psychological (e.g., anxiety) symptoms are managed with medication and psychosocial support (Franken & Hendriks, 1999). Intensive rehabilitation treatment usually follows detoxification and addresses psychosocial aspects of substance use disorders (e.g.,

motivation to use, related consequences, lifestyle changes, etc.) and is provided either in a inpatient (e.g., milieu or residential treatment) or an outpatient setting (e.g., day hospital). The rationale for the inpatient treatment is that living in a therapeutic milieu for a period of time may be beneficial for some patients (Miller & Wilbourne, 1997), as a respite or protection from risky environments. Finally, aftercare treatment is provided on an outpatient basis and focuses on the transition from intensive rehabilitation to a post-substance abuse lifestyle (Hawkins & Catalano, 1985). Aftercare's fundamental goal is relapse prevention and is based on the assumption that continued assistance is required to address posttreatment factors associated with relapse (see below).

Though few substance abusers seek formal treatment, those who do seek services tend to do so repeatedly. The prevalence rate to seek formal treatment for substance abuse/dependency has been estimated at only 1.5% (Grant & Dawson, 1999). Maude-Griffin et al. (1998) found that 84% of crack-cocaine abusers who sought outpatient treatment had at least one prior treatment. Other investigators reported that within a national sample of cocaine abusers who underwent treatment ($n = 1,605$), 18% were re-admitted to treatment within one-year posttreatment (Simpson, Joe, Fletcher, Hubbard, & Anglin, 1999).

Several studies have supported the efficacy of several treatments for specific substance use disorders. In a series of investigations, O'Malley et al. (1992; 1996) found that coping and social skills therapy (CST) was an efficacious treatment for alcohol dependent individuals, especially when paired with pharmacotherapy. In one study, O'Malley et al. (1992) conducted a double-blind, placebo controlled study that randomly assigned alcohol dependent individuals to either 12-weekly sessions of coping skills therapy or supportive therapy in conjunction with either naltrexone (i.e., an opioid-antagonist

developed to reduce alcohol cravings) or placebo. Participants ($n = 97$) were included if diagnosed as alcohol dependent; abstinent at least 7 to 30 days, had no other drug dependency, had no major psychiatric problems, and pharmacotherapy was not contraindicated. A survival analyses during the treatment phase indicated that the naltrexone/supportive therapy group had the greatest latency to first drink. However, latency to relapse (i.e., 5+ drinks for men; 4+ drinks for women) was significantly longer when participants were assigned to the coping skills/naltrexone condition rather than the other conditions. In a follow-up study, 80 of the 97 participants were assessed over a six-month period posttreatment (O'Malley et al., 1996). The results indicated that naltrexone generally failed to provide a distinct advantage over placebo six-months following treatment discontinuation. Conversely, coping skills therapy was found to be more beneficial than supportive psychotherapy, especially when paired with the placebo condition. These investigators hypothesized an increase in participants' confidence to cope with difficult situations was bolstered with CST. Whether pharmacotherapy undermines or bolsters confidence gained when exposed to CST has yet to be investigated (O'Malley, 2001).

Cue-exposure therapy (CET) also targets alcohol use cravings. Cravings are understood as conditioned responses to alcohol use and potential antecedents to relapse (Rohsenow et al., 2001). When paired with CST that also focuses on managing urges to drink, CET has been found to decrease frequency and intensity of alcohol use up to six-months following treatment (Rohsenow, 2001). Thus, whether paired with pharmacological interventions or specific behavioral interventions, coping skills training is an efficacious treatment for alcohol use disorders.

Miller and Wilbourne (1997) reviewed 361 controlled clinical trials for *alcohol use disorders* over the past 40 years. Study methodology, outcome (i.e., treatment effect), inferential strength, and population substance use severity were systematically ranked to better evaluate different treatment modalities (e.g., medications, behavioral skills training, mutual-help approaches, etc). Studies with the highest ranking showed that brief interventions, motivational enhancement, pharmacotherapies (i.e., acamprosate and naltrexone), social skills training, and other behavior therapies were the most effective. Alcoholics Anonymous, a mutual-help resource, was associated with poor overall cumulative evidence for efficacy.

There is evidence for treatment efficacy in the management of cocaine dependency. Voucher-based incentive treatments have received support for cocaine dependency (Higgins, Alessi, & Dantona, 2002). Voucher-based treatment is essentially the delivery of vouchers (i.e., incentives) contingent on achievement of a predetermined treatment goal (i.e., self-reported abstinence corroborated by urine samples). Higgins et al., (2003) conducted a randomized trial that examined the treatment effectiveness of vouchers, either alone or with a community reinforcement approach (i.e., emphasis on coping skills and socio-occupational reintegration), for cocaine dependent individuals (n = 100). Participants were randomly assigned to either a 24-week vouchers or vouchers and community reinforcement condition (CRA), followed by 6 monthly aftercare sessions. The combined condition was effective in enhancing retention in treatment and decreasing substance use and psychosocial problems (e.g., employment) over a 24-month follow-up period. The role of aftercare and its components were not defined and its impact on outcome was not examined. It is noteworthy that despite efforts to examine treatment effects on cocaine abusers, approximately 60% of

the study participants had alcohol dependency. Because CRA is comprised of other interventions, including coping and social skills, these findings might reflect the success of these interventions on alcohol dependency rather than cocaine dependency itself.

Despite the evidence for effective treatments for different substance use disorders, posttreatment relapse remains problematic. Over the past two decades, researchers have found that substance abuse treatment outcome was represented by high rates of relapse. Multiple substance abuse was among many factors identified as contributing to poor treatment outcome. Early research that focused primarily on alcohol abuse treatment outcome found high rates of problem drinking (i.e., 54%), and only moderate rates of non-problem drinking (i.e., 18%) or abstinence (28%) at 2 and 4-year follow-up (Polich, Armor, & Braiker, 1980). Disparate outcomes were also found in treated drug abusers including those who experienced immediate lapses (i.e., initial use) posttreatment but then regained abstinence (Gossop, Green, Phillips, & Bradley, 1987). Brown et al. (1993) compared the six-month posttreatment outcomes of alcohol abusers versus alcohol and drug abusers. Relapse rates were significantly greater for the latter group compared to the former group (i.e., 69% vs. 43%, respectively). Brown et al. also noted that the alcohol and cocaine abusers tended to be younger, unmarried, using multiple other drugs, and sought treatment sooner compared to alcohol only abusers. Other investigators have reported abstinence rates at 12 months following treatment ranging from 7% to 25% (Ouimette, Finney, & Moos, 1997; Copeland, Swift, Roffman, & Stephens, 2001). As the majority of substance abusers presenting for treatment have increasingly multiple substance use problems (Chapman Walsh et al., 1991; Miller & Bennett, 1996), treatments are increasingly required to address the varied needs. Thus, posttreatment relapse is a likely outcome, especially when multiple

substances are considered. Moreover, substance abusers are increasingly a heterogeneous population with a multitude of needs.

A vexing methodological dilemma in outcome studies has been the disparate definitions of treatment outcome (e.g., substance use, psychosocial functioning, etc.), especially with respect to relapse. Not surprisingly, relapse rates have varied across studies as a function of the definitions employed (Miller & Cooney, 1994; Connors, Longabaugh, & Miller, 1996). Early treatment outcome research often used the “first drink” following treatment as a relapse indicator, reflecting the dominance of the disease model of alcoholism at that time (see below). That is, one symptom (i.e., lapse to drinking) purportedly signaled the return of the disease (i.e., relapse with dependency). Since then, investigators have found that abstinence could be regained even after a lapse (Gossop et al., 1987). Mattson et al., (1994) suggested a need to move away from “sentinel” events, like time to first drink; to differentiate between lapse and relapse; and to consider relapse as a return to a cycle of behavior (e.g., regular consumption). This is pertinent given the heterogeneity of substance abusers’ patterns of use. A sentinel event could be a number of combinations of substances for a multiple drug abuser. Common outcome measures that consider the heterogeneity of substance use patterns, such as percentage days abstinent (Project Match Research Group, 1997a), are needed. The diversity in how relapse is operationalized is in itself meaningful, and suggests that relapse is a multidimensional concept amenable to multiple levels of measurement.

Despite evidence for the short-term effectiveness of tailored treatments with certain substance use disorders, no single treatment is effective for all substance abusers (O’Malley, 2001). Given the chronic and changing course of substance use disorders, posttreatment

interventions that address common needs of substance abusers have come under more rigorous investigation.

Aftercare has been defined as any posttreatment intervention whereby the fundamental goal was the prevention of posttreatment substance abuse (Hawkins & Catalano, 1985). Aftercare was conceived to remove or reduce posttreatment factors associated with relapse, such as family and social circumstances, peer influences, social isolation, lack of meaningful activities, negative emotional states (e.g., depression), and to bolster maintenance of treatment gains (Hawkins and Catalano). Ito and Donovan (1986) posited that aftercare played three main therapeutic roles: 1) detection and intervention of the relapse process; 2) evaluation of new behaviors and lifestyle changes; and 3) encouragement of active coping strategies for maintenance of behavior change rather than passive avoidance.

Earlier research provided evidence for the effectiveness of aftercare programs in reducing relapse rates and treatment re-admissions for alcohol use disorders in the medium term (i.e., 6-months) (Donovan, Kivlahan, & O'Leary, 1983; Siegal, Alexander, & Lin, 1984; Hawkins and Catalano, 1985). After reviewing the aftercare literature, Ito and Donovan (1986) concluded that aftercare contributed significantly to positive treatment outcome (e.g., decreased drinking) by addressing relapses and bolstering social support, as well as by emphasizing a "learning perspective" with respect to the relapse experience. They described aftercare as possibly "the" active ingredient in successful alcohol treatment. These conclusions were drawn in a research era when alcohol use disorder treatment comprised mainly of detoxification and milieu settings (e.g., 28-day inpatient treatment), with little to no emphasis on the role of drug use disorders. Since then, treatment regimens

such as those outlined above have been developed in a ‘managed care’ era, with emphasis on brief cost-effective interventions. Contemporary research has since identified additional active ingredients that influence treatment process and outcome, such as tailored brief interventions at the outset of treatment that foster client motivation to change (Yahne & Miller, 1999). Moreover, specific treatments approaches for substance use disorders incorporate many of the social re-integration aspects of aftercare from the outset of treatment (e.g., community reinforcement approach). The role of aftercare has evolved since Ito and Donovan’s (1986) review. Aftercare remains best positioned to prevent relapse and maintaining behavior change, yet little is known about its role in outcome.

To summarize, despite the development of efficacious treatments for certain substance use disorders, the chronic nature of substance abuse and the seemingly short-term benefits of most intensive treatments necessitate further investigation of the role of aftercare in bolstering treatment outcome. The varied treatment outcomes and presenting problems of substance abusers require investigation with sound research methodology sensitive to this reality. Given that substance abusers are increasingly a heterogeneous population, aftercare treatments that adapt to individual needs might produce better outcomes. The following discussion will address different models of addictive behavior, related treatment aftercare approaches, and their effectiveness.

Models of Addiction and Treatment

The term ‘addiction’ has been used synonymously with substance dependency to denote the acquisition and presence of compulsive behaviors and physical symptoms associated with substance use (Grant & Dawson, 1999). Although numerous models of

addiction exist, the following review will focus on the conceptual and theoretical underpinnings of the two most prominent: relapse and disease models.

Relapse model of addiction and treatment. Conceptually, the *relapse model* describes addictive behavior as a series of “bad habits” (Marlatt, 1985). A core assumption of this model is that addictive behavior involves over-learned, maladaptive habit patterns (e.g., drinking to relieve stress). A behavior is considered maladaptive when it leads to negative consequences related to health, social status, and self-esteem. Marlatt proposed that addictive behavior develops through situational and environmental antecedents, beliefs and expectations, family history and prior learning experiences. The combined effect of social learning and conditioning rules contribute to addictive behavior. Social learning factors (e.g., substance use within the family, beliefs, etc.) emphasize the environment’s role in habit-forming behavior. The psychoactive properties of the substances contribute to reinforce addictive behavior. In order to change addictive behavior, Marlatt proposed that individuals pass through three phases. First, motivation and commitment are developed; changes are then implemented; finally, changes are maintained. The maintenance phase will be discussed further as it addresses the role of relapse in the change process.

The relapse model considers relapse as a progressive process and defines it as a return to a previous maladaptive level of substance use following cessation. The model (See Appendix A) assumes that the individual initiates a voluntary choice to abstain or control use. As the maintenance phase is entered, a sense of control over the habit (i.e., self-efficacy) is increased as the abstinence period grows. Bandura (1995) defined self-efficacy as: “the belief in one’s capabilities to organize and execute the courses of action required to manage prospective situations” (p. 1). The relapse model posits that a sense of self-efficacy

continues until a high-risk situation threatens this perceived self-efficacy and increases the risk of a lapse. High-risk situations could be either internal pressures (e.g., anxiety) or external pressures (e.g., social pressure to use).

If effective coping strategies are used when confronted with a high-risk situation, then the likelihood of a lapse is decreased. Quigley and Marlatt (1999) defined a lapse as the “initial return to substance use or transgression of one’s goals” (p.373). Success in coping with a risky situation leads to a heightened perception of control and increased self-efficacy (Marlatt, 1985). If coping strategies fail to be implemented, then a decrease in self-efficacy is experienced. The risk of lapse is increased by a perceived lack of control and by positive outcome expectancies of a substance’s effect (e.g., relief of stress). The reaction to an initial lapse determines whether or not a relapse follows. The abstinence violation effect (AVE) is considered a common reaction to violating an absolute rule (e.g., a commitment to complete abstinence). It is defined by specific causal attributions (e.g., lapse is due to a personality trait that does not change and affects all behavior) and an intense cognitive-affective reaction (e.g., dissonance and shame) that enhance the likelihood that a relapse would occur (Marlatt).

The relapse model has received considerable empirical support. The original taxonomy of relapse situations (see Cummings, Gordon, & Marlatt, 1980) has been supported whether assessed prospectively or retrospectively (Marlatt, 1996). Other investigators have modified the relapse taxonomies but these changes have failed to result in better predictive models of outcomes (Stout, Longabaugh, & Rubin, 1996). The role of self-efficacy and the abstinence violation effect in outcome have received empirical support across addictive behaviors such as smoking, alcohol use, and drug use (Stephens, Curtin,

Simpson, & Roffman, 1994; Shiffman et al., 1996). The theoretical underpinnings and empirical support of the model have contributed to the development of the Relapse Prevention treatment model.

Relapse prevention (RP) was developed as a cognitive-behavioral treatment that specifically addressed the cognitive (e.g., self-efficacy expectations) and behavioral (e.g., social skills) components involved in maintaining behavior change (Marlatt & George, 1984). Typically, skills training (e.g., self-monitoring), lifestyle intervention (e.g., assertiveness), and cognitive reframing (e.g., relapse debriefing) have been used in this treatment. The latter component of cognitive reframing specifically addresses the issue of a hypothetical or real lapse and the AVE. A lapse is reframed as a learning experience and is presented as a possible outcome that requires preparation.

Disease model of addiction and treatment. The *disease model* emphasizes physiological determinants of addictive behavior. This model was initially proposed to describe the development of alcoholism (Jellinek, 1960) but later was applied to the development of all chemical dependencies (Yeager, Piazza, & Yates, 1992). Under this model, addictive behavior is viewed largely as a product of predisposing physiological factors (e.g., dysregulation of stress) that are genetically transmitted and contribute to the progressive deterioration of addicted individuals. When substance use is active, addiction is the result of changes in physiological states, resulting in cravings and urges (Jellinek). The disease is considered an affliction for life, regardless of whether substance use and associated symptoms are active or have remitted; that is, “one either is or is not alcoholic” (Miller & Kurtz, 1994). As Miller and Kurtz noted of this model, the disease purportedly leads to an inevitable deterioration of addicted individuals if abstinence is not initiated.

Sheehan and Owen (1999) reviewed the current status of the disease model. They concluded that sufficient neurobiological (e.g., molecular and cellular changes in neurons) and genetic evidence (e.g., family history of alcohol dependence) existed to support that addiction was not solely a learned behavior. Symptoms of dependency put forth by the disease model (e.g., tolerance, loss of control, etc.) and their progressive nature have received empirical support (Yeager et al., 1992). Whether these symptoms represent a disease state rather than a clinical syndrome remains questionable (Sheehan & Owen).

Treatment interventions based on the disease model focus on the numerous negative features associated with addictive behaviors. These features include biological (e.g., experience of withdrawal with cessation), interpersonal (e.g., denial and blaming others), psychosocial (e.g., remorse and shame), and mental health concerns. Spiritual deficits (e.g., abandoned values) are also considered important features (Sheehan & Owen, 1999). Multifaceted interventions that include education, therapy, and fellowship are provided in the context of a 12-Step oriented treatment model (see below). Traditionally, the therapy included in this intervention has been interpersonally based and emotion-focused, relying heavily on group interaction (See Brown & Yalom, 1977). Finally, because of the progressive nature of the disease, abstinence is the only recommended goal. An “addict” is guided to accept powerlessness over substances and develop a positive identification as a “recovering” addict (Brower, Blow, & Beresford, 1989).

The disease model contributed to the creation of the ‘Minnesota Model’ (MM) of alcoholism treatment. The Minnesota treatment model was popularized by the Hazelden alcoholism treatment program three decades ago. Typically, this 28-day inpatient treatment approach emphasizes: (a) the possibility for lifestyle change; (b) the “disease concept” of

alcoholism; (c) abstinence as a crucial treatment goal; and (d) the principles of 12-Step fellowship programs such as Alcoholics Anonymous (A.A.) (Morojele & Stephenson, 1992). The accent on 12-Step fellowships is to ensure that treated individuals seek affiliation with these organizations as “continuing care” after treatment and as an ad-hoc aftercare program (Sheehan & Owen, 1999).

Briefly, 12-Step fellowships such as A.A. are mutual-help organizations (Nowinski, 1999). These organizations provide accessible, free support to addicted individuals across North America and around the world. Previous A.A. surveys (A.A., 1993) indicated 89,000 groups registered worldwide, comprised of roughly 1.7 million members. The only requirement for membership is “the desire to stop drinking” (A.A., 1953, p.143). The fellowship is based on 12-Steps (see Appendix B), or spiritual principles, that are practiced in order to overcome addictive behavior. These Steps are guided by the notion that “alcoholic” drinking reflects the human need for a spiritual life gone astray (Miller & Kurtz, 1994). The root of alcoholism is primarily attributed to an individual’s character, though no one etiological position is explicitly taken. The 12-Step fellowship ideology is conceptually inclusive rather than exclusive. Consequently, various etiological theories of alcoholism have been integrated into its ideology.

Although the A.A. writings are explicit, a dilemma for the fellowship has been its constant association with “disease” model concepts. Morojele and Stephenson (1992) found that alcohol abusers’ disease concept attitudes and beliefs significantly increased when exposed to a 12-Step oriented treatment program.

Miller and Kurtz (1994) noted that while many theories of alcoholism have been associated with A.A., the disease model has a substantial presence. They stated that A.A.

tenets differed from the disease model in several ways: 1) the cause of alcoholism is primarily spiritual and not solely physical; 2) alcoholics are responsible for the past and are not victims of a predetermined physical anomaly; and 3) recovery is accomplished through a mutual understanding of spiritual needs and not through a rigid medical approach. It is likely that an A.A. link with numerous models of addiction, especially the disease model, has been due to its theoretical neutrality.

Other fellowship movements, such as Narcotic's Anonymous (N.A.) and Cocaine Anonymous (C.A.) have been modeled on A.A. tenets. As an informal treatment resource, individual participation in a 12-Step fellowship program varies as there is little standardization from meeting to meeting. For example, types of meetings differ (e.g., discussion, speaker meetings, Step meetings, etc.) as well as participants' frequency of attendance and length of sobriety. However, common rituals and traditions can be observed in all meetings (Nowinski, 1999).

One such tradition has been the emphasis placed on the period of continued abstinence that members have acquired. Periodic milestones are celebrated (e.g. 3-month chip, 1-year cake, etc.) whereas breaches of abstinence (i.e., a 'lapse') are not. A lapse requires a fellowship member to re-obtain a 'beginner's chip'. This has been proposed to enhance humility, a characteristic deemed important for the development of spirituality (Alcoholics Anonymous, 1953). The general understanding of a lapse has been that an individual has not completed the fellowship's first step (i.e., accept powerlessness over alcohol). A member may take the 'beginner chip' in order to revisit the first step and develop humility. This tradition is consistent with the dichotomous outlook of the disease

model. That is, relapse is viewed as an “all-or-none” phenomenon within the fellowship, and a member has either accepted or rejected the notion of powerlessness.

McCrary (1994) contrasted the theoretical and practical aspects of A.A. and behavior therapy (e.g., relapse prevention). McCrary noted that both approaches addressed cognitive, affective, and interpersonal processes as necessary elements to maintain abstinence. Dissimilar etiologies (i.e., character defect vs. multiple determinants), maintaining factors (i.e., disease and spirituality vs. habits), and change objectives (i.e., abstinence vs. selected drinking goals) were noted. In addition, the notion of ‘powerlessness’ in A.A. was seen as contradicting that of personal control and mastery imbedded in the relapse model. On a practical level, A.A. ‘powerlessness’ resembles the attribution style associated with the abstinence violation effect proposed in the relapse model. While the A.A. model embraces this attribution style, the relapse model recognizes it as a potentially harmful element in the relapse process. For these reasons, attempts to combine relapse prevention and 12-Step interventions have been deemed impractical (McCrary).

To summarize, the relapse and disease models are two prominent models of addictive behavior. The former is principally based upon learning theory whereas the latter is based upon physiological determinants of addictive behavior. Their respective treatment approaches have addressed addictive behavior in fundamentally different manners, especially with respect to relapse. Relapse prevention considers relapse an opportunity for learning. A disease model of treatment, such as the Minnesota model, views relapse as a terminal event signifying a basic failure to accept recovery. The 12-Step approach views it as a failure to grasp basic fellowship tenets (i.e., powerlessness). Relapse prevention

promotes self-efficacy, whereas disease model and 12-Step approaches promote humility and a collective understanding and identity about substance abuse (e.g. 'alcoholic' label). Differences in ideology have made integrating these approaches problematic.

Effectiveness of Relapse Prevention and 12-Step Interventions

The following is a brief review of the empirical support for relapse prevention (RP) and 12-Step approaches for addictive behavior. The evidence for RP as an aftercare and as an overall treatment will be presented, followed by the evidence for 12-Step interventions. For the purpose of the present discussion, all cognitive-behavior therapies based on Marlatt's relapse model will be referred to as RP.

RP. Relapse prevention was initially developed as a maintenance program following intensive substance abuse treatment (Quigley & Marlatt, 1999). As such, it is suited to aftercare programs but has also been developed as a stand-alone treatment to initiate and maintain behavior change. Since Marlatt & Gordon's (1985) initial treatment model was proposed, much research has been conducted on RP's efficacy as both an aftercare program and stand-alone treatment.

Ito, Donovan and Hall (1988) found then when male alcohol abusers ($n = 39$) were assigned to either an 8-week RP or interpersonal process aftercare post-inpatient treatment, similar changes in alcohol use, latency to first drink, and abstinence rates were observed up to 6 months post-treatment. Other investigators confirmed that RP aftercare provided to alcohol and drug abusers was equally effective compared to interpersonal process for improving drinking outcome and psychosocial functioning over a 6-month follow-up (Kadden et al., 1989). Annis (1990) also noted that RP aftercare was equally effective compared to other supportive interventions in reducing alcohol consumption in male alcohol

abusers over a 6-month follow-up. Interestingly, a subgroup of men (i.e., those who drank in specific situations) showed more of a decrease in drinking with RP. Allsop, Saunders, Phillips, and Carr (1997) found that RP aftercare contributed to a longer latency to lapse and relapse in a group of alcohol dependent men compared to a no-treatment control condition. However, these investigators also noted that by 12-month follow-up, the RP group did not differ significantly from the control group on abstinence rates. Thus, RP aftercare appears equally effective as traditional aftercare interventions, though RP might be more beneficial in certain groups of substance abusers.

The effectiveness of RP when duration of treatment was considered has yielded consistent results. Investigators found that RP provided over a 26-week or 12-week duration reduced alcohol and drug consumption and enhanced psychosocial functioning (Kadden et al., 1989; Ouimette, Finney, & Moos, 1997; Project Match Research Group, 1997a; Litt, Kadden, Cooney, & Kabela, 2003). However, RP's effect on psychosocial functioning was less pronounced when shorter treatment durations were considered. Brief RP interventions (i.e., one or six weekly sessions) provided to drug abusers were superior to wait-list control on substance use outcomes, but no more effective on other psychosocial outcomes at six-month follow-up (Copeland, Swift, Roffman, & Stephens, 2001). Thus, RP's effectiveness in achieving specific outcomes may be compromised if treatment exposure is too brief.

The magnitude of RP's effectiveness has also been studied. Irvin, Bowers, Dunn & Wang (1999) conducted a meta-analytic review of 26 studies on the effectiveness of RP. Their investigation combined both intensive and aftercare treatment studies on RP. They noted RP was effective in reducing consumption across addictive behaviors especially in alcohol abusers ($r = .14$), and in producing large treatment effects ($r = .48$) on measures of

psychosocial functioning. Its efficacy did not vary as a function of treatment modality (i.e., individual or group) or setting (i.e., outpatient or inpatient). The magnitude of effect for RP (i.e., on average, $r = .19$) was maintained up to 6-months posttreatment, but this decreased as length of follow-up increased (i.e., $r = .09$ at 12-month follow-up).

In summary, RP has received support as an effective aftercare treatment for alcohol abuse but its effectiveness with drug abuse remains understudied. Certain individuals might benefit more from RP. However, the benefits of RP have been noted to wane over longer follow-up periods and with briefer interventions, especially with respect to psychosocial functioning.

12-Step. Despite RP's empirical support, the 12-Step approach remains a popular intervention. Prior to reviewing pertinent studies related to 12-Step interventions, a practical difference must be drawn. Three major forms of 12-Step interventions have been studied: 1) 12-Step fellowships, 2) 12-Step oriented treatments, and 3) 12-Step manual-guided research protocols. As described above, the 12-Step fellowships (e.g., A.A.) are mutual-help groups. As a result, studies of this intervention employ naturalistic follow-up protocols of 12-Step members; usually heterogeneous samples (e.g., abstinence duration, gender, duration of participation). The second form is the investigation of 12-Step oriented treatments (e.g., Minnesota Model). Again, these are formal treatments that encourage participation in 12-Step fellowships and practices. Studies with this form of intervention tend to examine homogenous treatment populations (e.g., male alcohol abusers) that are initiating changes in addictive behavior. The third form is a manual-guided 12-Step intervention, often referred to as Twelve-Step Facilitation (TSF). A TSF intervention integrates 12-Step principles into professional practice (Nowinski, 1999). The role of an addiction therapist is to help

individuals integrate into 12-Step mutual-help groups. This is achieved by stressing the importance of participation, induction into actively working the steps (i.e., usually the first four steps), and working through any resistance associated with 12-Step participation. An addiction therapist participates in “active” rather than “passive” (i.e., encouragement only) facilitation (Nowinski). The TSF intervention has often been studied with controlled clinical trials.

Subtle methodological differences exist between each of the 12-Step interventions discussed above. The most notable difference is the dose provided by each intervention. In a 12-Step fellowship, members self-regulate the frequency and intensity of participation, whereas in a 12-Step oriented treatment facility, treatment providers have more control over the dose of 12-Step activities. The TSF is a manual-driven intervention in a research context with a specified duration and amount of contact with a therapist. Finally, the difference of motivation to participate is pertinent. The motivation to participate in a 12-Step fellowship group or official treatment program reflects a voluntary choice, whereas assignment to a research protocol is usually an experimenter-controlled manipulation. Some researchers have found that the generalizability of research findings may be associated to how participants navigate the assignment process (Seraganian, Brown, & Tremblay, 2003). Thus, the following review of 12-Step approach studies will treat these interventions separately and compare them cautiously.

The effectiveness of *12-Step fellowships* has received far less attention compared to formal treatments. Toumbourou, Hamilton, U'Ren, Stevens-Jones, and Storey (2002) conducted a 12-month follow-up of new N.A. members (i.e., members for at least 3 months but not more than 12 months) with alcohol and drug problems. At 12-month follow-up,

stable attendance (i.e., at least once per week) was associated with less alcohol and marijuana use but not injection drug use. Additionally, stable attendance was associated with positive changes in employment and social support but not associated with changes in mental health symptoms.

According to a survey of its members, Alcoholic's Anonymous (1993) reported that 35% of members were sober for more than 5 years. McKellar, Stewart, and Humphreys (2003) noted that researchers have often attributed the effectiveness of A.A. to a self-selection bias (i.e., individuals with low psychopathology and high motivation); that is, 'good prognosis' individuals attend A.A. In their two-year follow-up of 2,319 male alcohol abusers posttreatment, McKellar et al. found that A.A. involvement within the first year remained significantly predictive of less alcohol problems at two-year follow-up. This relationship remained significant after a latent variable of 'good prognosis' was accounted for in a structural equation model. Thus, stable participation in 12-Step fellowships produced positive alcohol and drug related outcomes. Severe drug use and psychiatric symptoms were less affected by this participation.

Few treatment outcome studies have compared the effectiveness of *12-Step oriented treatments* with other formal treatments. In a review of the methodology of alcoholism treatment outcome studies spanning 1970 to 1998, Swearingen, Moyer, and Finney (2003) found that less than 4% of published multiple group studies included 12-Step oriented treatments. However, one study by Ouimette et al. (1997) compared 12-Step to RP oriented treatment programs for substance abuse. They opted for a prospective naturalistic design (i.e., self-selection into treatment). The investigators suspected that random assignment to a 12-Step oriented treatment would change the nature of the intervention, usually involving

self-selection. A total of 3,018 male alcohol and drug abusers (i.e., mean age = 43 years; 76% unemployed; and 19% married) were recruited from 15 veterans' affairs (VA) treatment programs. The participants were assessed prior to intensive treatment (i.e., RP, 12-Step, or mixed 12-Step and RP) and re-assessed at 12-month follow-up. The results at 12-month follow-up indicated that participants who attended a 12-Step oriented treatment program were more likely to be abstinent (i.e., no alcohol or drug use) than the RP and mixed program participants (i.e., 25% versus 18% and 19%, respectively). Participants who received either 12-Step or RP were more likely to be employed at follow-up than those who received mixed programs. There were no other treatment main effects for substance use or psychosocial functioning. Because few main effects were found, the investigators proceeded with confirmatory analyses with what they considered only the 'purest' treatment programs (i.e., programs with goals that adhered strongly to the respective treatment philosophies and spent less than 5% of treatment time on the other treatment orientation). No additional main effects were found.

Thus, attendance in 12-Step fellowships and treatments improve substance use outcomes and certain aspects of social functioning. Psychiatric needs seem less influenced by these forms of 12-Step intervention, however, few studies have investigated this relationship. Investigators noted that little research existed on individual attributes that interact with 12-Step approaches (Mattson et al., 1994). No studies investigated 12-Step fellowship involvement or 12-Step oriented treatments in an aftercare context.

The final 12-Step approach that has been studied is TSF. This intervention has been studied in the context of randomized clinical trials as an outpatient and aftercare program (Project Match Research Group, 1997a; Maude-Griffin et al., 1998). Given that this

intervention was developed in the context of evaluating attribute by treatment interaction effects (i.e., matching hypotheses), its efficacy will be reviewed below in that context.

In summary, RP and 12-Step approaches have received support as viable interventions to alter substance use and aspects of psychosocial functioning. Clearly, RP has received more investigation than 12-Step approaches, especially as an aftercare intervention. Relapse prevention tends to bring about a reduction in consumption and enhance psychosocial functioning, whereas 12-Step approaches appear to promote abstinence outcomes and enhance social functioning. Mixed RP and 12-Step programs seem to contribute less to improved outcome. These results are consistent with the basic philosophical tenets of each approach. Neither intervention is superior but each contributes uniquely to treatment outcome. The question of determining which intervention is superior may be less important than understanding which individuals benefit from specific approaches (Mattson et al., 1994). Individuals with certain attributes (e.g., psychiatric status) have responded differently to each intervention approach (Annis, 1990; Ouimette et al., 1997; McKellar et al., 2003). Individual attributes that interact with treatment need to be considered in order to tailor treatment to improve outcome.

Individual Attributes and Treatment Interactions: The Matching Hypothesis

The matching hypothesis has challenged a longstanding notion that all substance abusers are a homogeneous population that should benefit equally from a single intervention (Mattson et al., 1994). Two decades of research has confirmed that substance abusers are a heterogeneous population with varied needs. As noted above, the matching hypothesis proposes choosing treatment options based on client attributes that interact differentially with the interventions to produce favorable outcomes. A challenge with treatment matching

is the multitude of combinations of client, therapy, and therapist interactions that could influence treatment outcome. After reviewing several studies, Mattson et al. identified two client attributes, psychiatric distress and sociopathy, as promising matching variables in need of further investigation.

The following discussion will review the role of psychiatric distress and sociopathy in treatment outcome. Pertinent studies that have examined the impact of these individual attributes on treatment effectiveness will then be considered.

Degree of psychiatric distress and addiction treatment outcome. Numerous studies have investigated the relationship between psychiatric distress and substance abuse (Kadden et al., 1989; Flynn, Craddock, Luckey, Hubbard, & Duntzman, 1996; Ouimette et al.; 1997; Franken & Hendricks, 1999). The relationship between psychiatric distress and substance abuse has been investigated largely in two contexts: 1) the general presence of psychiatric distress while in treatment, and 2) the impact that psychiatric distress has on treatment outcome. For the purpose of the present discussion, psychiatric distress is generally understood as the amount of functional disruption and distress experienced as a direct result of psychiatric symptoms (e.g., depression, anxiety, etc.). Comorbidity will not be reviewed but the reader is referred to Grant (1995) or Hasin and Grant (2002) for a review of pertinent epidemiological data.

The relationship between degree of psychiatric distress and poor treatment outcome has been well documented. Early research found that substance abusers attributed posttreatment relapses to emotional distress (e.g., stress, depression, anger, etc.) in approximately 35% of reported relapse situations (Cummings et al., 1980). Kadden et al. (1989) found that alcohol and drug abusers with greater psychiatric distress upon admission

to residential treatment experienced heavier drinking and less social behavior at six-months posttreatment. Miller, Westerberg, Harris, and Tonigan (1996) found presenting psychiatric symptoms predictive of relapse at 6 and 12-month follow-up in a sample of 122 alcohol dependent outpatients. Additionally, pre-treatment psychiatric distress has been associated with relapse. Simpson, Joe, Fletcher, Hubbard, and Anglin (1999) found that 66% of cocaine abusers reported depressive or anxious symptom distress 12-months prior to seeking treatment. These pre-treatment psychiatric symptoms were predictive of greater cocaine use at 12-month follow-up. Thus, greater psychiatric distress prior to and at the outset of treatment was associated with greater substance use and poor social behavior in the year following treatment.

Investigators have also noted that psychiatric distress in substance abusers often persist despite treatment. Ouimette et al. (1997) found over 70% of substance abusers at the outset of treatment reported clinically significant distress associated to anxiety and depression, as measured by the Brief Symptom Inventory (Derogatis & Melisaratos, 1983). At 12-month follow-up, approximately 50% of those individuals continued to experience clinically significant psychiatric symptom distress. Treatment programs that address psychiatric distress have been found to significantly increase overall general coping styles in substance abusers, which in turn have been related to the absence of psychiatric symptoms and greater abstinence rates posttreatment (Moggi, Ouimette, Moos, & Finney, 1999).

Although greater psychiatric distress has been identified as a potential precipitant of posttreatment relapse, the precise nature of the relationship between the two is unclear. The notion that greater psychiatric distress leads to substance use is a facet of the “self-medication” hypothesis (Brown & Wolfe, 1994). That is, the effects of a substance were

hypothesized to counter disturbing states (e.g., alcohol relieved stress, cocaine alleviated depression, etc.). Conversely, psychopathology may be a consequence of substance abuse. Stilley, Miller, and Tarter (1997) found that partially and fully remitted substance abusers awaiting liver transplants were more likely (47%) than other liver transplant patients (26%) to report greater symptom distress related to anxiety and depression. Thus, a history of substance abuse might contribute to psychiatric distress. Hasin and Grant (2002) reported that the risk of experiencing depressive symptoms increased 4-fold in remitted alcohol dependent individuals despite extended abstinent periods (i.e., 12 to 24 months). More than likely, the relationship between substance abuse and psychiatric distress is bi-directional.

In addition to its relationship to greater substance use and poor psychosocial functioning, greater psychiatric distress has been associated with decreased treatment adherence. Franken and Hendriks (1999) found that greater psychiatric symptom distress during detoxification contributed to greater treatment attrition. Other investigators have linked psychiatric distress to repeated admissions to substance use disorders treatment (Tómasson & Vaglum, 1998). There is a need for effective assessment and intervention of psychiatric distress in order to minimize a 'revolving door' phenomenon.

Psychiatric distress in substance abusers has been assessed in various ways. The psychiatric composite score of the Addiction Severity Index (ASI: McLellan, Luborsky, O'Brien, & Woody, 1980), a semi-structured interview protocol, has been used to establish general severity of psychiatric problems (Kadden et al., 1989). The scale score was developed as an aggregate of numerous psychiatric indices (e.g., symptoms, distress ratings, etc.). Although it has been shown to be a reliable measure of change in psychiatric problem severity over time, the value (i.e., percentage score) itself has been deemed relatively

meaningless because it is non-specific (National Institute on Drug Abuse: NIDA, 1988). That is, a value of .65 may carry a different meaning per individual depending on the various combinations of scale items that contribute to the value. Other measures of psychiatric symptom distress, such as the revised Symptoms Checklist-90 (SCL-90-R; Derogatis, 1983) and the Brief Symptom Inventory (BSI; Derogatis, 1975), have been used to successfully predict substance abuse treatment outcome (Franken & Hendricks, 1999; Caetano & Weisner, 1995). As quantitative measures of recent symptom distress, these inventories are sensitive to changes in symptom presentation over time, as does the ASI. However, their normalized scores permit clinically meaningful interpretations, something the ASI fails to do.

While quantitative measures of psychiatric distress have been used to understand substance abuse treatment outcome, qualitative indices, namely the individual's appraisal of their distress, have received less investigation. Brown, Seraganian, and Shields (1999) studied the concurrent validity of the ASI client severity ratings with its composite scores (i.e., seven status domains: medical; employment; family/social; legal; psychiatric; alcohol and drug). The severity ratings solicit the substance abuser's appraisal of their distress and need for treatment. Substance abusers ($n = 199$, 70% male) recently admitted to treatment were administered the ASI and were asked to describe the most difficult situation(s) they had dealt with in the prior month. Content analysis of the open-ended questions yielded several problem domains, including substance abuse, family, employment, and affective emotional problems. The client severity ratings were significantly correlated with verbalized problems in the domain of family problems. However, ASI composite scores were not related to either verbalized problems or client severity ratings. Despite the fact that

the client severity ratings are included in the composite score calculations, when considered independently, these ratings represent a distinct perspective on problem domains. Brown et al. concluded that the ASI client severity ratings were viable indicators of clients' qualitative appraisals of clinical needs and might measure different domains of well being than the ASI quantitative indices. The ASI psychiatric severity ratings might also provide a unique perspective on the relationship between psychiatric distress and substance abuse. This possibility has yet to be explored.

A dilemma in the assessment of psychiatric distress in substance abuse is the potential for other factors to confound psychiatric symptom presentation. Withdrawal symptoms tend to mimic psychiatric symptom distress (Franken & Hendriks, 1999). That is, common withdrawal symptoms for cocaine abuse are anhedonia, agitation, concentration difficulties, and sleep disturbance experienced over an extended time period. These symptoms are similar to those diagnostic criteria outlined in the DSM-IV for a major depressive episode. The worries and anxiousness frequently experienced at the onset of treatment might mimic an anxiety disorder. Brown et al. (1993) found the majority of substance abusers who presented for treatment with "clinical profiles" of psychiatric symptoms (i.e., as measured by the SCL-90-R) showed a significant reduction in symptom distress over the duration of treatment. Their data did not directly address whether the resolution of the "clinical profiles" was due to treatment, the passing of time, or other factors. Continued assessment of psychiatric symptoms throughout treatment, especially after withdrawal symptoms have abated, might provide a more useful indicator of persistent psychiatric distress and treatment needs in this domain. Accordingly, indices of psychiatric

symptom severity obtained at the end of intensive treatment present more timely information for aftercare planning.

In summary, degree of psychiatric distress at the outset of treatment has been associated with less treatment adherence; greater substance use; poor psychosocial outcomes, and repeat admissions. From a methodological standpoint, the potential utility of qualitative appraisals and post-withdrawal indices of psychiatric distress has yet to be assessed. These issues are particularly pertinent when tailoring aftercare treatment to individual needs.

Degree of sociopathy in addiction treatment outcome. Sociopathy is another attribute that has received much investigation with substance abusers. Sociopathy has been associated with the development of substance abuse and treatment outcome (Kadden, Litt, Donovan, & Cooney, 1996). The present discussion focuses on sociopathy's relationship to treatment outcome. The reader is referred to Hesselbrock, Hesselbrock, and Epstein (1999) for a review of the role of sociopathy on substance abuse etiology.

Little consensus exists with respect to a common definition of sociopathy (Kadden et al., 1996). Sociopathy has been described in behavioral (e.g., lying, aggressiveness, etc.) and personality-based terms (e.g., lack of remorse, egocentricity, etc.). Consequently, the term sociopathy has been used synonymously with psychopathy and antisocial personality disorder (Hare, 1990). Hare described psychopathy as being comprised of a characteristic pattern of interpersonal (e.g., manipulative), affective (e.g., inability to bond with others) and behavioral (e.g., impulsive and violate social norms) features.

Both diagnostic (i.e., behavior based) and personality-based (i.e., dimensional) indices of sociopathy have been used to establish prevalence rates and understand treatment

outcome in substance abusers. From a diagnostic perspective, Flynn et al. (1996) established that the prevalence of antisocial personality disorder (ASPD) in a national sample of drug abusers was 40%. Antisocial traits have been identified as strong predictors of relapse (Jin, Rourke, Patterson, Taylor, & Grant, 1998), associated with greater treatment attrition (Kadden et al., 1996), and associated with multiple detoxification admissions in substance abusers (Tómasson & Vaglum, 1998).

Substance abusers with greater sociopathy have been considered “treatment resistant”, in part due to the emphasis on interpersonal and group-oriented modalities of most addiction interventions (Messina, Farabee, & Rawson, 2003). Investigators found that alcohol abusers with greater sociopathy lacked interpersonal skills that facilitated the formation of therapeutic relationships (Woody, McLellan, Luborsky, & O’Brien, 1985) and showed poor psychosocial outcomes (e.g., employment) following treatment (Kadden et al., 1989).

Given these findings, substance abusers with greater sociopathy may benefit from treatments that are less interpersonally oriented. Messina et al. (2003) conducted a 12-month follow-up study of drug dependent patients treated with 16 weeks of either RP group therapy, contingency management (CM) involving the provision of incentive vouchers following clean urine samples, or combined RP-CM therapy. Patients with antisocial traits benefited (i.e., repeated clean urine samples) more from all conditions compared to wait-list controls, and were more likely to be drug-free throughout the follow-up period when exposed to CM. The investigators noted that only praise was provided in addition to vouchers. Thus, although RP was effective for this subgroup, treatment that involved less interpersonal demands and positive reinforcement provided the best outcomes.

In some of the studies cited above (Woody et al., 1985, Kadden et al., 1989), sociopathy was assessed with the California Psychological Inventory socialization subscale (CPI-So, Gough, 1987). The CPI-So measures an individual's prosocial attitudes and behavior, that is, the degree of social maturity, integrity and rectitude (Gough, 1987). The CPI-So has become the most common measure of degree of sociopathy in substance abuse treatment research, especially in studies of alcohol abusers (Project Match Research Group, 1997a; Kadden, Litt, Cooney, Kabela, Herbert, 2001). Kadden, Litt, Donovan, and Cooney (1996) found that the CPI-So was a reliable measure of sociopathy in a sample of alcohol dependent individuals ($n = 1,239$; 76% male). They also found that these individuals tended to have relatively low CPI-So scores, indicative of greater sociopathy. The CPI-So was also significantly correlated to ASPD diagnoses in their sample.

Thus, despite a consensus on a working definition of sociopathy, a significant proportion of substance abusers exhibit sociopathic features. These features interfere with normal interpersonal and social functioning and as a consequence may contribute to poor treatment engagement and outcome. Given that degree of psychiatric distress and sociopathy have been linked to poor treatment prognosis, researchers have investigated whether substance abuse treatment regimens might be tailored to improve treatment outcome despite these attributes.

Attribute x treatment matching. Several studies have examined psychiatric distress and sociopathy as potential attributes that interact with treatment. The following review will focus primarily on the few studies that have looked at the aftercare by attribute interaction. Outpatient studies that possess similar methodologies will be referred to as well.

In an early attempt to address potential interactions of psychiatric distress and sociopathy with substance abuse treatment, Kadden et al. (1989) examined the effectiveness of two 26-week *aftercare* group interventions: interactional therapy (i.e., insight and interpersonal oriented) or behavioral coping skills training (i.e., relapse prevention oriented). They hypothesized that patients with greater psychiatric distress (i.e., as measured by the ASI - psychiatric status) and greater sociopathy (i.e., as measured by the CPI-So) at the outset of treatment would benefit more from aftercare oriented to coping skills training rather than to interactional therapy. Substance abusers (N = 118, 66% men) admitted to residential treatment were randomly assigned posttreatment to aftercare groups. While no overall aftercare treatment main effects were observed for drinking and psychosocial adjustment from pre-aftercare to six-month follow-up, patients with greater psychiatric distress assigned to interactional therapy had more heavy drinking days (i.e., 6 or more drinks per day), were less likely to be abstinent, and had a greater likelihood of alcohol-related problems at follow-up than those assigned to coping skills training. Patients with greater sociopathy assigned to interactional therapy were less likely to be abstinent and more likely to have alcohol related problems at follow-up than those assigned to coping skills training. Kadden et al. (1989) suggested that aftercare involving coping skills training was more effective for substance abusers with greater sociopathy and psychiatric distress.

In 1989, the National Institute on Alcoholism and Alcohol Abuse (NIAAA) sponsored a national, multi-site, randomized clinical trial titled Matching Alcoholism Treatments to Client Heterogeneity (Project MATCH: Project Match Research Group, 1993; 1997a). Project MATCH investigated whether adult alcohol dependent patients (N = 774; 80% male) randomly assigned to one of three manual-driven aftercare treatments would

benefit differentially as a function of certain patient attributes. Patient attributes included sociopathy (i.e., measured using the CPI-So) and psychiatric severity (i.e., measured using the ASI-psychiatric status). Aftercare treatments included either 12-weekly individual sessions of RP, TSF, or 4 motivational enhancement therapy (MET) sessions (see reference article for detailed description). Patients were recruited post-inpatient treatment and the primary inclusion criteria for the study were a primary diagnosis of alcohol dependence and a referral from inpatient treatment staff. Exclusion criteria were drug dependency (i.e., except cannabis dependency); lack of a 'locator' person; residential instability; and involvement in alternative treatments for alcohol during the course of the study. Patients were assessed over a 12-month follow-up period on two primary outcome variables: percentage days abstinent (PDA) and average number of drinks per drinking day (DDD). These variables were obtained using the timeline follow-back method (Sobell & Sobell, 1992), a calendar prompted substance use recall procedure.

At 12-month follow-up, aftercare participants reported over 80% days abstinent throughout the follow-up period. Additionally, 35% of participants reported continued abstinence; 65% reported a slip (i.e., first drink); 40% of participants reported having an episode of regular consumption (i.e., 3 consecutive heavy drinking days) whereas 60% denied regular consumption. One significant main effect for treatment was found: TSF participants had greater PDA toward the end of follow-up than other aftercare participants. The attribute by aftercare interactions for psychiatric severity and sociopathy were non-significant. A secondary *a priori* matching hypotheses for Project MATCH (Project Match Research Group, 1997b) involved ASPD. Participants with ASPD assigned to RP exhibited

less drinks per day in the two months following aftercare than those assigned to TSF or MET. However, these effects were not maintained over the follow-up period.

The results of Project MATCH have been debated. Some investigators have posited that the modest interaction findings were due to an overly rigorous methodology that included multiple exclusion criteria and recruitment of a relatively homogeneous and high functioning sample (Glaser, 1999; Heather, 1999). The methodology may have enhanced the study's internal validity, but at the cost of external validity and the study's capacity to detect differential outcomes. On the other hand, other investigators have argued that the multiple exclusion criteria had little impact on sample representation and cited comparable demographic make-up of retained participants and non-retained participants (Velasquez, DiClemente, & Addy, 2000).

As a general concern in outcome studies, Humphreys and Weisner (2000) suggested that common exclusion criteria (e.g., social instability, residential instability, and drug dependency) applied in most alcohol treatment outcome studies have compromised the ability to generalize results to "real world" practice settings. Limiting exclusion criteria might also allow for a more representative picture of the attributes in question.

To date, no studies have confirmed Kadden et al.'s (1989) attribute by aftercare interaction effects. Outpatient designs have provided partial support for an interaction effect, especially when considering the effectiveness of the TSF intervention described earlier. Project Match Research Group (1997a) found that alcohol abusers low in psychiatric distress demonstrated greater PDA when assigned to outpatient TSF rather than RP. Maude-Griffin et al. (1998) found main effects and attribute by treatment interaction effects when drug abusers were randomly assigned to either a 12-week outpatient RP or TSF

intervention. That is, drug abusers were more likely to be abstinent (i.e., clean urine samples) throughout a six-month follow-up when assigned to RP as opposed to TSF. Additionally, drug abusers that had a concurrent diagnosis of major depressive disorder (MDD) or had a history of MDD were more likely to achieve abstinence when assigned to RP than when assigned to TSF.

In an attempt to partially replicate the Kadden et al. (1989) study, Kadden, Litt, Cooney, Kabela, and Getter (2001) examined the relative interaction of psychiatric distress and sociopathy on *outpatient* treatment effectiveness (i.e., relapse prevention vs. interactional therapy) for alcohol dependent patients. Using a similar study design to that of Kadden et al. (1989), a median split of the ASI-psych and CPI-So were used to examine the hypothesis that participants with greater psychiatric distress and sociopathy would benefit more from RP than interactional therapy. They found that participants with lower sociopathy had the least PDA when assigned to interactional therapy compared to those assigned to relapse prevention. Participants with greater sociopathy had greater PDA when assigned to interaction therapy than those assigned to RP. The findings contradicted those of Kadden et al. (1989). The investigators suggested treatment protocol differences (i.e., open groups, changing therapists, outpatient, etc.) as possible reasons for the disparate findings.

To summarize, aftercare treatment outcome studies have yielded mixed results with respect to possible interactions between psychiatric distress and sociopathy with distinct treatment regimes. The initial attribute by RP aftercare interaction effects observed by Kadden et al. (1989) have not been confirmed. The interaction of both attributes with RP produced mixed findings when outpatient RP was considered. Attribute interactions with a

TSF aftercare intervention were absent. However, unlike the abstinence-oriented outcomes of other 12-Step intervention approaches, TSF only produced this outcome when provided as aftercare.

A synthesis of the few matching investigations is complicated by numerous methodological differences. Varied sampling (i.e., alcohol or alcohol and drug abusers; exclusion criteria; etc.), treatment modalities (i.e., individual vs. group), and treatment duration (i.e., 12 weeks or 26 weeks) likely contributed to the inconsistent findings. Additionally, all of the above studies employed only intake indices of psychiatric distress, a practice that requires further scrutiny if withdrawal symptoms are not considered.

Summary

Poor treatment outcome (i.e., relapse and impaired psychosocial functioning) following substance abuse treatment has been a consistent finding. Aftercare treatment seems well positioned to enhance treatment outcome. The RP and 12-Step approaches represent contemporary and traditional aftercare treatments, respectively. Although neither approach seems superior to the other, each use different methods in an attempt to promote distinct outcomes (i.e., abstinence vs. improved psychosocial functioning). Efforts to improve treatment outcome by uncovering individual attributes that interact with aftercare treatments have yielded mixed results. psychiatric distress and sociopathy have been identified as prognostic indicators for poor treatment outcome. Their interaction with distinct aftercare treatment remains unclear and understudied, especially with respect to 12-Step approaches. Varied methodologies in this domain have complicated synthesis of the literature. Particularly noteworthy is when and how to assess psychiatric symptoms, especially given the possible confound of presenting withdrawal symptoms commonly

associated with substance abuse. Finally, the potential role that an individual's qualitative appraisals might play as supplementary indices of psychiatric problem severity and aftercare treatment needs requires further investigation.

The Present Research Study

The purpose of the present study was to investigate a number of matching hypotheses, specifically by examining interaction effects on outcome between the selected individual attributes and aftercare approaches. Data for this study were drawn from a larger investigation of matching conducted by the Alcohol and Drug Addiction Research Unit at Concordia University (see Seraganian, Brown, Tremblay, & Annis, 1998). Individuals who completed intensive substance abuse treatment were stratified on key attributes and were randomly assigned to one of two 10-week group therapy aftercare regimes: 1) TSF or 2) Structured Relapse Prevention (SRP). Participant attributes targeted for aftercare treatment matching included: degree of psychiatric distress, operationalized as post-intensive treatment level of psychiatric symptom distress; and level of sociopathy, operationalized as level of socialization at intake to intensive treatment. Treatment outcome was assessed using a repeated measures design (i.e., pre-intensive treatment, posttreatment, and at six months posttreatment). Multiple outcome domains measured included substance use (e.g., percentage days abstinent, latency to lapse and relapse, and substance related problems) and psychosocial functioning (e.g., family/social status, employment status, psychiatric status, etc.).

Another purpose of the present study was to examine the relative utility of using qualitative appraisals of psychiatric symptom distress in addition to quantitative indices to predict treatment outcome. With respect to the role of psychiatric distress as a predictor of

treatment outcome, quantitative (i.e., SCL-90-R) and qualitative (i.e., ASI severity ratings) indices of participants' psychiatric distress were regressed onto substance use (i.e. percentage days abstinent) and psychosocial outcome variables (ASI family/social and psychiatric status) at six-month follow-up. To my knowledge, no study to date has employed the ASI psychiatric severity ratings to predict substance abuse treatment outcome.

Clarification of matching of client attributes to distinct aftercare regimens would be important to improve treatment outcome. The study of qualitative measures of psychiatric distress could contribute to our knowledge of how clinical assessment can best be carried out.

Study Hypotheses

Several hypotheses were tested with respect to attribute by aftercare interactions, main effects of aftercare and attributes, and the utility of qualitative-based measures of psychiatric distress.

Attribute x aftercare interaction. Participants with greater psychiatric distress or sociopathy would benefit more from SRP than the TSF aftercare condition. Relapse prevention incorporates more active coping skills (e.g., stress and anger management) that seem better adapted to participants with greater psychiatric distress. Additionally, participants with greater sociopathy would benefit less from a TSF intervention due to the social demands placed upon participants to integrate into the 12-Step fellowship.

Main effects of aftercare. SRP participants would have a longer latency to relapse (i.e., return to regular alcohol and/or drug use) than TSF participants. This hypothesis was based on the contention that SRP directly enhances self-efficacy and coping with high-risk situations and lapses, whereas TSF encourages accepting powerlessness and traditions that

might elicit negative emotional reactions to lapses, hence an increased likelihood of relapse. It was also thought that participants exposed to SRP would have better psychosocial outcomes due to the emphasis on coping skills.

Conversely, it was suspected that participants exposed to TSF would achieve more abstinence related outcomes than the SRP participants, based on the greater importance placed upon abstinence in TSF.

Main effects of attributes. Participants who exhibited greater posttreatment psychiatric distress or greater sociopathy would have generally poorer treatment outcome (i.e., greater substance use and lower psychosocial functioning) than those with less severity in these attributes.

Utility of qualitative appraisals of psychiatric distress. Finally, participants' qualitative severity ratings of psychiatric distress and treatment needs would contribute to the prediction of substance use and psychosocial functioning at 6-month follow-up.

Method

Participants

A sample of 125 substance abusers (i.e., 42 women and 83 men) was recruited from three alcohol and drug treatment facilities in the Montreal and Montérégie regions of Québec: La Maison Jean Lapointe (n = 46), Pavillon Foster (n = 52), and Le Virage (n = 27). Participants had a mean age of 38.26 years ($SD = 9.28$), a mean of 12.36 years ($SD = 2.73$) of completed education, and were mainly Caucasians (92%). Participants' marital status was categorized as 38% in a committed relationship (i.e., married or common-law), 23% separated or divorced, 38% single, and 1% widowed.

Participants were included in the study if they: 1) met DSM-IV criteria for psychoactive substance abuse/dependence, 2) had not exhibited opioid dependence, severe organic brain syndrome or psychotic symptoms, 3) could read and write in either French or English at a grade five level, and 4) had transportation or resided within a 50 km radius of Montreal.

Addiction treatment facilities. Pavillon Foster (PF) is a provincially funded inpatient (i.e., 20 beds) and outpatient service for English speaking clients from across the province of Québec. La Maison Jean Lapointe (MJL) is a private, non-profit inpatient service (i.e., 42 beds) for French speaking clients primarily from the Montreal area. Le Virage (LV) is a provincially funded inpatient (30 beds) and outpatient service for French speaking clients from the Montérégie region of Quebec. While each center may have differed in terms of staff and treatment resources, all possessed common treatment goals: psycho-education of the negative consequences of substance abuse, enhancement of personal autonomy from psychoactive substances, increase social and coping skills, and on-going participation in

mutual-help groups for substance abuse. All centers encouraged abstinence from all substances throughout treatment and worked to help clients maintain this goal. Regular treatment was delivered using both individual and group formats. Inpatient treatment at PF and MJL was 6 and 3 weeks, respectively; outpatient services duration at each recruitment site varied considerably, ranging from 6 to 20 weeks. Each treatment facility also provided its own aftercare services to help maintain treatment gains.

Materials

All data for the present study were collected with semi-structured interviews, self-report questionnaires, and standardized tests. Materials were provided in either French or English, depending on the mother tongue of the participant.

Participant attribute measures. *Degree of psychiatric distress:* The Symptoms Checklist-90 Revised (SCL-90-R: Derogatis, 1983). The SCL-90-R was used as the principal measure of psychiatric symptom distress. This instrument has been used in previous matching studies (Mattson et al., 1994) and has also been used to evaluate substance abuse treatment outcome (McLellan, Luborsky, O'Brien & Druley, 1983; Brown, Seraganian, & Tremblay, 1994). The SCL-90-R provides a comprehensive assessment of psychiatric symptom distress related to nine clinical scales as well as a Global Severity Index (GSI), an aggregate score sensitive to all individual clinical scales. It consists of 90 items that asks respondents to indicate on a likert scale to what extent they have been distressed (i.e., "not at all" to "extremely") by various psychiatric symptoms in the preceding week. Standard scale scores greater than 62 indicate clinically significant distress. The SCL-90-R is usually completed in approximately 10-15 minutes. For the present study, the GSI was assessed repeatedly and served as both a matching variable and

as an outcome measure. The GSI post-intensive treatment served as the psychiatric distress attribute variable whereas the GSI at follow-up served as an outcome variable.

Degree of sociopathy: The California Psychological Inventory, Socialization subscale (CPI-So: Gough, 1987) was used in the present study as a measure of sociopathy. It consists of 46 items that measure the degree of social maturity, integrity and rectitude that an individual has attained (i.e., prosocial behavior). Standardized scores are provided for men and women. Lower CPI-So scale scores represent individuals who tend to be among other things: defensive, demanding, opinionated, resentful, cunning and deceitful with others. Greater scale scores represent individuals who are serious and honest, sincere, conscientious and responsible, self-denying and conforming. The CPI-So has been supported as a reliable and valid indicator of sociopathy in alcoholic patients (Cooney, Kadden, & Litt, 1990), and has been used in several matching studies (Kadden et al., 1989, Project Match Research Group, 1997a, Kadden, et al., 2001).

Substance abuse diagnostic measure. The psychoactive substance use disorders section of the Structured Clinical Interview for DSM-III-R: Non-Patient Version (SCID-NP) was used to obtain a diagnostic classification of alcohol and/or drug abuse (Spitzer, Williams, Gibbon, & First, 1990). The standardized interview identified lifetime diagnoses and assessed current symptom identification (i.e., past month) and took approximately 30-45 minutes to administer. The use of DSM diagnostic criteria to classify substance abuse and dependency is a common procedure in contemporary outcome and matching studies (Kadden et al., 1989; Project Match Research Group, 1997a; Ouimette et al., 1997; Kadden et al., 2001).

Substance abuse and psychosocial outcome measures. The Addiction Severity Index (ASI: McLellan et al., 1980) is a 45-minute structured interview used to assess medical, employment, legal, drug and alcohol use, family and social relations, and psychiatric dysfunction associated with substance abuse. Its capability to provide both quantitative indices (e.g., based upon self-reported problems related to substance use) and qualitative indices (i.e., patient severity ratings) of dysfunction and treatment needs has contributed to this instrument having been selected as the standard assessment procedure in public Francophone and Anglophone substance abuse treatment centers within Québec (Landry, Bergeron, & Brochu, 1998).

The quantitative indices of the ASI are derived from *composite scores* (i.e., from 0.00 to 1.00) for each of the seven problem areas. The composite scores (CS) are generated for each problem area and are based on weighted responses to objective questions and client severity ratings of problem severity within the previous 30 days. They are general status measures for each problem area and have been found to possess internal consistencies greater than .70 (NIDA, 1988). The composite scores have been used as comparative problem severity measures across time and across individuals/groups, but are less meaningful when considered alone. Two items in the alcohol and drug status section solicit problems related to substance use in the past 30 days (e.g., urges, withdrawal, hangovers, etc.). For the present study, a similar measure to that of prior investigations (Kadden et al., 1989; Kadden et al., 2001) was obtained when these items were combined and dichotomized as either the *presence or absence of substance-related problems*. Finally, the patient severity ratings for each problem area, while not significantly correlated to the ASI composite scores, have been significantly correlated to interviewer severity ratings (Brown

et al., 1999). These ratings are commonly used as treatment planning indices. Each severity rating is based on a likert scale that allows participants to rate the severity of a problem area within the past 30 days (i.e., participant severity rating: PSR), and to rate their perceived need for treatment or services in this area (i.e., participant importance of treatment: PIT). Each rating scale ranges from 0 to 4 and was defined as follows: 0 = not at all; 1 = slightly; 2 = moderately; 3 = considerably; 4 = extremely. For the purpose of the present study, the ASI psychiatric status PSR and PIT were chosen as qualitative appraisals of psychiatric distress and all problem area composite scores were used as indices of treatment outcome and indicators of psychosocial functioning.

The Cross Study Shared Database intake and follow-up versions (CSSD-I & F, respectively) were used to obtain self-report quantity-frequency measures of alcohol and drug use. The CSSD (Sanchez-Craig, Annis, Bornet, & MacDonald, 1984) was used in the present study to obtain days on which participants consumed alcohol, drugs, both alcohol and drugs, or were abstinent. Consumption data were obtained for periods of 90 days preceding each interview. It was not feasible to compare quantity or frequency of drug use versus alcohol use in participants who possessed different substance use patterns. Thus, percentage of days abstinent (PDA) in the past 90 days at follow-up, similar to the conversion used by the Project Match Research Group (1997a), was calculated as a standard measure for all participants.

In order to increase the accuracy of substance use recall, the timeline follow-back (TLFB) method was employed (Sobell & Sobell, 1994). The TLFB requires participants to recall their daily alcohol and drug use during a specified period of time with the aid of a calendar that helps prompt recall. Important dates and events are highlighted on the

calendar period, especially those associated with the increased likelihood for substance use (e.g., birthdays, paydays, etc.). The TLFB has been found to be a reliable measure of past alcohol use (Maisto, Sobell, Cooper, & Sobell, 1979) and has been employed in other matching outcome studies (Project Match Research Group, 1997a; Kadden et al., 2001). The present study used this method to obtain the frequency of both alcohol and drug use throughout the follow-up period. The TLFB allowed for a continuous measure of substance use from intensive treatment termination to six-month follow-up and established time to lapse (i.e., first use of either alcohol or drugs) and relapse (i.e., three days of alcohol and/or drug use within a one-week period). Relapse was defined in terms of frequency (i.e., days) as opposed to quantity consumed to allow for a common indicator of relapse across individuals who used alcohol and/or drugs.

Aftercare group stratification variables. As part of the larger study (see Seraganian, Brown, Annis, & Tremblay, 1999), several other matching hypotheses were posited and several participant characteristics were assessed as group stratification variables (see randomization procedure below). In addition to substance abuse diagnosis, psychiatric symptom severity and level of sociopathy, other matching characteristics included demographic variables (i.e., age and gender), intensive treatment status (i.e., inpatient or outpatient), cognitive status, and verbal ability.

Cognitive Status. The Wechsler Adult Intelligence Scale – Revised (WAIS-R) subtests Block Design (BD), Digit Symbol (DS) and Digit Span (DSp) were used to assess level of cognitive impairment in participants. For the BD subscale, participants match patterns using colored blocks within a limited time. It assesses visual-spatial abilities and non-verbal concept formation. For the DS subscale, participants copy symbols within a time

limit. It assesses clerical speed and accuracy as well as visual short-term memory. The DSp subscale requires participants to listen to and immediately perform verbal recall of number series either in the same order presented or in reverse order. It assesses immediate rote recall as well as short-term working memory. For the purpose of the present study, the three subscales were combined to create a composite score as a general indicator of cognitive impairment. Several studies have supported the usefulness of these WAIS-R subtests to identify cognitive impairment in substance abusers and associated changes in functioning (Smith & Smith, 1977; Malloy, Noel, Rogers, Longabaugh & Beattie, 1989; Brown, et al., 1993). Level of cognitive impairment has received equivocal support for its usefulness as a treatment-matching variable (Kadden et al., 1989; Project Match Research Group, 1997a).

Verbal ability. The Peabody Picture Vocabulary Test – Revised (PPVT-R: Dunn & Dunn, 1981) was used to assess whether participants possessed a minimum grade 5 reading level necessary for valid assessment and full participation in the treatments provided. The PPVT-R measures receptive vocabulary and comprehension. Participants are presented a card with several images and are asked to identify which image corresponded to a word dictated to them by an interviewer. The PPVT-R provides both age and grade equivalent scores.

Software. Teleform (Version 5.3), by Cardiff Software Inc., Solana Beach CA, was used as a means to accelerate and increase the accuracy of data seizure and verification (Brown, Seraganian, & Shields, 1995). The software can read hand written characters and digits, via scanner or fax, from forms created with the software. The Optical Character Recognition technology developed by Nestor Inc. permitted accurate interpretation (i.e., to within 99% confidence) of hand written data that subsequently was stored in a computer

database format (i.e., SPSS). All descriptive and inferential statistical analyses were conducted using SPSS for windows (Version 7.5.1).

Procedure

The protocol, reviewed and approved by the Concordia University Research Ethics Committee, was introduced to the three participating substance abuse treatment sites (Pavillon Foster, Maison Jean Lapointe, and Le Virage) in two phases. In the first phase, the principal investigators and the supporting research team provided a general description of the study to the clinical staff at each center. Given the applied nature of the study, discussion with staff focused mainly on the smooth integration of the project into the existing treatment protocols. The second phase involved a brief pilot phase of the larger study's assessment and aftercare protocol without a follow-up.

Recruitment at each center was conducted in a consistent manner by designated clinical staff (i.e., intake assessment workers). Patients at each center were approached within the first week of treatment by clinical staff and informed about the study. If patients were interested in participating, an informed consent form (Appendix B) was provided to the patient. For the larger study, corroborator participation was also solicited at this point. Once consent was obtained, the designated clinical staff member contacted the research coordinator and forwarded the signed informed consent to the research team. Subsequently, the research protocol was initiated.

Upon receipt of the consent form, the research coordinator contacted the participants while in treatment and scheduled an intake interview. Participation in the study involved two components: *assessment* and *aftercare* assignment. The timeline for the assessment sessions and aftercare regimes is depicted in Figure 1.

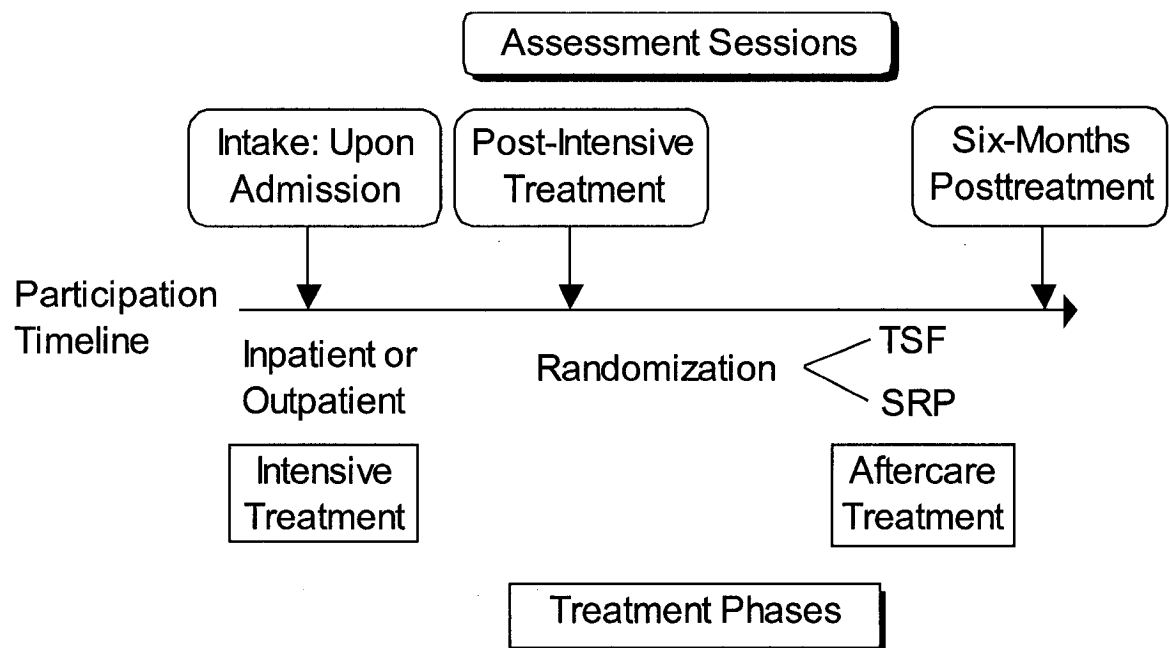


Figure 1. Participation timeline for assessment sessions and treatment phases.

Assessment. In the larger study, participants were administered a battery of questionnaires and tests on five occasions. Participants were assessed at the outset of intensive treatment, post-intensive treatment, post-aftercare treatment, and then at six and twelve month follow-up post-intensive treatment. The present study focused on the intake, post-intensive treatment, and six-month follow-up assessments. The initial assessment battery was comprised of all the tests described above (i.e., SCID, CSSI, CPI-So, ASI, SCL-90-R, WAIS-R subtests, TLFB and PPVT-R). The follow-up assessment sessions excluded the SCID, CPI, and PPVT-R. Participants received \$10 at the post-aftercare assessment, and \$20 at the 6 and 12-month follow-up assessments.

Randomization to aftercare. Upon completion of intensive treatment, participants were randomly assigned to one of two aftercare regimes: Structured relapse prevention (SRP) or Twelve-Step Facilitation (TSF). Urn randomization software was provided by Project Match Research Group (1993). Urn randomization (Wei, 1978) increases the likelihood of equivalence between aftercare groups on experimenter-identified variables. Eight intake participant characteristics that were deemed influential on treatment outcome were used for the urn procedure in this study: age; gender; primary substance of abuse; treatment modality; psychiatric symptom severity; level of sociopathy; cognitive status; and verbal ability. Urn randomization was performed separately for each treatment center and was conducted each time the number of continuous referrals required for starting two aftercare groups was attained (i.e., 14-20 participants), or no more than four weeks from the previous aftercare group start-up date. The aftercare groups were ‘partially closed’: participants were permitted to enter their assigned aftercare groups up to and including the third weekly session, but all participants terminated aftercare together. In the case of late

arrivals, aftercare interveners met with participants prior to the initial session and provided necessary details of prior sessions.

Aftercare initiation. Once participants were assigned to an aftercare group, only contact information was provided to the group aftercare interveners. In order to maintain aftercare participation as a distinct phase of the study, no assessment information acquired during the intensive treatment phase of a participant's treatment was provided to the aftercare interveners. The aftercare interveners contacted the participants with the start-up date and location (i.e., Maison Jean-Lapointe, Le Virage, and Concordia University) of the aftercare group to which the participants were assigned.

Aftercare interveners. Aftercare interveners for the two aftercare regimes differed in both background and training. The SRP interveners were Ph.D. level psychology graduate students who received 3 days of intensive SRP training with Helen Annis, Ph.D., at the Addiction Research Foundation (Toronto, Ontario). The graduate students were selected as SRP interveners because their academic background with cognitive-behavioral theory and techniques was consistent with SRP principles. The TSF interveners were individuals who had previous personal experience with the 12-Step philosophy and approach. Stuart Baker, Ph.D. of the Department of Psychiatry at Yale University and author of the Project MATCH TSF manual provided the training in TSF aftercare at Concordia University. Both teams of aftercare interveners received bi-monthly supervision by senior therapists trained in each approach in order to minimize drift from the study protocol and to allow for the discussion of clinical issues.

i) Structured relapse prevention (SRP) aftercare. The present study employed a RP intervention modeled upon the treatment manual developed by the Addiction Research

Foundation (Annis, 1986) entitled “Structured Relapse Prevention Program”. It was based mainly on the principles of Marlatt’s (1985) cognitive-behavioral model of relapse and also incorporated Miller’s (1983) motivational interviewing techniques. Ten group therapy sessions were divided into three phases: (1) assessment and feedback, (2) initiation of behavior change strategies, (3) maintenance of behavior change strategies.

In the first phase (Session 1 - 2), group participants were introduced to the principles and goals of SRP and received two SRP specific assessments: Inventory of Drug Taking Situations (IDTS, Annis & Martin, 1992) and Drug Taking Confidence Questionnaire (DTCQ: Annis & Martin, 1985). Both instruments dealt specifically with the level of risk for substance use and the confidence to cope in the eight interpersonal and intrapersonal relapse domains outlined by Marlatt and Gordon (1980): (1) unpleasant emotions, (2) physical discomfort, (3) pleasant emotions, (4) testing personal control, (5) urges and temptations, (6) conflict with others, (7) social pressure, and (8) pleasant times with others. Participants were provided personalized feedback on high-risk relapse situations and were encouraged to develop a “risk hierarchy” in order to develop coping strategies addressed in the sessions that followed. Motivational interviewing techniques were employed in the first two sessions in order to resolve participants’ ambivalence about changing substance abuse.

The second phase (sessions 3 - 6) focused on initiation of behavior change strategies. Participants were encouraged to use daily monitoring and weekly goal setting as a means of increasing their awareness and sense of control over their substance use. Since the goal of this phase was to address initiation of behavior change and increase confidence in coping with high-risk relapse situations, reliable and straightforward coping strategies such as avoidance and seeking support from others were encouraged. A menu of other coping skills

(e.g., assertiveness, anger management, refusing requests, etc) was introduced and related homework assignments were introduced.

The final phase (sessions 7 - 10) focused on maintenance of behavior change and generalization of learned coping strategies to new situations. Graduated exposure to high-risk situations was encouraged rather than simple avoidance. Participants were encouraged to plan for high-risk situations and implement newly learned coping skills. Graduated exposure accompanied by successful coping experiences increased confidence in coping with increasingly higher-risk situations (i.e., self-efficacy). Relapse episodes were readily discussed and alternate coping strategies explored.

ii) Twelve-Step Facilitation (TSF) aftercare. The TSF program was based on the Project MATCH 12-Step Facilitation Manual, version 2.2 (Nowinski & Baker, 1992). It was initially developed for use with alcohol abusers as an individual outpatient intervention. Although the manual had no official relationship with or sanction from Alcoholics Anonymous, the authors designed it to initiate active participation in traditional 12-Step fellowship activities and to promote work on the “12 Steps and 12 Traditions” (A.A., 1953). The TSF program was based on the concept of alcoholism as a disease of the body, mind and spirit that only abstinence could remedy. The TSF program specifically focused on Steps 1 through 4. That is, powerlessness over alcohol, belief in a greater power, turning lives over to god, and performing a moral inventory.

Ten aftercare sessions were divided into three phases. The first phase (Session 1) was an introduction to the program and the concept of ‘active involvement’ in 12-Step fellowships. The 12-Step view of alcoholism and drug use was introduced and motivation to stay sober was explored. Personal journaling of 12-Step fellowship involvement was

encouraged and coping with emergencies (e.g., slips, substance related problems) were discussed. Coping strategies included calling a sponsor, going to a meeting, prayer, etc. The second phase (sessions 2-9) included coverage of core topics (i.e., treatment introduction; Step 1 and acceptance; Steps 2 & 3 and surrender; and getting active) and elective topics (e.g., genograms, enabling, sober living, Steps 4 & 5). Each session reviewed material from previous sessions, introduced a new topic, and engaged the participants in planning recovery tasks (i.e., readings, meetings to attend, etc.). The final phase (session 10) addressed termination. This session focused on review of the previous sessions and focused on the participant's experiences in the TSF aftercare program.

Both SRP and TSF aftercare programs promoted abstinence from all substances. All participants were neither encouraged nor discouraged from participating in their usual aftercare programs offered by the respective intensive treatment centers. If a participant showed signs of marked deterioration (i.e., repeated relapses), then the participant was encouraged to return to the intensive treatment facility for a consultation without compromising participation in the present study.

Results

Three separate sets of analyses were conducted. The first focused on describing attrition and the retained participants' characteristics. The second set focused on the aftercare-attribute matching hypotheses (i.e., degree of psychiatric distress and sociopathy) and the impact on substance abuse treatment outcome. The third set focused on the relative contribution of qualitative indices of psychiatric distress as predictors of treatment outcome. An alpha level of $\alpha < .05$ for statistical inference was adopted for the present study. When multiple hypothesis tests were conducted, a Bonferroni-corrected alpha level was adopted to reduce the likelihood of family-wise Type I error (i.e., alpha level divided by the number of dependent measures). Due to the conservative estimation of the Bonferroni-correction technique on the alpha level, an alpha level for a test of significance that was greater than its corrected alpha but less than the experiment-wise alpha was reported as a trend.

Attrition and Retained Participants' Characteristics

Attrition. An initial sample of 330 substance abusers (i.e., 221 men and 109 women) agreed to participate in the present study and completed the intake interview. Their mean age was 36.21 years ($SD = 9.04$, range = 18 to 70) and their mean years of completed education was 11.91 years ($SD = 2.83$). The initial sample comprised 247 (75%) inpatient and 83 (25%) outpatient participants. Of these participants, 266 (79%) agreed to be randomized to aftercare; the remaining participants accepted to be assessed only (See Brown et al., 2002b for a more complete description of assessment-only participants). A total of 232 (70%) participants completed the posttreatment assessment and 154 (47%) completed the six-month follow-up assessment.

Of the 154 participants who completed the 6-month follow-up, 133 had been randomized. Eight randomized participants were excluded from the final analyses due to missed assessment sessions, 6 participants from the TSF group and 2 participants from the SRP group. The retained participants were individuals who accepted randomization and completed each of three assessment sessions (i.e., intake, posttreatment/pre-aftercare, and 6-month follow-up). Table 1 summarizes the intake characteristics of retained participants ($n = 125$) to those of non-retained participants excluded from the final analyses due to refusal to be randomized, missed assessment sessions or drop out ($n = 205$). Significant group differences were noted on demographics and verbal ability. Retained participants had a significantly greater mean age, years of education, and PPVT-R scores ($M = 153.19$, $SD = 16.47$) than non-retained participants ($M = 148.23$, $SD = 16.34$, $t(328) = 2.66$, $p < .05$). Differences in PPVT-R scores indicated that retained participants had a significantly greater mean age-equivalent verbal ability score ($M = 24.62$, $SD = 8.79$) than the non-retained participants ($M = 21.76$, $SD = 7.99$, $t(328) = 3.04$, $p < .05$). Three participants of the non-retained group scored lower than a grade-five verbal ability, but only one of them had been excluded from the study due to significant comprehension problems.

No significant group differences were observed with respect to treatment characteristics or psychiatric distress indices. The retained and non-retained participants were comprised primarily of combined alcohol and drug abusers (i.e., 64% and 65%, respectively) and were similar across substance use diagnoses. No significant group differences were detected at intake on psychiatric symptom distress (i.e., GSI), degree of sociopathy (CPI-So), and ASI psychiatric composite scores. No significant differences were noted on the mean number of days in the previous month that psychiatric problems were

Table 1

Demographic, substance abuse, cognitive and psychiatric intake data for retained (n = 125) and non-retained (n = 205) participants

Variable		Non-Retained	Retained
	<u>M (SD)</u>	<u>M (SD)</u>	<u>t (df = 328)</u>
Age	35.41 (8.85)	38.26 (9.28)	2.78*
Education	11.63 (2.85)	12.36 (2.73)	2.28*
		<u>n (%)</u>	<u>χ² (df)</u>
Gender			
Male	137 (67)	83 (66)	.01 (1)
Female	68 (33)	42 (34)	
Race			
Caucasian	196 (96)	115 (92)	1.86 (1)
Other	9 (4)	10 (8)	
Marital status			
Never Married	90 (44)	48 (38)	3.17 (3)
Married or Common law	58 (28)	47 (37)	
Separated or Divorced	53 (26)	29 (24)	
Widowed	3 (2)	1 (1)	

Note. *p < .05.

Table 1 (Continued)

Demographic, substance abuse, cognitive and psychiatric intake data for retained (n = 125) and non-retained (n = 205) participants

	Non-Retained	Retained	
	N (%)	N (%)	χ^2 (df)
Recruitment Site			
MJL	70 (34)	46 (36)	.784 (2)
PF	82 (40)	52 (42)	
LV	53 (26)	27 (22)	
Treatment Status			
Inpatient	151 (74)	94 (75)	.10 (1)
Outpatient	54 (26)	31 (25)	
Substance Use Diagnoses			
Alcohol abuse	40 (20)	27 (22)	.21 (2)
Drug abuse	30 (15)	18 (14)	
Alcohol and drug abuse	135 (65)	80 (64)	

Note. * $p < .05$.

Table 1 (Continued)

Demographic, substance abuse, cognitive and psychiatric intake data for retained (n = 125) and non-retained (n = 205) participants

	Non-Retained	Retained	
	<u>M (SD)</u>	<u>M (SD)</u>	<u>t (df = 328)</u>
WAIS-R composite score	9.46 (1.69)	9.67 (1.82)	1.07
PPVT			
Raw	148.23 (16.34)	153.19 (16.47)	2.66*
Age equivalent	21.76 (7.99)	24.62 (8.79)	3.04*
CPI-So	33.66 (8.91)	35.19 (9.17)	1.49
SCL-90-R GSI (Intake)	66.68 (10.13)	68.25 (9.41)	1.37
ASI Psychiatric Status			
Psychiatric composite	.27 (.20)	.26 (.19)	-.23
Psych 30 days ¹	10.18 (11.53)	10.12 (11.37)	-.04
PSR	2.36 (1.44)	2.34 (1.43)	-.15
PIT	2.29 (1.66)	2.36 (1.65)	.36

Note. * $p < .05$. ¹ Variable represents the number of days of psychiatric problems within the prior month

experienced ($\underline{M} = 10.12$, $\underline{SD} = 11.37$ and $\underline{M} = 10.18$, $\underline{SD} = 11.53$, respectively) nor on participant severity ratings (PSR) and participant importance of treatment (PIT) ratings of psychiatric problems in the month prior to treatment. The PSR and PIT ratings indicated that both groups reported being “moderately” disturbed and rated the importance of treatment for psychiatric problems as “moderate”.

The final descriptive comparison examined the latency to lapse and relapse posttreatment for all retained participants ($n = 125$) versus non-retained participants ($n = 8$). Survival curves for latency to lapse and relapse are depicted in Figures 2 and 3, respectively. The non-retained participants had a greater median days to lapse ($\underline{Mdn} = 182$) than the retained participants ($\underline{Mdn} = 155$). Conversely, the retained participants had a greater median days to relapse ($\underline{Mdn} = 210$) than the non-retained participants ($\underline{Mdn} = 182$). Survival analyses were not calculated due to the highly discrepant group sizes.

Retained participants’ characteristics. With respect to aftercare assignment, the TSF group comprised 66 participants and the SRP group comprised 59 participants. Table 2 summarizes participant characteristics by aftercare group.

Independent t-tests and chi-square analyses were conducted to compare the demographic characteristics of the aftercare groups. Although stratified on age and randomly assigned to groups, one anomaly was detected: the SRP group had a significantly greater mean age ($\underline{M} = 40.22$, $\underline{SD} = 10.48$) than the TSF group ($\underline{M} = 36.51$, $\underline{SD} = 7.73$), $t(123) = 2.26$, $p < .05$.

Table 3 describes the recent intensive treatment experiences of group participants. No significant group differences were found for recruitment site, treatment status, or length of intensive treatment.

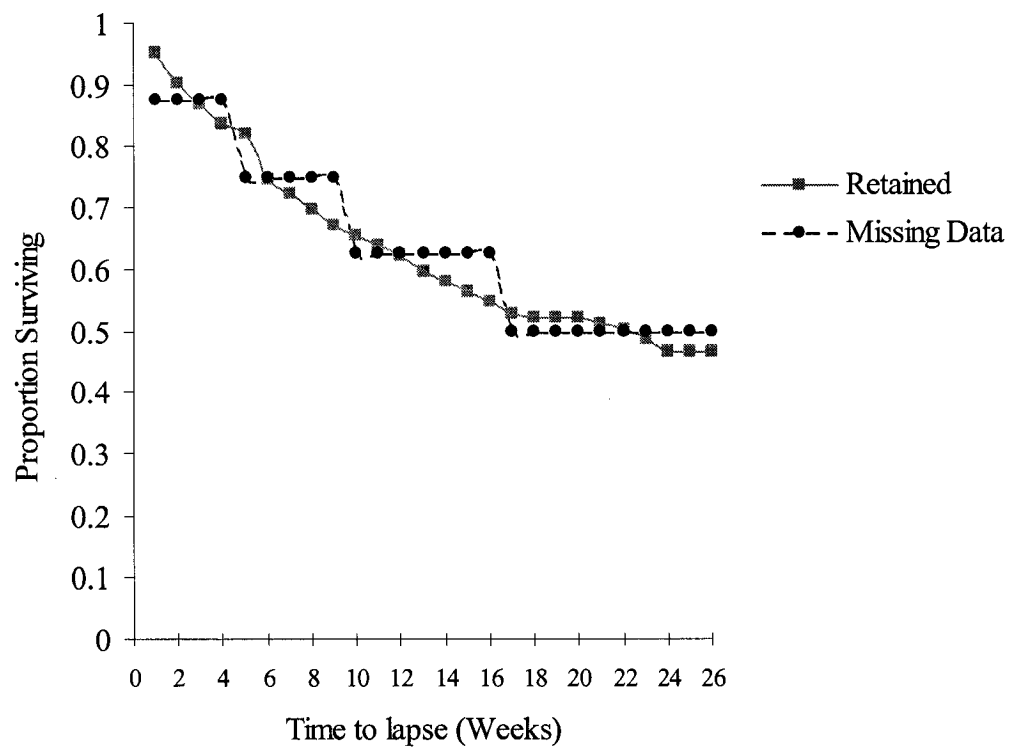


Figure 2. Proportion of retained ($n = 125$) and missing data ($n = 8$) group participants that survived without a lapse during the 6-month (i.e., 26-week) follow-up period.

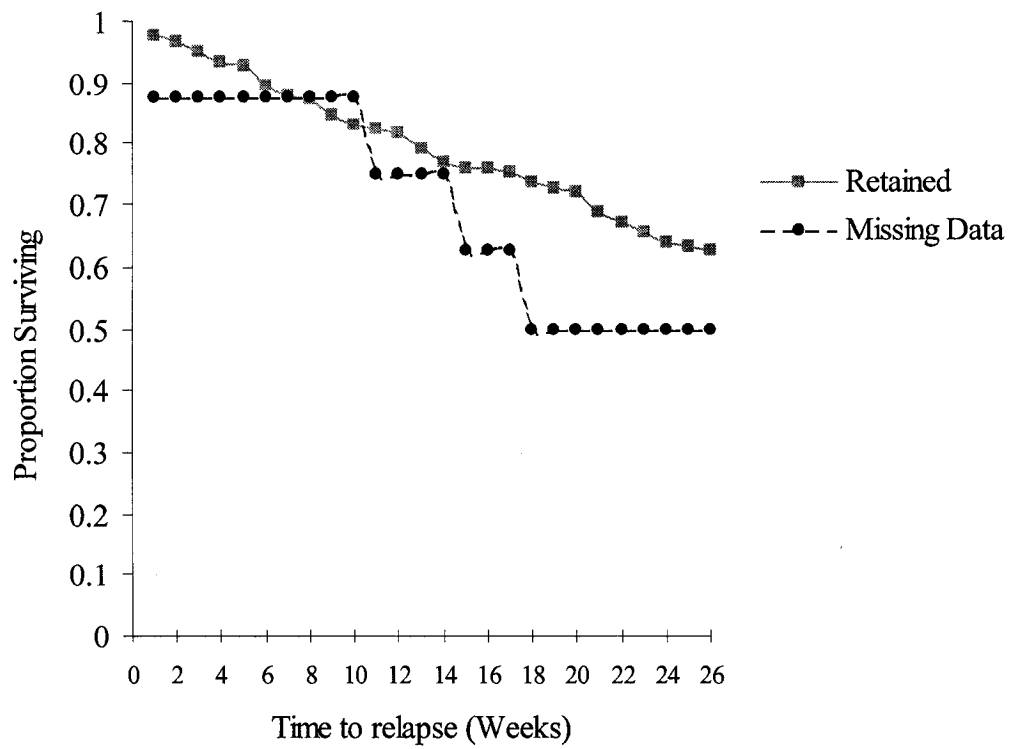


Figure 3. Proportion of retained ($n = 125$) and missing data ($n = 8$) group participants that survived without a relapse during the 6-month (i.e., 26-week) follow-up period.

Table 2

Intake demographic characteristics by aftercare group assignment

Variable	Aftercare group		
	TSF	SRP	
	<u>M (SD)</u>	<u>M (SD)</u>	<u>t (df = 123)</u>
Age	36.51 (7.73)	40.22 (10.48)	2.26*
Education	12.70 (2.56)	11.98 (2.89)	-1.46
	<u>n (%)</u>	<u>n (%)</u>	<u>χ² (df)</u>
Gender			.004 (1)
Male	22 (33)	20 (34)	
Female	44 (67)	39 (66)	
Race			3.22 (1)
Caucasian	58 (88)	57 (97)	
Other	8 (22)	2 (3)	
Marital status			2.42 (3)
Never Married	27 (41)	21 (36)	
Married/ Common Law	22 (33)	25 (42)	
Separated/ Divorced	17 (26)	12 (20)	
Widowed	0 (0)	1 (2)	

Note. *p < .05.

Table 3

Intensive treatment characteristics by aftercare group assignment

Variable	Aftercare group		
	TSF	SRP	
	<u>n</u> (%)	<u>n</u> (%)	χ^2 (<u>df</u>)
Recruitment Site			.506 (2)
MJL	26 (39)	20 (34)	
PF	27 (41)	25 (42)	
LV	13 (20)	14 (22)	
Treatment Status			.023 (1)
Inpatient	50 (76)	44 (75)	
Outpatient	16 (24)	15 (25)	
	M (SD)	M (SD)	<u>t</u> (<u>df</u> = 123)
Intensive Treatment (Days)	23.61 (7.16)	25.07 (7.39)	1.12

Note. * $p < .05$.

Table 4 summarizes the intake substance use and psychiatric data of group participants. No group differences were detected on substance use diagnoses, percentage of days abstinent within the previous 90 days prior to admission, and substance use (i.e., alcohol use, drug use, or both) prior to intensive treatment admission. Additionally, no group differences were noted on the intake GSI, CPI-So, the ASI psychiatric composite score, and the number of days of psychiatric problems in the month prior to admission. Participants had a mean standardized CPI-So score of 35.19 ($SD = 9.17$), with a range from 16 to 57. Participants had a significantly greater mean GSI at intake ($M = 68.25$, $SD = 9.41$) than at posttreatment ($M = 63.42$, $SD = 11.28$), $t(124) = 6.33$, $p < .05$. Posttreatment GSI standard scores ranged from 36 to 81.

Aftercare attendance was examined in order to clarify the exposure to treatment received by participants. The TSF group had a mean of 4.77 sessions attended ($SD = 4.00$) whereas the SRP group had a mean of 4.97 sessions ($SD = 3.70$) attended. Upon examination of the distributions of sessions attended by group participants, it was noted that both distributions were bi-modal. That is, participants either attended few to no groups (i.e., 2 or less) or attended many group sessions (i.e., 6 or more). The median value is the best measure of central tendency in such distributions. Accordingly, group TSF had a median of 5 sessions and group SRP had a median of 6 sessions attended, but a Mann-Whitney U -test found this difference to be non-significant ($U = 1895$, $p > .05$).

Aftercare by Attribute Matching Hypotheses

Participant attribute by aftercare interactions were evaluated using three analytic strategies: (1) hierarchical logistic and linear regression analyses; (2) survival analyses; and (3) repeated measures ANCOVAs. Consistent with analytic strategies used in prior

Table 4

Substance use and psychiatric intake data by aftercare group assignment

Variable	Aftercare group		
	TSF	SRP	
	<u>n</u> (%)	<u>n</u> (%)	χ^2 (df)
Substance use diagnoses			1.28 (2)
Alcohol abuse	12 (18)	15 (25)	
Drug abuse	11 (17)	7 (12)	
Both	43 (65)	37 (63)	
	<u>M</u> (<u>SD</u>)	<u>M</u> (<u>SD</u>)	<u>t</u> (df = 123)
PDA90 (intake)	49.69 (25.39)	50.45 (28.66)	.156
Past 30 days			
Alcohol use	2.41 (4.45)	2.42 (4.44)	.018
Drug use	1.20 (2.93)	2.39 (5.55)	.29
Both	1.76 (3.84)	1.97 (4.21)	1.47
GSI (intake)	68.33 (7.74)	67.61 (9.06)	-.724
CPI-So	34.16 (8.92)	36.34 (9.38)	1.33
ASI-Psych (intake)	.25 (.16)	.28 (.22)	.747
Psych 30 days ¹	9.31 (11.17)	11.02 (11.61)	.835

Note. * $p < .05$. ¹ Variable represents the number of days of psychiatric problems within the prior month. PDA90: percentage days abstinent in the prior 90 days. ASI-Psych: Addiction Severity Index psychiatric composite score.

matching studies (Kadden et al., 1989; Project Match Research Group, 1997), inferential analyses were conducted separately for each attribute.

i) Regression analyses. The first set of matching analyses were two variations of hierarchical regression analyses. Logistic regression analysis was used to examine the impact of the interaction effects on two dichotomous outcome variables at six-month follow-up: (1) *abstinence status* (i.e., reported sustained posttreatment abstinence), and (2) *presence of substance-related problems* during the previous month as indicated in the ASI alcohol and drug status (i.e., cravings, withdrawal symptoms, effects of intoxication and loss of control). Both outcome variables were dummy coded (i.e., 1 = presence, 0 = absence). Predictors were deemed significant if the resulting model fit the data (i.e., a non-significant Hosmer-Lemeshow goodness-of-fit chi-square test) and contributed significantly to the regression model (i.e., maximum likelihood improvement chi-square test). Hierarchical linear regression analyses were used to regress the same predictors onto two continuous outcome variables at six-month follow-up: (1) *percentage of days abstinent* (PDA) in the previous 90 days, and (2) *psychiatric symptom distress* (i.e., GSI score).

The first variables entered into each regression equation were age (i.e., due to group differences noted above) and the intake measure of the outcome variable in order to account for variance not controlled for prior to randomization. The intake values of the dichotomous variables (i.e., abstinence status and substance problems) were not considered in the first step as it was assumed that most, if not all, participants were not abstinent and had substance problems upon admission to intensive treatment. The second and third steps of the regression equations entered the aftercare assignment variable (i.e., dummy coded: SRP = 1, TSF = 0) and the respective attribute variables (i.e., posttreatment GSI and intake CPI-So).

The final step entered an aftercare by attribute interaction variable. This final step tested the unique contribution of the interaction (Cohen & Cohen, 1983) or the ‘matching’ effect. Bonferroni family-wise corrected alpha was set at $\alpha = .012$ (i.e., $\alpha = .05/4$) for each regression analysis in this set. The power estimates for the regression analyses above were based on an average expected treatment effect size of .20 (as previously noted in the meta-analysis of Irving et al., 1999), an alpha level initially established at .05, a sample size of 125 participants, and 3 degrees of freedom (i.e., based on 4 predictor variables per analysis). Using Cohen and Cohen’s (1983) post-hoc procedure for calculating power as a function of sample size, the estimated power for each regression analyses was greater than 95%.

The following analyses included psychiatric distress as the attribute variable (i.e., posttreatment GSI). The summary of the hierarchical logistic regression analysis for *abstinence status* is presented in Table 5. In the first step, age significantly predicted abstinence status at six-month follow-up ($B = .05$, $\text{Wald}(1) = 5.27$, $p < .012$) and accounted for 6% of the variance in the model. Aftercare assignment, entered at the second step, did not contribute significantly to the model. Posttreatment GSI, entered at the third step, significantly contributed to the model ($B = -.04$, $\text{Wald}(1) = 4.48$, $p < .012$), and accounted for an added 5% of the variance. The aftercare by attribute interaction entered in the final step did not significantly contribute to the regression model. Thus, greater age and lower posttreatment GSI were associated with being abstinent at six-month follow-up ($r_{pb} = .21$ and $r_{pb} = -.22$, respectively).

The summary of the hierarchical logistic regression analysis for the *presence of substance-related problems* is presented in Table 6. Neither aftercare assignment nor age significantly contributed to the prediction of substance-related problems.

Table 5

Summary of hierarchical logistic regression analysis for variables predicting abstinent status at six-month follow-up

Variable	<u>B</u>	<u>S.E. B</u>	Wald (<u>df</u>)	<u>R</u> ²
Step 1				
Age	.05	.02	5.27 (1)*	.06
Model: $\chi^2 (1) = 5.77, p < .012$				
Step 2				
Group	.07	.37	.03 (1)	.06
Model: $\Delta\chi^2 (1) = .03, p = \text{n.s.}$				
Step 3				
GSI-2	-.04	.02	4.48 (1)*	.11
Model: $\Delta\chi^2 (1) = 4.66, p < .012$				
Step 4				
GSI-2 x Group	-.06	.04	2.43 (1)	.13
Model: $\Delta\chi^2 (1) = 2.51, p = \text{n.s.}$				

Note. * $p < .012$. For steps 1 through 4, the Hosmer and Lemeshow goodness-of-fit chi-square test remained non-significant. GSI-2 = Posttreatment psychiatric distress; Group = Aftercare assignment.

Table 6

Summary of hierarchical logistic regression analysis for variables predicting substance-related problems at six-month follow-up.

Variable	<u>B</u>	<u>S.E. B</u>	Wald (<u>df</u>)	<u>R</u> ²
Step 1				
Age	-.01	.02	.22 (1)	.00
Model: $\chi^2 (1) = .219, p = \text{n.s.}$				
Step 2				
Group	-.35	.36	.89 (1)	.01
Model: $\Delta\chi^2 (1) = .89, p = \text{n.s.}$				
Step 3				
GSI-2	.06	.02	11.90 (1)*	.15
Model: $\Delta\chi^2 (1) = 13.41, p < .012$				
Step 4				
GSI-2 x Group	-.04	.04	.95 (1)	.16
Model: $\Delta\chi^2 (1) = .97, p = \text{n.s.}$				

Note. * $p < .012$. For steps 1 through 4, the Hosmer and Lemeshow goodness-of-fit chi-square test remained non-significant. GSI-2 = Posttreatment psychiatric distress; Group = Aftercare assignment.

When posttreatment GSI was then entered, it significantly contributed to the model ($\beta = .06$, $\text{Wald}(1) = 11.90$, $p < .012$) and accounted for 14% of added variance. The aftercare by attribute interaction entered in the final step did not contribute significantly to the model. Thus, greater posttreatment psychiatric distress was associated with the presence of substance related problems at six-month follow-up ($r_{pb} = .32$).

Table 7 summarizes the hierarchical linear regression analysis for *percentage days abstinent (PDA)* in the prior 90 days. Both age ($\beta = .27$, $t(122) = 3.09$, $p < .012$) and intake PDA ($\beta = .20$, $t(122) = 2.34$, $p < .012$) contributed significantly to the overall regression model in the first step, and accounted for 10% of the overall variance. Age and intake PDA were positively correlated with PDA at follow-up ($r = .24$ and $r = .16$, respectively). Aftercare, posttreatment GSI, and their interaction did not significantly contribute to the overall regression model.

Table 8 summarizes the hierarchical linear regression for *psychiatric symptom distress* (i.e., GSI) at six-month follow-up. The variables entered at the first step contributed significantly to predicting GSI at follow-up, and accounted for 38% of its variance. Psychiatric distress at intake contributed uniquely to this effect ($\beta = .63$, $t(122) = 8.65$, $p < .012$). Next, aftercare did not contribute significantly to the regression model. At the third step, posttreatment GSI significantly contributed to the regression model ($\beta = .49$, $t(120) = 8.65$, $p < .012$), and accounted for 13% of added variance. Finally, the aftercare by posttreatment GSI interaction did not contribute to the regression model. Thus, greater psychiatric distress at intake and posttreatment were associated with greater psychiatric distress at six-month follow-up.

Table 7

Summary of hierarchical linear regression analyses for variables predicting percentage days abstinent (PDA) within the past 90 days at six-month follow-up.

Variable	<u>r</u>	<u>B</u>	<u>S.E. B</u>	<u>β</u>
Step 1				
Age	.24	.66	.21	.27*
PDA (intake)	.16	.17	.07	.20*
Model: $\underline{R}^2 = .10$, $\underline{F} (2,122) = 6.58^*$				
Step 2				
Group	.13	3.5	3.9	.08
Model: $\Delta \underline{R}^2 = .01$, $\underline{F} (1,121) = .81$				
Step 3				
GSI-2	-.08	-.11	.17	-.06
Model: $\Delta \underline{R}^2 = .00$, $\underline{F} (1,120) = .42$				
Step 4				
GSI-2 x Group	.11	-.37	.35	-.53
Model: $\Delta \underline{R}^2 = .01$, $\underline{F} (1,119) = 1.11$				

Note. * $p < .012$. GSI-2 = Posttreatment psychiatric distress; Group = Aftercare assignment.

Table 8

Summary of hierarchical linear regression analyses for variables predicting psychiatric symptom distress (GSI) at six-month follow-up.

Variable	<u>r</u>	<u>B</u>	<u>S.E. B</u>	<u>β</u>
Step 1				
Age	-.01	.15	.10	.10
GSI-1	.60	.86	.09	.63*
Model: $\underline{R}^2 = .38$, $\underline{F} (2,122) = 37.43^*$				
Step 2				
Group	.01	.66	1.89	.00
Model: $\Delta \underline{R}^2 = .00$, $\underline{F} (1,121) = .12$				
Step 3				
GSI-2	.68	.57	.09	.49*
Model: $\Delta \underline{R}^2 = .13$, $\underline{F} (1,120) = 33.27^*$				
Step 4				
GSI-2 x Group	.11	.00	.15	-.14
Model: $\Delta \underline{R}^2 = .00$, $\underline{F} (1,119) = .15$				

Note. * $p < .012$. GSI-1 = Intake psychiatric distress; GSI-2 = Posttreatment psychiatric distress; Group = Aftercare assignment

When the above logistic and linear regression analyses were repeated with steps three and four including sociopathy (i.e., CPI-So) as the attribute variable, neither sociopathy nor its interaction with aftercare contributed significantly to predict any of the outcome measures.

ii) Survival analyses: latency to lapse and relapse. The second set of matching analyses examined aftercare treatment matching with respect to latency to lapse and relapse. Cox's proportional hazard regression analyses (i.e., survival analyses) were employed to model time-to-event data in the presence of censored cases (i.e., cases in which latency to lapse had not been recorded during the follow-up period). Latency to lapse was defined as the number of consecutive days posttreatment before the first day of any alcohol and/or drug use. Latency to relapse was defined as the number of consecutive days posttreatment before regular use was resumed (i.e., 3 days of alcohol and/or drug use within a 7-day period).

The profile of all participants' lapses and relapses were summarized according to substance(s) implicated. Of those participants who lapsed by six-month follow-up (i.e., 61% of all participants), 49% used alcohol, 26% used drugs, and 25% used a combination of alcohol and drugs. Conversely, of those participants who relapsed by six-month follow-up (41% of all participants), 35% used alcohol, 51% used drugs, and 14% used a combination of alcohol and drugs.

Due to the operationalization of latency to lapse as the use of any substance, lapsed individuals were partitioned by aftercare group and type of substance. Table 9 summarizes the lapse types by substance and makes additional reference to group participants' initial diagnoses to indicate if participants lapsed using their substance of choice (i.e., congruent), or using another substance (i.e., incongruent). There were no significant group differences across lapse types ($\chi^2(3, N = 125) = 1.33, p > .05$). Overall, lapses tended to be either

Table 9

Six-month lapse type by substance use diagnosis for aftercare group participants

	Substance use diagnosis		
	Alcohol	Drug	Alcohol & Drug
Lapse type	n (%)	n (%)	n (%)
Twelve-Step Facilitation Group (n = 66)			
No use	8 (67)	3 (27)	17 (40)
Alcohol	4 (33) ^C	2 (18) ^I	11 (25) ^{PC}
Drug	0 (0) ^I	2 (18) ^C	8 (19) ^{PC}
Alcohol & Drug	0 (0) ^{PC}	4 (36) ^{PC}	7 (16) ^C
Structured Relapse Prevention Group (n = 59)			
No use	6 (40)	3 (43)	12 (32)
Alcohol	8 (53) ^C	2 (29) ^I	10 (27) ^{PC}
Drug	0 (0) ^I	0 (0) ^C	10 (27) ^{PC}
Alcohol & Drug	1 (7) ^{PC}	2 (28) ^{PC}	5 (14) ^C

Note. Each category was classified with respect to the congruency between the lapse type and the substance use diagnosis. The classifications are as follows: ^C = congruent; ^{PC} = partially congruent; ^I = incongruent.

partially (61%) or fully congruent (34%) with initial substance use diagnoses. A small proportion of participants (5%) had incongruent lapses (i.e., failed to correspond to initial diagnosis). These lapses were unique to drug abusers that lapsed with alcohol.

The first pair of survival analyses examined whether posttreatment GSI, aftercare, or their interaction predicted latency to lapse or relapse. Similar to the above regression analyses, each of the predictor variables were regressed in a stepwise manner onto the proportional changes of censored data (i.e., survivors). A Bonferroni corrected alpha level was established at $\alpha < .025$ (i.e., $\alpha = .05/2$) for each analysis of this set.

The results for the survival analysis of *latency to lapse* are summarized in Table 10. At the first step of the model, age contributed significantly to predicting time to lapse ($B = -.03$, $\text{Wald}(1) = 4.34$, $p < .025$). After a non-significant aftercare variable was entered at step two, posttreatment GSI and its interaction with aftercare significantly contributed to predicting latency to lapse at steps three and four, respectively ($B = .02$, $\text{Wald}(1) = 4.58$, $p < .025$, and $B = -.04$, $\text{Wald}(1) = 3.56$, $p < .025$, respectively). Thus, greater age and lower posttreatment GSI scores were associated with a longer latency to lapse. Participants with lower posttreatment GSI scores had a longer latency to lapse when assigned to SRP than when assigned to TSF. Conversely, individuals with greater posttreatment GSI scores had a longer latency to lapse when assigned to TSF than when assigned to SRP. The aftercare groups' survival curves for latency to lapse are depicted in Figure 4.

The results for the survival analysis of *latency to relapse* are summarized in Table 11. In the first step, age contributed significantly to predicting relapse ($B = -.04$, $\text{Wald}(1) = 4.22$, $p < .025$). Aftercare did not significantly contribute to the regression model at step two. Posttreatment GSI significantly contributed to the model at the third step ($B = .04$,

Table 10

Summary of Cox's proportional hazard regression analysis with variables (including posttreatment psychiatric distress) predicting time to lapse

Variable	2LL ¹	B	S.E. B	Wald (df = 1)
Step 1				
Age	670.22	-.03	.01	4.34*
Model: $\chi^2 (1) = 4.35, p < .025$				
Step 2				
Group	667.87	-.36	.23	2.36
Model: $\Delta\chi^2 (1) = 2.35, p = \text{n.s.}$				
Step 3				
GSI-2	663.28	.02	.01	4.58*
Model: $\Delta\chi^2 (1) = 4.59, p < .025$				
Step 4				
GSI-2 x Group	659.75	-.04	.02	3.56*
Model: $\Delta\chi^2 (1) = 3.53, p < .025$				

Note. * $p < .025$, ¹log likelihood. GSI-2 = Posttreatment psychiatric distress; Group = Aftercare assignment group.

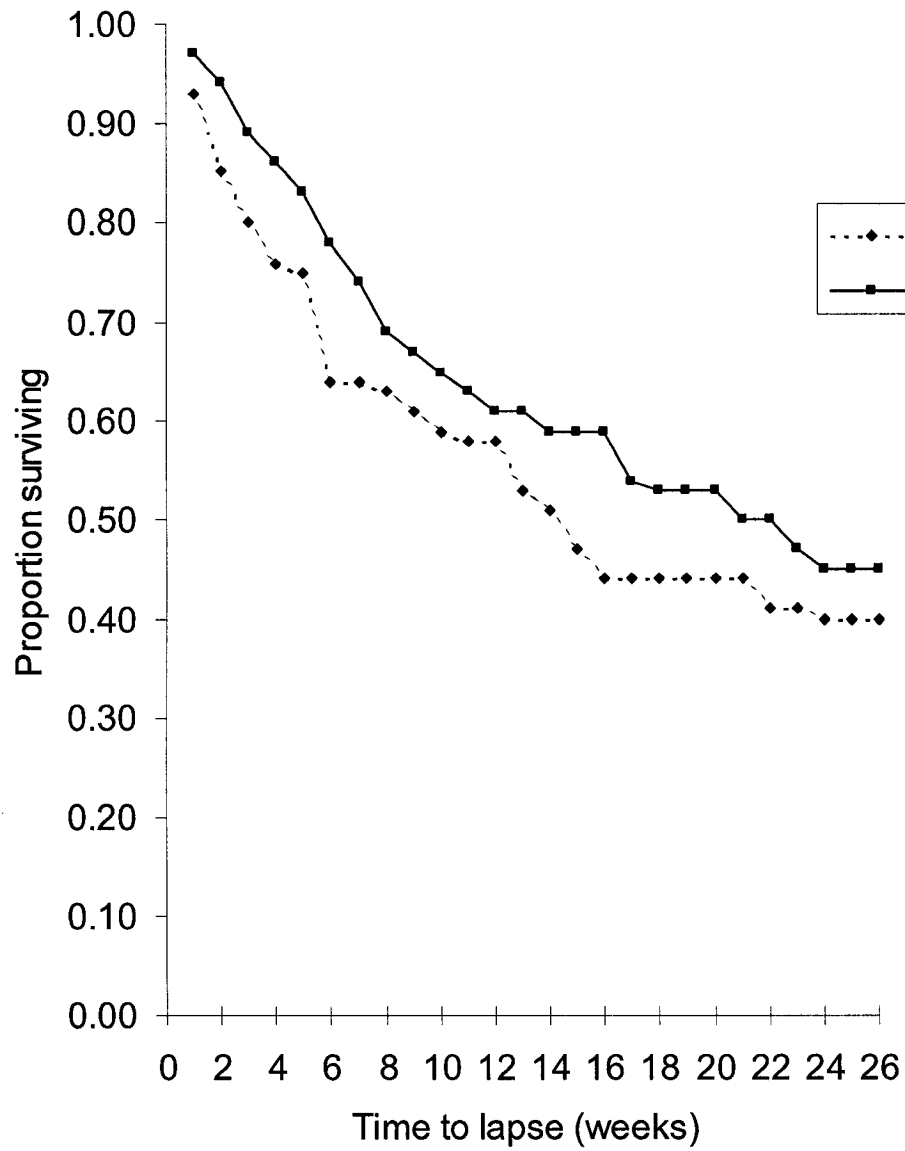


Figure 4. Proportion of SRP (n = 59) and TSF (n = 66) group participants that reported a lapse within the follow-up period (i.e., 26 weeks)

Table 11

Summary of Cox's proportional hazard regression analysis with variables (including posttreatment psychiatric distress) predicting time to relapse

Variable	2LL ¹	<u>B</u>	<u>S.E. B</u>	<u>Wald (df = 1)</u>
Step 1				
Age	464.05	-.04	.02	4.22*
Model: $\chi^2(1) = 4.22, p < .05$				
Step 2				
Group	462.28	-.38	.28	1.77
Model: $\Delta\chi^2(1) = 1.77, p = \text{n.s.}$				
Step 3				
GSI-2	453.92	.04	.01	8.24*
Model: $\Delta\chi^2(1) = 8.36, p < .05$				
Step 4				
GSI-2 x Group	450.87	-.04	.03	3.05
Model: $\Delta\chi^2(1) = 3.05, p = \text{n.s.}$				

Note. * $p < .05$, ¹log likelihood. GSI-2 = Posttreatment psychiatric distress; Group = Aftercare assignment.

Wald(1) = 8.24, $p < .025$). Finally, the posttreatment GSI by aftercare interaction did not significantly contribute to the model. In sum, greater age and lower posttreatment GSI scores were associated with longer latency to relapse. The aftercare groups' survival curves for latency to relapse are depicted in Figure 5.

When the survival analyses for latency to lapse and relapse were repeated with sociopathy (i.e., CPI-So) as the attribute, neither sociopathy nor its interaction with aftercare significantly contributed to the models.

iii) Analyses of covariance of ASI composite scores. The final set of matching analyses examined the effect of aftercare, attribute, and their interaction on the seven ASI domain composite scores from posttreatment to six-month follow-up. Repeated measures 2 x 2 x 2 ANCOVAs (aftercare x attribute x time) were conducted with age and ASI intake composite scores as covariates. A median split procedure was used to group participants on both attribute variables. The posttreatment overall GSI median score (Mdn = 62) was used to group participants into either high psychiatric distress (HPD; $n = 65$) or low psychiatric distress (LPD; $n = 60$) groups. The median value was the same as the recognized clinical cut-off score (Derogatis et al., 1973). The CPI-So overall median score (Mdn = 34) was used to group participants into either high sociopathy (HS; $n = 60$) or low sociopathy (LS; $n = 65$) groups.

Posttreatment and six-month follow-up ASI domain composite scores were mildly to moderately positively skewed. Square root transformations of medical, drug, and legal status scores were applied. A Bonferroni corrected alpha was set accordingly at $\alpha = .007$ (i.e., $\alpha = .05/7$) for each analysis of this set.

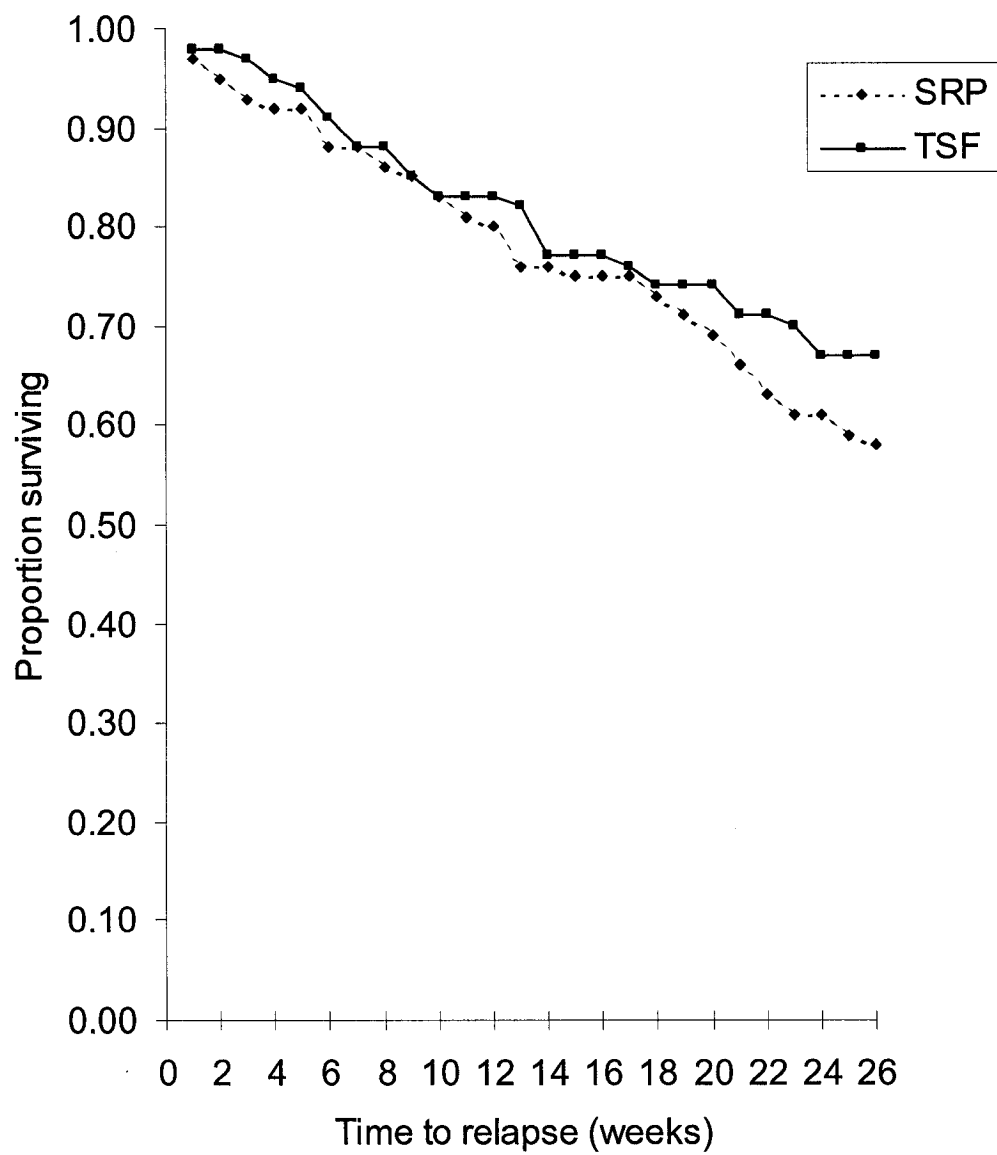


Figure 5. Proportion of SRP (n = 59) and TSF (n = 66) group participants that reported a relapse within the follow-up period (i.e, 26 weeks)

Table 12 summarizes the descriptive statistics for each ASI domain composite score by aftercare and psychiatric distress groupings. Repeated measures ANCOVAs revealed several main effects of posttreatment psychiatric distress on ASI domain composite scores (see Figure 6). The repeated measures ANCOVA for *alcohol composite scores* indicated a significant main effect for posttreatment psychiatric distress ($F(1, 119) = 7.36, p < .007$) with a small effect size ($\eta^2 = .06$); a trend toward a main effect for aftercare ($F(1, 119) = 4.42, p = .03, \eta^2 = .04$); but no time or interaction effects. That is, HPD participants had overall greater mean alcohol composite scores than LPD participants at posttreatment and follow-up. The main effect trend for aftercare indicated that the TSF participants maintained a lower mean alcohol composite score from posttreatment to follow-up compared to the SRP participants.

When drug composite scores were examined, a significant main effect of posttreatment psychiatric distress was observed ($F(1, 119) = 16.45, p < .007, \eta^2 = .12$). The HPD participants had an overall greater mean drug composite score than LPD participants at posttreatment and follow-up. Additionally, a trend ($F(1, 119) = 4.65, p = .03, \eta^2 = .03$) for an aftercare by psychiatric distress interaction was noted whereby LPD participants assigned to TSF tended to have a greater mean drug composite score posttreatment than the LPD participants assigned to SRP. No significant aftercare differences were detected at follow-up. That is, although more severe in drug composite scores prior to aftercare assignment, the LPD-TSF condition tended to show more of a reduction in this domain over the follow-up period.

Table 12.

Means and standard deviations for ASI domain composite scores as a function of aftercare and posttreatment psychiatric distress.

Group	Assessment Time	
	Posttreatment	Six-month follow-up
	<u>M (SD)</u>	<u>M (SD)</u>
Alcohol Status		
TSF	.16 (.12)	.14 (.19)
Low distress	.13 (.11)	.12 (.19)
High distress	.19 (.12)	.17 (.18)
SRP	.18 (.14)	.20 (.21)
Low distress	.14 (.13)	.15 (.19)
High distress	.22 (.14)	.25 (.23)
Drug Status		
TSF	.08 (.06)	.06 (.07)
Low distress	.06 (.06)	.03 (.05)
High distress	.09 (.06)	.08 (.09)
SRP	.07 (.07)	.05 (.07)
Low distress	.04 (.05)	.03 (.04)
High distress	.09 (.07)	.08 (.08)

Table 12 (continued).

Means and standard deviations for ASI domain composite scores as a function of aftercare and posttreatment psychiatric distress.

Group	Assessment Time	
	Posttreatment	Six-month follow-up
	<u>M (SD)</u>	<u>M (SD)</u>
Family/Social Status		
TSF	.20 (.18)	.16 (.19)
Low distress	.13 (.14)	.09 (.15)
High distress	.26 (.19)	.22 (.21)
SRP	.19 (.16)	.19 (.20)
Low distress	.13 (.12)	.12 (.15)
High distress	.25 (.16)	.27 (.21)
Employment Status		
TSF	.56 (.29)	.45 (.29)
Low distress	.55 (.28)	.45 (.27)
High distress	.56 (.30)	.45 (.30)
SRP	.57 (.32)	.53 (.32)
Low distress	.52 (.29)	.48 (.33)
High distress	.62 (.33)	.58 (.31)

Table 12 (continued).

Means and standard deviations for ASI domain composite scores as a function of aftercare and posttreatment psychiatric distress.

Group	Assessment Time	
	Posttreatment	Six-month follow-up
	<u>M</u> (<u>SD</u>)	<u>M</u> (<u>SD</u>)
Legal Status		
TSF	.06 (.14)	.03 (.08)
Low distress	.04 (.12)	.03 (.08)
High distress	.07 (.16)	.03 (.09)
SRP	.06 (.13)	.04 (.13)
Low distress	.05 (.13)	.05 (.14)
High distress	.07 (.13)	.04 (.11)
Medical Status		
TSF	.10 (.13)	.09 (.12)
Low distress	.07 (.10)	.11 (.15)
High distress	.13 (.14)	.08 (.09)
SRP	.13 (.13)	.13 (.12)
Low distress	.13 (.14)	.11 (.11)
High distress	.13 (.12)	.16 (.13)

Table 12 (continued).

Means and standard deviations for ASI domain composite scores as a function of aftercare and posttreatment psychiatric distress.

Group	Assessment Time	
	Posttreatment	Six-month follow-up
	<u>M</u> (<u>SD</u>)	<u>M</u> (<u>SD</u>)
Psychiatric Status		
TSF	.20 (.20)	.18 (.19)
Low distress	.08 (.10)	.11 (.15)
High distress	.31 (.21)	.24 (.20)
SRP	.19 (.18)	.21 (.21)
Low distress	.09 (.09)	.13 (.16)
High distress	.29 (.18)	.31 (.22)

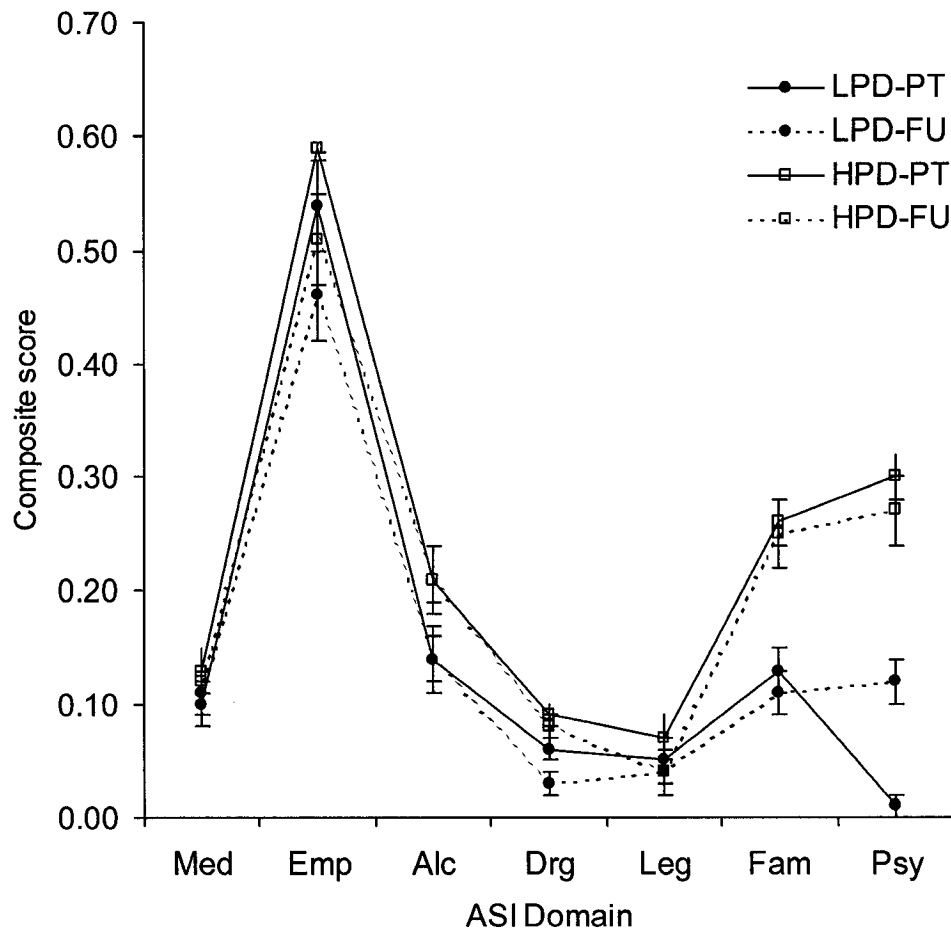


Figure 6. Mean ASI domain composite scores for high psychiatric distress (HPD, n = 65) and low psychiatric distress (LPD, n = 60) groups at posttreatment (PT) and six-month follow-up (FU). The ASI domain descriptions are as follows: Med - medical status; Emp - employment status; Alc, alcohol status; Drg - drug status; Leg - legal status; Fam - family status; Psy - psychiatric status.

Repeated measures ANCOVAs of the *ASI family/social and psychiatric* composite scores revealed significant main effects of posttreatment psychiatric distress ($F(1, 119) = 19.18, p < .007, \eta^2 = .14$; and $F(1, 119) = 26.78, p < .007, \eta^2 = .18$, respectively). That is, in both instances HPD participants had greater mean social/family and psychiatric composite scores at posttreatment and follow-up. No significant main effects for aftercare or its interaction with posttreatment psychiatric distress were found. Finally, no significant aftercare, psychiatric distress, or interaction effects were uncovered for *ASI legal, employment, and medical* composite scores.

When degree of sociopathy (i.e., LS and HS) was used as the attribute variable for the ANCOVAs of ASI domain composite scores, significant main and interaction effects were observed (See Figure 7). A main effect of sociopathy was observed with the *psychiatric composite scores* ($F(1, 119) = 6.09, p < .007, \eta^2 = .04$). The HS participants had a greater mean psychiatric composite score than the LS participants at posttreatment and follow-up. Additionally, a significant sociopathy x aftercare interaction was noted with respect to *legal composite scores* ($F(1, 119) = 4.96, p < .007, \eta^2 = .02$). The HS participants assigned to TSF tended to have a greater decrease in mean legal composite score from posttreatment to follow-up ($M = .08, SD = .17$ and $M = .04, SD = .09$, respectively) than the HS participants assigned to SRP ($M = .05, SD = .10$ and $M = .05, SD = .13$, respectively).

A main effect trend was noted for the *medical composite scores* ($F(1, 119) = 4.82, p = .03, \eta^2 = .03$). That is, HS participants tended to have a greater mean medical composite score at posttreatment and follow-up ($M = .13, SD = .14$ and $M = .13, SD = .13$, respectively) than the LS participants ($M = .10, SD = .11$ and $M = .09, SD = .11$,

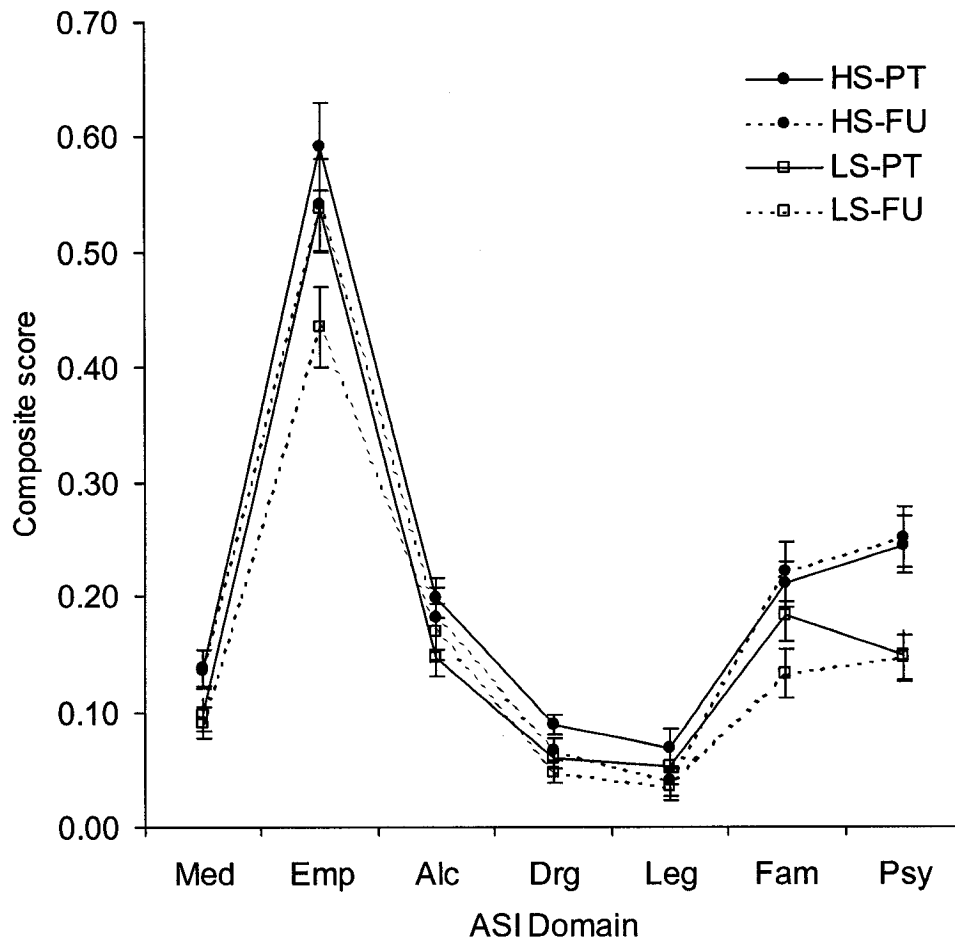


Figure 7. Mean ASI domain composite scores for high sociopathy (HS) and low sociopathy (LS) groups at posttreatment (PT) and six-month follow-up (FU). The ASI domain descriptions are as follows: Med - medical status; Emp - employment status; Alc, alcohol status; Drg - drug status; Leg - legal status; Fam - family status; Psy - psychiatric status.

respectively). A trend was noted for a time by sociopathy interaction on the family composite score ($F(1, 119) = 4.63, p = .03, \eta^2 = .04$). The LS participants tended to show a greater decrease in mean family composite score from posttreatment to follow-up than the HS participants.

Quantitative and Qualitative Indices of Psychiatric Distress as Predictors of Outcome

A final set of hierarchical linear regression analyses compared how participants' quantitative and qualitative indices of psychiatric distress predicted treatment outcome at six-month follow-up.

The quantitative (i.e., GSI) and qualitative (i.e., ASI: PSR and PIT ratings) indices of psychiatric distress were regressed onto psychosocial (i.e., ASI family/social and psychiatric composite scores) and substance use (i.e., percentage days abstinent at follow-up: PDA) outcome variables. The first step entered the intake value of the selected outcome variables and participants' age and aftercare assignment. The latter predictor variables were included in this step to control for variability in outcome measures due to treatment effects. The second step entered intake values of GSI, PSR and PIT ratings. Finally, the third step entered posttreatment values of these indices. A Bonferroni corrected alpha was set accordingly at $\alpha = .016$ (i.e., $\alpha = .05/3$) for each regression analysis in this set.

Relationship between measures of psychiatric distress. Table 13 summarizes inter-correlations between quantitative and qualitative psychiatric distress indices, age, and aftercare. Aftercare was dummy coded as follows: SRP = 1, TSF = 0. Due to the numerous correlations, a Bonferroni corrected alpha was set accordingly at $\alpha = .001$ (i.e., $\alpha = .05/28$) to detect significant relationships. Age was significantly negatively correlated to

Table 13

Correlation matrix of participants' (n = 125) age, aftercare group assignment, quantitative and qualitative indices of psychiatric distress at intake and posttreatment

Variable	1	2	3	4	5	6	7	8
1. Age	---	.20 [†]	-.18	-.14	-.04	-.23*	-.24*	-.19 [†]
2. Group		---	-.07	-.02	-.01	.02	-.13	-.03
3. GSI-1			---	.67*	.45*	.38*	.26*	.41*
4. GSI-2				---	.26*	.54*	.14	.57*
5. PSR-1					---	.36*	.62*	.27*
6. PSR-2						---	.32*	.71*
7. PIT-1							---	.26*
8. PIT-2								---

Note. * $p < .001$; [†] $p < .10$. Group: aftercare group assignment; GSI: SCL-90-R global severity index; PSR: participant severity rating; PIT: perceived importance of treatment. Variables with the suffix -1 and -2 represent intake and posttreatment assessments, respectively.

participants' intake PIT ratings and posttreatment PSR ratings. A trend was observed ($p = .04$) for age to be negatively correlated to posttreatment PIT ratings. Thus, as age increased, severity ratings of psychiatric distress decreased. Participants' intake GSI scores were significantly positively correlated to all psychiatric distress indices. Posttreatment GSI scores were also significantly correlated with most qualitative indices except intake PIT. Finally, all qualitative indices of psychiatric distress were significantly positively correlated with each other, ranging from $r = .26$ to $r = .71$. The strongest associations were noted between the PSR and PIT ratings for the same assessment periods (i.e. intake: $r = .62$; posttreatment: $r = .71$).

The qualitative indices of psychiatric distress significantly decreased from intake to posttreatment. Participants' mean PSR ratings at intake ($M = 2.34$, $SD = 1.43$) were significantly greater than at posttreatment ($M = 1.67$, $SD = 1.35$), $t(124) = 4.72$, $p < .05$. Participants' mean PIT ratings at intake ($M = 2.36$, $SD = 1.65$) were significantly greater than at posttreatment ($M = 1.58$, $SD = 1.58$), $t(124) = 4.44$, $p < .05$.

Psychiatric distress indices as predictors of psychosocial outcome. Table 14 summarizes the hierarchical regression analysis for quantitative and qualitative indices of psychiatric distress as predictors of the *ASI psychiatric composite scores* at six-month follow-up. The predictor variables entered at the first step contributed significantly to the model and accounted for 14% of the overall variance in psychiatric composite scores at follow-up. Intake ASI psychiatric status was the sole significant predictor at this step ($\beta = .36$, $t(121) = 4.23$, $p < .016$). Intake quantitative and qualitative psychiatric distress indices contributed significantly to the overall model at the second step and accounted for 7% added variance. Intake GSI was the only significant predictor at this step ($\beta = .30$, $t(118) = 3.18$,

Table 14

Summary of hierarchical regression analyses for quantitative and qualitative psychiatric indices predicting ASI psychiatric composite at six-month follow-up.

Variable	<u>r</u>	<u>B</u>	<u>S.E. B</u>	<u>β</u>
<u>Step 1</u>				
Age	-.06	.001	.002	-.04
Group	.09	.03	.04	.07
Psych-1	.37	.38	.09	.36*
Model: $R^2 = .14$, $F(3, 120) = 6.59^*$				
<u>Step 2</u>				
GSI-1	.39	.01	.002	.30*
PSR-1	.25	-.01	.02	-.10
PIT-1	.17	-.01	.01	-.07
Model: $\Delta R^2 = .07$, $F(3, 117) = 3.77^*$				
<u>Step 3</u>				
GSI-2	.47	.004	.002	.24 [†]
PSR-2	.37	.004	.02	.03
PIT-2	.42	.02	.02	.18
Model: $\Delta R^2 = .08$, $F(3, 114) = 4.56^*$				

Note. * $p < .016$, [†] $p < .10$. Psych-1: ASI psychiatric composite score at intake.

$p < .016$). At the third step, posttreatment quantitative and qualitative psychiatric distress indices contributed significantly to predicting ASI psychiatric composite scores at follow-up, and accounted for 8% added variance. Thus, greater intake ASI psychiatric composite and GSI scores were predictive of greater ASI psychiatric composite scores at six-month follow-up. Qualitative indices failed to contribute significantly to the model.

Table 15 summarizes the hierarchical regression analysis for quantitative and qualitative indices of psychiatric distress as predictors of the *ASI family/social composite scores* at follow-up. The predictor variables entered at the first step contributed significantly to the regression model and accounted for 20% of the variance in family/social composite scores at follow-up. Intake family/social composite score was the sole predictor that significantly contributed the model at this step ($\beta = .43$, $t(121) = 5.15$, $p < .016$). Intake quantitative and qualitative psychiatric distress indices entered at the second step did not contribute significantly to the model. Posttreatment quantitative and qualitative indices significantly contributed to the model when entered at the final step and accounted for 9% added variance. The posttreatment PIT rating emerged as the only significant predictor at this step ($\beta = .28$, $t(115) = 2.43$, $p < .016$). A trend for posttreatment GSI to contribute to the model was noted ($\beta = .26$, $t(115) = 2.17$, $p = .03$). Thus, after intake family/problem composite scores and psychiatric indices were accounted for, only posttreatment psychiatric distress PIT ratings emerged as significant predictors of family/social composite scores at six-month follow-up.

Table 15

Summary of hierarchical regression analyses for quantitative and qualitative psychiatric indices predicting ASI family/social status composite at six-month follow-up.

Variable	<u>r</u>	<u>B</u>	<u>S.E. B</u>	<u>β</u>
<u>Step 1</u>				
Age	-.11	.001	.002	-.04
Group	.09	.03	.03	.07
Family-1	.44	.43	.08	.43*
Model: $R^2 = .20$, $F(3, 120) = 10.06^*$				
<u>Step 2</u>				
GSI-1	.26	.003	.002	.16 [†]
PSR-1	.16	.01	.02	.06
PIT-1	.13	-.003	.01	-.03
Model: $\Delta R^2 = .03$, $F(3, 117) = 1.68$				
<u>Step 3</u>				
GSI-2	.38	.004	.002	.26 [†]
PSR-2	.27	-.02	.02	-.17
PIT-2	.38	.04	.02	.28*
Model: $\Delta R^2 = .09$, $F(3, 114) = 5.28^*$				

Note. * $p < .016$, [†] $p < .10$. Family-1: ASI family/social composite score at intake.

Psychiatric distress indices as predictors of substance use outcome. Table 16 summarizes the hierarchical regression analysis of quantitative and qualitative indices of psychiatric distress as predictors of percentage of days abstinent within the previous 90 days (PDA) at six-month follow-up. The predictors entered at the first step contributed significantly to a regression model for PDA at six-month follow-up. These predictors accounted for 11% of the total variance. Age and intake PDA contributed significantly to this model ($\beta = .26$, $t(121) = 2.90$, $p < .016$, and $\beta = .21$, $t(121) = 2.41$, $p < .016$, respectively). Quantitative and qualitative indices entered at the second and third steps failed to significantly contribute to the overall model. Thus, greater age and percentage days abstinent at intake significantly predicted PDA at six-month follow-up. No measures of psychiatric distress predicted this aspect of substance use outcome.

Table 16

Summary of hierarchical regression analysis for quantitative and qualitative psychiatric indices as predictors of percentage days abstinent at six-month follow-up.

Variable	<u>r</u>	<u>B</u>	<u>S.E. B</u>	<u>β</u>
<u>Step 1</u>				
Age	.24	.63	.21	.26*
Group	.14	3.89	4.00	.09
PDA90-1	.17	.18	.07	.21*
Model: $\underline{R}^2 = .11$, $\underline{F} (3, 120) = 4.94^*$				
<u>Step 2</u>				
GSI-1	-.21	-.34	.24	-.14
PSR-1	-.17	-.94	1.96	-.06
PIT-1	-.15	-.18	1.59	-.01
Model: $\Delta \underline{R}^2 = .03$, $\underline{F} (3, 117) = 1.44$				
<u>Step 3</u>				
GSI-2	-.09	-.02	.27	-.01
PSR-2	.01	3.18	2.22	.19
PIT-2	-.03	-.21	1.86	-.01
Model: $\Delta \underline{R}^2 = .02$, $\underline{F} (3, 114) = 1.07$				

Note. * $p < .016$, $^{\dagger}p < .10$. PDA90-1: percentage days abstinent within the past 90 days at intake.

Discussion

The present study investigated distinct substance abuse treatment aftercare regimes and their interaction with participant attributes, specifically degree of posttreatment psychiatric distress and sociopathy, on treatment outcome. The present study also sought to investigate the predictive validity of qualitative appraisals of psychiatric distress on outcome.

Evidence for Attribute by Aftercare Interactions

There was weak support for the matching hypotheses explored here. Outcome was not better when participants with a greater degree of psychiatric distress or sociopathy received SRP aftercare. In fact, the few attribute by aftercare interaction effects that occurred were in the opposite direction of that hypothesized. Latency to lapse was increased when participants with lower psychiatric distress were assigned to SRP and when participants with greater psychiatric distress were assigned to TSF. This finding and the lack of significant interaction effects for abstinence status or the presence of substance related problems at follow-up failed to replicate Kadden et al.'s (1989) initial aftercare interaction effects. A trend was noted for decreased likelihood of sustained abstinence at follow-up for participants with greater psychiatric distress when assigned to SRP. Again, this trend was in the opposite direction of what had been hypothesized for these participants.

A trend was also noted for a greater decrease in drug status severity when participants with lower psychiatric distress were assigned to TSF. That is, low psychiatric distress participants assigned to TSF tended to have greater drug severity scores posttreatment than the SRP group and showed greater improvement by six-month follow-up. This trend must be interpreted cautiously as the difference in posttreatment drug status

existed prior to randomization and participants were not stratified on drug severity prior to aftercare. Thus, the posttreatment differences might represent sampling bias and the greater improvement in the TSF group might reflect an artifact of regression to the mean. Despite this possibility, Project MATCH research group (1997) noted a similar interaction effect but with a different outcome variable. That is, low psychiatric distress paired with TSF outpatient interventions contributed to more abstinence at follow-up. As these investigators have suggested (Project Match Research Group, 1997), research into what aspects of greater psychiatric distress influence TSF's effectiveness is needed. However, the present study found that participants with greater or lower psychiatric distress benefited from TSF depending on the outcome measure investigated.

Magura et al. (2003) suggested that mainstream mutual-help groups might be intolerant of the needs of individuals with greater psychiatric needs, necessitating specialized groups to enhance participation. The finding that latency to lapse was greater for participants with greater psychiatric distress opposes this notion. Yet as discussed earlier, the TSF intervention is a controlled manual driven approach that does not reflect the reality of a naturalistic 12-Step fellowship group, such as A.A. It is possible that subtle discrimination occurs in the 'real world' 12-Step approaches. This is probably a less likely scenario in TSF where a therapist guides the intervention.

The current study failed to replicate prior matching findings with respect to psychiatric distress. Previous matching studies had used the intake ASI psychiatric status composite score to evaluate attribute by aftercare interactions (Kadden et al., 1989; Project Match Research Group, 1997), whereas the current study chose to use a posttreatment psychiatric symptom distress inventory (i.e., SCL-90-R) to investigate these interactions.

The psychiatric distress group cut-score represented a normed clinical cut-score, whereas the ASI is more of a general psychiatric distress index. Both measures have provided some evidence for aftercare matching. The lack of corroboration with other matching investigations might be a result of how psychiatric distress was operationalized. I suspected that posttreatment psychiatric distress would be a more timely and meaningful measure of psychiatric distress when considering aftercare needs. Further investigation into clinically meaningful psychiatric distress indices as aftercare interaction attributes is needed.

A significant interaction effect for aftercare and sociopathy on legal status was observed. Legal status was improved when participants with greater sociopathy were assigned to TSF rather than SRP. To my knowledge, no prior matching investigations have examined this relationship. It is possible that the abundant moral and spiritual components of the 12-Step facilitation approach (e.g. honesty, accepting responsibility, and making amends) might have had an impact on the deviant attitudes and practices associated with greater sociopathy.

Both aftercare interventions were offered in a group format and required basic social skills. Since neither intervention improved psychosocial functioning for participants with greater sociopathy, perhaps treatments that focus primarily on substance specific skills training (i.e., urge control) might better address the needs of these individuals and improve treatment outcome. Contingency management treatments have shown promise as an alternate substance abuse treatment approach for individuals with greater sociopathy (Messina et al., 2003). That is, less interpersonally demanding interventions with greater 'reward' components might be best suited for substance abusers with greater sociopathy.

Investigators have noted that greater sociopathy may contribute to “treatment resistance” in substance abusers (Messina et al., 2003). The extent of treatment resistance may depend upon the outcome expectations with respect to treatment. That is, treatments that promote social functioning will view deficits in this area posttreatment as failure whereas treatments that seek to change substance use only will ignore deficits in social functioning. Thus, tailoring treatment goals to substance abusers with greater sociopathy could mean negotiating goals that are realistic to them and not the treatment structure.

Differences in aftercare duration between the present study and other investigations might also underlie inconsistencies in the findings between studies regarding matching. It is plausible that less exposure to the aftercare treatment regimes might have contributed to this difference. Participants attended on average 50% of the scheduled 10 weekly aftercare sessions. Project Match research group (1997) had reported that their participants completed 66% of the scheduled 12-session aftercare treatment. Copeland et al. (2001) noted that 50% of their participants completed all six sessions of an outpatient RP treatment but also found that it became less effective when delivered in a briefer format (i.e., less than 6 sessions). It is unclear to what extent duration and number of sessions impacted on the current study’s aftercare effectiveness. If the aftercare intervention became less effective as a result of less participation, then the hypothesized interaction effects sought might have been attenuated. Additionally, the present study did not control for participation in other treatments during the follow-up period, especially informal 12-Step or other self-help involvement. Consequently, the level of aftercare participation and exposure to other treatments might have also obscured attribute by aftercare interaction effects.

To summarize, the present study provided limited support for the hypothesized attribute by aftercare interactions. In particular, posttreatment psychiatric distress and sociopathy emerged as uncertain matching attributes. As investigators have noted, numerous combinations of individual attributes and treatment have yet to be adequately explored (Mattson et al., 1994). However, given that studies using the most meaningful attributes have yielded modest support for matching, the value of considering more obscure patient attributes, and more complex and clinically demanding patient-treatment interactions, is questionable.

The Impact of Aftercare Regime

The current study failed to support the hypothesis that distinct aftercare treatments would differentially influence latency to relapse. It was hypothesized that the SRP emphasis on preparation for high-risk situations, promotion of self-efficacy, and reframing lapses would produce a longer latency to relapse. Assignment to either TSF or SRP produced no added benefit to this end. The lack of differences between aftercare group latencies to lapse and relapse might be explained by the finding that just under half of all participants reported continued abstinence by six-month follow-up. These findings are particularly of interest as SRP's appeal has been its unique focus on the relapse process and preparing individuals for posttreatment challenges. The added benefit to outcome of this approach was not evident in the current study. This finding is consistent with those of Project MATCH and supports the notion that no single aftercare produced superior latencies to lapse or relapse. Moreover, the proportion of participants that lapsed (i.e., 61%) and relapsed (i.e., 41%) by six-month follow-up was almost identical to that of the aftercare arm of Project MATCH (Project Match Research Group, 1997a). That is, despite intensive treatment and distinct aftercare

interventions, posttreatment lapses and relapse episodes remain common occurrences for substance abusers.

The second hypothesis that aftercare treatment would differentially influence substance use or psychosocial outcome was not supported. A trend for TSF participants to maintain lower ASI alcohol status scores from posttreatment was in line with the hypothesized effect but no other substance use outcome indices supported this trend. That is, TSF failed to show a marked advantage over SRP on abstinence status, percentage days abstinent, or substance-related problems at follow-up. Likewise, SRP demonstrated no added advantage with respect to psychosocial functioning. Prior research had found no one aftercare to possess overall superior treatment effectiveness (Kadden et al., 1989; Project Match Research Group, 1997a), although distinct advantages for each, such as abstinence outcomes related to TSF interventions and improved psychosocial functioning related to SRP interventions, had been observed (Ito et al., 1988; Ouimette et al., 1997). Neither of these distinct effects was observed in the present study.

The Impact of Degree of Psychiatric Distress and Sociopathy

The present study also hypothesized that participants with greater posttreatment psychiatric distress or greater sociopathy would have poorer treatment outcomes than other participants. This hypothesis was supported as participants with greater posttreatment psychiatric distress had poorer substance use and psychosocial outcomes. Greater posttreatment psychiatric distress contributed significantly to a decreased likelihood of sustained abstinence at follow-up, an increased likelihood of experiencing substance-related problems (e.g., cravings, loss of control, etc.), increased ASI alcohol and drug severity during the follow-up period, and finally a shorter latency to lapse and relapse. Greater

posttreatment psychiatric distress was also related to poorer family/social functioning at follow-up. These findings confirm prior investigations that have supported an association between psychiatric distress and poorer substance use and psychosocial functioning following treatment (Miller et al., 1996; Simpson et al., 1999).

The notion that posttreatment psychiatric distress would be a viable indicator of persistent distress was supported. First, participants' psychiatric distress decreased significantly from intake to posttreatment but remained clinically meaningful and predictive of outcome. Second, previous studies investigating the predictive validity of psychiatric distress at intake to treatment have found that these measures could be confounded by withdrawal symptoms. When intake alcohol and drug severity (i.e., including withdrawal symptoms) were accounted for, posttreatment psychiatric distress was significantly associated with substance use severity at outcome. Third, posttreatment indices of psychiatric distress, such as the SCL-90-R GSI, might contribute to a more timely and accurate portrayal of aftercare treatment needs. When intake psychiatric symptom distress was accounted for, posttreatment psychiatric distress contributed significantly to predict psychiatric distress at follow-up. Although the current study addressed overall posttreatment psychiatric symptom distress, more research is needed to identify the role of specific domains of posttreatment psychiatric disturbance (e.g., depression and anxiety) and related aftercare treatment needs of substance abusers.

Degree of sociopathy received little support as a predictor of poor treatment outcome. It was significantly related to greater psychiatric disturbance (i.e., ASI-psychiatric composite) at posttreatment and follow-up. There was also a trend for greater sociopathy to be related to greater medical disturbance throughout the follow-up period. Participants with

lower sociopathy tended to show improved family functioning over the six-month follow-up. Thus, greater sociopathy was mildly associated with a greater disturbance in psychosocial functioning. There was no support for an association between greater sociopathy and poorer substance use outcomes.

Qualitative Indices of Psychiatric Distress

The final hypothesis that qualitative indices of psychiatric distress would contribute uniquely to predicting treatment outcome received some support. When quantitative psychiatric distress indices were controlled for, participants with greater posttreatment importance of treatment ratings (PIT) for psychiatric problems were more likely to have poorer family/social functioning at follow-up. That is, participant appraisal of the need for posttreatment psychiatric treatment signaled a poorer family/social outcome. Additionally, the posttreatment PIT rating was significantly correlated with all quantitative indices of psychiatric distress, including the posttreatment SCL-90-R global severity index. Thus, as Brown and colleagues (1999) posited, the ASI treatment ratings provide an additional and useful measure of treatment needs. The ASI client and therapist severity ratings are intended for treatment planning. The majority of research on the ASI has focused on the domain composite scores and interviewer severity ratings. The present study contributes support for the validity of client qualitative appraisals with respect to psychiatric needs.

Neither of the participant severity ratings (PSR) nor intake PIT ratings received support as predictors of substance use and psychosocial outcome measures. The intake PIT rating was the only qualitative psychiatric distress measure that was not significantly correlated to posttreatment GSI. It also had the weakest relationship with posttreatment PIT compared to other psychiatric distress measures. Thus, qualitative indices of importance of

treatment for psychiatric needs at intake provide little apparent additional or corroborative information with respect treatment needs. Additionally, PSR and PIT ratings decreased significantly from intake to posttreatment. These findings have treatment implications. Given that the ASI is usually administered at the outset of substance abuse treatment for the purpose of treatment planning, the current findings suggest that client appraisals for psychiatric treatment at intake be interpreted cautiously. Exaggerated intake ratings might represent the artifact of a “cry for help” and not necessarily indicate psychiatric treatment needs. This underscores the importance of timing in the assessment of psychiatric treatment needs.

Finally, intake qualitative ratings varied significantly as a function of age. That is, younger age was associated with greater intake PSR and PIT ratings. This relationship was reduced to a trend with the PIT at posttreatment. It is possible that younger individuals present with a more severe psychiatric picture, however, this trend was not noted with the quantitative psychiatric indices. This relationship might exemplify the “cry for help” suggested above. In sum, younger individuals might see their psychiatric situation as much more dire. Although this finding is specific to psychiatric needs, it requires further investigation. The current study did not specifically target other ASI domain PSR and PIT ratings.

Methodological Implications and Limitations

The current study contributed to the controversy surrounding how outcome, specifically relapse, is operationalized. The finding that participants had an overall greater latency to relapse than lapse indicates that the traditional outcome measure of “first use” only partially describes outcome. The emphasis on a “sentinel” event (i.e., first use of a

substance) reflects the disease model assumption that the first drink inevitably leads to loss of control. More recently, investigators have extended outcome measurement to include “patterns” of substance use (Project Match Research Group, 1997). The present study confirmed that rates of relapse and lapse vary greatly during the six months posttreatment. The move away from solely relying on sentinel events to measure relapse (i.e., return to a pattern of consumption) seems justified to gain a more meaningful appraisal of treatment outcome.

Defining lapse and relapse when participants are multiple substance abusers presents a particular challenge, both empirically and clinically. In the present study, the majority of substance abusers admitted to treatment were alcohol and drug abusers. We found that the precise substance implicated in a lapse or relapse varied greatly, and often differed from the substance that was the presenting problem at intake. Only 34% of participants lapsed on the substance that was their presenting problem. Alcohol use was most common in lapses whereas drug use was most common in relapses. A challenge for future research is how to incorporate multiple substances into understanding the relapse process. For example, does lapsing on one substance influence the likelihood of relapsing with another substance? This finding also has clinical implications. Traditional treatment models have tended to encourage “total abstinence” from all substances as they believe that lapsing on any substance will result in an inevitable relapse to the problem substance. This is a position derived from the disease model’s opposition to controlled drinking as a treatment goal. Whether this is an accurate position or not remains to be confirmed empirically. Early research confirmed that a minority of alcohol abusers returned to “non-problem drinking”

posttreatment (Polich et al., 1980). This has yet to be adequately documented across substances.

The present study's findings are not without shortcomings. The attrition rate (i.e., approximately 50%) presented as a major dilemma with respect to the generalizability of the results. Participants that were not retained for analyses due to either dropout or missed assessment sessions were significantly younger, less educated, and possessed poorer verbal skills. Brown, Seraganian, Tremblay and Annis (2002) more comprehensively examined attrition in the current study's sample. They found non-retained participants had poorer employment functioning and more prior treatments for alcohol problems than retained participants. This pattern replicated findings from a previous treatment follow-up study (Brown et al., 1993) where along with a 40% attrition rate, study dropouts were less educated, had more socio-economic problems, and more prior treatments. This finding is also consistent with those of other investigators who found retention in treatment was associated with greater age, income, and verbal ability (Walker, Donovan, Kivlahan, & O'Leary, 1983; Copeland et al., 2001). Thus, the current findings should be cautiously generalized to this profile of participant.

Attrition is a vexing problem for substance abuse treatment research. Attrition rates in other substance abuse treatment outcome studies have ranged from 18% to 40% (Ouimette et al., 1997; Toumbourou et al., 2002). The relatively high attrition rate seen here is likely an inadvertent result of the deliberate attempt to enhance external validity. That is, exclusion criteria were intentionally minimized. For example, the participation of corroborators and contact individuals were sought for all participants, though not all participants could or were prepared to provide this information. Unlike other studies where

the availability of a contact person was required and as a result attrition was appreciably lower (e.g., Project MATCH), participants in the present study were not excluded for this reason. As lower attrition is typically observed when rigorous exclusion criteria are adopted, our recruitment strategy probably contributed to participant loss. On the other hand, the current sample included individuals with unstable living conditions, multiple substance use problems, and concurrent psychiatric problems. These individuals would have been excluded under other matching protocols (e.g., Project Match Research Group, 1997) though they may be more representative of the individuals seeking help in the ‘real world’. The trade-off seems to be a choice between more representative substance abuse samples or lower attrition rates. The strategy employed in the current study favored the former.

Likewise, the decision to retain participants in the study despite varied participation in the aftercare programs reflected an “intent to treat” randomization strategy. Participants that completed few aftercare sessions likely represented highly ambivalent individuals that frequently present for substance abuse treatment. That is, not all substance abusers are 100% committed to behavior change or to the treatment process. Consequently, retaining these participants allowed for a more ‘real world’ sample.

A few participants were excluded from the analyses due to missed assessment sessions. Their latencies to lapse and relapse differed from the retained participants. Although not subjected to statistical scrutiny due to uneven sample sizes, the differences seemed to depict that these participants had greater latencies to lapse but relapsed sooner than retained participants. The impact their exclusion had on the current analyses is uncertain.

Conclusions and Future Directions

Overall, the matching hypothesis explored here received little support and distinct aftercare regimes showed no superior effect on treatment outcome. The interaction of posttreatment psychiatric distress with TSF aftercare to produce favorable outcomes requires further investigation. If this is in fact a viable matching variable, two issues must be considered further. First, how comparable is TSF to 12-Step fellowships? Given that the former was developed as an intervention for randomized research trials and the latter is a self-selected intervention that involves a collective ideology, the TSF findings are not easily generalized to 12-Step fellowships. Second, would matching to a self-selection intervention (i.e., 12-Step fellowship) actually change the nature of the intervention process as previous investigators have suspected (Ouimette et al., 1997)? In essence, self-selection is self-matching. A comparison between matching and self-selection into aftercare treatment is required. Researchers might investigate the influence of 12-Step beliefs and the relative decision-making process that is undertaken (e.g., cost-benefit analysis) by individuals that self-select into 12-Step treatments. Consequently, self-selection mismatches could be examined as well. These issues have yet to be understood. Considering that 12-Step fellowships are abundant, accessible, and free of charge, they represent opportune aftercare interventions that warrant comprehensive evaluation.

Finally, posttreatment psychiatric distress appears to be a valuable predictor of treatment outcome. Providing timely assessments of psychiatric needs will allow for improved aftercare treatment planning tailored to individual needs. Moreover, qualitative appraisals for psychiatric treatment needs hold promise in treatment planning and predicting

treatment outcome. Brief likert-scale ratings for psychiatric distress and treatment needs have both empirical and clinical appeal.

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Appendix A

Schematic of the Relapse Model

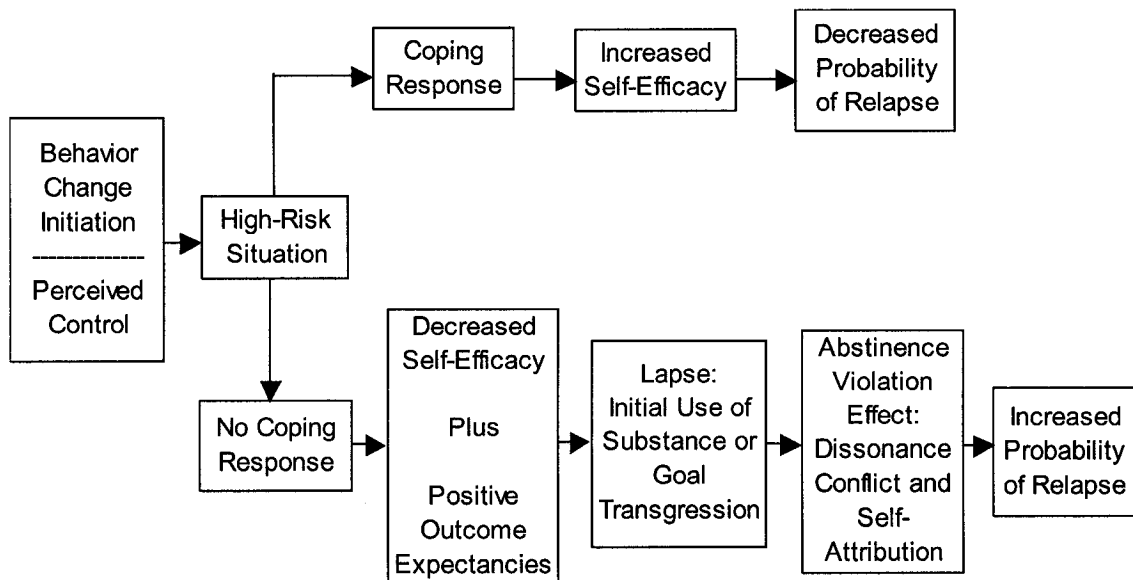


Figure A-1. cognitive behavioral model of the relapse process.
 (Likeness taken from: Quigley, L. A., & Marlatt, G. A. (1999). Relapse Prevention: Maintenance of changes after initial treatment. In B.S. McCrady & E.E. Epstein (Eds.), Addictions: A comprehensive guidebook (pp. 370-384). New York: Oxford University Press.)

Appendix B

The Twelve Steps of Alcoholics Anonymous

Alcoholics Anonymous: The Twelve Steps

Step One: We admitted we were powerless over alcohol-that our lives had become unmanageable.

Step Two: Came to believe that a power greater than ourselves could restore us to sanity.

Step Three: Made a decision to turn our will and our lives over to the care of God as we understood him.

Step Four: Made a searching and fearless moral inventory of ourselves.

Step Five: Admitted to God, to ourselves, and to another human being the exact nature of our wrongs.

Step Six: Were entirely ready to have God remove all these defects of character.

Step Seven: Humbly asked him to remove our shortcomings.

Step Eight: Made a list of all persons we had harmed, and became willing to make amends to them all.

Step Nine: Made direct amends to such people wherever possible, except when to do so would injure them or others.

Step Ten: Continued to take personal inventory and when we were wrong promptly admitted it.

Step Eleven: Sought through prayer and meditation to improve our conscious contact with God as we understood Him, praying only for knowledge of His will for us and the power to carry that out.

Step Twelve: Having had a spiritual awakening as the result of these steps, we tried to carry this message to alcoholics, and to practice these principles in all our affairs.

Appendix C

Participant Informed Consent Form

Experimental Manipulation of Treatment Aftercare Regimes for the Substance Abuser

Patient Informed Consent Form

September 1995

Pavillon Foster, la Maison Jean Lapointe and Le Centre de Readaptation Monteregie in conjunction with researchers from Concordia University request your cooperation in a resaearch project aimed at evaluating the influence of two different aftercare programs. Participation in the research project has no bearing on the intensive treatment or the usual aftercare program which your center offers; the aftercare programs which are part of the research project are added-on to those which your are already scheduled to receive. The two aftercare programs, which are both held for one session per week for ten weeks, are based on either a 12-Step model which employs the principals of Alcoholics Anonymous or a Relapse Prevention model which tries to teach you knew coping skills. If more than a week lapses between the end of your intensive treatment and the scheduled start-up of your 10-week aftercare program, an induction session will also be offered to familiarize with what is to come. Both aftercare programs adhere to a philosophy of complete abstinence from alcohol and drug usage. If you agree to participate in the project you will be assigned at random to participate in one or the other aftercare program. This means that the additional aftercare program that you receive as part of the research project is decided by the luck of the draw and not selected deliberately because of any special characteristics or problems you have. Trained counselors under the supervision of expert consultants oversee the planning and implementation of the aftercare programs. Therapists from your treatment center might, from time to time, attend some of the aftercare sessions as observers.

Participants in this study undergo assessment of alcohol and drug use, physical, cognitive, as well as psychological status at five points in time: 1) intake into intensive treatment, 2) following completion of intensive treatment, 3) following the ten session aftercare program, 4) six months following completion of intensive treatment, and 5) twelve months following completion of intensive treatment. Each of these assessment sessions takes around about two hours to complete with the first session being a little longer than the others.

As part of the research project we also would like to interview, around the time these five assessment sessions, a person who knows you well to ask for their views on how you are doing. This person whom we call a corroborator, could be your spouse, close friend, roommate, co-worker, brother, sister or parent. The corroborator should ideally be someone whom you know well, sees you regularly, knows about your alcohol or drug use, and that you trust that we could talk in confidence without creating problems for you. These interviews are completely confidential, and would not give the person being interviewed any information that we have gathered from you other than that you are in treatment for substance abuse. The person serving as corroborator should be someone who understands the importance of the research and would give us honest answers. At the bottom of this form we ask you to provide names and addresses of two individuals who we can contact in order to ask them to corroborate your alcohol and drug status. We require only one

corroborator but we ask for two names in case the first person isn't willing to participate in the study.

As a token of our appreciation for your participation in the study you will be given \$10.00 for completing the third assessment session as well as \$20.00 for completing each of the fourth and fifth assessment sessions (i.e. a total of \$50.00). At the end of the project you can receive if you wish a description of your individual results as well as a summary of the group findings.

It is anticipated that the results of this study will improve understanding of the aspects of aftercare programs that contribute to greater success in the struggle to combat alcohol and drug abuse. If one of the aftercare programs proves to be more beneficial than the other, all study participants, if they haven't already, will be given the opportunity to receive this 10 session program, once the study is over.

If you are unwilling to participate in the experimental aftercare programs but would be prepared to allow us to perform the assessment sessions (five maximum), we would also be grateful for such partial participation in the research project. There is a section at the end of this form that you can check off if such partial participation in the project is of interest to you.

Risks and Discomfort

We envision no risk to your physical or psychological well-being due to any of the above procedures. If we feel at any time that your further participation in the research project is detrimental to your well-being we will inform you of this decision, terminate your participation in the study, and provide appropriate referrals.

Confidentiality

All data collected will be kept strictly confidential. A qualified researcher from Concordia University who is not involved in your treatment will gather the experimental data. Thus, the information that you provide will in no way influence your treatment. Information gathered from you will be coded for the purpose of statistical analysis and will not be available to the clinical staff or others not directly involved in this study. Due to this commitment to confidentiality some questions or sections of questionnaires which are asked in the assessment sessions may duplicate information which staff from your treatment center may have gathered. Although such duplication is unfortunate, it is a price we must pay for keeping your data confidential.

There is one situation in which our commitment to confidentiality may be waived. If our data strongly suggest the potential for harm to you or others (e.g. suicide, violence) we must inform you and if necessary, the appropriate health professionals.

Inquiries

If you have any doubts or questions about any of the procedures please ask the experimenter for further information or call Naomi Rappaport, the project co-ordinator, at 848-2856 during regular business hours.

Freedom of Consent

Your participation in this study is voluntary. You are free to deny consent or to withdraw from the study at any time. Your actions in this regard will have no bearing on the services usually offered at Pavillon Foster, La Maison Jean Lapointe and Le Centre de Readaptation Monteregie.

I have read this form, understand the procedures, and consent to participate in the project either

Fully_____

Just for the assessment sessions (five maximum)_____

Signature of participant_____

Address_____

Telephone (home)_____

Witnessed by _____Date_____

Please provide below the names, addresses and telephone numbers of two people (corroborators) whom we can contact to inquire about your alcohol and drug use status at the time of the four assessment sessions.

Name_____

Address_____

Telephone#_____

Relationship_____

Best time to call_____

Name_____

Address_____

Telephone#_____

Relationship_____

Best time to call_____

Appendix D

Hierarchical logistic and linear regression analyses of substance use and psychiatric distress:
Sociopathy as matching attribute

Table D-1

Summary of logistic regression analysis for variables predicting abstinent status at 6-month follow-up

Variable	<u>B</u>	<u>S.E. B</u>	Wald (<u>df</u>)	<u>R</u> ²
Step 1				
Age	.05	.02	5.27 (1)*	.06
Model: $\chi^2 (1) = 5.77, p < .012$				
Step 2				
Group	.07	.37	.03 (1)	.06
Model: $\Delta\chi^2 (1) = .03, p = \underline{n.s.}$				
Step 3				
CPI-So	-.01	.02	.08 (1)	.06
Model: $\Delta\chi^2 (1) = .08, p = n.s.$				
Step 4				
CPI-So x Group	-.01	.04	.06 (1)	.06
Model: $\Delta\chi^2 (1) = .04, p < n.s.$				

Note. $p < .012$. For steps 1 through 4, the Hosmer and Lemeshow goodness-of-fit chi-square test remained non-significant.

Table D-2

Summary of logistic regression analysis for variables predicting substance-related problems at 6-month follow-up.

Variable	<u>B</u>	<u>S.E. B</u>	Wald (<u>df</u>)	<u>R</u> ²
Step 1				
Age	-.01	.02	.22 (1)	.00
Model: $\chi^2 (1) = .219, p = \text{n.s.}$				
Step 2				
Group	-.35	.36	.89 (1)	.01
Model: $\Delta\chi^2 (1) = .89, p = \text{n.s.}$				
Step 3				
CPI-So	.03	.02	2.5 (1)	.04
Model: $\Delta\chi^2 (1) = 2.57, p < .\text{n.s.}$				
Step 4				
GSI2 x Group	.02	.04	.20 (1)	.04
Model: $\Delta\chi^2 (1) = .20, p < .\text{n.s.}$				

Note. $p < .012$. For steps 1 through 4, the Hosmer and Lemeshow goodness-of-fit chi-square test remained non-significant.

Table D-3

Summary of linear regression analyses for variables predicting percentage days abstinent (PDA) within the past 90 days at 6-month follow-up.

Variable	<u>R</u>	<u>B</u>	<u>S.E. B</u>	<u>β</u>
Step 1				
Age	.24	.66	.21	.27*
PDA (intake)	.16	.17	.07	.20*
Model: $\underline{R}^2 = .10$, $\underline{F} (2,122) = 6.58^*$				
Step 2				
Group	.13	3.5	3.9	.08
Model: $\Delta \underline{R}^2 = .01$, $\underline{F} (1,121) = .81$				
Step 3				
CPI-So	-.02	-.26	.22	-.10
Model: $\Delta \underline{R}^2 = .01$, $\underline{F} (1,120) = 1.32$				
Step 4				
CPI-So x Group	.13	.16	.44	.14
Model: $\Delta \underline{R}^2 = .00$, $\underline{F} (1,119) = .14$				

Note. * $p < .012$.

Table D-4

Summary of linear regression analyses for variables predicting psychiatric symptom distress (i.e. SCL-90-R: GSI) at 6-month follow-up.

Variable	<u>R</u>	<u>B</u>	<u>S.E. B</u>	<u>β</u>
Step 1				
Age	-.01	.15	.10	.10
GSI1	.60	.86	.09	.63*
Model: $\underline{R}^2 = .38$, $\underline{F} (2,122) = 37.43^*$				
Step 2				
Group	.01	.66	1.89	.00
Model: $\Delta \underline{R}^2 = .00$, $\underline{F} (1,121) = .12$				
Step 3				
CPI-So	-.27	-.04	.11	-.03
Model: $\Delta \underline{R}^2 = .00$, $\underline{F} (1,120) = .15$				
Step 4				
CPI-So x Group	-.06	-.21	.21	-.31
Model: $\Delta \underline{R}^2 = .01$, $\underline{F} (1,119) = 1.01$				

Note. * $p < .012$.

Appendix E

Survival analyses for latency to lapse and relapse: Sociopathy as matching attribute.

Table E-1

Summary of Cox's proportional hazard regression analysis with variables (including sociopathy) predicting time to lapse

Variable	-2LL ¹	<u>B</u>	<u>S.E. B</u>	<u>Wald (df = 1)</u>
Step 1				
Age	670.22	-.03	.01	4.34*
Model: $\chi^2 (1) = 4.35, p < .025$				
Step 2				
Group	667.87	-.36	.23	2.36
Model: $\Delta\chi^2 (1) = 2.35, p < n.s.$				
Step 3				
CPI-So	667.35	.01	.01	.52
Model: $\Delta\chi^2 (1) = .52, p < n.s.$				
Step 4				
CPI-So x Group	667.20	.01	.03	.15
Model: $\Delta\chi^2 (1) = .15, p < n.s.$				

Note. * $p < .025$

Table E-2

Summary of Cox's proportional hazard regression analysis with variables (including psychiatric distress) predicting time to relapse

Variable	-2LL ¹	<u>B</u>	<u>S.E. B</u>	<u>Wald (df = 1)</u>
Step 1				
Age	464.05	-.04	.02	4.22*
Model: $\chi^2 (1) = 4.22, p < .025$				
Step 2				
Group	462.28	-.38	.28	1.77
Model: $\Delta\chi^2 (1) = 1.77, p < n.s.$				
Step 3				
CPI-So	462.26	.00	.02	.01
Model: $\Delta\chi^2 (1) = .01, p < n.s.$				
Step 4				
CPI-So x Group	461.57	-.03	.03	.69
Model: $\Delta\chi^2 (1) = .69, p < n.s.$				

Note. * $p < .025$; ¹ -2 Log Likelihood

Appendix F

Summary tables for repeated measures ANCOVA

Table F1

Repeated Measures Analysis of Covariance for ASI Composite Scores with PsychiatricDistress as Attribute

Source	df	F			
		Med.	Emp.	Fam.	Leg.
Between subjects					
Covariate A (A)	1	.43	.49	1.13	.001
Covariate B (B)	1	11.87*	234.54*	52.06*	183.95*
Group	1	3.29	1.01	.25	.59
Attribute	1	.76	1.85	19.18*	.79
Group x Attribute	1	.28	.63	.27	1.70
Subject within group					
error	119	(.02)	(.05)	(.03)	(.01)
Within Subjects					
Time	1	.21	.07	.57	.04
Time x A	1	.10	.05	.69	.04
Time x B	1	.68	3.69	.45	14.65*
Time x Group	1	.18	2.41	1.34	.88
Time x Attribute	1	.62	.001	.56	1.05
Time x Group x Attribute	1	5.37	.02	.12	.08
Time x Subject within group					
error	119	(.01)	(.03)	(.02)	(.01)

Note. * $p < .007$. Values in parenthesis represent mean square error. Med. = Medical; Emp. = Employment; Fam. = Family Social; Leg. = Legal; Covariate A = age of participant; Covariate B = intake value of dependent measure; Group = aftercare group assignment.

Table F1 (Continued)

Repeated Measures Analysis of Covariance for ASI Composite Scores with PsychiatricDistress as Attribute

Source	df	F		
		Alc.	Drg.	Psych.
Between subjects				
Covariate A (A)	1	4.33	13.65*	1.73
Covariate B (B)	1	25.97*	52.96*	19.23*
Group	1	4.42	.001	.38
Attribute	1	7.37*	16.45*	26.78*
Group x Attribute	1	.48	4.65	.02
Subject within group				
error	119	(.03)	(.004)	(.03)
Within Subjects				
Time	1	1.14	.09	.57
Time x A	1	1.44	.05	1.25
Time x B	1	.12	1.76	.38
Time x Group	1	1.58	.19	1.07
Time x Attribute	1	.06	2.06	1.36
Time x Group x Attribute	1	.25	.47	1.15
Time x Subject within group				
error	119	(.02)	(.002)	(.02)

Note. * $p < .007$. Values in parenthesis represent mean square error. Alc. = Alcohol; Drg. = Drug; Psych. = Psychiatric; Covariate A = age of participant; Covariate B = intake value of dependent measure; Group = aftercare group assignment.

Table F2

Repeated Measures Analysis of Covariance for ASI Composite Scores with Sociopathy as Attribute

Source	df	<u>F</u>			
		Med.	Emp.	Fam.	Leg.
Between subjects					
Covariate A (A)	1	.26	.23	1.68	.13
Covariate B (B)	1	10.05*	251.35*	54.73*	188.31*
Group	1	5.00	1.58	.33	.52
Attribute	1	4.82	6.84	3.77	.36
Group x Attribute	1	3.24	3.38	.003	4.96
Subject within group					
error	119	(.02)	(.05)	(.03)	(.01)
Within Subjects					
Time	1	.001	.04	.85	.003
Time x A	1	.05	.02	1.03	.02
Time x B	1	1.28	3.91	.34	16.31*
Time x Group	1	.22	3.05	1.93	.81
Time x Attribute	1	.35	2.12	4.64	.00
Time x Group x Attribute	1	1.82	.01	.84	2.77
Time x Subject within group					
error	119	(.01)	(.03)	(.01)	(.01)

Note. * $p < .007$. Values in parenthesis represent mean square error. Med. = Medical; Emp. = Employment; Fam. = Family Social; Leg. = Legal; Covariate A = age of participant; Covariate B = intake value of dependent measure; Group = aftercare group assignment.

Table F2 (Continued)

Repeated Measures Analysis of Covariance for ASI Composite Scores with Sociopathy as Attribute

Source	df	<u>F</u>		
		Alc.	Drg.	Psych.
Between subjects				
Covariate A (A)	1	5.25	12.51*	2.37
Covariate B (B)	1	26.51*	46.32*	30.99*
Group	1	4.83	.01	.38
Attribute	1	2.34	2.52	6.09
Group x Attribute	1	.05	.84	1.84
Subject within group				
error	119	(.03)	(.004)	(.04)
Within Subjects				
Time	1	1.05	.06	.76
Time x A	1	1.32	.01	2.08
Time x B	1	.13	1.08	1.67
Time x Group	1	1.21	.07	1.48
Time x Attribute	1	1.15	.51	.76
Time x Group x Attribute	1	.07	.23	.08
Time x Subject within group				
error	119	(.01)	(.00)	(.02)

Note. * $p < .007$. Values in parenthesis represent mean square error. Alc. = Alcohol; Drg. = Drug; Psych. = Psychiatric; Covariate A = age of participant; Covariate B = intake value of dependent measure; Group = aftercare group assignment.