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THE EFFECTS OF PSYCHIATRIC SYMPTOMATOLOGY ON INVOLVEMENT AND BENEFIT FROM SELF-HELP IN A DUALLY DIAGNOSED SAMPLE

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THE EFFECTS OF PSYCHIATRIC SYMPTOMATOLOGY ON INVOLVEMENT AND BENEFIT FROM SELF-HELP IN A DUALLY DIAGNOSED SAMPLE

By

Lisa C. Jordan

A DISSERTATION

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ABSTRACT

THE EFFECTS OF PSYCHIATRIC SYMPTOMATOLOGY ON INVOLVEMENT AND BENEFIT FROM SELF-HELP IN A DUALLY DIAGNOSED SAMPLE

By

Lisa C. Jordan

This study was designed to investigate the efficacy of Alcoholics and Narcotics Anonymous (AA/NA) programs for persons with dual diagnoses of substance abuse and mental illness, using correlational analyses and EQS structural equation modeling with data from a group of 474 persons with dual diagnosis. All of the participants in this study received treatment at a public psychiatric hospital, and many were subsequently referred to AA/NA for sobriety support services. The current analyses were conducted with data from the hospital admissions interview, and four follow-up interviews, concluding at 14-months post-hospitalization.

The results indicated that from hospital discharge through 10-months post-hospitalization, participants in this sample were attending AA/NA at rates equivalent to those reported in studies of persons with singly diagnosed substance abuse disorders. These findings suggest that dual diagnosis is not necessarily a deterrent to AA/NA participation. However, participants with the most severe and chronic psychiatric problems were less likely to attend AA/NA, and were more likely to drop out if they did attend. Results from the structural equation models did not support the expectation of differential outcomes from AA/NA and other service use

based on psychiatric symptomatology and chronicity. Persons who attended AA/NA regularly had fewer alcohol and drug problems, and fewer psychiatric problems at 10- and 14-months post-discharge, regardless of prior symptomatology and chronicity. While AA/NA participation was not directly related to psychological or family/social problems, or rehospitalization, reduction in alcohol and drug problems seemed to mediate the relationship between AA/NA service use and functioning in these other domains. Use of outpatient mental health services alone, or in combination with AA/NA was not significantly related to better outcomes. Participants with more severe and chronic psychiatric problems were more likely to continue using mental health services after hospitalization, although these services were generally not related to positive outcomes.

To John Henry Jordan, Sr. the person I admire most in this world.

Thanks for you love and support. Your Baby Girl has become a doctor!

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Self-help or Mutual Aid for serious problems such as substance abuse has been increasing rapidly over the past decade, both in terms of the number and types of groups and the people being served by them. Since the 1970s, Alcoholics Anonymous (AA) membership increased by 7% annually, with the United States and Canada accounting for the largest percent of this increase (Alcoholics Anonymous, 1989). The number of AA chapters worldwide has increased more than 200% over the past ten years, with current estimates of more than 80,000 groups in 150 countries (Miller & McCrady, 1993). A number of reasons have been cited for this tremendous growth, including lack of extended family and community supports (especially in urban areas), increasing rates of mental health problems such as depression and addiction, and inaccessibility of professional services for low income and uninsured persons (Borman, 1992).

For serious problems such as alcohol and drug addiction, there are often not enough treatment options available. AA is the largest substance abuse treatment program currently in use, and is the only treatment ever received by a majority of those who receive any help (Bradley, 1988). When persons with substance abuse

problems do receive residential treatment (typically for 28 days or less), maintenance of treatment effects is often compromised by inadequate aftercare and/or lack of community supports. This is probably one reason why referral to Alcoholics and Narcotics Anonymous (AA and NA) for aftercare support has become a common practice in professional treatment programs. Self-help groups are often the only source of continued help for persons who have begun the process of recovery.

Another reason for the growth in AA groups is that many persons have been helped by AA/NA where professional treatment has failed. The "revolving door" effect in many substance abuse treatment programs is testimony to the fact that relapse is a common occurrence, even after intensive professional treatment. Some clients keep coming back until their treatment resources are expended (e.g., insurance will no longer pay for treatment or the treatment facility will no longer accept them - some programs have a limit on how many times a person can return). When treatment resources are expended, or it becomes clear that professional treatment is not enough, community resources such as AA/NA become more realistic alternatives. AA provides its members with an indigenous support system, and a free therapy which is available anytime. The program goal of AA is clear and focused: to help those who suffer from alcoholism attain sobriety. Following the twelve steps of AA has helped many achieve this goal (Emrick, 1987).

Although many alcoholics who attend AA do get better, more empirical

research is needed to determine the mechanisms of change through AA/NA, and the types of people most likely to change. To date, there have been very few empirical investigations of the efficacy of AA. However, the burden of experimental proof should not be shouldered by AA alone; professional treatment programs have likewise failed to demonstrate their efficacy through empirical research. In his 1990 review of the research on substance abuse treatment programs, Peele made a sweeping claim that no treatment program currently utilized in the U.S. had sufficiently demonstrated its effectiveness via experimental research. Furthermore, he stated that current treatment methods (including Alcoholics Anonymous, psychoeducation, confrontation, disulfiram, group therapy, and individual counseling) were based on accepted historical traditions and folk beliefs rather than proven effectiveness. Other less critical reviewers have suggested that the provision of appropriate (i.e., to the client's needs) treatment does substantially improve outcomes over no treatment at all, but that no particular treatment approach has been found to be effective for all persons with substance abuse problems (Institute of Medicine, 1990).

In terms of mental health practice, the increasing use of AA/NA as a treatment agent exacerbates the need for research on its efficacy. Although AA has been heralded as the most effective treatment currently available, the dearth of scientific evidence of its efficacy poses a major concern for practitioners (cf. Bebbington, 1976; Glaser & Ogborne, 1982 for comprehensive review and discussion). AA/NA may be a valuable resource for some people with substance

abuse problems, but others are unable to utilize or benefit from this resource. A number of investigations have been conducted in attempts to identify characteristics associated with AA involvement and outcome. Unfortunately, these studies have been plagued by inadequate research questions and methodological problems (see literature review for more detailed discussion), such that the efficacy of AA for different types of alcoholics remains an elusive subject.

Some authors have argued that persons with the characteristics of the respondents in this study - dually diagnosed African American males - are not likely to go to AA/NA, and if they do, they receive little benefit from their involvement (cf. Bartalos, 1992; King, 1983; Swift & Beverly, 1985). However, the issue of AA/NA involvement may be complicated by other factors, in addition to person characteristics (cf. Humphreys & Woods, 1993 for discussion of contextual factors such as "racial fit").

Studies on benefit from substance abuse treatment in dually diagnosed samples are inconsistent in their findings, but generally indicate that the dually diagnosed are a difficult to treat population (cf. Mueser, Bellack, & Blanchard for discussion). Clinical literature indicates that persons with severe mental illness are often perceived as difficult, non-compliant, and resistant to both psychiatric and substance abuse treatment (Hellerstein & Meehan, 1987). The challenges posed by clients with dual diagnosis sometimes results in their exclusion from both systems of care.

Over the past decade, the number of studies on dual diagnosis has

increased dramatically (Minkoff, 1989). However, the impact of dual diagnosis on treatment engagement and outcome is not well understood. Some authors (e.g., Bartalos, 1992) have postulated that dual diagnosis status would pose a particular challenge to AA involvement. One issue that has been noted is that AA/NA members often actively promote an anti-drug policy, discouraging the use of psychotropic medication. This policy creates a conflict for many dually diagnosed clients. AA members are encouraged to strive for a drug-free state, use the group, and follow the 12-steps as the primary means of dealing with personal problems, a formidable challenge for the person with a serious mental illness. While the official organization literature indicates that group members with psychiatric problems should not be discouraged from psychotropic drug use (Alcoholics Anonymous, 1975), the reaction of other AA members towards those who use psychotropic medications varies and remains a very controversial topic (cf. Buxton, Smith, & Seymour, 1987; Zweben, 1987 for more comprehensive discussion of this issue). These, and other problems make it particularly challenging for persons with dual diagnosis to become fully engaged with AA/NA and to receive its potential benefits.

Research on patient-treatment fit with AA/NA, and data on outcome by person characteristics would greatly enhance our ability to determine 'which kinds of individuals, under what circumstances, are likely to respond to AA, by achieving what kinds of goals?' (Institute of Medicine, 1990, p. 143). As more comprehensive data is amassed to answer these questions, clinicians and

counselors will be better able to make appropriate referrals to these organizations, thereby improving the chances of successful outcomes. In terms of research strategies, randomized controlled clinical trials have been suggested as the most optimal approach to assessing patient-treatment fit and treatment outcomes (Institute of Medicine, 1990). Other methods include correlational studies using predictor strategies and/or causal modelling (Miller & Hester, 1986). These methods have been used to deal with issues of efficacy in the field of psychotherapy (cf. Kazdin & Wilson, 1978), and are similarly appropriate to research on substance abuse treatment outcome. The current study is an attempt to address the need for empirical data on AA/NA efficacy using correlational methods and causal modelling.

Purpose of this Study

(1) The first purpose of this study is to provide descriptive information on levels of AA/NA participation in a dually diagnosed sample, and to determine if in fact persons with dual diagnosis are less likely to participate in AA/NA. This goal will be accomplished by comparing rates and patterns of involvement found in this sample with that reported in the literature on singly diagnosed substance abusing clients.

(2) A second goal is to identify factors related to AA/NA participation in a dually diagnosed population. It is suggested that chronic and/or severe psychiatric symptomatology will act as a deterrent to sustained participation in self-help. Persons with high levels of psychiatric distress are expected to become only

marginally involved with AA/NA, and to drop out quicker than their psychologically healthier counterparts.

(3) Third, this study seeks to determine whether or not patterns of involvement with AA/NA are related to alcohol/drug use and other indices of community functioning. The literature reviewed in the following section leads the researcher to predict that those who do not become consistently involved with AA/NA soon after professional treatment will to not receive its benefits.

(4) Finally, this study will incorporate program theory, and compare the mechanisms of change suggested by two different treatment models: an integrated treatment model and an AA/NA model. The goal is to determine which model is more likely to be operating in this sample of persons with dual diagnosis.

REVIEW OF THE LITERATURE

According to Chen (1990), in order to understand why a program succeeds or fails, the researcher must have an appropriate understanding of the underlying program theory of the treatment being studied. Understanding program theory offers numerous benefits including: allowing the program theory to be tested in a way that reveals whether failure results from implementation failure or failure of the program theory itself; and to test whether the program is being implemented under conditions in which it is appropriate. While most prior research on AA has not incorporated program theory into its evaluation, an attempt will be made to do so in the present evaluation.

The program theory of AA is clearly stated in primary literature produced by members of the fellowship, and in secondary sources. The main goal of AA is to help those who suffer from alcoholism attain sobriety. (It should be noted that while most evaluations of AA have focused on abstinence as the primary outcome variable, AA makes a clear distinction between "dryness" and sobriety or serenity, Kurtz, 1993). Those who attain sobriety are able to admit that they are powerless in relation to alcohol, they accept help from a higher power and from other members of the fellowship, they address constitutional and psychological

underpinnings of their desire to drink (e.g., self-centeredness, arrogance, etc.) and restore their sanity, they make amends to others that they have harmed in the process of following an alcoholic lifestyle, they make specific changes in their physical and social environments, they stop drinking, and they carry the AA message to others who are suffering from alcoholism. The suggested method of attaining these sobriety-related goals is by attending AA meetings and following the twelve steps. According to AA literature, those who thoroughly follow the AA program will succeed (Alcoholics Anonymous, 1976). Those who do not succeed have not fully implemented the AA program.

In terms of the group structure, AA is far from a monolithic organization. There is great diversity in types of AA groups, types of persons who participate in AA, and in members' perceptions of what AA does (Beckman, 1980). There is no official "leader" of AA, nor is there any significant input from professionals in terms of how groups should be run or who should participate. The twelve traditions of AA specify that the organization is to remain decentralized, so as to maintain its autonomy from outside forces and allow individual AA groups to remain autonomous in their structure and function, progressing toward the goal of sobriety in a way that is most appropriate for them. AA is open to anyone who is interested in joining; "the only requirement for membership is a desire to stop drinking" (Alcoholics Anonymous, 1976).

While the explicit goal of AA is to help members attain sobriety, the implicit goals of the organization address other domains of functioning as well. DiClemente

(1992) identified five domains of functioning which are targeted by AA: (1) symptomatic/situational problems - including changes in alcohol consumption and life consequences; (2) maladaptive cognitions - for example, pride, negative thinking; (3) interpersonal conflicts - by making amends to others; (4) family/systems conflicts - value of common welfare above individual's; and (5) intrapersonal conflicts - addressing character defects that coincide with alcoholism.

A number of studies have been published on AA (relatively few on NA); however, a vast majority are reviews and anecdotal reports as opposed to empirical evaluations. This literature review includes both empirical studies, clinical reports, and other reviews, but will emphasize empirical literature on factors related to AA/NA participation, factors related to AA/NA outcome, social support, and the efficacy of group therapy for persons with severe mental illness. There have been few clinical reports and hardly any empirical studies on NA. Thus, most of the literature cited in this review refers to Alcoholics Anonymous. While the specific content of AA and NA meetings may differ, AA is the historical predecessor of NA and the groups still share many aspects in common. For instance, the groups adhere to the same basic principles of recovery as written in the *Big Book* (Alcoholics Anonymous, 1976). In fact, it is known that many AA members also have other drug problems and that persons whose primary problem is with illicit drug use often attend both groups (Emener & Dickman, 1992). Until there is sufficient empirical evidence to suggest that these groups should be considered separately, it must be assumed that they may be simultaneously considered under

one broad rubric which is self-help for addiction, based on the AA model.

Description of the Literature Search

The literature reviewed in this section was identified through: computerized searches on PsycInfo (1976-1995) and MAGIC (Michigan State University computerized library catalog). Key words used in searching these data bases were: Alcoholics Anonymous, Narcotics Anonymous, substance abuse, drug abuse, alcohol abuse, schizophrenia, mental illness, dual diagnosis, treatment, and group therapy. These key words were used in various combinations and yielded more than 200 articles and 20 books on the selected topics. References obtained from the reference sections of the selected primary sources were also retrieved and used in this review.

Factors Related to AA/NA Outcome

Most studies on AA/NA involvement and outcome have examined personal characteristics of participants and related those to outcome. Upon review of this literature, one finds a mass of chaos and confusion regarding personal correlates of treatment success. Gibbs and Flanagan (1977) conducted a meta-analytic review of the prognostic indicators of treatment outcome and found that across 45 studies, 208 different predictors had been examined. The studies reviewed had explored all kinds of variables from the usual (e.g., sociodemographic characteristics and social stability, prior treatment history, baseline functioning level, prior abstinence/sobriety, length of drinking career, MMPI and other personality measures, etc.) to the unusual (e.g., visual-motor perception, digit

span, degree of fantasy ideation, frequency of contact with mother, and number of sexual partners before marriage). Across the 45 studies, the authors were unable to identify any stable predictors using rather modest criteria (i.e., the predictor being tested in six or more studies, and found to predict success in at least half of these studies). While there were a few predictors that met these criteria (e.g., good employment status, marital stability, fewer arrests, history of AA attendance, and higher social class), for most other predictors, there were equal numbers of studies that found contradictory results or nonsignificant results for the same predictors.

The studies that examined outcome from AA and other types of group treatment found socioeconomic status, age, marital status, prior involvement with AA, history of abstinence, and psychiatric status to be related to treatment success. While these variables were significant in some studies, in most cases, there were other studies that found nonsignificant or contradictory results with these same predictors. In commenting on the inconsistency of findings across studies, Gibbs and Flanagan (1977) concluded that the task of identifying stable (and universal?) predictors of alcoholism treatment outcome was almost impossible. Some of the difficulties with such an endeavor are: each study involves different treatment agents (i.e., therapists with different orientations, personalities, and skill levels), administering different types of treatment, and using different outcome criteria over different follow-up time periods, with different types of clients.

Fortunately, in the decades since Gibbs and Flanagan's review, the range of

variables studied seems to have decreased somewhat and researchers are beginning to examine some of the same predictors across studies, thereby corroborating prior research findings. Also, researchers are tending to focus on one type of treatment and are defining the characteristics of the treatment population more consistently. However, in a more recent review of the literature on AA, Emrick (1987) came to conclusions similar to those of Gibbs and Flanagan. The findings in the more recent literature were inconsistent and contradictory.

One suggestion from these comprehensive reviews is that simplistic questions such as, "does AA work?" are inappropriate. The researcher must consider contextual factors of the person's environment, their personal characteristics and pre-existing functioning levels, and the context in which treatment in offered (e.g., is the treatment being implemented correctly, at what dosage, and are there any outside influences such as other concurrent treatment which might blur the effects of AA/NA involvement).

Literature on psychotherapy outcome has shown that multiple criteria are necessary to evaluate treatment outcome and the relative value of different types of treatment (cf. Kazdin & Wilson, 1978). Some of the most important factors in clinical research are: the specificity of change (i.e., did the therapy ameliorate the problem for which therapy was sought), the clinical significance or importance of the change observed, the breadth of change (i.e., has the client experienced improvement in other aspects of his/her everyday functioning), and the durability of any change associated with the treatment.

Kazdin and Wilson (1978) have criticized prior research for emphasizing normative group changes following treatment. They argued that group differences in mean performance on an outcome criterion is an extremely limited method for evaluating the effects of treatment. Empirical studies need to explicate factors related to positive outcome in terms of the proportion and types of treated individuals who change, as well as assessing the quality and duration of that change. These points are particularly relevant to persons with dual diagnoses. Dually diagnosed persons often present with a plethora of problems in various life functioning domains. Thus, in order for treatment to be effective for persons with dual diagnoses, it must improve their functioning in a number of affected life domains. Prior studies of AA have tended to focus on one specific outcome: abstinence, and have not fully examined other possible outcomes related to AA attendance; nor have they examined the outcomes of AA participation for persons with multiple disorders.

The remainder of this section will review AA/NA outcome studies only, with a particular emphasis on AA as aftercare to inpatient substance abuse treatment.

Individual Characteristics and AA Attendance

Persons who attend AA have been found to be different in many respects from those who do not attend. Some studies have identified differences in demographics, personality characteristics, problem severity, and treatment history for attenders vs. nonattenders (Polich, Armor, & Braiker, 1980). For instance, some studies have found that AA attenders are more likely to be older males who

have higher socioeconomic status, self-identify as alcoholic, are affiliated with a church or religious group, are psychologically healthier, have adequate social networks which they utilize, and have had prior substance abuse treatment (Elal-Lawrence, Slade, & Dewey, 1986; O'Leary et al., 1980; Polich, Armor, & Braiker, 1980; Ribisl, 1995; Trice & Roman, 1970) .

While factors related to AA attendance have been examined in a number of studies, the findings are inconsistent and more recent data generally refutes the prior findings of significant differences (Emrick, 1989). For instance, Thurstin, Alfano, and Nerviano (1987) failed to find any differences in demographics or psychological characteristics of attenders vs. nonattenders. Emrick, in his 1989 literature review, indicated that sociodemographic differences were not consistently observed (except for age - most studies find that AA attenders are likely to be older) and that drinking-related issues (e.g., loss of control, drinking patterns, level of physiological addiction) also do not consistently predict AA involvement. Emrick, Tonigan, Mongtomery, and Little (1993) reviewed all the empirical literature on AA and concluded that "systematic distinctions between AA affiliates and non affiliates can be identified; although the literature is not currently developed enough to provide us with a composite profile of the most likely AA affiliates" (p.53).

While motivation to engage in particular types of treatment has not been well studied, motivation to attain sobriety has long been suggested as an integral factor related to treatment engagement and outcome. Clinicians who treat persons with substance abuse problems frequently lament the problem of denial in alcoholics

and drug addicts and often use confrontational techniques in an attempt to help clients face the reality of their problems (i.e., "helping the alcoholic to hit bottom," Miller, 1985). Motivation is a key component of the stages of change model proposed by Prochaska, DiClemente, and colleagues. These authors' research on addictive behaviors, including alcoholism, suggests that the client's pretreatment stage of change (i.e., readiness or motivation to change) is one of the most important determinant of treatment success (Prochaska, DiClemente, & Norcross, 1992). AA program literature also highlights the importance of the alcoholic's level of motivation to stop drinking. The AA *Big Book* asserts that those who thoroughly follow the AA program will succeed. Those who do not recover are suspected of not giving themselves completely to the program, and are even said to be "constitutionally incapable of being honest with themselves" (Alcoholics Anonymous, 1976).

Outcomes when AA is Aftercare to Professional Treatment

AA is commonly used as an adjunct to or follow-up of professional substance abuse treatment. Treatment follow-up studies have probably contributed the most to our fund of knowledge about the efficacy of Alcoholics Anonymous. These studies have revealed a number of important findings regarding use of AA as treatment aftercare:

(1) persons who receive inpatient treatment for substance abuse problems are likely to be referred to AA, and the majority do attend (estimates as high as 80%; Edwards et al., 1971; Knouse & Schneider, 1987; Pettinati, Sugerman,

DiDonato, & Maurer, 1982).

(2) there is a high drop out rate from AA, even among those who were referred by treatment staff (estimated 25% or less will attend regularly; Belasco, 1971; Emrick, 1987; Tomsovic, 1970). Data from the General Service Office of Alcoholics Anonymous indicates that fewer than one half of all persons who come to an AA meeting will remain for even three months (AA, 1989).

(3) The most positive benefits from AA are usually obtained when it follows formal treatment (Emrick, 1987; Knouse & Schneider, 1987) or is used as an adjunct to professional treatment (Emrick, Tonigan, Montgomery, & Little, 1992). In addition, Knouse and Schneider (1987) found that of patients who attended AA after inpatient treatment, those who joined AA soon after hospital discharge (i.e., within the first three months) were most likely to maintain sobriety. AA involvement did not seem to make a difference if initiated after three months in the community.

While many studies have found that persons who attend AA have better outcomes (especially abstinence rates) than those who do not (cf. Elal-Lawrence, Slade, & Dewey, 1986; Gregson & Taylor, 1977; Haberman, 1966; Hoffman, Harrison, & Belille, 1983; McBride, 1991), some controlled studies have failed to find any significant differences based on AA attendance (cf. Ditman, Crawford, Forgy, & Maskowitz, 1967; Edwards et al., 1977; Walsh et al., 1991). The cited rates of success vary across studies, depending on a number of factors including client characteristics, patterns of AA involvement, access to other support systems, and length of follow-up. Studies that follow-up clients for six months or more post-

hospitalization usually find that approximately 70% of respondents resumed drinking (Bateman & Petersen, 1971). The factors found to be related to continued abstinence include: age, employment status, length of prior abstinence, and prior history of AA attendance. Factors related to relapse include: negative physical or emotional states, social pressure, unemployment, and history of AA attendance (Elal-Lawrence, Slade, & Dewey, 1986; Ogborne & Bornet, 1982; Rather & Sherman, 1989).

While most substance abuse treatment outcome studies (especially those studies involving AA) have focused exclusively on drinking outcomes, some authors have stressed the need to examine psychological, social, and behavioral adjustment as well (e.g., Belasco, 1971; Bromet, Moos, Bliss, & Wuthmann, 1977). Outcomes in these domains are generally less consistent than drinking outcomes, nevertheless, they warrant mention. In a study of 429 treated alcoholics, Bromet, Moos, Bliss, and Wuthmann (1977) found that those who attended AA after discharge were significantly less likely to be rehospitalized. Emrick, Tonigan, Montgomery, and Little's (1992) meta-analysis of AA studies found positive relationships between AA involvement and employment (r = .12) and social/family adjustment (r = .13). More robust and reliable correlations were found between AA involvement and improvement in psychological adjustment (r = .25).

Some researchers have suggested that the relationship between AA attendance and psychosocial functioning is moderated by attainment of abstinence. That is, AA involvement leads to abstinence which lead to better functioning in

other life domains (see Laundergan, 1992 for review). Overall, these findings suggest that the breadth of outcomes attained from AA attendance extend well beyond simple indices of drinking or abstinence, and warrants further investigation.

Levels of Involvement and Outcome

Patterns of AA attendance have been found to predict drinking outcomes fairly consistently. Persons who attend AA regularly report higher rates of abstinence, fewer days drinking, and fewer episodes of intoxication than those who do not attend regularly (Emrick, 1987; Knouse & Schneider, 1987; McBride, 1991; Thurstin, Alfano, & Nerviano, 1987; Trice & Roman, 1970). McBride (1991) found that the length of continuous AA attendance was highly correlated with months of abstinence (r = .71) and accounted for 50% of the variance in outcome. Conversely, infrequent or irregular attendance at AA post-treatment has been associated with poor prognosis and outcome (McLatchie & Lomp, 1988).

Emrick, Tonigan, Montgomery, and Little's (1992) meta-analysis of quantitative studies of AA (n=107) found that frequency of AA attendance and drinking outcomes were correlated r = .19; however, the authors noted that this correlation might be an underestimation. (Due to inconsistency across studies, the correlation contained a high degree of error variance.) There were too few data on AA participation and outcome in other life domains to enter into the meta-analysis.

In an earlier review paper, Emrick (1987) suggested that of those who become long-term (not defined), active members of AA, 40-50% will enjoy years of sobriety, and 60-68% will improve somewhat. Similarly, Thurstin, Alfano, and

Nerviano (1987) found that persons who attended AA consistently throughout an 18-month follow-up period had the best outcomes of any group. Hoffman, Harrison, and Belille (1983) found that 73% of respondents who attended AA weekly during a 6-month post-hospital follow-up remained chemical-free, while only 33% of nonattenders abstained. One can generally conclude from the literature on AA that people who "work the program," and attend meetings consistently over a longer period of time are more likely to have better outcomes, at least in terms of their drinking (Emrick, Tonigan, Montgomery, & Little, 1992).

Summary of Literature on AA Involvement and Outcome

The literature on AA reveals considerable evidence that AA attendance helps at least some alcoholics (e.g., those who become regular and active members) to attain abstinence. However, this literature has generally neglected outcomes in other life domains. Although abstinence has been related to better social, physical, and psychological outcomes in some reports (cf. Alford, 1980; and Akerlind, Hamquist, Elton, & Bjurulf, 1990 for review), neither abstinence nor level of alcohol consumption alone are sufficient predictors of functioning in other life domains. Researchers need to examine other areas of functioning directly instead of using alcohol involvement as a proxy for global functioning. Additionally, there is a need for empirical studies with dually diagnosed persons.

Many persons who seek treatment have dual problems, and it is likely that their response to treatment will be quite different from persons with substance abuse problems only. The literature on persons with dual diagnoses of mental

illness and substance abuse suggests that they experience problems across a number of life domains, and differ in many respects from other persons with substance abuse problems. Dually diagnosed persons are more likely to be homeless and/or vagrant and to have been jailed (Ridgely, Goldman, & Talbott, 1986). Several authors have noted the high rates of criminal involvement, as well as violent acting out and self-injurious behavior among persons with dual diagnosis in comparison to those with singly diagnosed mental illness or substance abuse problems (Kay, Kalathara, & Meinzer, 1989; Minkoff & Drake, 1991; Mueser, Bellack, & Blanchard, 1992; O'Farrell, Connors, & Upper, 1983).

In terms of mental health treatment, substance abuse has long been recognized as a complicating factor in the treatment of persons with severe mental illness (cf. Mueser, Bellack, & Blanchard, 1992; Ridgely, Goldman, & Talbott, 1986). Persons with dual problems of substance abuse and mental illness are often more difficult to diagnose and also pose complications to regular treatment of mental illness (e.g., noncompliance with medication regimens). Substance abuse in persons with diagnosed schizophrenia has been related to more severe course of illness, more severe symptomatology, more pervasive deterioration in functioning, and increased likelihood of psychiatric relapse (Mueser, Bellack, & Blanchard, 1992; Ridgely, Goldman, & Talbott, 1986).

Osher and Kofoed (1989) indicated that patients with dual diagnoses were also more difficult to engage in substance abuse treatment, particularly

abstinence-oriented treatment. The authors suggested that dually diagnosed patients were less able to transcend denial, a core requirement of many substance abuse treatment programs, because of their "impaired ability to process information due to thought disorders, depressive cognitions, or organic brain syndromes" (Osher & Kofoed, 1989, p. 1028). These authors surmised that prolonged abstinence, the primary goal of AA, would be particularly difficult for persons with dual diagnosis to attain.

Treating Persons with Psychiatric Disorders

McLellan and his associates have conducted numerous studies which indicate that high psychiatric severity (assessed by number, intensity, and duration of symptoms) is negatively related to substance abuse treatment outcomes. McLellan et al. (1983) found that in a VA sample of male alcoholics (n=460) and drug addicts (n=282), scores on a psychiatric severity index were strongly and consistently related to treatment outcomes (as measured by seven composite scores from the Addiction Severity Index). This study revealed that patients with low psychiatric severity experienced better treatment outcomes than those with high or mid-range psychiatric severity, no matter what type of treatment they received. In addition, for the high psychiatric severity group, having a greater number of prior treatments was also associated with poorer outcomes. Those with high psychiatric severity showed virtually no improvement in any of the treatment conditions. Overall, psychiatric severity accounted for 48-54% of the variance in treatment outcomes for the high psychiatric symptom group.

Using prior psychotherapy as a proxy for psychological health, Haberman (1966) found that history of involvement in psychotherapy was negatively related to substance abuse treatment outcome (i.e., abstinence). In Gibbs and Flanagan's 1977 meta-analytic review, psychiatric history and symptomatology were also found to be negative predictors of treatment outcome in a number studies. Using proxies for psychological well-being such as: having a primary psychosis diagnosis, history of seeking psychiatric treatment, rating oneself as "mentally ill," scores on personality measures such as the MMPI, and history of suicide attempts, several studies found that better psychological health was related to better outcomes from AA and other group therapies for alcohol abuse.

In terms of treatment engagement, some studies have found experience of psychiatric symptoms to be negatively related to engagement in substance abuse treatment (Liss, 1979; Panepinto, Higgins, Keane-Dawes, & Smith, 1970). Persons with schizophrenia were more likely become withdrawn or drop out of treatments which stressed collective responsibility or high levels of interpersonal engagement with staff and other clients. If the treatment involved only minimal engagement (e.g., ten-minute sessions with an internist that focused on symptom update, and involved only minimal exploration of thoughts and feelings, clients with schizophrenia were more likely to continue coming (Panepinto et al., 1970). Persons with less severe mental illness were more likely to drop out of the latter type of treatment. These findings suggests some interesting relationships between client characteristics, type of treatment, and likelihood of treatment success.

Psychiatric Symptomatology and Interpersonal Functioning

Previous studies have demonstrated that persons with chronic mental illness or dual diagnoses are likely to suffer deficits in many areas of life functioning, including family/social relationships (Westermeyer & Neider, 1988). Persons who report experiencing severe symptomatology are more likely to rate their family and social relationships as poor/nonsupportive, and/or conflictual. Participants in the current study were found to have inadequate social networks which were unusually small and unsupportive (Ribisl, 1995). They reported that their relationships were not stable, nor did they serve the important functions of social support or mental health promotion. These types of relationships may actually contribute to experienced distress instead of acting as a buffer against it. Prior research has indicated that experience of interpersonal conflict, especially in the family context, is often a precursor to relapse and is generally related to poorer long-term outcomes for persons with serious mental illness (Swindle, Cronkite, & Moos, 1989).

While the amount of social support received is affected by contextual factors and the availability of supportive others, it is also affected by individual skills in accessing and maintaining supportive relationships (Heller & Swindle, 1983) . Naturalistic studies suggest that persons with better mental health (e.g., social competence and intrapersonal resources) are more likely to establish and maintain supportive social networks (Heller, 1979). Persons with good mental health are more likely to be sociable, assertive, comfortable with intimacy, free from

debilitating social anxiety, have good conversational skills, are able to talk about their behavior and feelings, have adequate social problem-solving skills, and are able to take the perspectives of other people (Heller & Swindle, 1983). All of these qualities are essential to the initiation and maintenance of social relationships, and social support. Persons with poor mental health are often less socially competent, less adept at interpreting social cues or altering their interpersonal behaviors, and more prone to inaccurate appraisals of social situations.

In addition to person characteristics, ecological and community factors also affect the availability and quality of supportive relationships (cf. Korte, 1978 for review). For instance, in highly urbanized areas, isolation and anonymity are common experiences. In an environment where suspicion and hostility are more common than helpfulness and friendliness towards others, developing support networks outside of the family can become a formidable task. Neighborhood attractiveness, density, and racial composition are also important factors that influence the quality of social relationships and social support.

It has been suggested that persons with serious and/or chronic mental illness are less efficient at accessing and maintaining social relationships that provide appropriate levels of support to aid in coping. While persons with mental illness may have access to as much social support as others, they are less likely to give support to others or maintain reciprocal social relationships (Heller & Swindle, 1983). In addition, respondents in the current study were drawn from an urban metropolitan area in the Midwest, where environmental barriers to social support

were likely to exist. Therefore, it was predicted that the participants in this study would be less likely to have successful experiences in the context of a mutual self-help group like AA or NA, where provision and receipt of social support are necessary.

Psychiatric Symptomatology and Involvement in Group Therapy

Clinical literature generally suggests that persons with serious mental illness are often not appropriate for group work (cf. Kanas, 1982; Yalom, 1985). This finding is quite relevant to investigating the appropriateness of AA for a group of persons with problems of mental illness as well and substance abuse.

Structurally and philosophically, there are some important differences between professional psychotherapy and self-help or mutual aid groups (e.g., no formal group "leader" or therapist, self-selection to group). Self-help groups have traditionally been defined as being composed of members who share a common problem, create a network of support for one another through regular social and emotional interactions, are self-governing, and involve egalitarian relationships based on principles such as "helper therapy" and identification of members as "prosumers" (i.e., producer as well as consumers of services and aid; Hedrick, Isenberg, & Martini, 1992; Leiberman & Borman, 1979). Another major difference is that self-help programs are free and open to all who wish to attend.

Nevertheless, there are many elements which AA shares in common with other therapy groups (Knight, Wollert, Levy, Frame, & Padgett, 1980; Yalom, 1985). Irvin Yalom's work has been most instrumental in identifying the curative

elements involved in group therapy process - that is, the mechanisms of change that can be found in any therapy group. Of the eleven factors identified by Yalom, at least nine can be found in AA self-help groups: instillation of hope, universality, imparting of information, altruism, development of socializing techniques, imitative behavior, interpersonal learning, group cohesiveness, and catharsis. (The remaining two factors are somewhat tangential to the emphasis of AA - corrective recapitulation of primary family group and existential experiences.) While there is no group leader present to ensure that these elements are in effect, there is a standard protocol to most AA groups which includes these factors. For instance, the use of testimonials of the effectiveness of AA serves to instill hope in other members, especially new or struggling members. The common use of the introduction "hi, my name is ____ and I'm an alcoholic" serves to reinforce a sense of commonality, group cohesion, and validation of the experiences of other members. Imparting of advice and altruistic behaviors (e.g., sponsorship, 12-stepping - saving other alcoholics by telling them about AA) are also common experiences in AA.

One of the most important, if not the critical curative ingredient of AA is involvement in mutual social support and fellowship with other members (Knight, Wollert, Levy, Frame, & Padgett, 1980; Maxwell, 1984). As noted previously, AA also serves as a primary support group for many members, fulfilling many of their material, social, and psychological needs (Emrick, 1989). Those who have studied AA groups, particularly via participatory observation, find that AA members derive

benefit primarily by involving themselves in fellowship with other members (e.g., through sponsorship, 12-stepping, etc.). Maxwell (1984), a psychologist who conducted studies on AA process, indicated that recovery through AA "means becoming immersed in the AA social environment. It means participating in open, honest sharing and interaction with fellow members." Furthermore, "the degree and quality of involvement with other members will be a major factor in how much will be gained from AA" (p.155).

Clinical literature suggests that group work is not the treatment of choice for persons with serious and/or chronic mental illness, especially those with schizophrenia (cf. Otteson, 1979 for review). Clinicians have noted that "among the general characteristics of the chronically mentally ill is their difficulty in becoming meaningfully engaged in a therapeutic endeavor" (Stone, 1991, p.13). Often persons with severe mental illness are not able to withstand the anxieties related to self-disclosure or confrontation, which are common elements of group experience. Several theories have been proposed to explain this resistance to group engagement. For example, it has been proposed that persons with mental illness are more concerned about survival than self-realization; that the level of developmental arrest and intrapersonal conflict inhibits the establishment of trusting relationships and also makes it difficult for persons with mental illness to regulate personal boundaries without feeling anxious; and finally, that psychiatric patients experience a realistic caution against revealing themselves, since prior experience has taught them that this is dangerous and may lead to punishment (Chacko,

Adams, & Gomez, 1985; Stone, 1991). Another hypothesis is that use of psychotropic medications subdues both abnormal and normal behaviors, including social responsiveness.

In terms of group process, the work of Yalom and his colleagues indicates that when people with psychosis and other severe mental illnesses are placed in groups where most members are not suffering from mental illness, the peculiarity of the person with mental illness is often obvious to other group members. Oddities in dress, mannerisms, and verbalizations (e.g., irrelevant or bizarre verbal content) cause them to stick out like sore thumbs. Thus, they often find it difficult to fit in the group and are quickly ostracized as deviants. (In terms of AA, the person with mental illness might also be taking psychotropic medication, which, if discovered would also make them different from the other group members and also inhibit their adherence to the group norm of abstinence from all chemicals.) Additionally, persons with severe mental illness, especially those on psychotropic medications, often appear to be "sealed over" (Yalom, 1985, p. 237). Their affect may be flat, inappropriate or bizarre and they may be generally withdrawn from social interactions. Clinicians who work specifically with psychotic clients indicate that they often have deficits in even the most mundane social and conversational skills (Wilson, Diamond, & Factor, 1990). The inability of many persons with severe mental illness to involve themselves in an interactional group without threatening the group norms or becoming overly anxious themselves, seriously interferes with their ability to derive benefit from a group therapy experience. According to Yalom,

the psychotic person tends to interfere with the normal dynamic process of the group and consequently, "eventually the group will extrude the deviant" (1985, p. 238). Thus, one would expect these persons to be forced out by the group or to opt out of the group themselves.

Specific to self-help group involvement, Bartalos (1992) suggests that "in order to be an effective member of a self-help group, one has to have adequate perception and judgement, ability to interact meaningfully with others and a reasonable chance to benefit from such interactions" (p. 72). Given this proscription for successful participation, persons with severe mental illness would be among those left out (by self-selection or a group screening process) due to inability to participate fully.

Although much clinical evidence suggests that group therapy with seriously mentally ill and/or dually diagnosed persons is extremely difficult, some clinicians and researchers have been successful in developing models of group work that are effective with these patients (e.g., Fairweather et al., 1969; Hellerstein & Meehan, 1987; Otteson, 1979; Wilson, Diamond, & Factor, 1990; Yalom, 1985). These successful efforts generally have been developed and utilized with homogeneous groups (e.g., hospitalized psychiatric patients) and involve special techniques designed to address the particular needs of persons with serious mental illness.

The Fairweather Lodge studies were perhaps the first attempt by researchers to determine whether a group of chronically mentally ill patients could function in a community-based group. Fairweather and his colleagues found that a

group of chronically mentally ill patients (more than half also had substance abuse problems), when given the chance, were able to live semi-autonomously and ultimately take complete responsibility for their community, and their livelihood. In terms of outcome, across a 40-month hospital follow-up period, the Lodge members were more successful in maintaining employment and remaining in the community (i.e., spending more days in the community than in the hospital) than a comparison group that received traditional aftercare services. Hellerstein and Meehan (1987) found similar results with a group of dually diagnosed patients. Using a group model designed especially to address dual diagnosis issues, these authors reported success in reducing the number of days participants spent in the hospital.

Although the Lodge project was successful overall, there were differential outcomes based on chronicity and severity of illness. Persons with more chronic mental illness (i.e., having been in the hospital longer) spent fewer days in the community, one of the most important measures of successful outcome, and were less likely to be employed than those with more acute illness. Behaviorally, the less chronic and nonpsychotic persons were more adept at handling the social demands of Lodge living and work environments. They were more likely to chosen by their peer to be leaders in the Lodge community (45% of nonpsychotic Lodge members were selected as leaders vs. only 15% of psychotic members). Given these differential outcomes, the authors concluded that "chronicity places a damper on friendship relations, verbal contact, activity level, and freedom from emotional

disturbance," all of which are requirements of communal living or work settings (Fairweather et al., 1969).

Other authors have identified successful models for group work with hospitalized psychiatric patients (cf. Wilson, Diamond, & Factor, 1990), in which the therapists use special techniques to help clients manage anxiety and learn appropriate social skills via step-by-step skills training. In terms of AA involvement, Minkoff (1989) found that with special preparation in advance, dually diagnosed patients were able to participate successfully and benefit from AA/NA. Staff at this specialized program prepared clients for AA/NA attendance by: providing them with individualized education on appropriate behavior in the group, having them participate in groups with other dually diagnosed persons, linking them up with another person in AA/NA, and selecting meetings that would be most suitable for dually diagnosed persons. These methods eased the transition of dually diagnosed persons into the groups, allowing them to feel more comfortable and providing them with behavioral coaching to minimize inappropriate and/or bizarre behaviors which might frighten other group members. Unfortunately, no specific data on patient outcomes were reported in this study.

Summary

This review suggests that although persons with severe and chronic mental illness are generally not expected to respond well to group therapy, under special circumstances and with advanced training in social skills, people with chronic mental illness or dual diagnosis may be able to benefit from mutual aid groups such

as AA/NA. More empirical research is needed to determine the extent and conditions under which AA/NA can be utilized as a therapeutic resource by persons with dual diagnosis.

Limitations of Prior Studies on AA

The majority of reports on the efficacy of AA have been anecdotal and/or inconclusive due to lack of scientific rigor. Miller and Hester (1980) identified three very serious problems with the literature on AA: (1) lack of control groups in experimental studies, (2) reliance on abstinence as the sole criteria of treatment success, and (3) over reliance on self-report measures of both AA attendance and outcomes. Another important issue is that the effectiveness of a particular treatment will be affected by whether this is the only type of treatment received. Concurrent involvement in other types of treatment can obscure results, and is particularly problematic in terms of evaluating multimodal treatment programs in which AA/NA is only one component (Emrick, 1987; Thurstin, Alfano,& Nerviano, 1987). The effects of AA are often confounded with the effects of the other components of the treatment program.

One of the major obstacles to empirical investigation of AA is inaccessibility of AA members. This limitation has resulted in many studies using biased samples - either volunteers (self-selection bias) or court referred participants (who might be quite different from other members). Additionally, most studies have been conducted with socially stable, Caucasian males. To date, there have not been any studies of the efficacy of AA for persons who are dually diagnosed.

Goals of the Present Study

This study will address some of the weaknesses identified in prior research. One of the major criticisms of prior research is a failure to incorporate program theory into research evaluations. The current study will compare two treatment models. In light of the stated program theory and goals of AA and those of the specialized treatment received by the study participants, an attempt will be made to test a model of integrated treatment (see Figure 1, Model A) for persons with dual diagnoses as opposed to a model which is more consonant with AA program theory (see Figure 2, Model B). This study will examine whether AA/NA attendance, following specialized treatment, relates directly to outcomes in other functioning domains (e.g., psychological and family/social functioning, and recidivism), as would be suggested by an integrated treatment model, or whether these outcomes are mediated by abstinence or improvement in drinking/drug use, as would be suggested by an AA/NA treatment model.

The proposed model for this study (see Figure 1) was adapted from the work of Moos and his colleagues. According to Moos, Finney, and Maude-Griffin (1992), the individual's personal characteristics and life context interacts with treatment to produce differential outcomes. Specifically, participation in treatment is influenced by the individual's resources prior to entering the group (noted in the model as individual characteristics/prior experiences), and the contextual factors that concur with treatment involvement (here noted by concurrent engagement in other forms of treatment besides AA/NA). Individual characteristics and prior

treatment experiences are expected to correlate with involvement in aftercare services, particularly AA/NA. These characteristics will influence the level of participation in aftercare treatment, as well as the types of services used. Service use is expected to be related to subsequent functioning in the treated domains (i.e., alcohol/drug use, psychological functioning, etc.). The present study will examine the extent to which pre-existing characteristics can be used to predict subsequent service use, and whether service use has any significant impact on outcomes. (The specific measures of each construct are depicted in the lower part of the figure, enumerated in the square boxes).

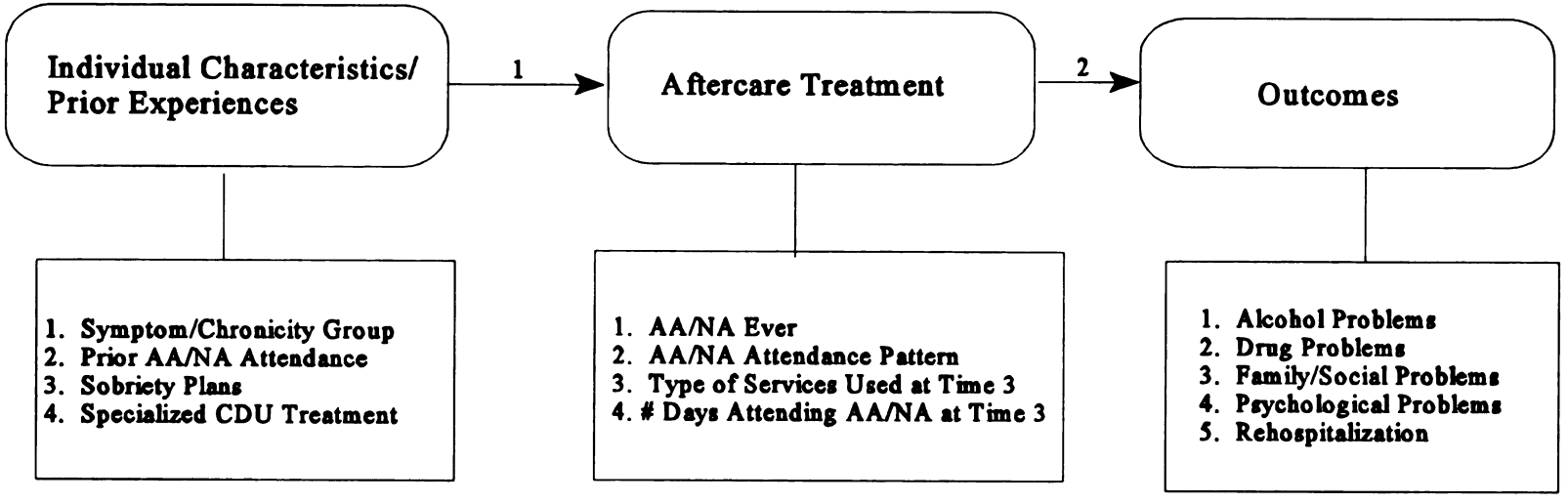

Figure 1. Model A - The Integrated Treatment Model

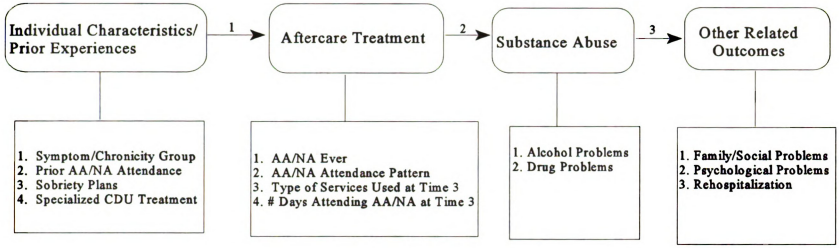

Figure 2. Model B - The AA/NA Treatment Model

Previous investigations with the Substance Abuse and Mental Illness (SAMI) project data also support the inclusion of the variables selected for the current study. The SAMI project was designed as an experimental evaluation of the effects of a specialized treatment program for persons with dual issues of mental illness and substance abuse. Findings from this study indicated that persons who participated in the specialized treatment were more knowledgeable about their substance abuse problems and were more motivated to maintain their sobriety, as indicated by their stated plans to continue treatment and to refrain from alcohol and drug use (Herman et al., 1996). The specialized treatment resulted in greater motivation, which was related to subsequent AA/NA involvement and improvements in functioning (BootsMiller et al., 1996). Over an 18 month follow-up period, persons who participated in the specialized treatment reported significantly fewer alcohol problems, although there were no significant findings for other functioning domains.

Regarding psychological functioning, Ribisl (1995) found that psychiatric distress was the strongest cross-sectional predictor of negative outcomes, particularly alcohol and drug abuse. Persons with greater psychiatric distress reported significantly more substance abuse following treatment. Psychiatric distress was a stronger predictor than sobriety support, social network factors, and all other variables in the model.

The results of these previous investigations indicate that psychiatric distress, participation in the specialized treatment, development of plans to

maintain sobriety, and AA/NA attendance are important factors related to participant outcomes. However, the nature of these relationships remains unclear. These variables could primarily serve as main effects or as moderators for other variables, such as pre-existing psychiatric symptomatology. The current study will build on previous SAMI studies and examine the effects of psychiatric symptomatology, using prior AA/NA attendance, specialized treatment, and sobriety plans as moderators. It will also examine the role of sobriety as a mediator of functioning in other domains. Results from this study will add to our knowledge base regarding treatment of persons with dual diagnosis.

While many prior studies have focused on homogeneous samples of middle-class White males with alcohol problems, the current study is conducted with an under represented sample. The participants are dually diagnosed patients receiving treatment at a large public psychiatric hospital, most of whom are low-income, poorly functioning, African American males. (Despite the homogeneity in sociodemographics, the participants of this study are quite heterogeneous in terms of their diagnoses and treatment experience.) Previous investigators have found that ethnicity, other personal characteristics, and contextual factors influence the patterns and types of services used, including AA/NA (cf. Brown, Joe, & Thompson, 1985; Hanson, 1985; Humphreys & Woods, 1993; Moos, Finney, & Maude-Griffin, 1993; Thompson, 1985).

In terms of research methodology, this study will differ from prior studies in several ways. First, a control group will be utilized - participants who received the

hospital treatment, but opted not to attend AA regularly as part of their aftercare. Second, contamination of AA treatment effects by other concurrent services will be addressed by directly testing whether use of outpatient substance abuse or mental health services following hospitalization had any additional effect on treatment outcomes. Third, the outcome variables in this study will include psychological and family/social functioning and rehospitalization, in addition to drug and alcohol involvement.

The limitations of this study are similar to those in prior investigations. This study will be most limited by reliance on self-report data, and the lack of direct measures of sobriety or serenity (the stated goals of AA/NA). In addition, there were no direct measures of the participants' engagement in AA/NA process (e.g., forming relationships with sponsors, doing 12-step work, giving testimonials, etc.) which are thought to be factors related to successful outcome.

STATEMENT OF THE PROBLEM

There have been a number of studies examining the characteristics of persons who engage with AA, and the patterns of involvement with AA and their relationship with outcomes, particularly drinking outcomes. There have been few controlled studies of AA, few studies that have examined outcomes other than drinking, and hardly any controlled studies of AA attendance and outcome for persons with dual diagnoses of mental illness and substance abuse.

For this dissertation study, I propose to examine the suitability of Alcoholics Anonymous and Narcotics Anonymous for a group of persons with dual issues of mental illness and substance abuse. In order to assess the impact of experienced symptomatology on participation in and benefit from AA/NA, participants will be divided into groups based on scores on the SCL-10 and history of prior psychiatric treatment. These groups will be compared in terms of patterns of involvement with AA/NA across the three follow-up interviews (2-, 6-, and 10-months post-discharge). Factors which might be related to AA attendance and/or outcomes - such as history of AA/NA involvement, concurrent aftercare treatment, motivation level at discharge, etc. will be controlled.

A number of studies have found significant relationships between AA attendance and drinking outcomes, which tends to support the explicit goal of AA - helping alcoholics attain sobriety. Because there have been few studies that examined outcomes in other domains, it is not clear whether AA has any direct impact on other areas of functioning or whether improvements in other domains are moderated by attainment of abstinence. Since abstinence/sobriety is the primary goal of AA, a model that incorporated abstinence as a moderator of other functioning outcomes might be more consonant with the AA program model (see Figure 2, Model B). If sobriety is the major outcome of successful engagement in AA, then Model B would be a more appropriate test of the effects of AA attendance and the program theory of AA would be supported. Conversely, Model A is more consonant with an integrated treatment approach that directly impacts a number of functioning domains simultaneously.

The current study will attempt to address a number of issues related to AA attendance and outcome and answer the specific research questions delineated in the next section. While this study will not supply definitive proof of the efficacy of AA, it will shed some light on the factors related to successful use of AA by dually-diagnosed persons, especially African American males.

HYPOTHESES

Prior research indicates that persons who attend AA/NA are psychologically healthier, have had prior substance abuse treatment and/or AA/NA involvement, and are more likely to be motivated for sobriety. Thus, the following hypotheses are suggested:

(1) Individual characteristics will systematically predict involvement in AA/NA. Persons who reported experiencing a high level of psychiatric symptomatology and multiple prior psychiatric hospitalizations (high symptom/chronic group) will be less likely to attend AA/NA after hospitalization; those with lower levels of psychiatric symptomatology and few prior psychiatric hospitalizations (low symptom/acute group) will be most likely to attend AA/NA (See Model A, path # 1, p. 35).

(2) Persons in the high symptom/chronic group who do attend AA/NA will not become regular attenders; they will be more likely to drop out than those in other symptom/chronicity groups (Model A, path # 1).

Previous studies have indicated that persons who attend AA/NA regularly, especially following professional substance abuse treatment, are likely to have better outcomes than those who do not attend or attend sporadically. Several studies have identified significant differences in alcohol use based on AA

attendance, and some have suggested that AA attendance can also lead to improvements in psychological and family/social functioning as well. Thus, the following hypothesis will be tested:

(3) Patterns of AA/NA service use after hospitalization are expected to be systematically related to therapeutic outcomes. Participants who begin regular involvement with AA soon after hospital discharge (i.e., report attending AA/NA over two or more consecutive time periods, beginning at 2- or 6-months post-discharge) are expected to show better outcomes than those who never attend or drop out (See Model A, path 2). Substance abuse, psychological, family/social, and rehospitalization outcomes will be assessed at Time 3 (10-months post-discharge) and Time 4 (14-months post-discharge).

There have been few studies examining the effects of concurrent professional and self-help services. In order to control for contamination of the effects of AA/NA attendance with other service use and use of other services, these relationships will be tested directly. For persons with dual diagnosis, it is anticipated that use of mental health services will have important implications for outcome. Thus:

(4) Participants who report using other outpatient substance abuse services or mental health services in addition to AA will show greater improvement on the outcome measures than those who attend AA only (Model A, path 2).

Finally, this study will compare an Integrated or nonmediated treatment model with a model which would be suggested according to AA/NA program

theory. If the Integrated model is more consonant with the data, AA/NA and other service use will directly impact alcohol and drug problems, as well as psychological and family/social problems, and rehospitalization. The AA/NA Treatment model would be supported if attainment of sobriety (or reduction in alcohol/drug problems) led to improvements in psychological and family/social problems, and reduced the incidence of rehospitalization. No prior research has directly compared these models, therefore:

(5) Exploratory path analysis will be conducted to test the predictive strength of the Integrated Treatment model (Model A) as opposed to the AA Treatment model (Model B), using indices of model fit based on EQS Structural Equations Program (Bentler, 1995).

CHAPTER 2

METHOD

This dissertation study was conducted as part of a larger project (Substance Abuse and Mental Illness Project, SAMI) funded by the National Institute of Mental Health, through the Michigan Department of Mental Health. The SAMI project involved an experimental evaluation of the effects of a specialized treatment program for persons with dual issues of mental illness and substance abuse who received treatment at a large public psychiatric hospital. Baseline data was collected from 474 inpatients at Northville Psychiatric Center who screened positive for dual problems of substance abuse and mental illness. The current study utilized data from the baseline (hospital admission) and discharge interviews and four of the follow-up interviews (2-, 6-, 10- and 14-months post-discharge).

Sample

Upon admission to Northville Regional Psychiatric Hospital, 627 patients who screened positive for dual problems of mental illness and substance abuse were approached to be in the SAMI study. All incoming patients were screened for eligibility using a modified version of the Michigan Alcoholism Screening Test (Selzer, 1971) and had to screen positive for dual problems of mental illness and

substance abuse. Patients who were severely cognitively impaired, developmentally disabled, or who showed a predisposition for violence or inappropriate sexual behavior were excluded from the study. An additional requirement was that patients had to remain in the hospital for a minimum of five days to insure that some minimum level of treatment was received. Of those approached, 535 met the eligibility requirements and agreed to be in the study; 474 had sufficiently complete information from the hospital admissions and ward interviews to be considered part of the baseline SAMI sample. For the purposes of this study, all analyses were conducted with 284 participants who had 100% complete data on pre-existing individual characteristics and prior experiences, post-discharge AA/NA attendance, and the selected outcome measures. Due to the use of path analysis, the data sets used in the analyses had to have valid scores for each variable used in the analyses. Missing data analyses and comparisons of persons included in the analyses vs. those excluded are discussed in a later section (see pp. 61-63).

Table 1 shows the demographic characteristics of the 474 patients who comprised the baseline SAMI population. The sample consisted primarily of African American (77%) males from the Detroit metro area. Most of the participants were unemployed or marginally employed and presented with a plethora of other psychosocial problems.

Table 1. Demographic Characteristics of Participants (N = 474)

Variable		%/ Mean (SD)
Gender	Male	74%
Ethnicity	African American	77%
	White	23%
Age (years)		33 (7.3)
Marital status	Never Married	63%
	Married	9%
	Separated Divorced or Widowed	28%
Years of education		11 (2.2)
Usual employment status	Full-time	30%
	Part-time	23%
	Unemployed	33%
	Out of workforce	14%
Monthly income		$ 688 (1333.2)
Previous psychiatric hospitalizations	None	33%
	1 or 2	30%
	3 or more	37%
Previous alcohol/drug treatment	None	33%
	Alcohol or Drug	38%
	Both	29%
Self-labeled drug problem	No problems	11%
	Drug problem	26%
	Addict	63%

Table 2. Distribution of DSMIII-R Diagnoses

	Mental Illness	
	N[a]	%
Schizophrenic Disorders	125	27.6%
Organic Mood Disorders	102	21.0%
Adjustment Disorder	73	15.1%
Mild Affective Disorders	82	16.9%
Antisocial Personality Disorder	43	8.9%
Major Depression	37	7.6%
Bipolar Depression	27	5.6%
	Substance Dependence	
Alcohol Dependence	220	45.4%
Cocaine Dependence	183	37.7%
Polydrug Dependence	147	30.3%
Cannabis Dependence	46	9.5%
Opioid Dependence	21	4.3%
Missing	63	13.9%

[a] Overall N = 474

Note. Numbers add up to more than 474 because participants could receive multiple diagnoses.

In terms of diagnoses, the participants in this study were more homogeneous that previous studies of persons with dual diagnoses. Table 2 shows the distribution of DSM-III-R diagnoses in the sample. Diagnoses of Schizophrenia or Schizoaffective Disorder and Organic Mood Disorders were most common in the sample, accounting for nearly half of all mental illness diagnoses. Alcohol and Cocaine Dependence together accounted for more than 80% of all substance dependence diagnoses, with about one-third of the respondents receiving both diagnoses. Approximately one-third (33%) of the respondents in this sample had both a major mental illness (e.g., Schizophrenia, Organic Mood Disorders, Major Depression, or Bipolar Depression) and a substance dependence diagnoses. A small percent of the sample (13. 9%, labelled as missing under substance dependence diagnoses) were diagnosed with mental illness, but did not meet the formal criteria for either a substance dependence or substance abuse diagnosis.

Measures

The following is a list of instruments and measures used to test the hypothesized relationships in Models A and B. (See Table 3 for a summarized listing of the measures used in this study.) Reported reliabilities of the measures were generally taken from the baseline hospital interview unless otherwise indicated.

Table 3. Measures Used in Current Study

Individual Characteristics/ Prior Experiences	Aftercare Treatment	Outcomes
Symptom/Chronicity Group	- AA/NA Ever - Patterns of AA/NA attendance - Types of Services used - # Days attending AA/NA at Time 3	Alcohol Problems - ASI Alcohol composite score Drug Problems - ASI Drug composite score Family/social Problems - ASI Family/social composite score Psychological Problems - ASI Psychiatric composite score Rehospitalization - # Hospital treatments for emotional or psychiatric problems
Covariates Prior AA/NA attendance Plans for sobriety Specialized CDU treatment		

Individual Characteristics & Prior Experiences

A. Psychiatric Symptom Groups. Based on respondents' level of psychiatric symptomatology at the time of hospital intake, and the number of times they had been previously hospitalized for psychiatric problems, four symptom/chronicity subgroups were created: low symptom/acute, low symptom/chronic, high symptom/acute, and high symptom/chronic.

Psychiatric Symptomatology. The Symptom Checklist-10 (SCL-10; Nguyen, Atikisson & Stegner, 1984) was used as an index of baseline psychiatric symptomatology. The SCL-10 is a 10-item version of the SCL-90 (Derogatis, Lipman, & Covi, 1973) that is used to assess global psychopathology. The items on the SCL-10 cluster into three factors: Depression, Somatization, and Phobic Anxiety. Reliability and validity of the instrument have been well established and cited elsewhere (Hoffman & Overall, 1978).

Psychiatric Chronicity. Self-reported history of psychiatric hospitalization was used as an index of chronicity of mental illness problems, the second variable used for grouping on individual characteristics. At the baseline interview, participants were asked to report how many times in their life they had been hospitalized for psychological or emotional problems.

First, participants were divided into groups based on their scores on the SCL-10. A median split was used to establish two comparison groups: a low symptom group and a high symptom group. The low symptom group was composed of 203 persons who scored 2.6 or lower on the SCL-10. The high

symptom group was composed of 198 participants who scored between 2.61 and 5.0. Scores on the SCL-10 were normally distributed, with values ranging from 1.0 to 5.0. The mean score was 2.68; the median was 2.6.

Second, groupings on chronicity were established. Participants who reported two or more prior psychiatric hospitalizations were categorized as a chronic group. Those who reported fewer than two prior hospitalizations were categorized as an acute psychiatric group.

The groupings based on the median split on the SCL-10 and history of psychiatric hospitalization were combined to form the four groups used in the current analyses. The four groups were: a low symptom/acute group (n = 86), a low symptom/chronic group (n = 59), a high symptom/acute group (n = 66), and a high symptom/chronic group (n = 73). These groupings will be used in most of the analyses reported.

Covariates

The following is a list of other measures of individual characteristics and prior experiences which are expected to be related to aftercare treatment and/or treatment outcomes. While no specific hypotheses are made regarding these variables, they are included in the models as covariates:

Prior AA/NA Attendance. As part of the baseline interview, participants were asked if they had attended AA or NA in the 30 days before they came to the hospital. Frequency of AA attendance and NA attendance were found to be significantly correlated (r = .42) and were therefore combined in all analyses.

These two questions were combined into one dummy coded variable which was used to assess AA/NA involvement prior to hospitalization. Seventy-three participants (25.7%) had attended AA/NA during the 30 days prior to hospitalization.

Plans for Sobriety. During the hospital discharge interview, participants were asked to report their plans for engagement in treatment, and other efforts to maintain sobriety and psychological health. This information was collected in a 14 item scale called Discharge Plan. There were three items on plans for sobriety maintenance which were combined to form a separate scale, called sobriety plans, which was used as a covariate in the analyses. Responses to these items were coded from 1 (definitely will) to 4 (definitely not). The mean scores on this scale was 1.38, indicating that at discharge most participants had plans to maintain their sobriety by going to AA/NA, staying sober, and staying off of street drugs. The items on this scale showed moderate internal consistency (Chronbach alpha = .63).

Specialized Chemical Dependency Unit (CDU) Treatment. Receipt of specialized treatment was measured by a two-level variable indicating whether the respondent was assigned to the specialized treatment unit, where they participated in AA/NA and other substance abuse treatment or to one of the standard psychiatric wards. Of the 284 participants included in this study, 192 received the specialized treatment; 92 were assigned to a standard psychiatric ward.

Aftercare Treatment

Each of the following measures of AA/NA attendance and other service use

were assessed at each community interview.

AA/NA Attendance. Participants were asked whether they had participated in Alcoholics Anonymous, Narcotics Anonymous, or any other self-help groups during the past 30 days. This item was summed across the three interview time periods (2-, 6-, and 10-months post-discharge) and dummy coded (0 = never attended AA/NA; 1 = attended at some time points) to determine how many participants ever attended AA/NA during the follow-up. Of the 284 participants with complete follow-up data, 107 did not report attending AA/NA at any of the follow-up interviews; 177 reported attending AA/NA at one or more interview time points.

In order to assess patterns of AA/NA attendance, a four-level variable was created grouping participants based on AA/NA attendance across the three interview time periods. This variable was coded 0 if the participant never attended AA/NA; 1 if they reported attending at one of the interview time points; 2 if they reported attending AA/NA at two consecutive time points; and 3 if they reported attending AA/NA at all three follow-up time points. This group resulted in four groups: nonattendees (n = 107, 37.7%), inconsistent attenders (n = 69, 24.3%), moderately consistent attenders (n = 39, 13.7%); and regular attenders (n = 69, 24.3%).

The third measure of AA/NA attendance was the number of days participants reported attending AA/NA at Time 3 (10-months post-discharge). Participants were asked how many days during the last 30 days they had attended AA. The same question was asked regarding NA. These two items were

averaged to derive a continuous measure of AA/NA participation, the # days attending AA/NA at Time 3.

Type of Service Use. In addition to items about AA/NA attendance, participants were asked if they had participated in any outpatient alcohol or drug treatment in the two weeks before the interview, such as a substance abuse group, a dual-diagnosis group at a mental health center, individual counseling for substance abuse problems.

The use of outpatient mental health services was assessed by asking participants if they had been treated for psychological or emotional problems as an outpatient or private patient since their last interview. They were also asked to report if they had received other mental health services during the two weeks before the interview, such as crisis assistance (via hotline, shelter, mental health center, etc.), individual therapy with a therapist, counselor, doctor, or case manager, or if they had participated in psychotherapy/support groups where they talked about their feelings or any emotional problems they were having. Participants who reported receiving any of these services were coded as having received outpatient mental health services.

In order to assess whether AA/NA participation had differential effects when combined with other services, a summary variable was created to categorize participants by the types of services they used. Due to the low frequency of outpatient substance abuse service use (only 8 participants reported using these services), use of mental health and substance abuse services were combined to

form an index of professional service use. A four-level variable was created to describe the types of services participants were using at Time 3. Participants who did not use any services were coded as 0; those who attended AA/NA only were coded as 1; those who participated in AA/NA and professional services were coded as 2; and those who used professional services only were coded as 3. One hundred people reported not using any services at Time 3, 40 attended AA/NA only, 59 attended AA/NA in addition professional services, and 85 participants reported using professional services only. These groupings were used in the analyses testing the relationship of type of service use to outcomes (Models A and B, paths 2, 3, 4, and 5).

Outcome Measures

The Addiction Severity Index (ASI; McLellan, Luborsky, O'Brien, & Woody, 1980) was the primary instrument used to measure treatment outcomes, including alcohol/drug use, psychological functioning, and family/social functioning. The ASI is a structured clinical and research interview that assesses the severity of seven global domains of life functioning which are often found to be impaired in persons with substance abuse problems. The seven domains are: Medical, Employment, Legal, Alcohol, Drug, Family/Social, and Psychiatric. As part of the ASI interview, participants are asked several questions related to their functioning in these areas. For each functioning domain, objective ratings of problems are obtained by weighted mathematical calculation of seven composite scores. Higher values on the composite scores indicate more problems in that domain. Each of the

composite scores showed acceptable internal consistency (Chronbach Alphas: medical = .86; employment =.60; legal = .70; alcohol = .81; drug = .57; family/social = .56; and psychiatric = .82). The four composite scores used in this study were the alcohol, drug, psychological, and family/social composites.

Rehospitalization. Respondents were asked whether they had been in a controlled environment in the past 30 days, including alcohol or drug treatment. In addition, the participants were asked to report how many times they had been treated for psychological or emotional problems in a hospital since their last interview. Due to the low frequency of inpatient substance abuse treatment, this variable was dropped from the analyses. The number of psychiatric hospitalizations since the last interview was used as the primary measure of recidivism.

Procedures

As part of the procedures, incoming patients who met the criteria and agreed to participate in the SAMI study were randomly assigned to one of two types of hospital wards: one of the regular psychiatric wards or the specialized Chemical Dependency Unit (CDU). (Although assignment was random, more patients were assigned to the CDU - approximately 75% - to make use of this specialized treatment for a population in need). Patients in the regular psychiatric wards received individual and group psychotherapy, and could attend AA/NA groups if they were interested. On the CDU, patients received comprehensive biopsychosocial treatment for both their mental illness and their substance abuse

problems. CDU participants attended 40 educational lectures which covered a wide variety of topics related to dual diagnosis. The goal of the lectures was to provide factual information regarding substance abuse, to change participants' attitudes towards substance abuse, and increase motivation for sobriety. The CDU program staff was multidisciplinary and provided treatment for physical, psychiatric, family/social, and substance abuse problems. Specific treatment components included: individual and group psychotherapy, family therapy, psychoeducational lectures on substance abuse, and AA/NA groups.

Upon admission to the hospital, all participants completed a baseline interview; at the time of discharge, a second interview was completed and follow-up data for community tracking was provided. The five follow-up interviews were conducted approximately every four months after hospital discharge, beginning at 2-months post-discharge. Using the information that participants provided at discharge, and other intensive tracking measures, SAMI staff were able to locate 84 to 86% of the participants at each interview time point following hospital discharge.

Chapter 3

Results

Data Analysis Strategy

The following is a description of the statistical procedures that were used to test the hypotheses of this study. Logistic regression was used to test the first hypothesis, predicting post-hospital AA/NA Ever. Analysis of Variance was used to test hypotheses 2, 3, and 4 examining the relationships between symptom/chronicity status and AA/NA attendance patterns and the relationships between the amount and types of services used and outcomes at 2- and 6-months post-hospitalization. These analyses were conducted in SPSS for Windows version 6.0 (Norusis, 1993) using experimental condition, prior AA/NA attendance and plans to maintain sobriety as covariates. Finally, a series of path models were tested using the EQS Structural Equations Program (Bentler, 1995). These path models examined the relationships between symptom/chronicity status, several variations of AA/NA and other service use, and outcomes in five domains: alcohol problems, drug problems, psychological problems, family/social problems, and rehospitalization. Two types of models were fit to the data: an integrated treatment model (Model A) and an AA treatment model. Results for the two models will be

reported separately.

In order to comply with the data requirements of EQS, a few changes were made in the data. First, all participants with missing data on any of the study variables were excluded from the analyses. Only the 284 participants with 100% complete data were included. (The next section discusses the missing data analyses and comparison of those included in the analyses vs. those exclued). Second, due to problems with non-normally distributed variables in the model (e.g., # days attending AA/NA, psychiatric rehospitalization, and family/social problems), all continuous measures were converted via log transformation. The variables with highly skewed distributions tended to be negatively skewed L-shaped distributions, with most respondents having scores of 0 (with the exception of AA/NA attendance which was bimodally distributed). Given the typically high number of near-zero values, the following transformation was conducted: $\log_{10}(X = 1)$ for each continuous variable (Howell, 1987).

The third substantial change was the elimination of the covariates in the path models. One variable (sobriety plans) was measured at the discharge interview, whereas the independent variables (the symptom/chronicity groups) were measured at baseline or hospital entry. Given the time sequence of these measures, sobriety plans could not logically be entered into the model as a predictor occurring before symptom/chronicity, and was therefore eliminated from the path analyses. The other two of the three covariates were dichotomous variables, which would have been used to predict the dichotomous design variables

representing the four levels of symptom/chronicity. Bentler (1995) strongly advises against including dichotomous dependent variables in structural equation modeling with EQS. It is noted that the path coefficients are not reliable and induce difficulty of interpretation. Therefore, wherever it was feasible, dichotomous variable were eliminated from the model, or used only as predictors (as in the symptom/chronicity groups). The one exception to this was the models testing types of service use, which was entered as three dichotomous design variables. Given the violation of EQS model assumptions, the findings from the models using type of service use should be interpreted with caution.

Missing Data Analyses

Participants with missing or invalid scores on any of the 23 variables used in this study were excluded from the analyses. Most participants who were excluded failed to complete one of the interviews from which data for this study was taken, usually because the project interviewers were unable to locate the participant. A less frequent cause of missing data was participant refusal or inability to answer the survey questions.

Participants were divided into two groups based on the completeness of their interview data. There were 284 participants who had complete data for all 22 study variables; 190 respondents had missing data for one or more variables. In order to determine if participants with missing data differed substantially from those with 100% complete data, a series of analyses were conducted comparing the two groups on baseline demographic characteristics, treatment experiences, psychiatric

diagnoses, and symptom/chronicity grouping. Between group comparisons were conducted using ANOVA for continuous variables and Chi-square for discrete variables. The results of these analyses are reported in Table 4.

While there were no significant differences between the two groups on most of the demographic, treatment, and diagnostic variables, participants with complete data were significantly more likely to be male, to have received multiple substance dependence diagnoses, and to have participated in the specialized Chemical Dependency Unit treatment in the hospital. These findings are somewhat surprising, and suggest that males with more serious substance abuse problems were more likely to remain in the study through 14-months follow-up. One tentaive hypothesis which might explain this finding is that males in this sample were more likely to be jailed or rehospitalized during the follow-up period. When participants were institutionalized, the interviewers often had an easier time of locating them and conducting the interviews, since they were dealing with a "captive audience."

Table 4. Comparison among Participants with Complete vs. Missing Data

	Level of Data Completeness [a]				
	Missing 1 or more variables n =190 (40.1%)		Complete Data n = 284 (59.9%)		
Variable	n	%	n	%	Statistical Test
Gender (% Male)	129	68%	220	77%	χ^2 (1, 474) = 5.37
Ethnicity (% African American)	135	71%	193	68%	n.s.
Age (Mean)	33.8	-------	33.1	-------	n.s.
Marital Status					
Never Married	121	64%	179	63%	n.s.
Married	19	10%	23	8%	
Separated, etc.	50	26%	81	29%	
Usual Employment Status					
Employed	92	48%	158	56%	n.s.
Unemployed	70	37%	84	30%	
Monthly Income (Mean)	$663	---------	$683	--------	n.s.
# Previous Psychiatric Hospitalizations (Mean)	3.4	--------	4.0	--------	n.s.
Severe Mental Illness Diagnosis[b]	110	58%	148	52%	n.s.
Substance Dependence (% Polydrug Dependent)	45	24%	101	36%	χ^2 (1, 474) = 5.27
Specialized CDU Treatment	109	57%	192	68%	χ^2 (1, 474) = 5.15
Treatment Duration (Mean # days spent in hospital)	42.8	--------	43.7	--------	n.s.
Prior AA/NA Attendance	47	25%	73	26%	n.s.

	Level of Data Completeness [a]				
	Missing 1 or more variables n =190 (40.1%)		Complete Data n = 284 (59.9%)		
Variable	n	%	n	%	Statistical Test
Symptom Group					
High Sx/Chronic	51	27%	73	26%	n.s.
High Sx/Acute	43	23%	66	23%	
Low Sx/Chronic	31	16%	59	21%	
Low Sx/Acute	45	24%	86	30%	

Note: All reported results are significant at $p < .05$.

[a] There were 22 study variables; participants with valid scores on all 22 variables were considered to have complete data.

[b] Participants with Schizophrenia, Organic Mood Disorders, Major Depression, or Bipolar Depression.

Descriptive Statistics on Study Variables

Table 5 provides descriptive information on AA/NA attendance and other service use during the follow-up period for the 284 persons included in the analyses. Almost two-thirds of the respondents reported attending Alcoholics Anonymous or Narcotics Anonymous at some time after hospitalization. However, the patterns of attendance tended to be sporadic, with many respondents only attending for a brief period of time. Of those who reported attending AA or NA at the 2-, 6-, or 10-month follow-up, only 39% were attending at each interview time-point. Those who were attending at the 10-month time point reported attending an average of 2 days during the previous month. Most AA/NA attenders went on ten days or fewer; only 1.4% were attending AA/NA most days out of the month (i.e., 20 days or more).

In terms of types of services used, one-third of the respondents reported not using any self-help or outpatient services at the 10-month follow-up. A small number of people were attending AA only, while many more were receiving professional services (typically mental health services). About one-third of the respondents were receiving professional services only, and not attending AA or NA.

Table 6 shows the descriptive statistics on the outcome measures. The ASI composites were used to assess problems in the alcohol, drug, psychological, and family/social domains, with higher scores indicating more problems. Rehospitalization represents the number of times participants had been rehospitalized since the last interview. This sample reported significant problems in all of the ASI functioning domains. However, the scores on drug problems were relatively low and showed

little variability. In terms of rehospitalization for psychiatric problems, few participants were rehospitalized at either time 3 or time 4. But a small number of participants had been rehospitalized more than once since the previous interview. Thus, there was considerable variability in scores on rehospitalization.

Table 5. Descriptives on AA/NA and other Service Use during Follow-up (n =284)

Variable	%/Mean (SD)
AA/NA Attendance Pattern	
Never attended	37.7%
Attended at 1 timepoint	24.3%
Attended at 2 consecutive timepoints	13.7%
Attended at all three timepoints	24.3%
Types of Services Used at 10-month Follow-up	
None	35.2%
AA only	14.1%
AA plus professional services	20.8%
Professional services only	29.9%
Average Number of Days Attended AA/NA during previous month at 10-month Follow-up	2.2(4.77)
0 days	65.5%
1-10 days	27.8%
11-20 days	5.3%
20 days or more	1.4%

Table 6. Descriptives on Outcome Measures

	Mean	Standard Deviation
T3 Alcohol Problems	.24	.20
T3 Drug Problems	.11	.08
T3 Psychological Problems	.30	.24
T3 Family/Social Problems	.23	.17
T3 Rehospitalization	.31	.66
T4 Alcohol Problems	.24	.19
T4 Drug Problems	.11	.09
T4 Psychological Problems	.28	.24
T4 Family/Social Problems	.21	.16
T4 Rehospitalization	.33	.73

Correlations among the Study Variables

Table 7 displays the zero-order correlations among the 23 variables used in the analyses. There were small to moderate correlations between the independent variables and covariates (see triangle 1 in Table 7), with sobriety plans and treatment condition having the highest correlation (r = .24). This suggested that the variables were measuring relatively distinct domains. Higher correlations were found among the AA/NA service use measures (rs range from .21 to .81) due to the fact that these variables included common items. However, all of the service use variables were included as they were thought to measure conceptually distinct factors. None of the service use variables were used in the same analyses. Finally, the time 3 and time 4 dependent measures were found to be significantly correlated (rs range from .25 to .59), therefore, the measures were entered together in the analyses predicting functioning in each outcome domain.

Table 7. Correlations between Predictor Variables, Covariates, and Outcome Variables (n = 283)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Tx Condition*	—																						
2. Prior AA/NA*	-.01	—																					
3. Sobriety Plans	-.24	.10	—																				
4. Low Sx/Acute*	.01	-.16	-.05	—																			
5. Low Sx/Chronic*	-.09	-.05	.04	-.34	—																		
6. High Sx/Acute*	.00	-.02	-.10	-.36	.53	—																	
7. High Sx/Chronic*	-.03	-.06	.01	-.39	.52	.50	—																
8. AA Ever *	.04	.19	-.05	.10	-.01	.03	-.12	—															
9. AA Pattern	.05	.25	-.09	.11	-.08	-.04	-.16	.81	—														
10. T3 AA Only*	.02	.13	-.03	.09	-.03	.03	.00	.31	.43	—													
11. T3 AA & Prof*	-.03	.16	-.05	-.04	-.08	-.04	-.13	.40	.57	-.21	—												
12. T3 Prof Only*	.06	-.11	-.03	-.18	.09	-.02	.14	-.25	-.35	-.26	-.34	—											
13. T3 AA/NA Days	.13	.21	-.14	.04	-.32	-.18	-.31	.36	.52	.40	.38	-.30	—										
14. T3 Alch Probs	-.01	-.06	.18	-.06	.01	.06	.09	-.01	-.10	-.15	-.06	-.00	-.15	—									
15. T3 Drug Probs	.01	-.00	-.00	-.16	.03	.09	.12	-.05	-.10	-.15	.04	.16	-.04	.31	—								
16. T3 Psych Probs	.01	-.04	.08	-.31	-.07	.01	.12	.01	-.03	-.07	.11	.04	-.03	.22	.31	—							
17. T3 Fam Probs	-.02	.13	-.01	-.17	.00	.11	.12	-.01	-.00	.03	-.02	.04	.03	.13	.24	.43	—						
18. T3 Rehosp	-.04	-.04	.10	-.24	.03	-.09	.07	.02	-.04	-.02	.07	.06	-.03	.07	.20	.38	.15	—					
19. T4 Alch Probs	-.02	-.06	.24	-.07	.03	.10	.04	-.02	-.03	-.08	.01	-.05	-.08	.59	.18	.19	.06	.17	—				
20. T4 Drug Probs	-.02	.03	.02	-.11	.05	.05	-.01	-.06	-.04	-.10	.04	.12	-.01	.16	.52	.15	.10	.21	.32	—			
21. T4 Psych Probs	.05	.04	.09	-.22	-.03	.03	.19	-.13	-.12	-.06	.01	.07	-.08	.20	.16	.49	.20	.24	.32	.30	—		
22. T4 Fam Probs	.08	.07	.01	-.00	-.10	.01	.02	.05	.05	.01	.01	-.04	-.01	.07	.01	.14	.25	.01	.19	.11	.28	—	
23. T4 Rehosp	.03	.05	-.02	-.16	.05	-.08	.01	.01	-.01	-.02	.05	.02	.01	.05	.03	.18	.09	.33	.11	.18	.43	.08	—

Note: r_s > .11 are significant at the p <.05 level; r_s > .15 are significant at p <.01; r_s > .18 are significant at p <.001.

* These categorical variables are coded 0, 1 (0= no; 1= yes). For Tx Condition, 0 = standard psychiatric ward 1 = dual diagnosis ward.

Hypotheses I & II: Relationship of Individual Characteristics to AA/NA Attendance

It was predicted that individual characteristics, that is, psychiatric symptoms and history of psychiatric hospitalization would be significant predictors of AA/NA attendance during the follow-up period. Persons who reported experiencing high levels of psychiatric symptoms and multiple prior psychiatric hospitalizations were expected to be less likely to ever attend AA/NA during the 10-month follow-up period, while those with fewer symptoms and more acute psychiatric problems were expected to be most likely to attend AA/NA. This hypothesis was tested via logistic regression with the three symptom/chronicity design variables as the independent variables (the low symptom/acute group was used as the constant), treatment condition, prior AA/NA attendance, and sobriety plans as the covariates, and AA/NA Ever as the outcome variable. The covariates were entered together on step one; the symptom/chronicity groups were entered on step two. Table 8 shows the results of each step of the logistic regression predicting AA/NA Ever. Included in each step are the regression coefficients (B), the standard errors, and the partial correlations (R) for each independent variable. The B values may be interpreted as the log odds of the event occurring (i.e., the participant ever attends AA/NA after hospitalization), given a one-unit increase in the predictor variable.

The three covariates entered on step one were significant predictors of AA/NA Ever, classifying 62% of the respondents correctly. Of the covariates entered on this step, prior AA/NA attendance was the only significant predictor. The log odds of a participant ever attending AA/NA after hospitalization were

increased by .97 if they had attended AA/NA prior to hospitalization. Treatment condition (i.e., dual diagnosis treatment vs. regular psychiatric treatment) and having plans to maintain sobriety did not significantly predict the odds of attending AA/NA. On step two, there was a slight improvement in classification of AA/NA attenders vs. nonattenders with the addition of the symptom/chronicity groups. The percent correctly classified increased to 63%. Of the symptom/chronicity groups, membership in the high symptom/chronic group was significantly related to AA/NA attendance. The log odds of AA/NA attendance decreased by .94 for individuals in this group. While the coefficients for the other groups were not significant, all were in the same direction, indicating that persons in the low symptom/chronic and high symptom/acute groups were also less likely to attend AA/NA. However, the log odds for the constant was positive (though statistically nonsignificant), indicating that persons in the low symptom/acute group were somewhat more likely to attend AA/NA than the other groups.

Table 8. Logistic Regression of Symptom/Chronicity and Covariates on AA/NA Ever (n = 283)

	Step 1 χ^2 Improvement = 11.18* Classified 61.84%			Step 2 χ^2 Improvement = 7.79* Classified 63.25%		
	B	S.E.	R	B	S.E.	R
Block 1						
Tx Condition	.12	.27	.00	.12	.28	.00
Prior AA/NA	.97*	.32	.14	1.09*	.33	.16
Sobriety Plans	-.10	.26	.00	-.04	.26	.00
Constant	.35	.47				
Block 2						
Low Sx/Chronic				-.58	.37	-.03
High Sx/Acute				-.44	.36	.00
High Sx/Chronic				-.94*	.35	-.12
Constant				.72	.51	

* $p < .05$

The second hypothesis was that persons in the high symptom/chronic group would be less likely to become regular AA/NA attenders, if they ever attended at all. It was predicted that persons in the more severe/chronic groups would be more likely to drop out of AA/NA than persons in other symptom/chronicity groups. This hypothesis was tested via ANCOVA using the 4-level symptom/chronicity variable as the independent factor, treatment condition, prior AA/NA attendance, and sobriety plans as the covariates, and AA/NA Pattern as the dependent variable. Table 9 shows the results of this analysis. As the results for hypothesis I indicated, persons in the high symptom/chronic groups attended AA/NA less consistently after hospitalization than members of the other symptom/chronicity groups. Persons in the low symptom/acute group were the most consistent in their AA/NA attendance. The overall model was statistically significant and explained 8.0% of the variance in AA/NA attendance patterns.

Hypotheses III & IV: Relationship of AA/NA and Other Service Use to Functioning

Hypothesis three indicated that persons who became consistent AA/NA attenders soon after hospitalization would show better outcomes than those who never attended AA/NA or who attended sporadically. This hypothesis was tested via five separate MANOVA models with AA/NA attendance pattern as the independent factor and the five sets of outcome measures (e.g., Time 3 alcohol problems and Time 4 alcohol problems) as the dependent variables. The results of these analyses are reported in Table 10. The MANOVA results indicate only

Table 9. ANCOVAs Predicting AA/NA Attendance Pattern from Symptom/Chronicity Groups & Covariates (n = 283)

Variable	Low Sx/Acute (n = 86)	High Sx/Acute (n = 66)	Low Sx/Chronic (n = 59)	High Sx/ Chronic (n = 73)	Statistical Test	Eta^2
AA/NA Attendance Pattern	1.53	1.19	1.28	.96	$F = 3.30^*$	.04
Covariates						
Tx Condition					$t = .38$	
Prior AA/NA Attendance					$t = 4.50^*$	.07
Sobriety Plans					$t = -.87$	
Total Explained					$F = 5.11^*$	.08

Note: Values in table are means for each group.
*$p < .05$

Table 10. MANOVAs Predicting Functioning from AA/NA Attendance Pattern (n = 284)

Variable	Never Attended (n = 107)	Attended at 1 Timepoint (n = 69)	Attended at 2 Consecutive Timepoints (n = 39)	Attended at all 3 Timepoints (n = 69)	F	Eta^2
Alcohol Problems						
Time 3	.24	.26	.27	.18	2.93*	.03
Time 4	.24	.23	.27	.22	.74	
Drug Problems						
Time 3	.12	.12	.11	.10	1.16	
Time 4	.12	.11	.11	.11	.45	
Psychological Problems						
Time 3	.30	.33	.28	.28	.66	
Time 4	.32	.26	.29	.25	1.82	
Family/Social Problems						
Time 3	.23	.23	.20	.23	.38	
Time 4	.20	.21	.22	.22	.27	
Psychiatric Rehospitalization						
Time 3	.29	.41	.33	.22	.99	
Time 4	.32	.35	.44	.26	.50	

Note: Values in table are means for each group.
*p < .05

Table 11. MANOVAs Predicting Functioning from Type of Services Used at Time 3 (n = 284)

Variable	None (n = 100)	AA/NA Only (n = 40)	AA/NA + Professional Services (n = 59)	Professional Services Only (n = 85)	F	Eta^2
Alcohol Problems						
Time 3	.28	.16	.21	.23	3.79*	.04
Time 4	.26	.20	.24	.22	1.34	
Drug Problems						
Time 3	.11	.08	.12	.13	4.34*	.04
Time 4	.11	.09	.12	.13	2.25	
Psychological Problems						
Time 3	.27	.26	.35	.31	1.68	
Time 4	..27	.25	.29	.31	.71	
Family/Social Problems						
Time 3	.22	.24	.22	.24	.32	
Time 4	.21	.22	.21	.20	.16	
Psychiatric Rehospitalization						
Time 3	.22	.28	.39	.37	1.15	
Time 4	.28	.30	.39	.35	.34	

Note: Values in table are means for each group.
*p < .05

moderate support for hypothesis III. Of the ten outcome variables, patterns of AA/NA attendance were found to be significantly related to alcohol problems at Time 3. Persons who reported attending AA/NA at each of the three follow-up time points reported significantly fewer alcohol problems at Time 3 (10-months post-hospitalization). Time 4 alcohol problems were not significantly related to AA/NA attendance pattern, nor were variations in drug, psychological, family/social problems or psychiatric rehospitalization significantly predicted by AA/NA attendance patterns.

Hypothesis four was that participants who report receiving outpatient professional mental health or substance abuse services in addition to AA would show greater improvement on the outcome measures than those who attended AA only. This hypothesis was tested via five MANOVA models with type of service use as the independent factor and the five sets of outcome measures as the dependent variables. The results of these analyses are reported in Table 11. Persons who attended AA/NA Only reported significantly fewer alcohol problems at Time 3 than persons who used Professional Services in addition to AA/NA or used Professional Services Only. Those who did not utilize any services reported the most alcohol problems of any group. Type of service use was not significantly related to alcohol problems at Time 4. Although the same patterns of group means was evident, the between group differences was small and did not reach statistical significance. Time 3 drug problems showed a similar pattern to that found for Time 3 alcohol problems. Persons who attended AA/NA Only had significantly fewer

drug problems. Again, the results for Time 4 were in the same direction, but not robust enough to reach statistical significance. Outcomes in the other domains --- psychological problems, family/social problems, and psychiatric rehospitalization were not significantly related to type of service use at Time 3. However, there was a nonsignificant trend for persons attending professional services only to report more psychological problems and to be more likely to be rehospitalized.

Summary of Preliminary Analyses & Hypotheses Tests

The preceding analyses indicated that respondents with high levels of psychiatric symptomatology and multiple prior psychiatric hospitalizations were less likely to ever attend AA/NA during the 10-month follow-up time period, and that if they did attend, they were less likely to attend consistently. Contrarily, persons with relatively few psychiatric symptoms and few prior hospitalizations were more likely to attend AA/NA. While these relationships were significant, they only accounted for a small percent of the variance in AA/NA attendance (approximately 4%). Thus, hypotheses I and II received moderate support.

In terms of the relationship between AA/NA service use and outcomes, persons who attended AA/NA regularly after hospital discharge had fewer alcohol and drug problems at 10-months post-hospitalization. Using AA/NA Only seemed to have the most beneficial effects on functioning. Contrary to expectations, persons who used Professional Services in addition to AA/NA did not show additional improvement over those who used AA/NA Only. In fact, the latter group had the fewest alcohol and drug problems. AA/NA service use was not found to

be directly related to psychological problems, family/social problems, or to psychiatric rehospitalization. In the next phase of the analyses the indirect relationships with these outcome measures were explored via path analysis.

The Structural Equation Models

In addition to identifying the relationships between individual characteristics, service use, and outcomes, a major objective of this study was to determine whether an hypothesized Integrated Treatment model (Model A) or an AA/NA Treatment model (Model B) was more consonant with the data from this sample of persons with dual diagnosis. In order to address these two objectives, a series of 24 different path models were tested using EQS Structural Equations Program. These path models examined the relationships between symptom/chronicity status, three variations of AA/NA and other service use (AA/NA attendance pattern over the 10-month follow-up, the number of days attending AA/NA at the 10-month interview, and the types of services used at the 10-month interview), and outcomes in five domains: alcohol problems, drug problems, psychological problems, family/social problems, and rehospitalization. Two types of models were fit to the data using the same sets of variables: an Integrated Treatment model (Model A) in which service use was directly related to each outcome variable (see Figure 3 for example of a measurement model predicting psychological problems) and an AA Treatment model in which alcohol and drug problems mediated functioning in the other domains (see Figure 4). Results for the Integrated Treatment model will be presented first, followed by the AA Treatment model.

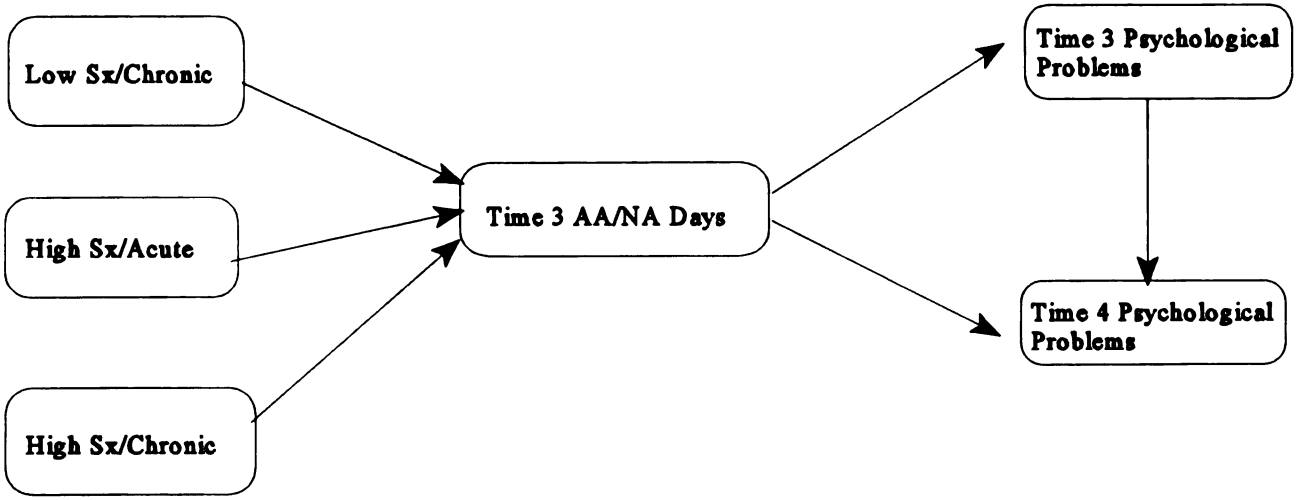

Figure 3. Measurement Model A1

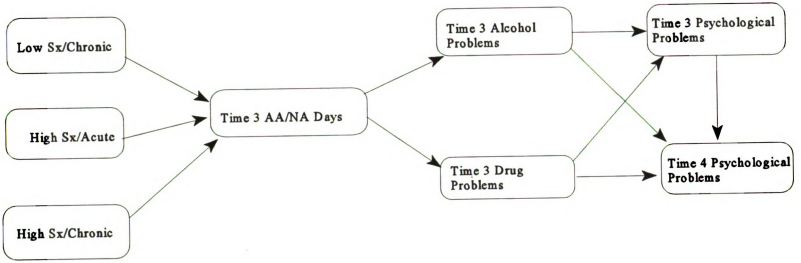

Figure 4. Measurement Model B1

For each model, all variables and predicted paths were entered and tested via maximum likelihood estimation. Since the goal of these analyses was to reach a parsimonious model which provided the best fit with the data, the Wald test of nonsignificant paths was implemented in each analysis. The Wald test is designed to determine which sets of estimated parameters could be either eliminated or set to zero without substantial loss in model fit (Bentler, 1995). Using the Wald test results, the least significant parameters were eliminated from each model until a parsimonious and interpretable model was attained.

In addition, the goodness of fit of each model was assessed via chi-square test, the Bentler-Bonnett nonnormed fit index (NNFI), and the comparative fit index (CFI). These measures of model fit are used somewhat differently in structural equation modelling. Generally, the chi-square is a test of the null hypothesis that the coefficients in the model are equal to zero; that is, there is no relationship between the specified variables. A significant chi-square indicates that the null model is the true state of affairs, and that the proposed model should be rejected. The NNFI and CFI are commonly reported indices of incremental model fit, that is, the degree to which the proposed model is an *improvement* over the null model. While some studies utilize the NFI (normed fit index), which is very similar to the CFI, the NNFI is reported here. In contrast to the CFI (and NFI), the NNFI is scaled according to the degrees of freedom in the model and is generally a more sensitive measure of model fit than the CFI or the NFI. The conventional criteria for good model fit is NNFI and CFI indices of .90 or greater. Given a nonsignificant

chi-square, an NNFI and/or CFI of .90 or higher would indicate that the model was a good fit with the data.

Path Analyses Results

Tables 12, 13, and 14 present the standardized path coefficients for the integrated treatment models using number of days attended AA/NA at time 3, AA/NA attendance pattern, and Type of service use to predict the five sets of outcome variables: alcohol problems, drug problems, psychological problems, family/social problems, and psychiatric rehospitalization. (See Appendix for diagrams for these path models as well as the mediated AA/NA models.) The direct effects on each outcome variable are presented, as well as the sum of all indirect effects via the symptom/chronicity groups. Not all indirect paths are presented in the tables, however, the coefficients for the missing indirect paths may be calculated from the data in the table. For instance, there was an indirect path from Time 3 AA/NA days to Time 4 alcohol problems, via Time 3 alcohol problems. This path can be calculated by multiplying the direct effect from Time 3 AA/NA days to Time 3 alcohol problems (.15) by the direct effect from Time 3 alcohol problems to Time 4 alcohol problems (.61). Thus, the indirect effect of Time 3 AA/NA days on Time 4 alcohol problems is .09. For each model, the fit indices are presented at the bottom of the table.

Table 12. Path Analysis Results: Integrated Model (A) with Number of Days Attended AA/NA at Time 3 (n = 284)

	Time 3 Outcome Variables				
Independent Variables	Alcohol Problems	Drug Problems	Psych Problems	Fam/Soc Problems	Rehospitalization
Direct Effects:					
T3 AA/NA Days	-.15*	-.04	-.04	.04	-.08
Indirect Effects:					
Via Low Sx/Chronic	.01	—	—	—	.01
Via High Sx/Acute	-.02	—	—	—	-.01
Via High Sx/Chronic	.02	—	—	—	.01
	Time 4 Outcome Variables				
Direct Effects:					
T3 AA/NA Days	.05	.01	-.07	-.02	-.02
T3 Problems[a]	.61*	.50*	.49*	.30*	.35*
Indirect Effects					
Via Low Sx/Chronic	—	—	—	—	—
Via High Sx/Acute	-.01	—	-.01	—	—
Via High Sx/Chronic	—	—	.01	—	—
Model Fit:					
X^2 (9 df), p value =	118.27, p <.001	127.06, p <.001	162.46, p <.001	129.98, p <.001	146.72, p <.001
NNFI =	.26	.02	-.08	-.35	-.29
CFI =	.56	.42	.35	.19	.22

* Path coefficient significant at p <.05. — Indicates path coefficients less than .01

[a] These path coefficients represent the prediction of T4 problems by T3 problems in the same domain (e.g., the path from T3 Alchol problems to T4 Alcohol problems).

Table 13. Path Analysis Results: Integrated Model (A) with AA/NA Attendance Pattern (n = 284)

Independent Variables	Alcohol Problems	Drug Problems	Psych Problems	Fam/Soc Problems	Rehospitalization
			Time 3 Outcome Variables		
Direct Effects:					
AA/NA Attendance Pattern	-.10	-.10	-.03	.00	-.06
Indirect Effects:					
Via Low Sx/Chronic	.01	.01	—	—	.01
Via High Sx/Acute	—	—	—	—	—
Via High Sx/Chronic	.02	.02	.01	—	.01
			Time 4 Outcome Variables		
Direct Effects:					
AA/NA Attendance Pattern	.03	.02	-.10	.05	-.03
T3 Problems[a]	.61*	.50*	.49*	.30*	.35*
Indirect Effects					
Via Low Sx/Chronic	—	—	.01	—	—
Via High Sx/Acute	—	—	—	—	—
Via High Sx/Chronic	—	.01	.02	-.01	.01
Model Fit:					
X^2 (9 df), p value =	117.82, p <.001	126.14, p <.001	161.60, p <.001	130.05, p <.001	146.01, p <.001
NNFI =	.25	.04	-.07	-.35	-.29
CFI =	.55	.42	.36	.19	.23

* Path coefficient significant at p <.05. — Indicates path coefficients less than .01.

[a] These path coefficients represent the prediction of T4 problems by T3 problems in the same domain (e.g., the path from T3 Alcohol problems to T4 Alcohol problems).

Table 14. Path Analysis Results: Integrated Model (A) with Type of Service Use at Time 3 (n = 284)

	Time 3 Outcome Variables				
Independent Variables	Alcohol Problems	Drug Problems	Psych Problems	Fam/Soc Problems	Rehospitalization
Direct Effects:					
AA Only	-.20*	-.09	-.02	.05	.03
AA + Professional Services	-.13*	.09	.14*	.01	.11
Professional Services Only	-.11	.17*	.08	.06	.14*
Indirect Effects:					
Via Low Sx/Chronic	—	.05	.01	—	.03
Via High Sx/Acute	-.01	.02	.02	—	.01
Via High Sx/Chronic	-.01	.05	.01	.01	.03
	Time 4 Outcome Variables				
Direct Effects:					
AA Only	.04	.05	-.01	.01	.01
AA + Professional Services	.08	.09	-.02	.01	.04
Professional Services Only	.01	.11*	.05	-.03	.04
T3 Problems[a]	.62*	.48*	.50*	.30*	.35*
Indirect Effects:					
Via Low Sx/Chronic	—	.06	.02	-.01	.02
Via High Sx/Acute	—	.02	.01	—	.01
Via High Sx/Chronic	-.01	.05	.03	-.01	.01
Model Fit:					
χ^2 (12 df), p value =	203.47, p <.001	210.12, p <.001	245.33, p <.001	213.55, p <.001	228.03, p <.001
NNFI =	-.31	-.54	-.66	-.98	-.88
CFI =	.44	.34	.29	.15	.19

* Path coefficient significant at p <.05. — Indicates path coefficients less than .01.

[a] These path coefficients represent the prediction of T4 problems by T3 problems in the same domain (e.g., the path from T3 Alcohol problems to T4 Alcohol problems).

Overall, the hypothesized path models did not prove to be good fits with the data. All of the Chi-squares were large and highly significant, indicating that the null hypothesis of no relationship between the variables could not be rejected.

While the overall models were not good fits, there was some consistency with findings from the previous analysis. For instance, persons in the high symptom/chronic group were significantly less likely to attend AA/NA regularly (β = -.17). They were also significantly more likely to use professional services only (β = .25), as were persons in the low symptom/chronic group (β = .19). However, in most cases, symptom/chronicity had very negligible impact on functioning via service use, as indicated by the low indirect effects.

The previously identified relationships between AA/NA service use and functioning were generally supported with the path analysis results. For instance, persons who attended AA/NA more often at Time 3 had fewer alcohol problems (β = -.15, see Table 12). Some divergent findings regarding service use and outcomes also emerged from the path analyses. For instance, regarding type of service use (Table 14), the path from AA/NA only to Time 3 drug problems was not significant, as would be expected based on previous analysis. However, persons who used professional services only had significantly more drug problems at Time 3 (β = .17) and Time 4 (β = .11). Also, persons who used AA/NA in addition to professional services had more psychological problems at Time 3 (β = .14). And those who used professional services only (which were predominantly outpatient mental health services) were more likely to be rehospitalized at Time 3 (β = .14).

The path models confirmed the lack of relationship between service use and Time 4 functioning. None of the direct paths from service use to Time 4 functioning reached statistical significance. The only relationships identified with Time 4 functioning were indirect paths, via Time 3 functioning. The high correlations between Time 3 and Time 4 functioning accounted for these relationships.

Tables 15, 16, and 17 show the path analysis results for the AA/NA Treatment models in which Time 3 alcohol and drug problems were mediators of functioning in the other domains. None of these models were judged to be significant fits with the data, as indicated by the large chi-squares and low values on the fit indices. However, there were more significant paths in the AA/NA Treatment models than in the Integrated Treatment models, primarily due to the concurrent relationships between the various indices of Time 3 functioning. For instance, Time 3 alcohol problems were significantly related to Time 3 psychological problems. Time 3 drug problems were significantly related to Time 3 psychological, family/social problems, and psychiatric rehospitalization. However, no significant relationships were identified for Time 4 functioning. In these path models, as in the Integrated Treatment models, the indirect effects of symptom/chronicity were very small or nonexistent, as were the indirect effects of service use.

Table 15. Path Analysis Results: AA/NA Treatment Model (B) with Number of Days Attended A/NA at Time 3 (n = 284)

Independent Variables	Psych Problems	Fam/Soc Problems	Rehospitalization
	Time 3 Outcome Variables		
Direct Effects:			
T3 Alcohol Problems	.15*	.08	.03
T3 Drug Problems	.27*	.22*	.22*
Indirect Effects:			
Via T3 AA/NA Days	-.04	-.02	-.01
Via Low Sx/Chronic	---	---	---
Via High Sx/Acute	---	---	---
Via High Sx/Chronic	---	---	---
	Time 4 Outcome Variables		
Direct Effects:			
T3 Alcohol Problems	.09	.05	.05
T3 Drug Problems	-.01	-.07	-.03
T3 Problems[a]	.48*	.31*	.36*
Indirect Effects:			
Via T3 AA/NA Days	-.03	-.01	-.01
Via Low Sx/Chronic	---	---	---
Via High Sx/Acute	---	---	---
Via High Sx/Chronic	---	---	---
Model Fit:			
χ^2 (18 df), p value =	189.49, p <.001	160.39, p <.001	177.63, p <.001
NNFI =	.09	-.14	-.14
CFI =	.42	.27	.27

* Path coefficient significant at p <.05.
--- Indicated path coefficients less than .01
[a] These path coefficients represent the prediction of T4 problems by T3 problems in the same domain (e.g., the path from T3 Alcohol problems to T4 Alcohol problems).

Table 16. Path Analysis Results: AA/NA Treatment Model (B) with AA/NA Attendance Pattern (n = 284)

Independent Variables	Psych Problems	Fam/Soc Problems	Rehospitalization
	Time 3 Outcome Variables		
Direct Effects:			
T3 Alcohol Problems	.15*	.08	.03
T3 Drug Problems	.27*	.22*	.22*
Indirect Effects:			
Via AA/NA Attendance	-.04	-.03	-.02
Via Low Sx/Chronic	---	---	---
Via High Sx/Acute	---	---	---
Via High Sx/Chronic	.01	.01	.01
	Time 4 Outcome Variables		
Direct Effects:			
T3 Alcohol Problems	.09	.05	.05
T3 Drug Problems	-.01	-.07	-.03
T3 Problems[a]	.48*	.31*	.36*
Indirect Effects:			
Via AA/NA Attendance	-.03	-.01	-.01
Via Low Sx/Chronic	---	---	---
Via High Sx/Acute	---	---	---
Via High Sx/Chronic	.01	---	---
Model Fit:			
χ^2 (18 df), p value =	189.27, p <.001	158.40, p <.001	175.27, p <.001
NNFI =	.09	-.14	-.14
CFI =	.41	.26	.27

* Path coefficient significant at p <.05.

--- Indicates path coefficients less than .01.

[a] These path coefficients represent the prediction of T4 problems by T3 problems in the same domain (e.g., the path from T3 Alcohol problems to T4 Alcohol problems).

Table 17. Path Analysis Results: AA/NA Treatment Model (B) with Type of Service Use at Time 3 (n = 284)

Independent Variables	Psych Problems	Fam/Soc Problems	Rehospitalization
	Time 3 Outcome Variables		
Direct Effects:			
T3 Alcohol Problems	.16*	.08	.03
T3 Drug Problems	.27*	.22*	.22*
Indirect Effects:			
Via AA/NA Only	.01	.04	-.02
Via AA/NA + Prof Services	.05	.03	.02
Via Prof Services Only	.07	.05	.04
Via Low Sx/Chronic	.01	.02	.01
Via High Sx/Acute	.01	---	.01
Via High Sx/Chronic	.01	.02	.01
	Time 4 Outcome Variables		
Direct Effects:			
T3 Alcohol Problems	.09	.05	.05
T3 Drug Problems	-.01	-.07	-.03
Time 3 Problems[a]	.48*	.31*	.36*
Indirect Effects:			
Via AA/NA Only	.02	.01	-.02
Via AA/NA + Prof Services	.03	---	---
Via Prof Services Only	.04	---	---
Via Low Sx/Chronic	.01	---	---
Via High Sx/Acute	---	---	---
Via High Sx/Chronic	.01	---	---
Model Fit:			
χ^2 (25 df), p value =	276.94, p <.001	244.89, p <.001	262.69, p <.001
NNFI =	-.14	-.34	-.34
CFI =	.37	.26	.26

* Path coefficient significant at p <.05.

--- Indicates path coefficients less than .01.

[a] These path coefficients represent the prediction of T4 problems by T3 problems in the same domain (e.g., the path from T3 Alcohol problems to T4 Alcohol problems).

Overall, these results indicate that the full models were very poor fits with the data. Using the Wald test of nonsignificant paths, an attempt was made to reach a parsimonious and well-fitted model with each set of variables. All nonsignificant paths were eliminated from each model until an interpretable path that met the criteria for model fit could be identified. These methods resulted in two models that fit the data. Figure 5 shows the significant model predicting psychological functioning, trimmed of all nonsignificant paths. (The full model with all paths shown can be found in Appendix A.) This model showed acceptable fit with the data - χ^2 (3 df) = 3.49, p =.32; NNFI = .97; CFI = .99, indicating that it was a plausible model. Persons who attended AA/NA more often had fewer alcohol problems at Time 3, and fewer psychological problems. Those with fewer psychological problems at Time 3 also had fewer psychological problems at Time 4. Symptom/Chronicity was not a significant predictor in this model. Although this model met the criteria for acceptable fit, it only accounted for a small amount of the variance in Time 3 alcohol problems (R^2 = .01) and Time 3 psychological problems (R^2 = .03), and a moderate amount of the variance in Time 4 psychological problems (R^2 = .13).

The second model that emerged is shown in Figure 6. Persons in the high symptom/chronic group were more likely to use professional services only, which was related to experiencing more drug problems at Time 3 and more family/social problems (χ^2 (6 df) = 8.06, p =.23; NNFI = .94; CFI = .97). Similar to the previous model, this trimmed model only accounted for a small percent of the variance in

use of Professional services (R^2 = .02), Time 3 drug problems (R^2 = .01), Time 3 family/social (R^2 = .03), and Time 4 family/social problems (R^2 = .05). Interestingly, use of AA/NA only did not emerge as a significant predictor in the trimmed model, as in previous analyses.

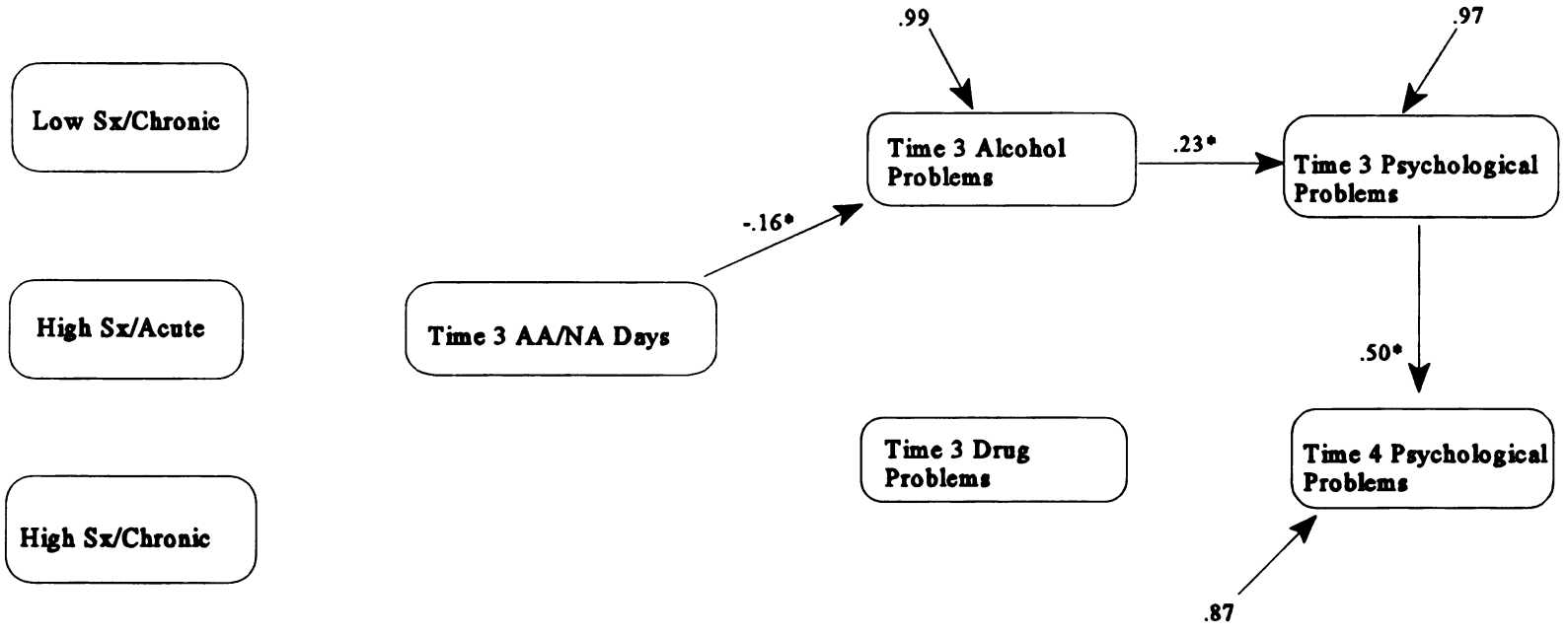

Figure 5. Significant Path Predicting Psychological Functioning

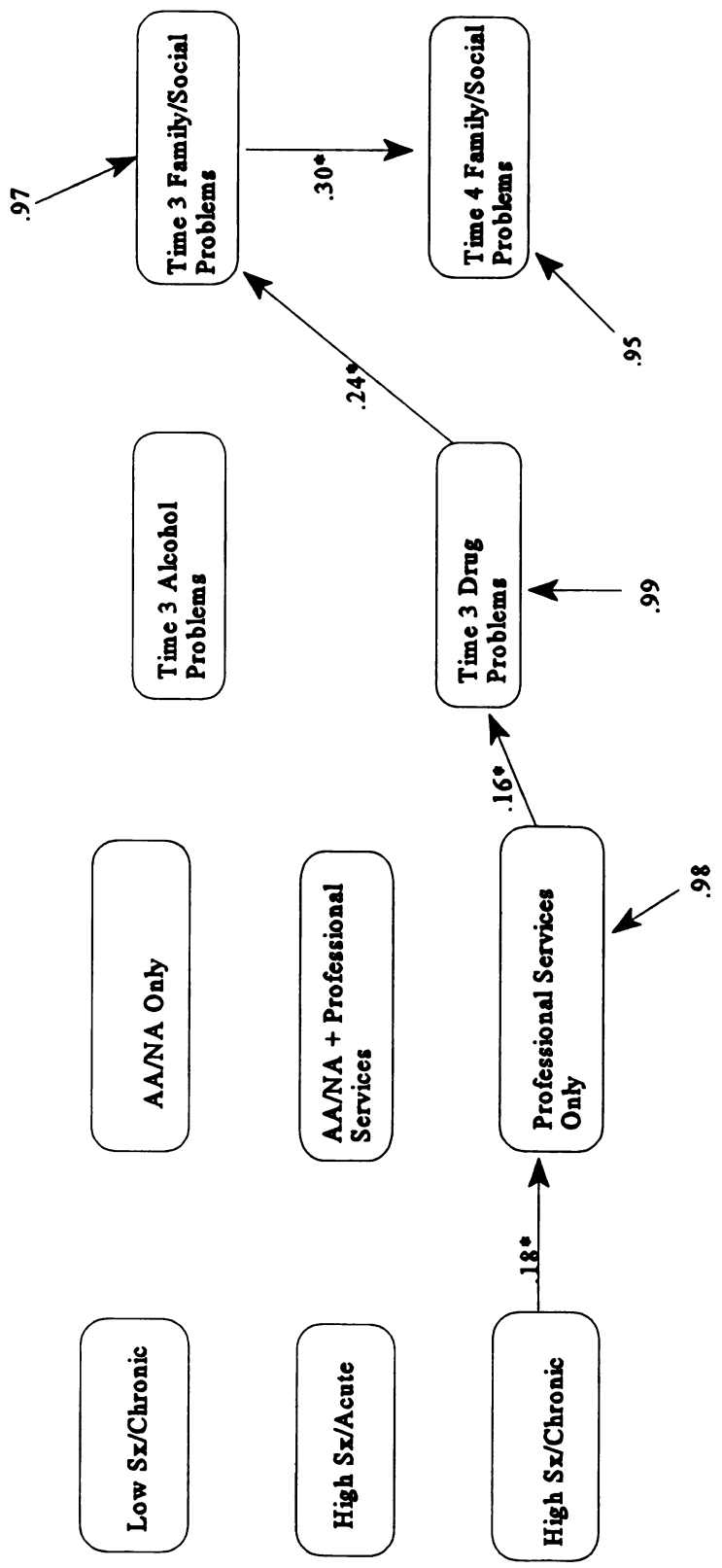

Figure 6. Significant Path Predicting Family/Social Functioning

Summary of Research Questions and Findings

(1) Are the rates of AA/NA participation among persons with dual diagnoses comparable to those without any diagnosed mental illness?

Yes. The self-reported rates of AA/NA attendance in this sample were comparable to those reported in the literature on persons with substance abuse disorders.

(2) Are persons with severe and chronic mental illness likely to attend AA/NA, and if so, how consistent will their attendance be?

Participants with severe and chronic psychiatric symptoms were significantly less likely to ever attend AA/NA after hospital discharge. They were also less likely to attend AA/NA consistently throughout the 10-month follow-up period. Participants with fewer psychiatric symptoms of acute duration reported the most consistent AA/NA attendance.

(3) Are patterns of AA/NA attendance related to alcohol/drug use and other indices of community functioning?

Persons who attended AA/NA consistently over the follow-up period (e.g., at all 3 interview timepoints) reported the best outcomes. They had significantly fewer alcohol problems. No significant findings were observed for AA/NA attendance and other functioning domains, although the direction of results for drug and psychological problems and psychiatric hospitalization were in the same direction. The latter findings were not robust enough to reach statistical significance.

(4) Do persons who receive professional services in addition to AA/NA show better outcomes than those who attend AA/NA only?

No. Use of professional services was not related to better outcomes than attendance at AA/NA only. In fact, persons who attended AA/NA only reported the best outcomes in terms of alcohol and drug abuse. Those who did not attend any services reported the most problems of any group. There were no significant difference in other functioning domains based on type of service use.

(5) Are the mechanisms of change in this sample more consonant with an integrated treatment model or an AA/NA model?

Findings from the path analyses suggested that the AA/NA treatment model was more consonant with the data. There were no direct relationships between AA/NA attendance or other service use and psychological and family/social problems or psychiatric rehospitalization. However, persons who attended AA/NA and reduced their alcohol use also reported significantly better psychological problems. Similarly, there was a mediated relationship between use of professional services, drug problems, and family/social problems.

Chapter 4

Discussion

This study sought to answer several questions related to AA/NA attendance and outcomes among dually diagnosed individuals. While there has been a general expectation that self-help groups such as AA/NA would not be appropriate or helpful for persons with the characteristics of this study's respondents, there was almost no empirical literature to validate this assumption. The current study is a step towards building an empirical data base on the efficacy of self-help groups for persons with dual diagnoses.

The first purpose of this study was to provide descriptive information on the levels of AA/NA participation in this sample, and to determine if persons with dual diagnoses attended AA/NA at different rates from persons with singly diagnosed substance abuse disorders. Previous investigators have indicated that of persons referred to AA following inpatient substance abuse treatment, 60-80% will attend (Edwards et al., 1971; Knouse & Schneider, 1987). In the current study, 62% of the respondents attended AA/NA at some time during the 10-month follow-up time period, which is comparable to the previously reported rates of attendance among persons with single diagnoses. Pettinati, Sugerman, DiDonato, and Maurer (1982)

reported AA/NA attendance rates of 74% in a dually diagnosed sample.

It is somewhat more difficult to compare rates or patterns of attendance across studies due to the wide divergence in definitions of "regular" vs. "irregular" attendance. However, the finding that 24% of the respondents in this study attended AA/NA at least once every four months over the 10-month follow-up is comparable to rates reported in the literature (Belasco, 1971; Emrick, 1987; Pettinati, Sugerman, DiDonato, & Maurer, 1982; Tomsovic, 1970). At 10-months post-hospitalization, 7% of the respondents were attending AA/NA two times per week or more. These findings are rather exceptional given the fact that most prior studies have been conducted with socially stable Caucasian males with substance abuse problems only. These data suggest that low-functioning, dually diagnosed, African American males are equally likely to attend AA/NA.

Relationship between Individual Characteristics and Service Use

Several studies have attempted to identify characteristics that differentiate persons who will attend AA/NA from those who will not. This study examined several individual characteristics thought to be related to AA/NA attendance: exposure to AA/NA treatment models via specialized dual diagnosis treatment, prior AA/NA attendance, plans to maintain sobriety, psychiatric symptomatology at hospital entry, and the number of prior psychiatric hospitalizations. Of the covariates used in this study, only prior AA/NA attendance was significantly related to AA/NA attendance during the follow-up time period. Participation in the specialized dual diagnosis treatment and motivation for sobriety (as measured by

stated plans to engage in treatment and other activities to maintain sobriety) were not significant covariates in the models predicting A/NA attendance.

The researcher was particularly interested in discovering whether persons with the most severe and chronic mental illness would show different rates of involvement with AA/NA than others. Due to the heterogeneity among persons with dual diagnosis, different characteristics and experiences might lead to different outcomes within the same sample. Prior studies indicated: (1) that persons with mental illness would be more difficult to engage in substance abuse treatment (cf. Liss, 1979; Osher & Kofoed, 1989; Panepinto, Higgins, Keane-Dawes, & Smith, 1970) and (2) psychiatric severity was a strong predictor of outcomes in other functioning domains (cf. Gibbs & Flanagan, 1977; McLellan et al., 1983).

Findings from this study partially corroborate Osher and Kofoed's (1989) expectation that persons with severe psychiatric problems would be more difficult to engage in substance abuse treatment. In the current study, participants characterized as high symptom/chronic group were less likely to attend AA/NA during the 10-month follow-up, whereas those with fewer symptoms and more acute problems were more likely to attend AA/NA and to attend more regularly. Persons with more chronic and/or severe psychiatric problems were more likely to use professional services only, which were primarily outpatient mental health services.

While symptom/chronicity was a significant determinant of AA/NA attendance, it only accounted for a modest percent of the variance (approximately

4.0%). In the path models predicting outcomes from AA/NA attendance and symptom/chronicity, symptom/chronicity was no longer a significant predictor. The indirect relationships between symptom/chronicity and functioning at Time 3 were very low or nonexistent. These findings suggest that psychiatric severity and chronicity have some influence on who is likely to attend AA/NA. However, the data from the path models indicate that once a connection is made to the self-help group, the severity and chronicity of mental illness are not related to outcomes derived from AA/NA participation. Regardless of individual characteristics, persons who were able to attend AA/NA more often had fewer alcohol and drug problems, and fewer problems in other life domains. Thus, attendance at AA/NA seems to be the more important determinant of outcomes, even for persons with severe and chronic mental illness.

Relationship of Service Use to Outcomes

Several hypotheses regarding service use and outcome were examined. First, it was hypothesized that persons who attended AA/NA regularly after hospitalization would have better outcomes than those who did not attend or who attended sporadically. This hypothesis was supported, but only for alcohol and drug use at Time 3. Persons who attended AA/NA had fewer alcohol and drug problems. AA/NA attendance was not directly related to better psychological or family/social functioning, nor was it related to the chances of being rehospitalized.

This is an important finding, particularly in a dual diagnosis sample. Most of the empirical literature on AA/NA attendance and outcomes have been conducted

with samples of individuals with singly diagnosed substance abuse problems. Persons with dual diagnoses experience functional deficits in multiple life domains, most notably in their psychological functioning. Whereas previous studies of AA/NA have typically utilized alcohol and/or drug use as the only outcome measures, research with dually diagnosed individuals must incorporate outcomes in other domains in order to reasonably determine the efficacy of a particular intervention. The recovery of persons with dual diagnosis should minimally include improvements in psychological functioning as well as decreases in alcohol and drug use.

It is also interesting to note that AA/NA attendance was only related to concurrent alcohol and drug problems, but not to prospective problems. The lack of relationship between AA/NA attendance and later alcohol or drug problems precludes any causal inferences about the relationship between AA/NA service use and sobriety. While it is tempting to infer that AA/NA attendance leads to sobriety, it is equally plausible that persons who already committed to maintaining sobriety gravitate towards AA to support their sobriety (Tournier, 1979). Persons who are actively drinking may not be as motivated to attend AA/NA. Previous studies with the current data suggest that motivation (as measured by plans to maintain sobriety) was an important factor related to AA/NA attendance and outcome. BootsMiller et al. (1996) found that persons who were more motivated for sobriety when they were discharged from the hospital were subsequently more likely to attend AA/NA, and to attain better outcomes.

A second important question addressed in this study was the extent to which the benefits of AA/NA participation could be augmented with simultaneous involvement in professional services, particularly those where mental health issues were primarily addressed. Previous authors had suggested that simultaneous involvement in other forms of treatment could obscure the effects of AA/NA participation (Emrick, 1987; Thurstin, Alfano, & Nerviano, 1987). Additionally, it was expected that professional treatment programs might be able to address the specific mental health needs (e.g., psychotherapy, medication review) of dually diagnosed persons that would not otherwise be met by attendance to AA/NA only.

The findings regarding types of service use were contrary to what was expected. Persons who attended AA/NA only had the best outcomes. Use of professional services was not related to improvements in any of the functioning domains. In fact, there was some evidence suggesting that persons who used professional services had more problems than those who attended AA/NA only. There was a nonsignificant trend for persons attending professional services to report more psychological problems and to be more likely to be rehospitalized. A significant path was observed between use of professional services and worse drug problems. Again, no causal inferences can be drawn from these data as the relationships were observed at a concurrent time point. It is quite plausible that persons with more severe problems were more likely to use professional services, although use of these services did not seem to impact their subsequent functioning (professional service use at Time 3 was not related to improvements in Time 4

functioning).

Findings and Implications of the Mediated AA/NA Treatment Model

The results from the structural equation models indicated that there was generally more support for an AA/NA treatment model than for the Integrated model. AA/NA attendance was not directly related to psychological or family/social functioning, nor to the incidence of rehospitalization. However, there was evidence for a mediated relationship between AA/NA attendance and the other outcomes via alcohol/drug use. As suggested by AA/NA program theory, individuals who were able to attain sobriety or reduce their alcohol and drug use had fewer problems in the other life domains. This finding was particularly evident in the significant pathway between the number of days of AA/NA attendance, Time 3 alcohol problems, and Time 3 psychological problems. Persons who attended AA/NA had fewer alcohol problems at Time 3; those with fewer alcohol problems also had fewer psychological problems at Time 3.

This finding tends to support prior reports indicating that attainment of abstinence may moderate the relationship between AA attendance and psychological functioning (Akerlind, Hamquist, Elton, & Bjurulf, 1990; Laundergan, 1992). However, this interpretation is made with caution. Given the correlations between the various outcome measures at the same time point (*rs* range from .07 to .38, with a mean correlation of .24), the significant paths between alcohol and drug problems and other functioning domains simply suggest that persons with alcohol and drug problems are also likely to have problems in other domains.

The findings of this study also indicated that the "dosage" of AA/NA was significantly related to outcome. The more frequently person attended AA/NA, the better their outcomes were. This is consistent with prior studies (Emrick, 1987; Knouse & Schneider, 1987; McBride, 1991; Thurstin, Alfano, & Nerviano, 1987; Trice & Roman, 1970). In fact, the magnitude of the effect (β = -.16) is comparable to that reported in Emrick, Tonigan, Montgomery, and Little's (1992) meta-analytic review of quantitative studies on AA. These authors reported an average correlation of .19 between AA attendance and drinking outcomes.

Limitations of the Current Study

This study was an improvement over previous investigations in some respects: providing data on a sample of African American males with dual diagnosis, incorporating AA/NA program theory into the evaluation, examining other types of service use in addition to AA/NA, and assessing outcomes in domains other than alcohol/drug use. Nevertheless, several limitations of this study warrant discussion. First, this study, like prior reports, relied on self-report data. Previous reports have indicated that self-report of sensitive information, such as substance abuse, is biased by under-reporting (Mensch & Kandel, 1988; Polich, 1982; Rouse & Kozel, 1985). Also, some authors have expressed concern over the reliance on self-report measures in samples with cognitive or psychological deficits (Drake et al., 1990).

In addition, some of the key variables used in this study, such as AA/NA attendance suffer from selection bias. Due to the fact that participants self-

selected to attend AA/NA or other services after hospitalization, there is no way to determine conclusively whether persons who attended were different in important (and unmeasured) ways from those who did not attend, and whether these unmeasured differences may have accounted for their outcomes. This is a particular difficulty in conducting research on self-help participation. In order to determine if use of particular services are differentially effective, randomized designs with control groups are necessary. However, prior research indicates that individuals must be personally motivated towards program engagement in order for participation in self-help groups to have any desirable impact. Persons who are randomly assigned or mandated to attend AA/NA often do not become sufficiently engaged, and therefore do not receive any benefits from attendance (cf. Ditman, Crawford, Forgy, & Maskowitz, 1967; Edwards et al., 1988; Walsh et al., 1991). The issue of selection bias is an on-going dilemma in research on self-help groups.

Perhaps the most serious weakness in this study was the insensitivity of the measures of AA/NA participation. The findings of this study are based on noncontinuous data collected at 2-4 month intervals. In order to determine the efficacy of AA/NA, more direct and specific measures of engagement are needed. For instance, prior studies indicate that the *quality* of AA/NA participation may be as important or more important than the quantity of attendance. Maxwell (1984) indicated that in order for persons to derive benefit from AA, they must engage themselves in the fellowship aspects of recovery. This fellowship includes forming relationships with sponsors and other group members, giving testimonials about

their own recovery, and "participating in open, honest sharing, and caring interaction with fellow members" (Maxwell, 1984, p. 155). The current study did not assess these qualitative aspects of AA/NA involvement. Additionally, engagement in 12-step work and self-realization is an important aspect of AA/NA involvement which was not measured in this study. Without these measures, it is impossible to determine how well participants in this study were actually "working" the AA program.

Conclusions & Implications

Despite its limitations, this study suggests some interesting implications for mental health policy and future research. The participants in this study with the most severe psychiatric problems and the longest histories of psychiatric hospitalization were less likely to engage in self-help programs following hospitalization, but were more likely to continue using mental health services. Use of mental health services seemed to have some positive relationship with alcohol problems, but the relationship was very small and there was no positive relationship with drug problems or problems in any of the other functioning domains. These findings indicate a disturbing trend, suggesting that persons with chronic and severe psychiatric problems were not receiving much support for their sobriety once they were discharged from the hospital. Given the fact that most of the participants in this study were not receiving outpatient substance abuse services, nor was the use of outpatient mental health services significantly related to improvements in alcohol and drug use, AA/NA attendance seemed to be the only

service which was useful in helping participants continue to receive support for and maintain their sobriety.

More research is needed to determine the impact of professional mental health services when used in combination with AA/NA. In clinical practice, persons with substance abuse problems are often encouraged to seek individual counseling while attending self-help groups. It is evident that persons with dual diagnosis need to be connected with substance abuse and/or dual diagnosis networks in order to maintain their sobriety. This study suggests that this combination of services is more beneficial than no service use, at least for improvement in alcohol problems. Therefore, mental health professionals may serve an important role in helping persons with substance abuse and/or psychological problems to access and benefit from self-help groups.

For persons with long histories of mental health problems and psychiatric hospitalization, the mental health services network may be a more familiar and easily assessable resource. Mental health service providers could be instrumental in implementing linkage programs to help those who would not otherwise become engaged with self-help and sobriety support programs. If persons with severe and chronic mental illness are helped in the process of engagement, this study's findings suggest that they will receive the benefits of sobriety (or at least be able to reduce their alcohol and drug use). Prior work by Minkoff (1989) suggests that with special preparation prior to hospital discharge, persons with dual diagnosis were able to successfully engage in AA/NA groups. Clients receiving dual diagnosis

treatment were prepared for AA/NA attendance via a structured program including social skills training, linkage with other AA/NA members, and trial attendance at selected meetings thought to be most suitable for persons with dual diagnosis. The work of Minkoff (1989) and others is promising, however, there is a lack of empirical data to document the efficacy of these program initiatives.

Future Directions

The findings of this study suggest several promising avenues for future research on AA/NA attendance among persons with dual diagnosis. A few prior studies have suggested that attainment of sobriety moderates the relationship between AA/NA attendance and psychological functioning. This study partly corroborated prior efforts, however, the findings were only identified cross-sectionally. No causal inferences could be made based on findings from the current data. There is a need for prospective longitudinal studies to explicate the relationship between psychological distress and substance abuse, and how these are related to AA/NA attendance.

While the current study indicated that persons who attended AA/NA more regularly attained better outcomes, the specific aspects of the AA/NA program related to positive outcome could not be identified. Future research should address the following questions: Which aspects of the AA/NA program are most helpful to persons with dual diagnosis? In what ways do persons with dual diagnosis "work" the AA/NA program? And what intrapersonal and group-related factors are related to their successful engagement in the program?

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APPENDIX

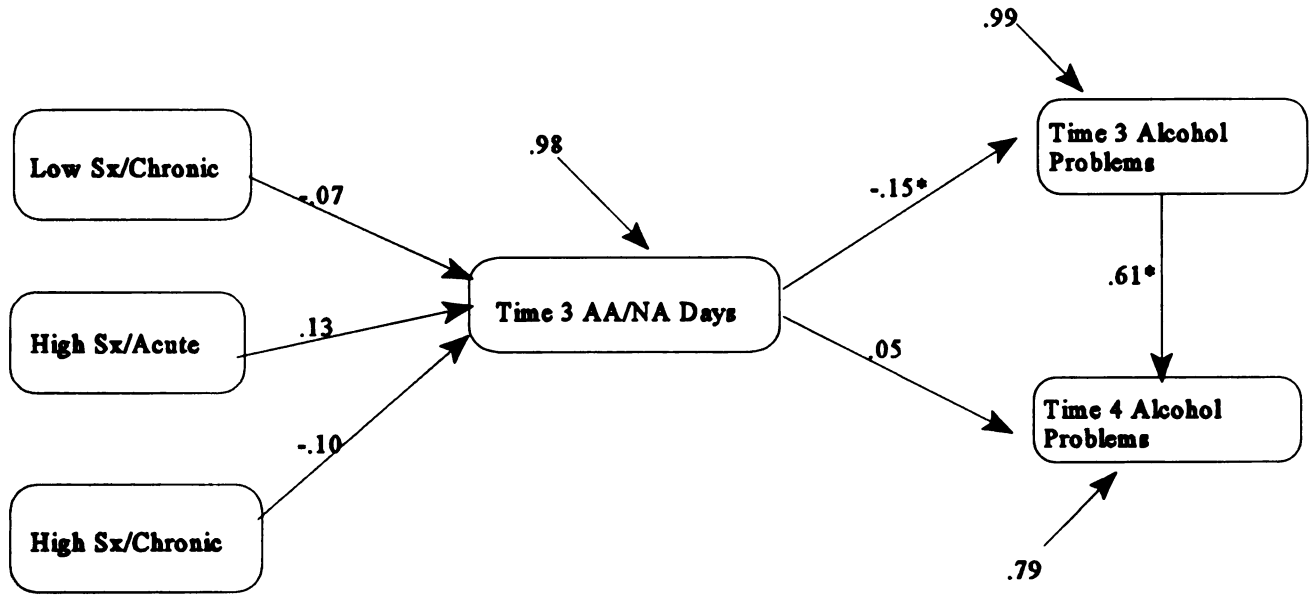

Figure A-1. Integrated Model: Number of Days Attending AA/NA and Alcohol Problems

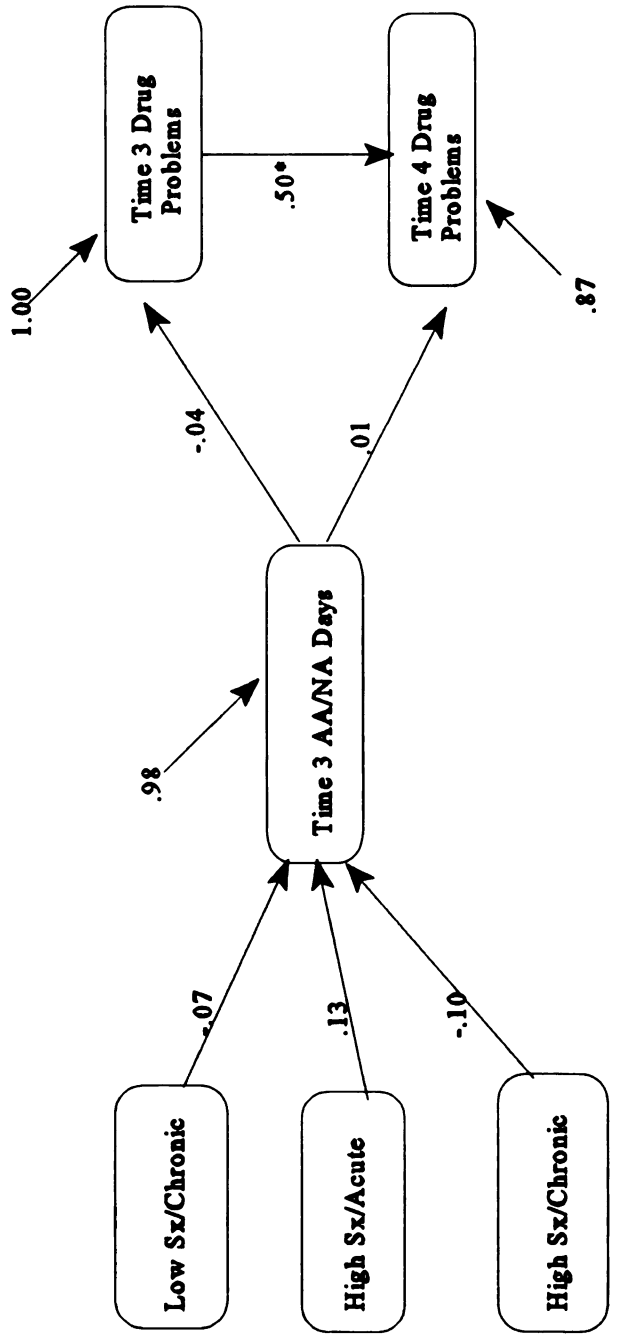

Figure A-2. Integrated Model: Number of Days attending AA/NA and Drug Problems

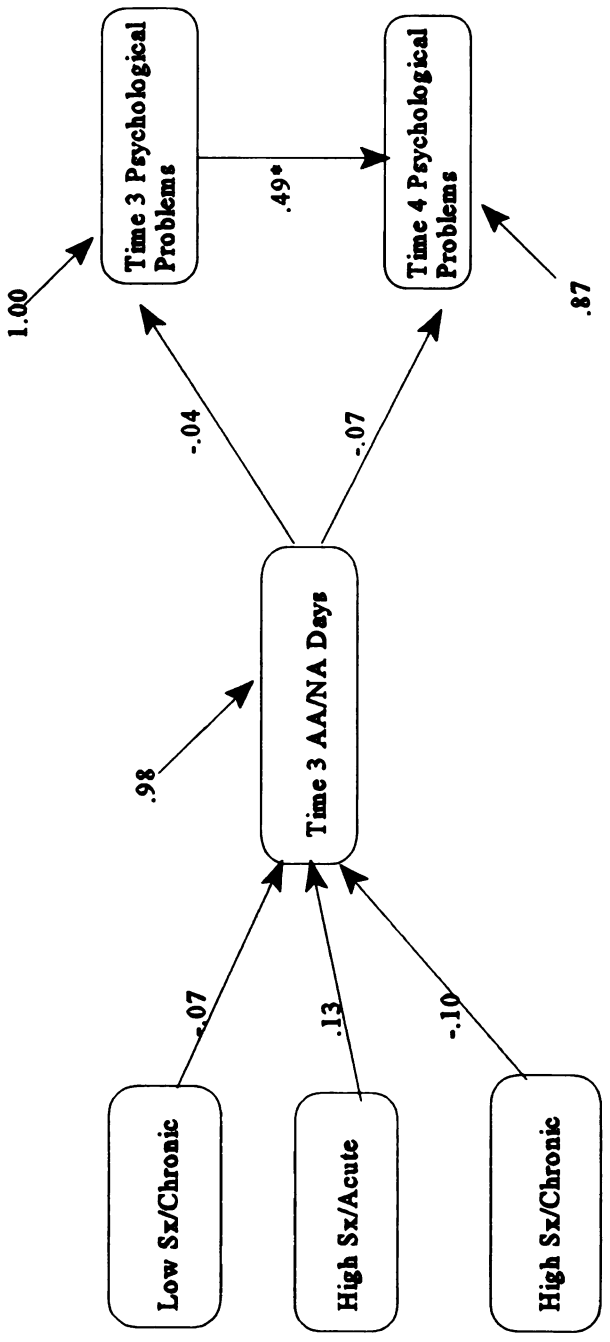

Figure A-3. Integrated Model: Number of Days Attending AA/NA and Psychological Problems

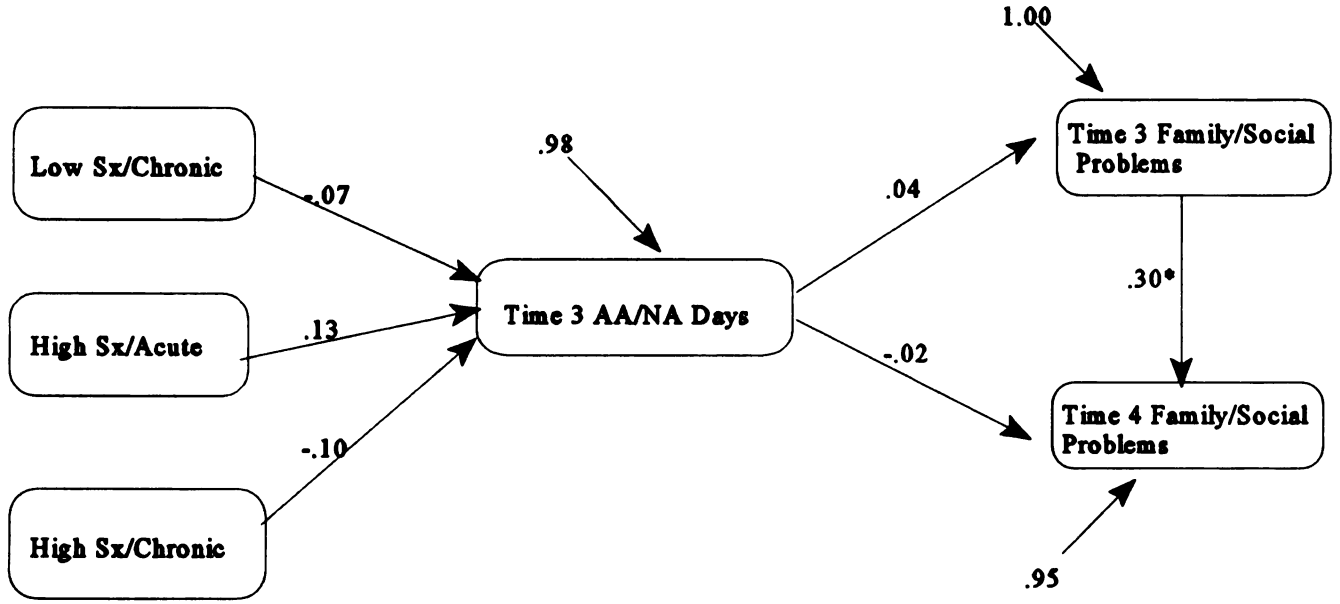

Figure A-4. Integrated Model: Number of Days Attending AA/NA and Family/Social Problems

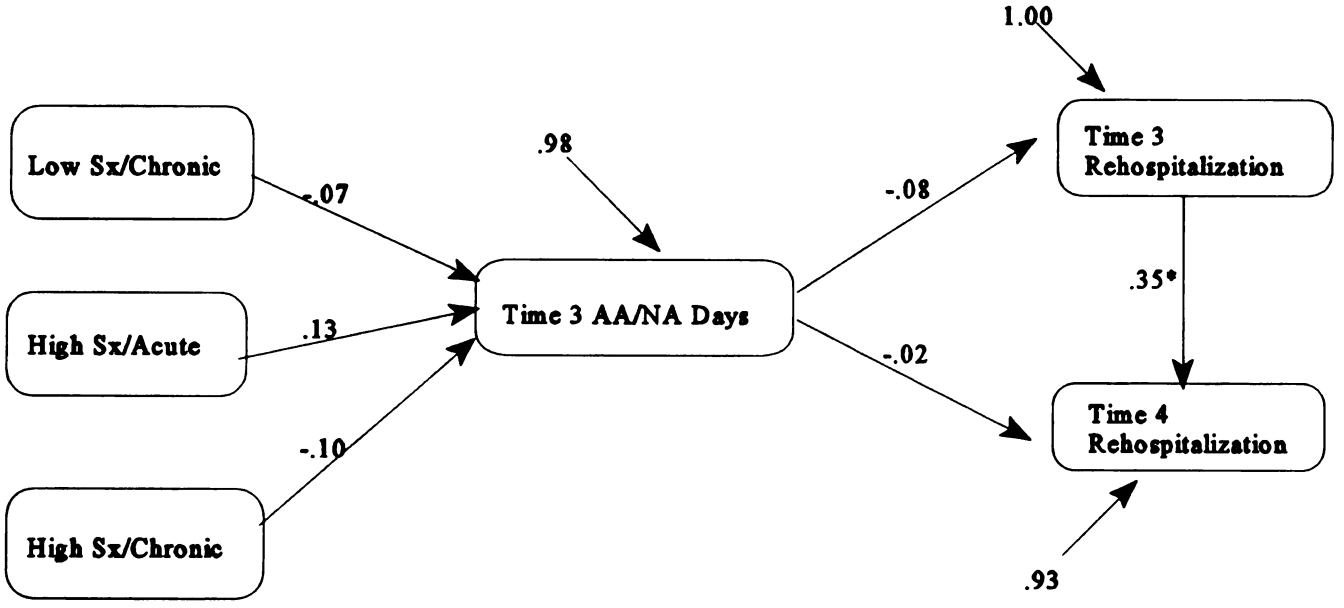

Figure A-5. Integrated Model: Number of Days Attending AA/NA and Rehospitalization

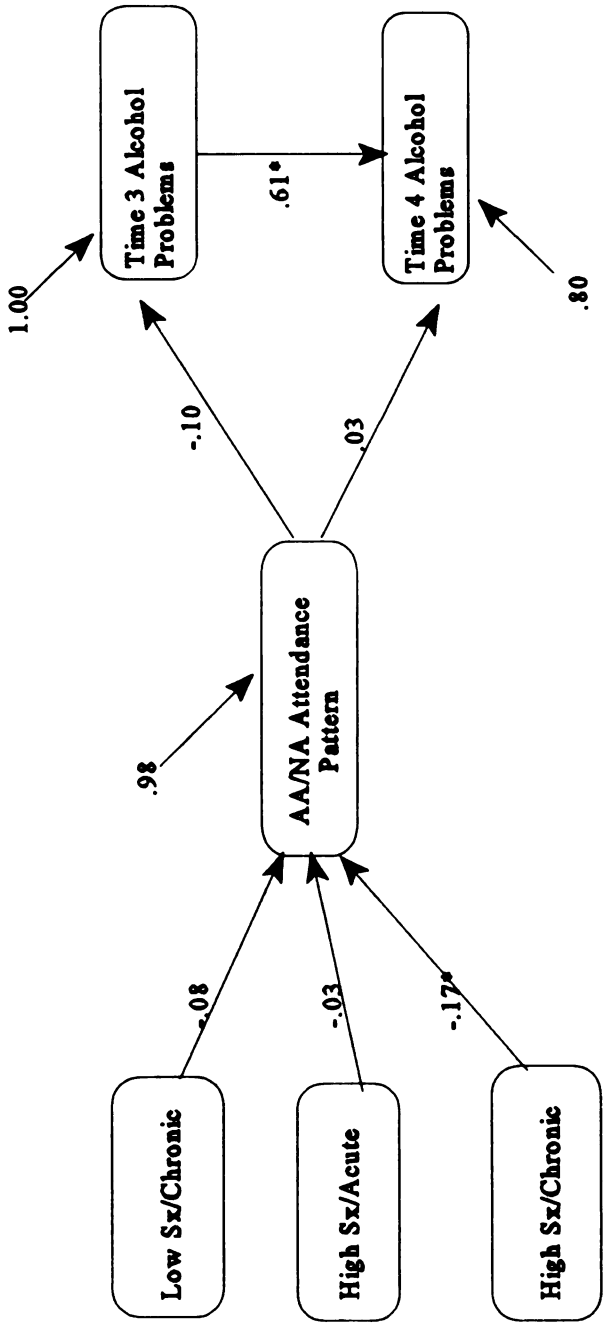

Figure A-6. Integrated Model: AA/NA Attendance Pattern and Alcohol Problems

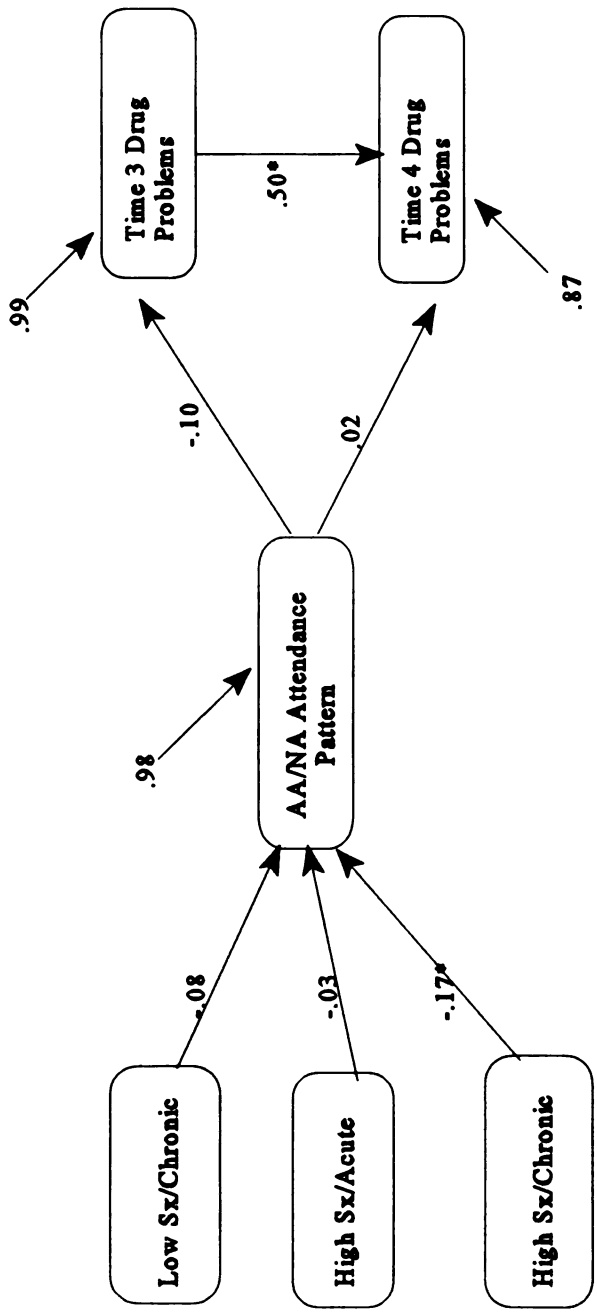

Figure A-7. Integrated Model: AA/NA Attendance Pattern and Drug Problems

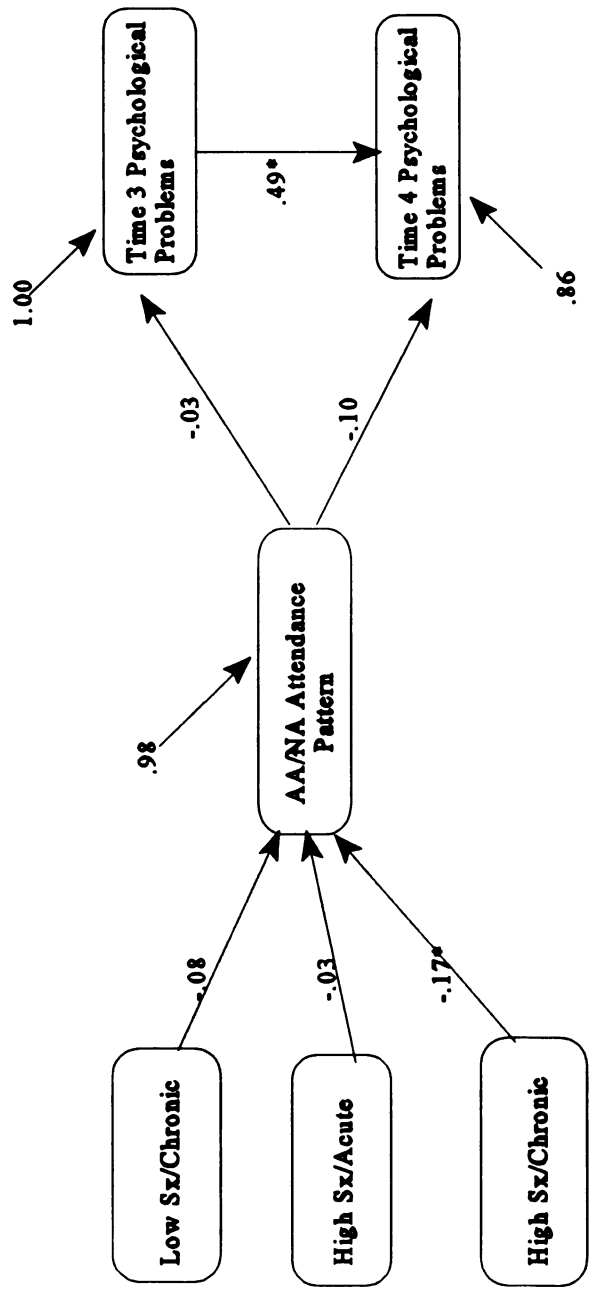

Figure A-8. Integrated Model: AA/NA Attendance Pattern and Psychological Problems

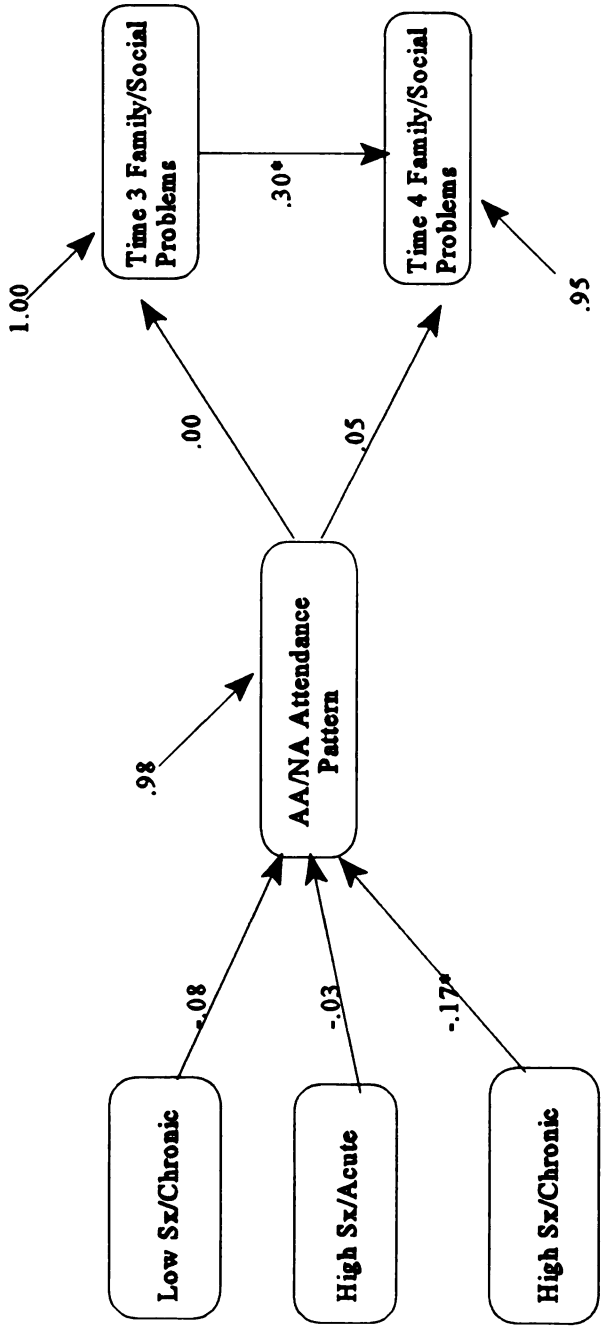

Figure A-9. Integrated Model: AA/NA Attendance Pattern and Family/Social Problems

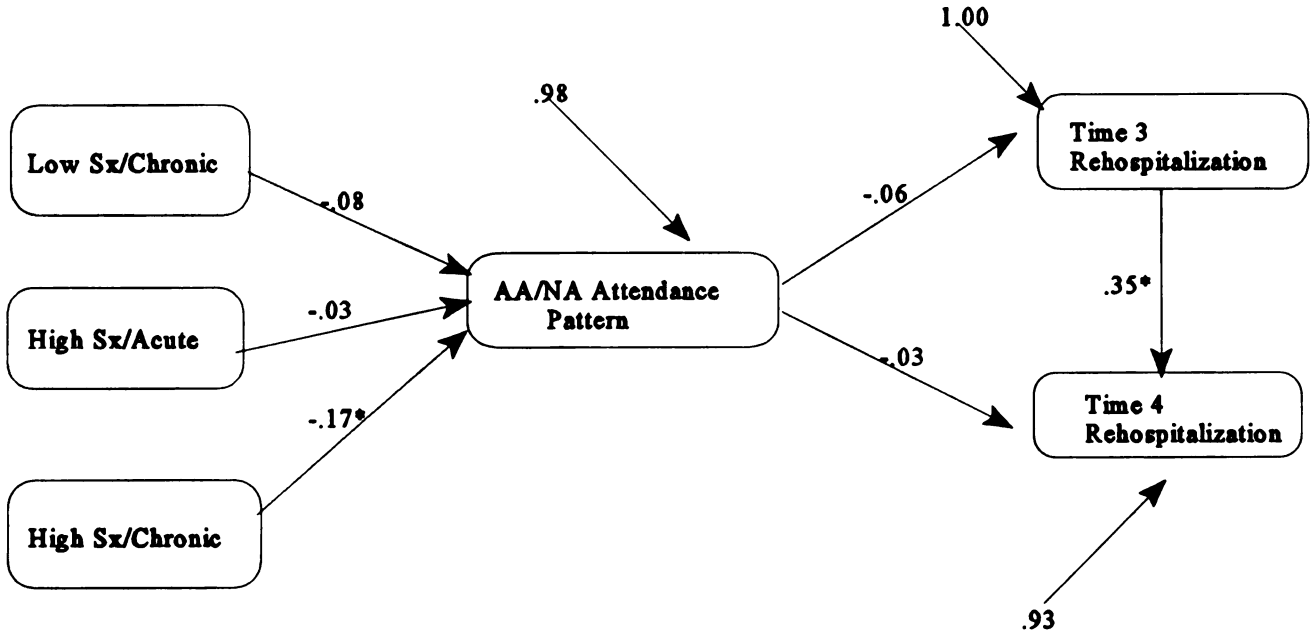

Figure A-10. Integrated Model: AA/NA Attendance Pattern and Rehospitalization

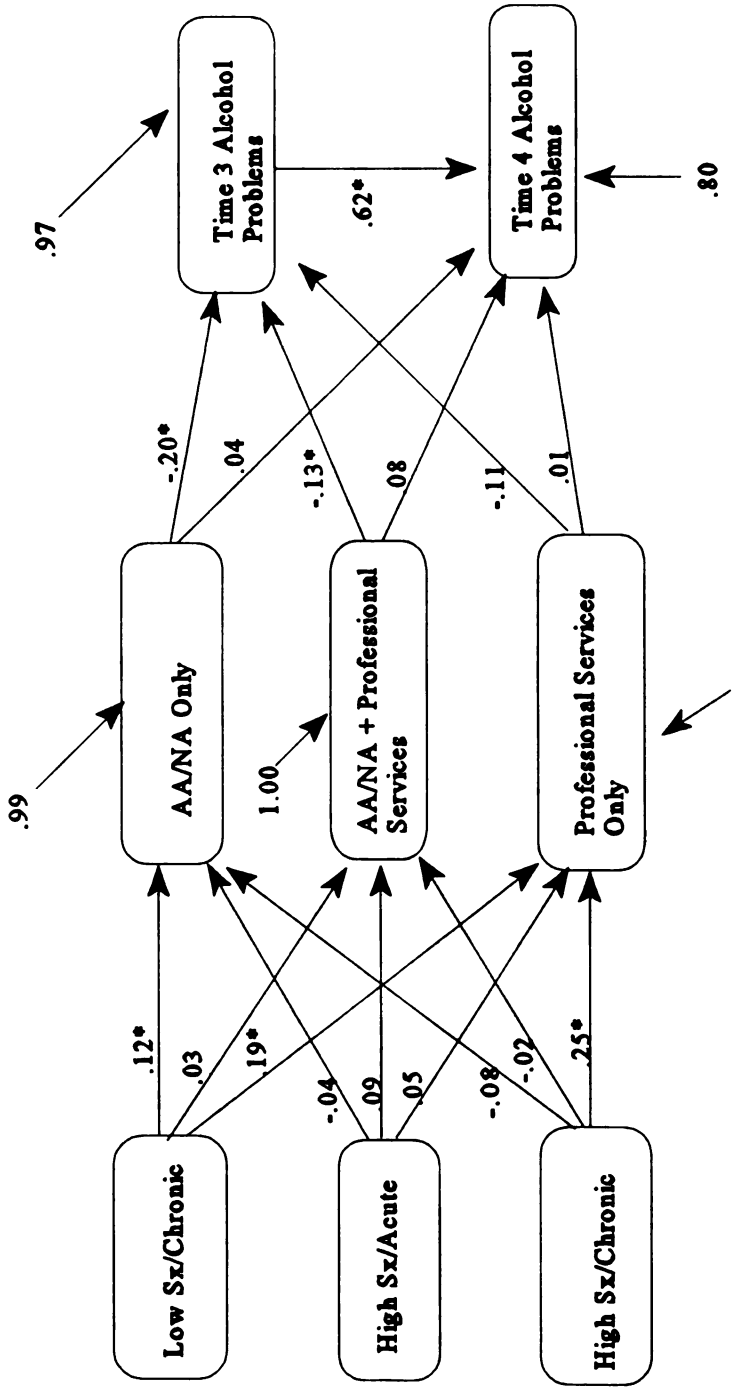

Figure A-11. Integrated Model: Type of Service Use and Alcohol Problems

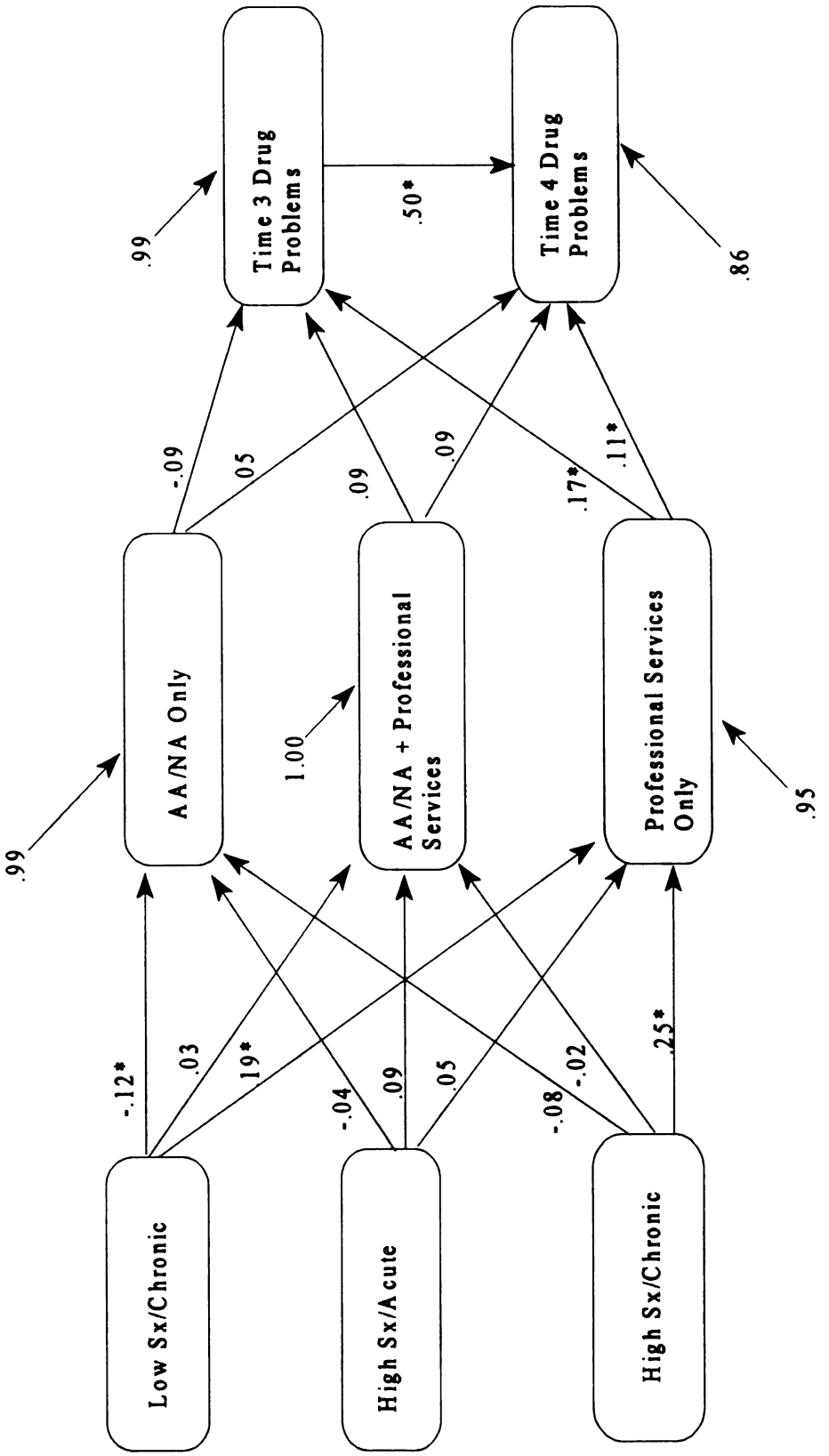

Figure A-12. Integrated Model: Type of Service Use and Drug Problems

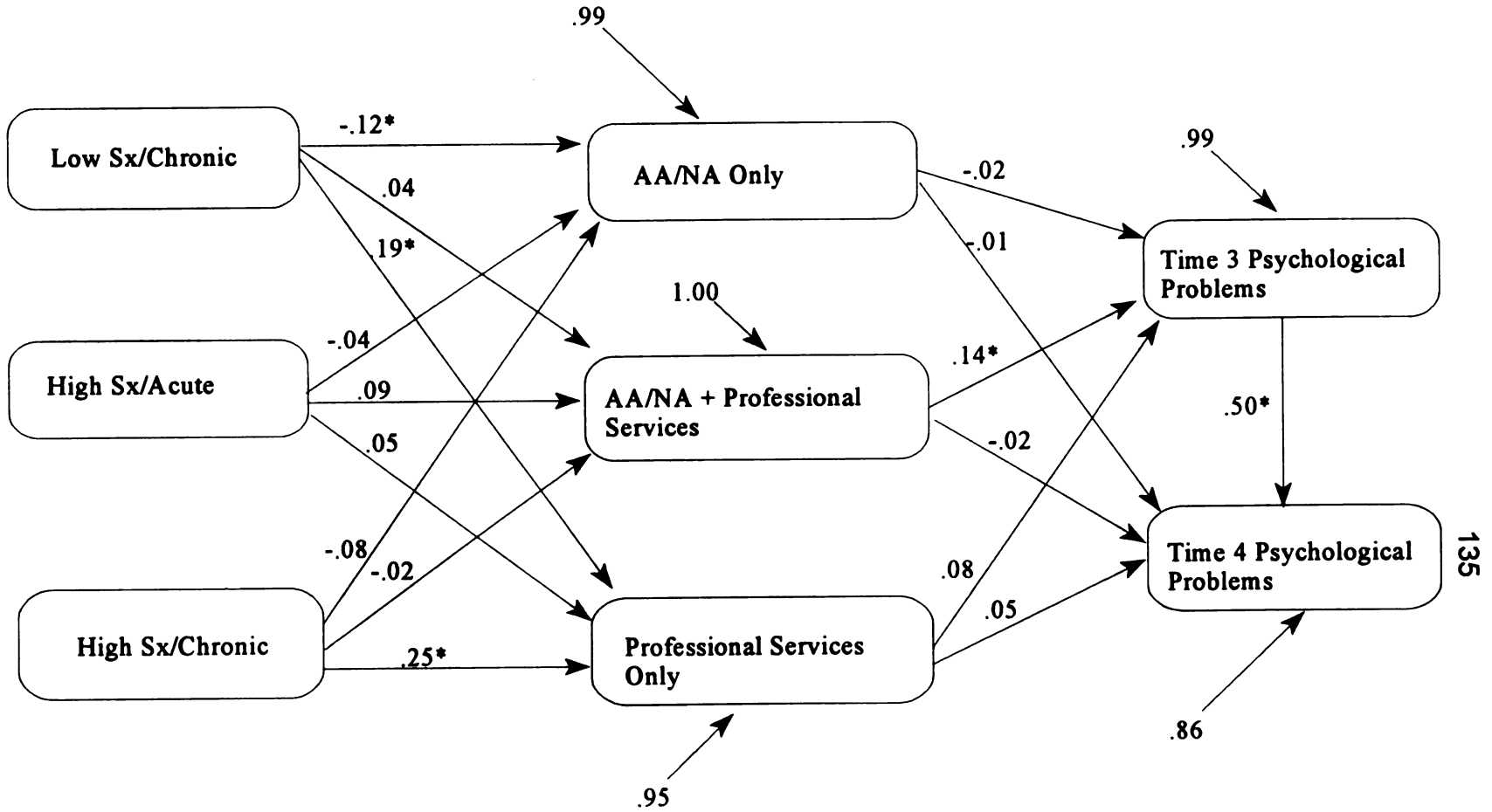

Figure A-13. Integrated Model: Type of Service Use and Psychological Problems

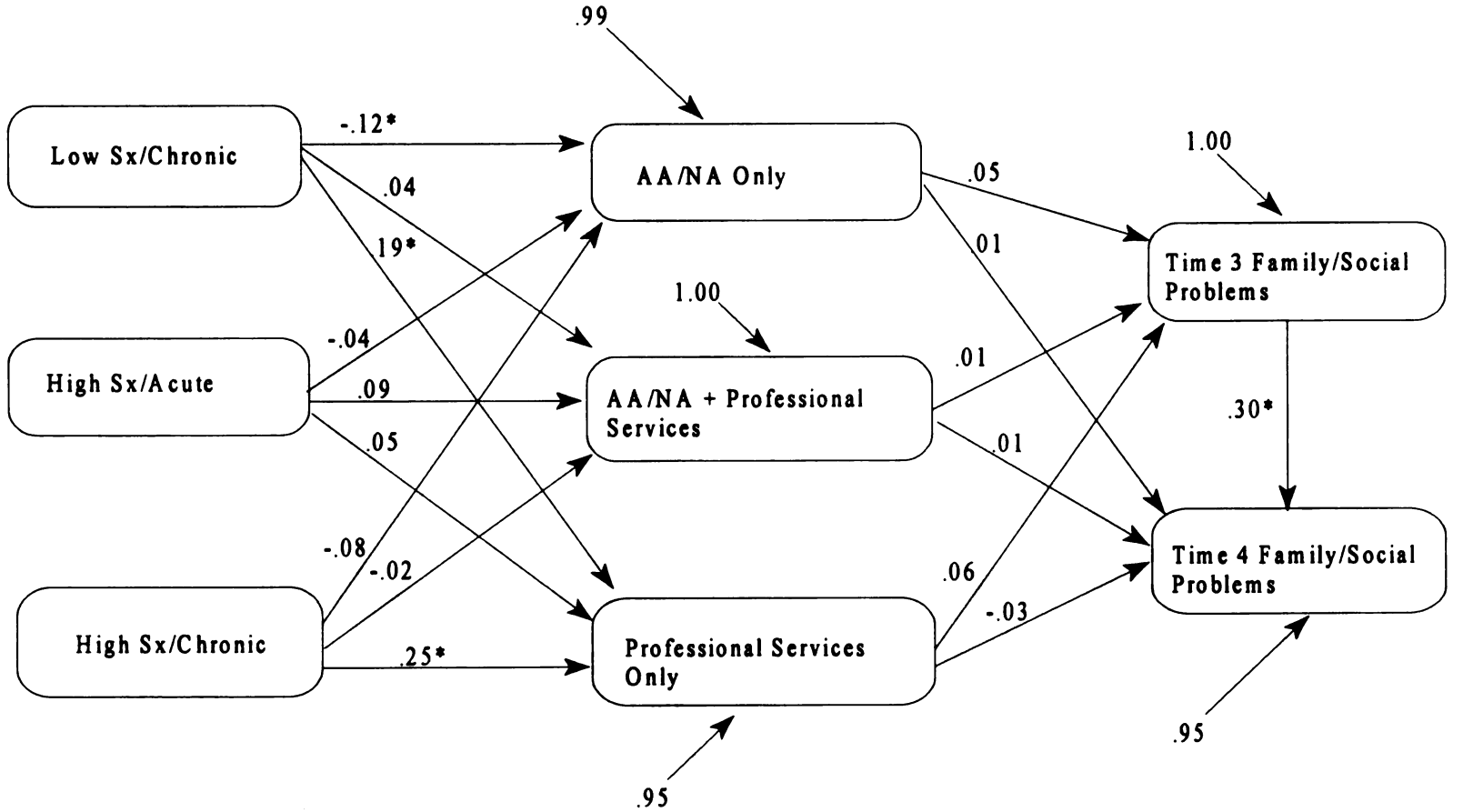

Figure A-14. Integrated Model: Type of Service Use and Family/Social Problems

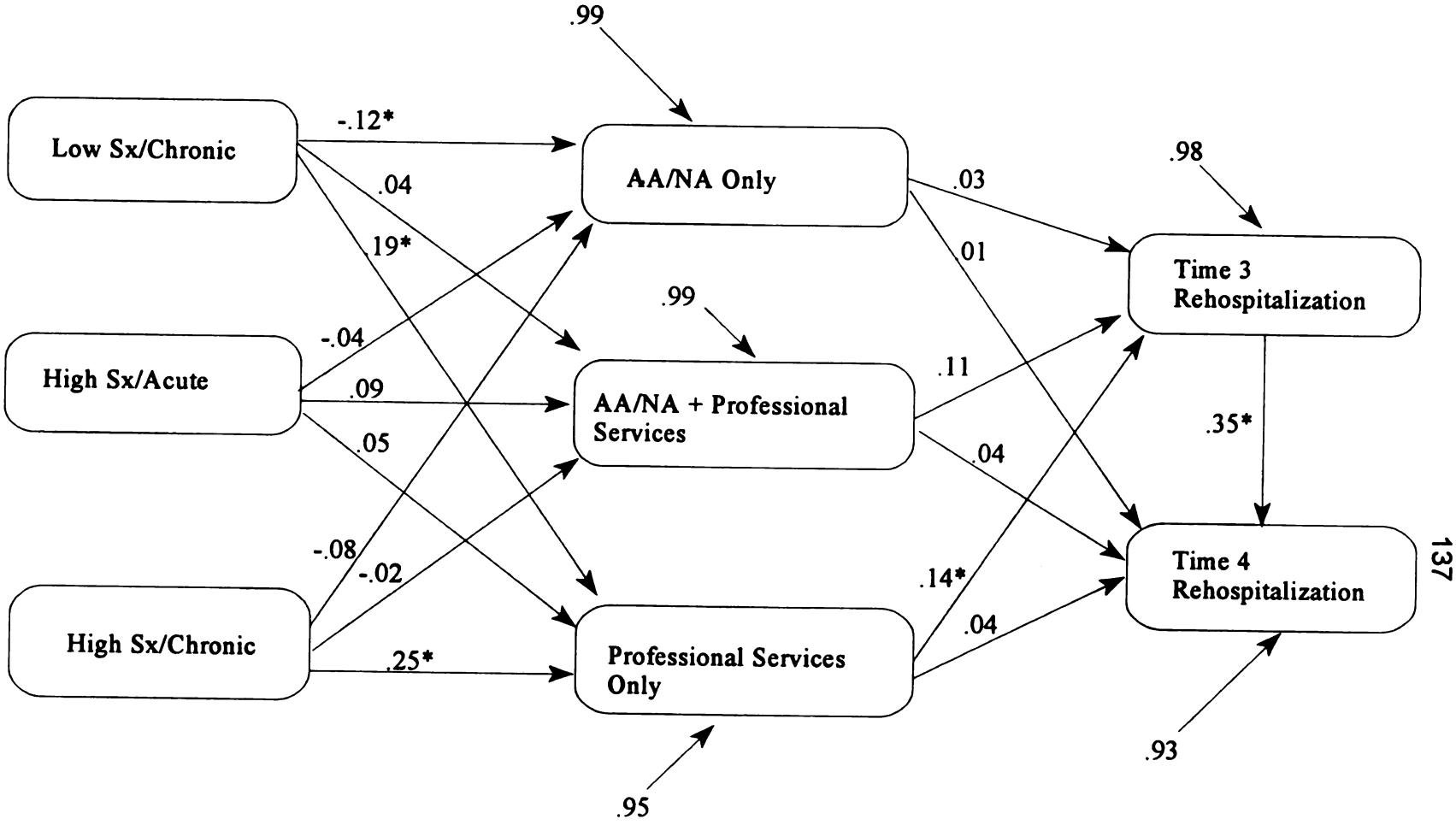

Figure A-15. Integrated Model: Type of Service Use and Rehospitalization

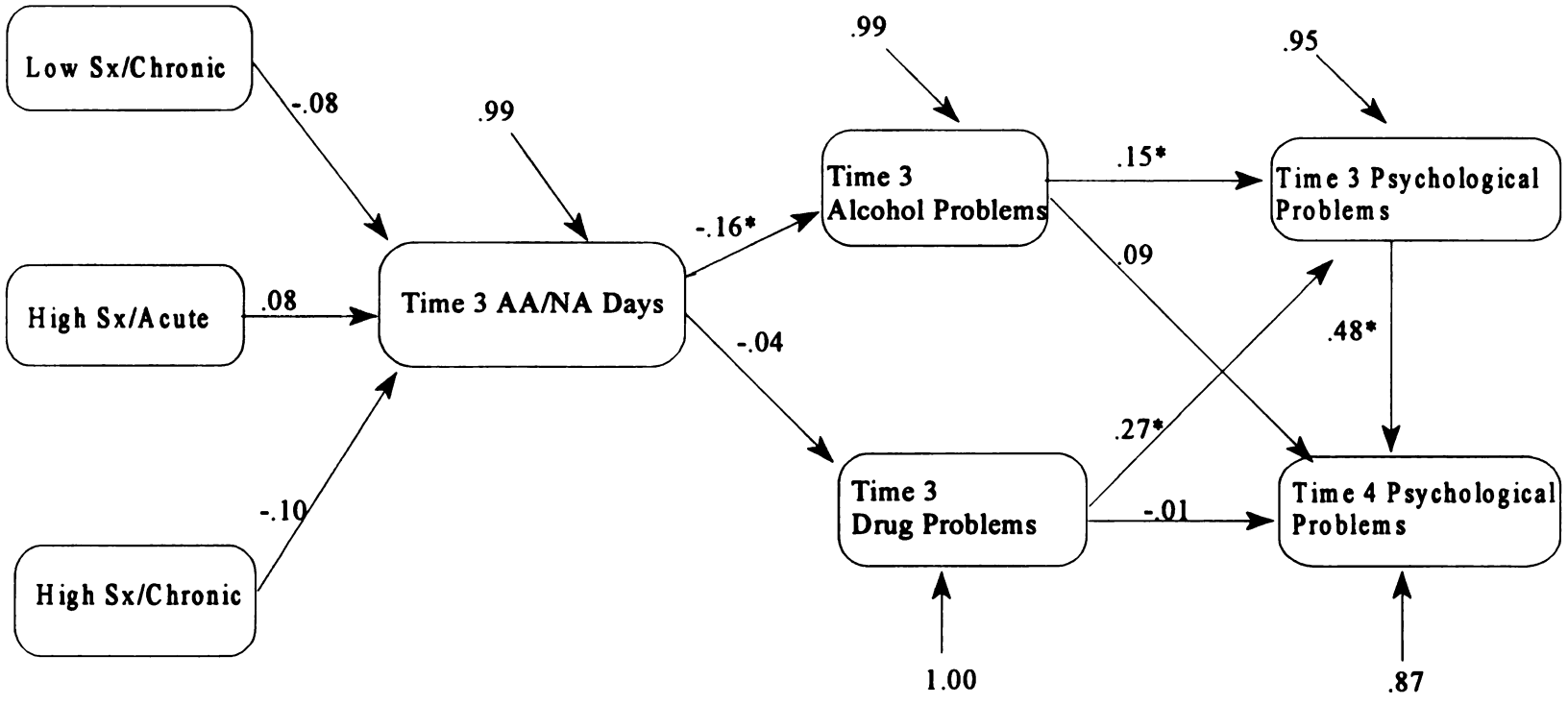

Figure A-16. AA/NA Treatment Model: Number of Days Attending AA/NA and Psychological Problems

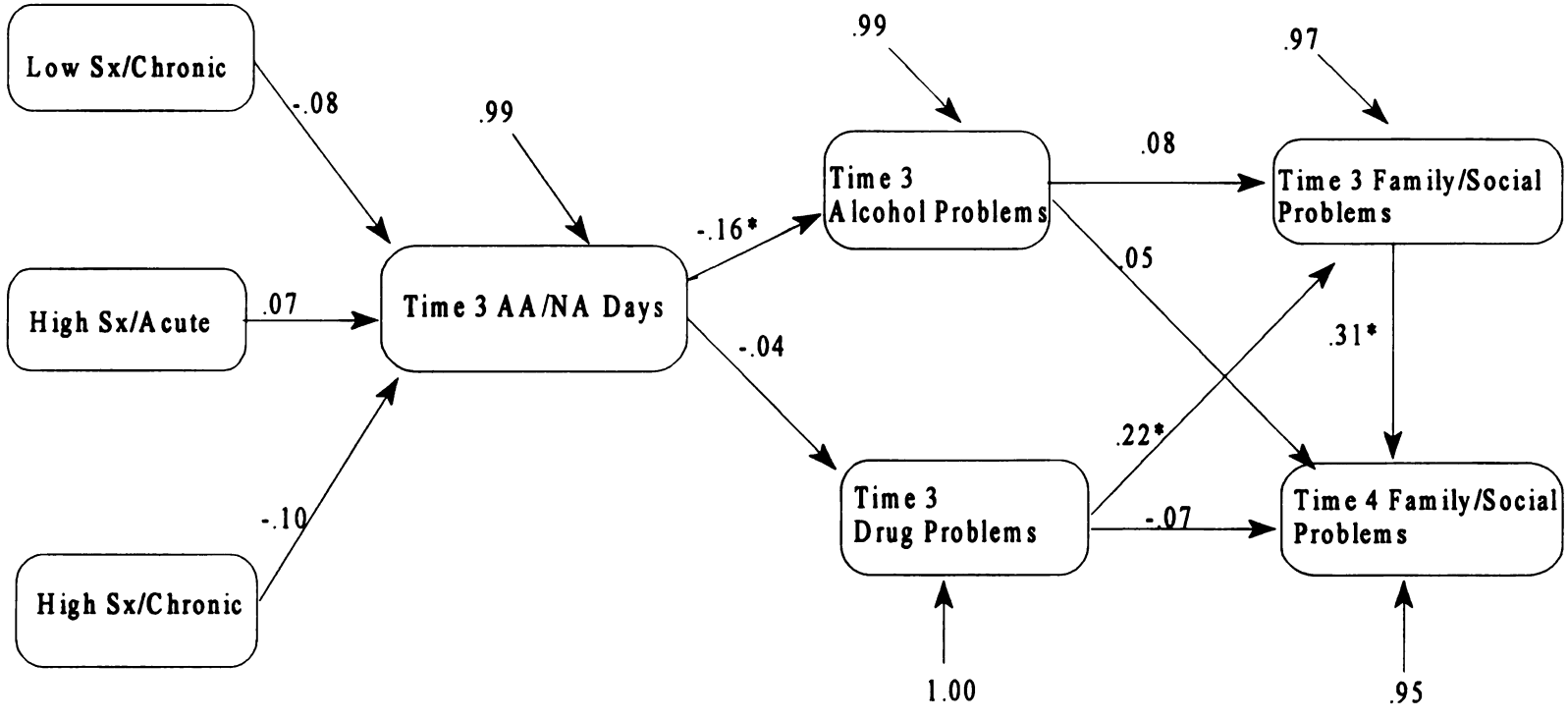

Figure A-17. AA/NA Treatment Model: Number of Days Attending AA/NA and Family/Social Problems

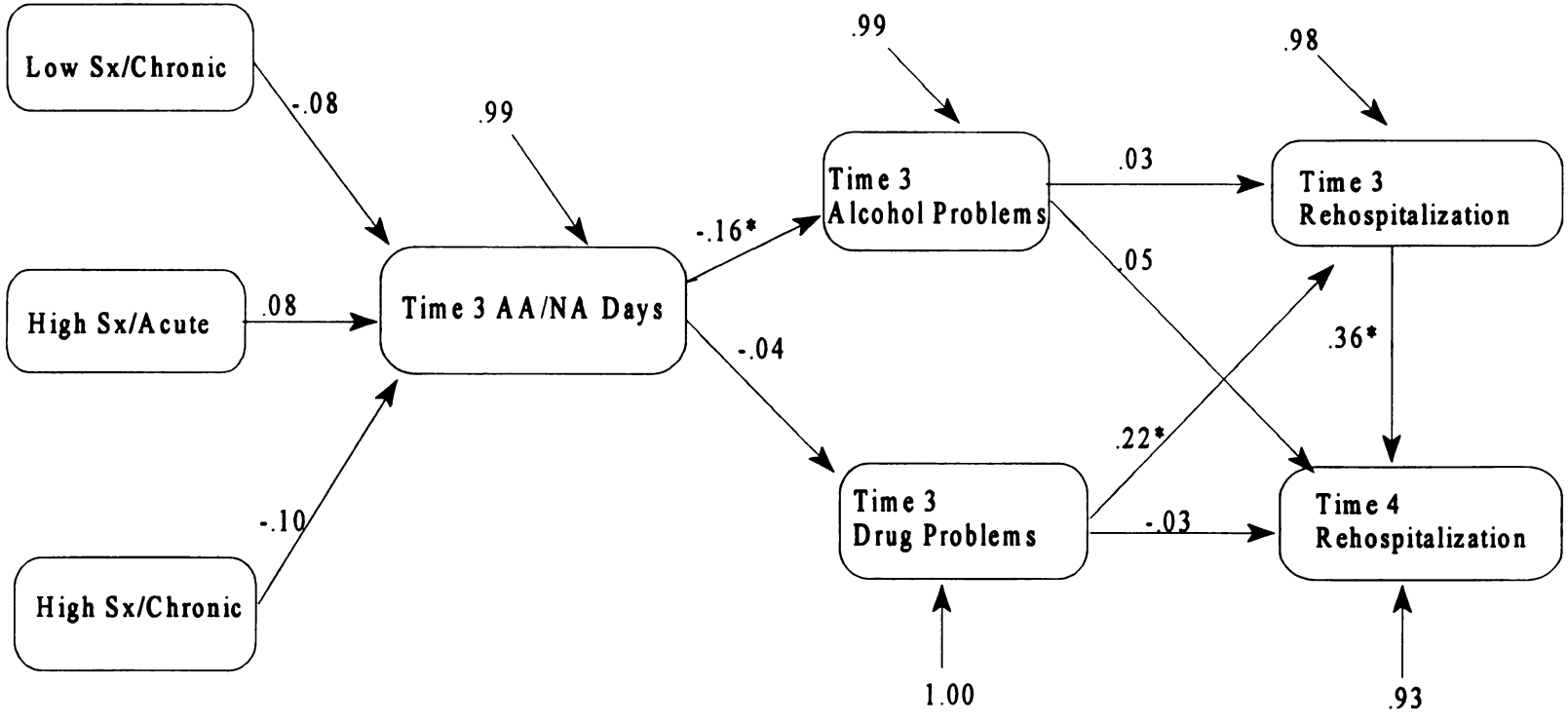

Figure A-18. AA/NA Treatment Model: Number of Days Attending AA/NA and Rehospitalization

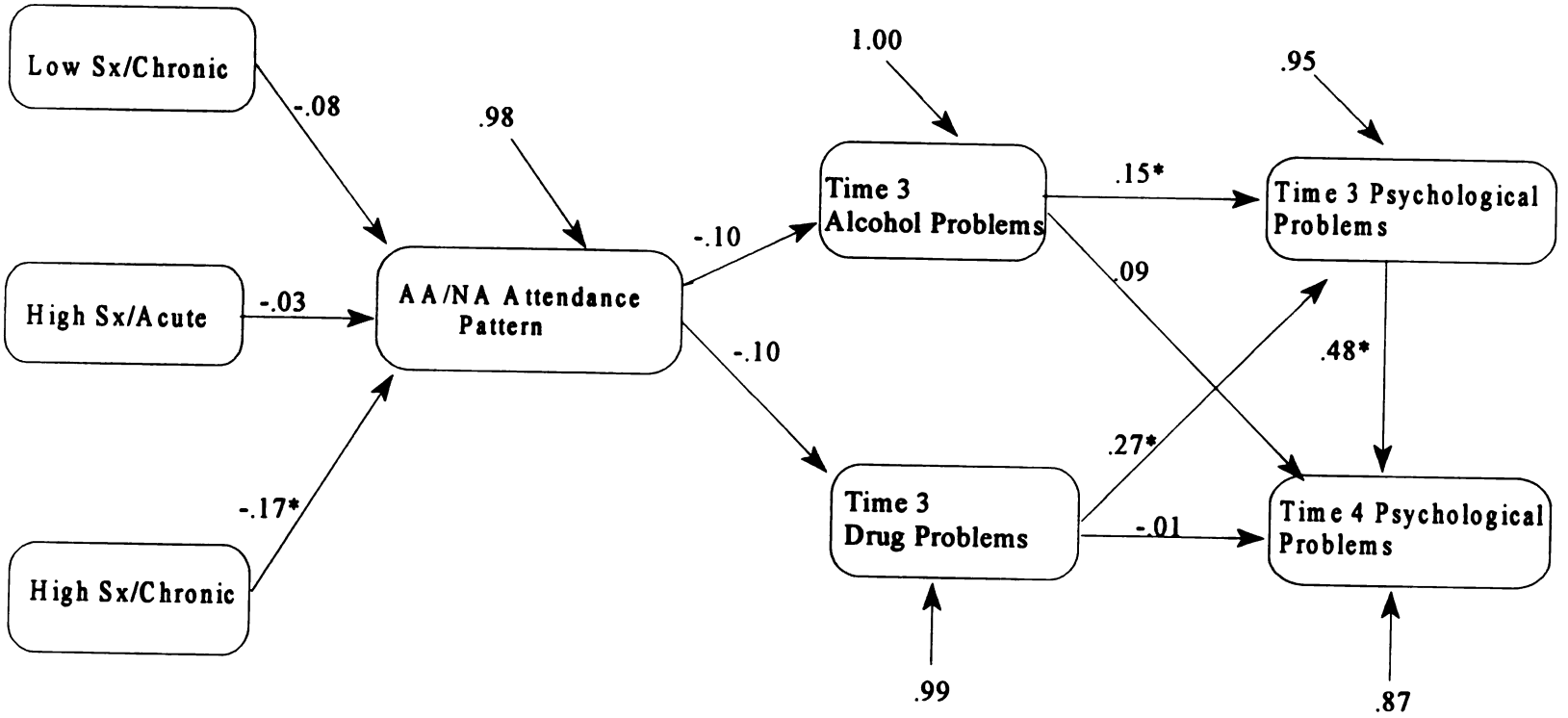

Figure A-19. AA/NA Treatment Model: AA/NA Attendance Pattern and Psychological Problems

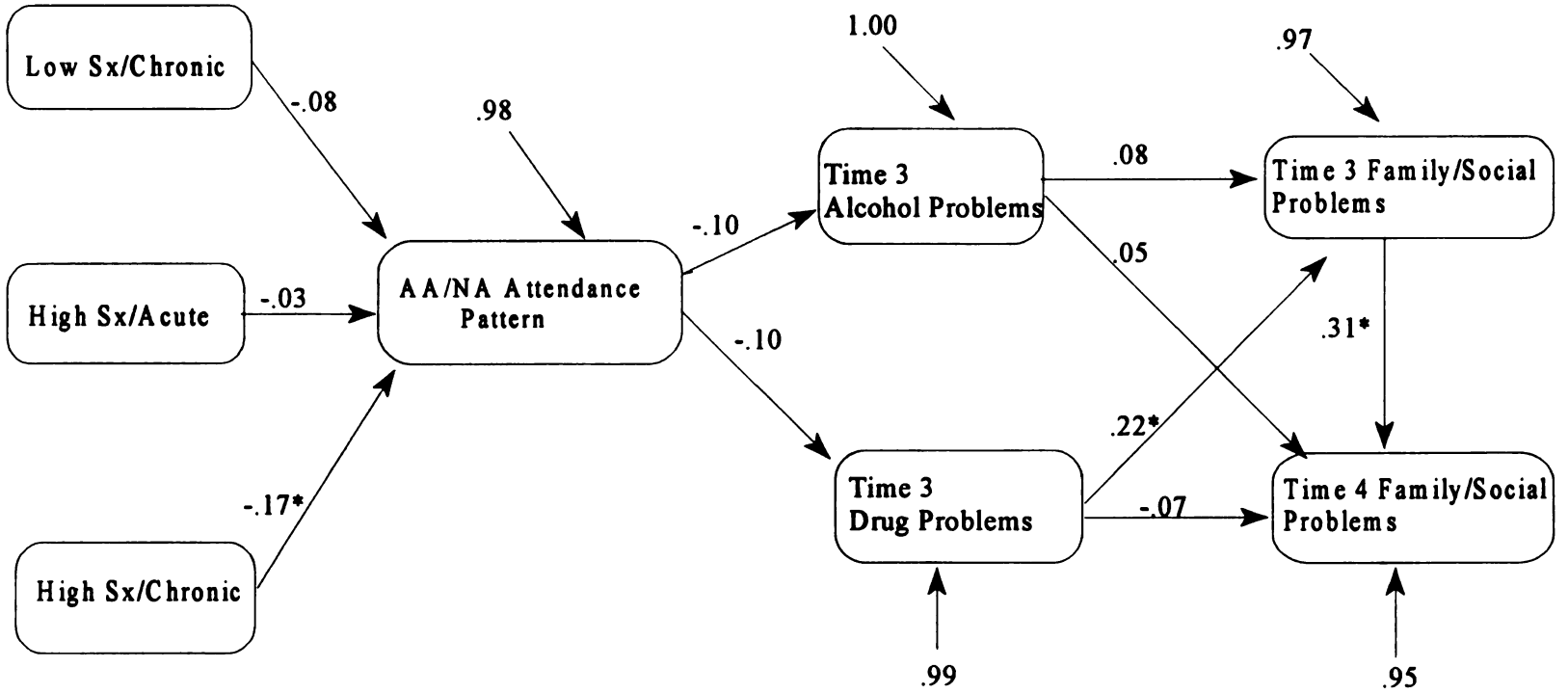

Figure A-20. AA/NA Treatment Model: AA/NA Attendance Pattern and Family/Social Problems

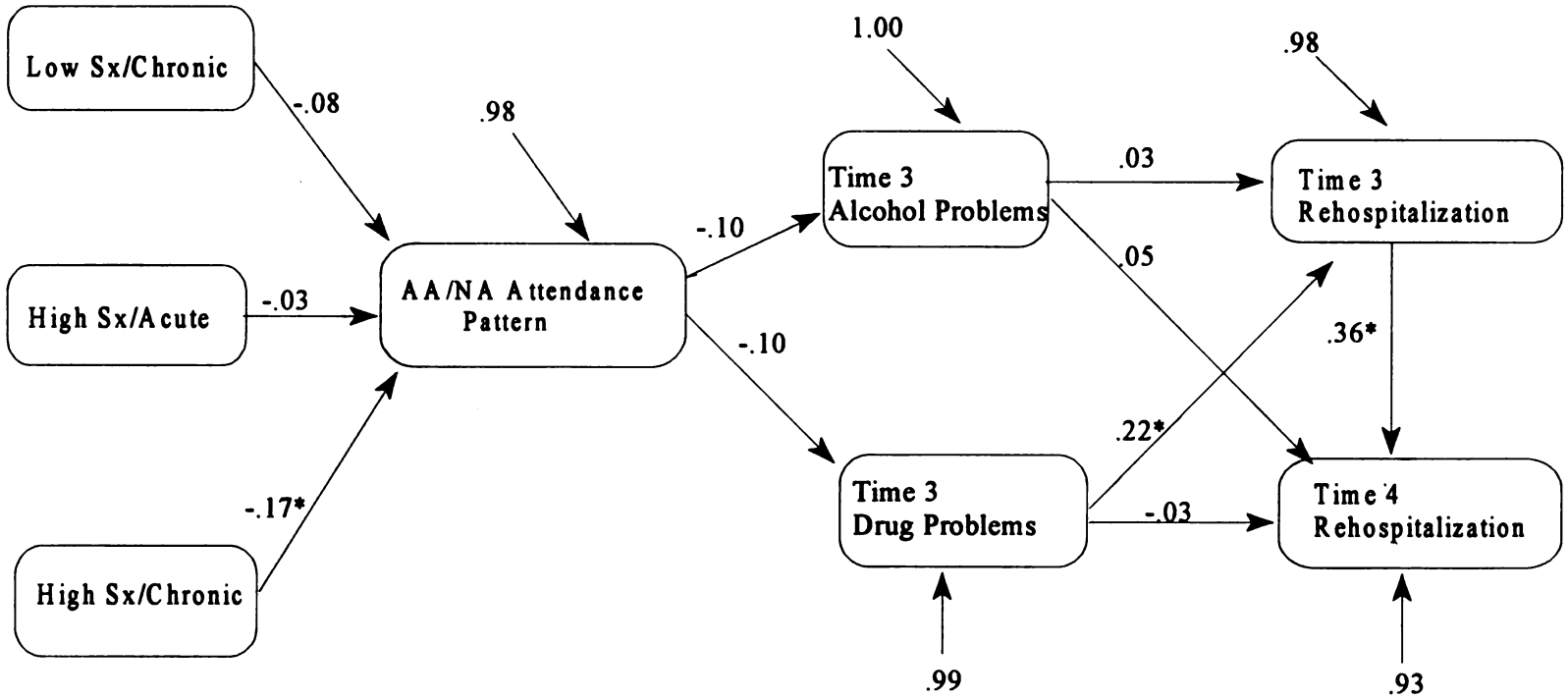

Figure A-21. AA/NA Treatment Model: AA/NA Attendance Pattern and Rehospitalization

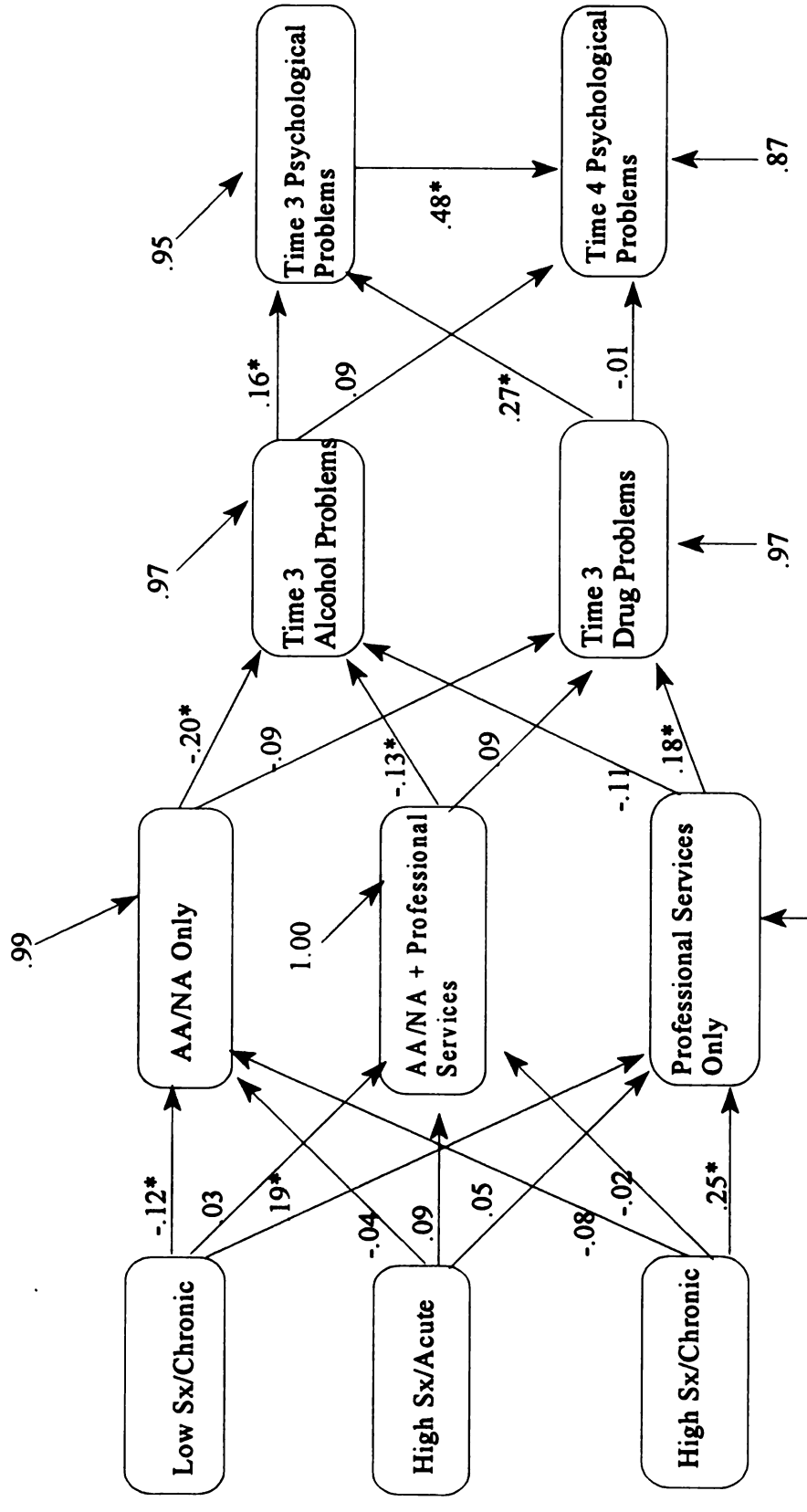

Figure A-22. AA/NA Treatment Model: Type of Service Use and Psychological Problems

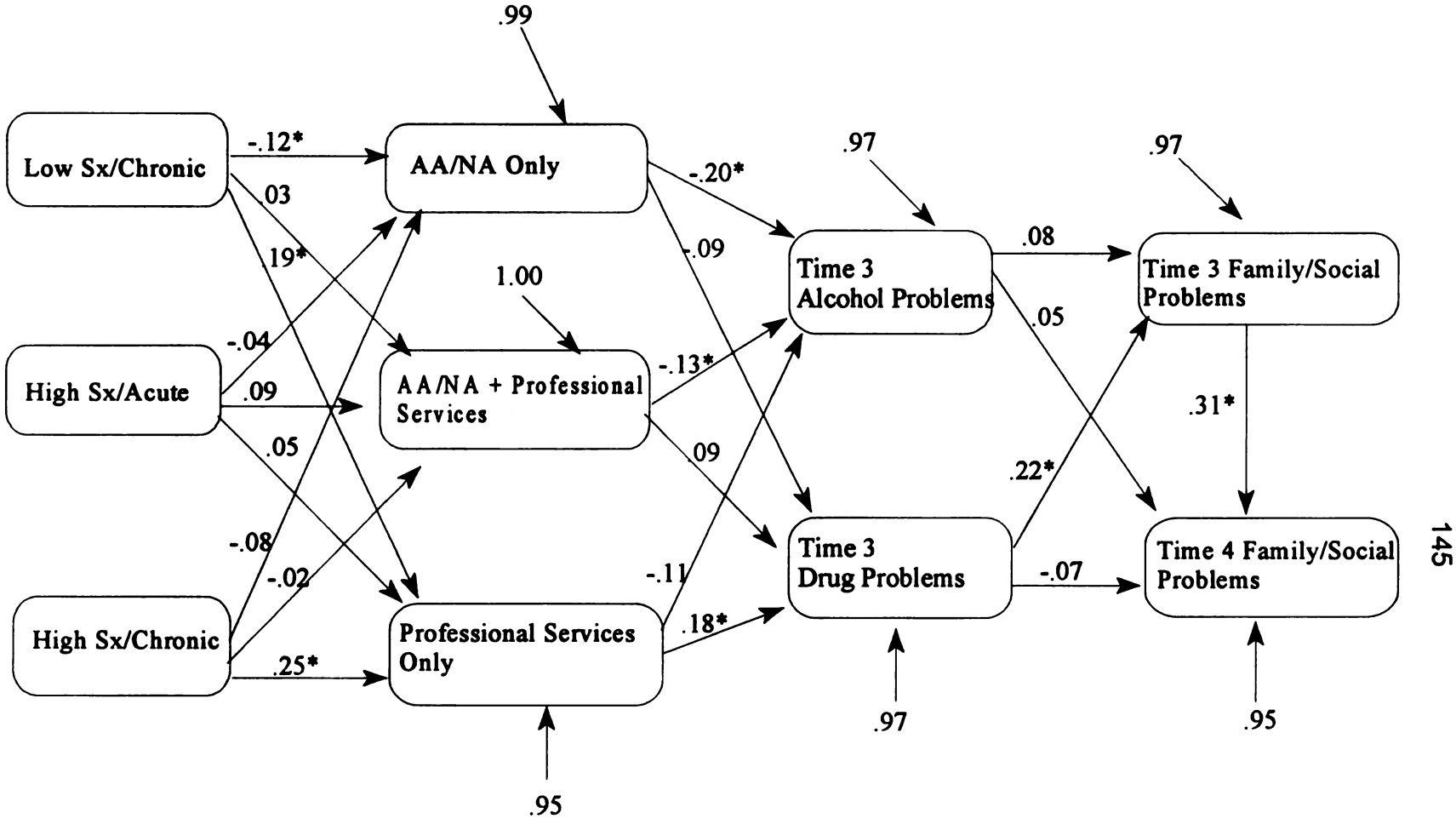

Figure A-23. AA/NA Treatment Model: Type of Service Use and Family/Social Problems

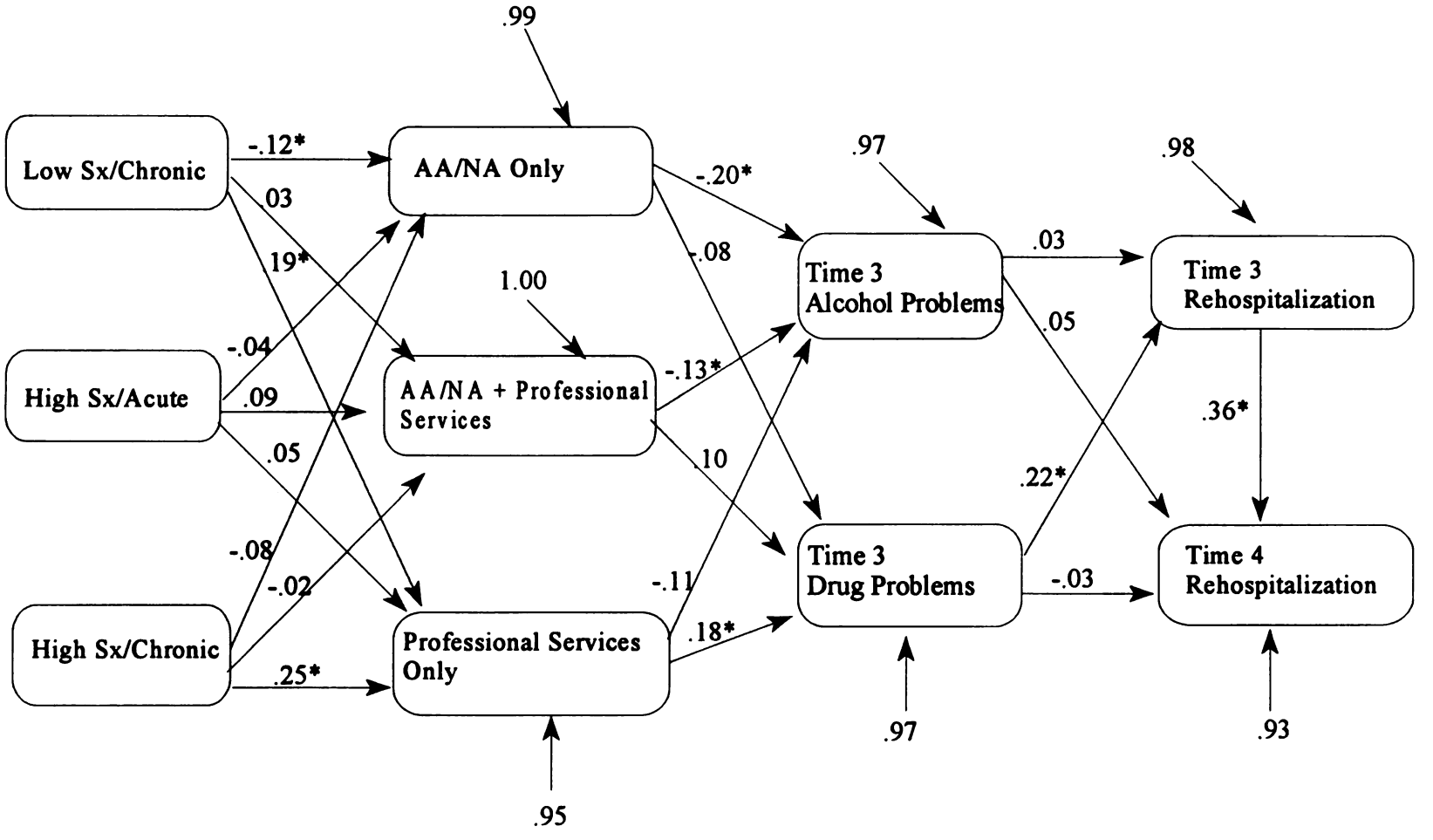

Figure A-24. AA/NA Treatment Model: Type of Service Use and Rehospitalization