The Impact of Self-Help Groups Following Outpatient Substance Abuse Treatment Among Adolescents: Substance Use Outcomes and Mechanisms of Change

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THE IMPACT OF SELF-HELP GROUPS FOLLOWING OUTPATIENT SUBSTANCE ABUSE TREATMENT AMONG ADOLESCENTS: SUBSTANCE USE OUTCOMES AND MECHANISMS OF CHANGE

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# TABLE OF CONTENTS

List of Tables ................................................................................................................................ vii
List of Figures ................................................................................................................................ viii
List of Appendices ........................................................................................................................ ix
Abstract ............................................................................................................................................x

1. CHAPTER ONE...........................................................................................................................1
   1.1 Theoretical Perspectives ................................................................................................4
      1.1.1 Cognitive behavioral model ...............................................................................5
      1.2.1 Social Cognitive theory ......................................................................................7
      1.3.1 Social Learning theory .......................................................................................9
      1.4.1 Group theory ....................................................................................................10
      1.5.1 Application of theory .......................................................................................11
      1.6.1 Statement of the Problem .................................................................................13
      1.7.1 Hypothesis and Research Question ..................................................................14
      1.8.1 Definition of Terms..........................................................................................15
      1.9.1 Assumptions .....................................................................................................18
      1.10.1 Limitations .......................................................................................................18
      1.11.1 Delimitations ....................................................................................................18
      1.12.1 Abbreviations ...................................................................................................19

2. CHAPTER TWO.........................................................................................................................21
   2.1 Adolescent Relapse ......................................................................................................21
   2.1 History of Self-help Groups .........................................................................................23
      2.1.1 Self-help and Treatment Integration ................................................................25
   2.1 Predictors of Self-help Group Attendance ...................................................................26
      2.1.1 Severity of Substance-related Problems ..........................................................27
      2.2.1 Demographic Factors .......................................................................................29
      2.3.1 Social-environmental Variables .......................................................................30
   2.1 Rates of Attendance .....................................................................................................31
   2.1 Post-treatment Self-help Group Attendance & Substance Use ....................................33
      2.1.1 Adult Samples ..................................................................................................33
LIST OF TABLES

Table 1.1 Demographic Characteristics of the Sample at Intake into Treatment... 63

Table 2.1 Clinical Characteristics of the Sample at Intake into Treatment ........... 65

Table 3.1 Potential Scale Ranges for Each Variable ............................................. 67

Table 4.1 Differences across Self-help Attendance Groups ................................. 69

Table 5.1 Correlation Matrix of Time 2 Variables & Substance Use at Time 2 73

Table 6.1 Direct, Indirect, and Total Effects on Substance Use .............................. 77

Table 7.1 Correlations between Intake into Treatment Measures and Attendance at time 2 ................................................................. 79

Table 8.1 Self-help Group Attendance Determinants............................................. 80

Table 9.1 Factors Related to Environmental Risk at Time 2 ................................. 81

Table 10.1 Factors Related to Severity at Time 2 .................................................. 82

Table 11.1 Summary of Findings.......................................................................... 84
LIST OF FIGURES

1.1 Bandura’s Social Cognitive Theory................................................................. 9

2.1 Predictors of Adolescent Substance Use Path Model................................. 15

3.1 Composition of the Sample for the Current Study..................................... 52

4.1 Model of Predictors of Adolescent Substance Use.................................... 75
LIST OF APPENDICES

Appendix A Overview of the CSAT Dataset.......................................................... 107

Appendix B Overview of the Treatments ............................................................... 112

Appendix C Agreement Guidelines and Informed Consents............................... 114

Appendix D Overview of the GAIN.................................................................... 124

Appendix E Gain Questions.................................................................................. 134
ABSTRACT

Research on adolescent substance abuse treatment effectiveness has grown in quantity, as evidenced by several review articles (Deas & Thomas, 2001; Muck, Zempolich, Titus, Fishman, Godley, & Schwebel, 2001; Williams & Chang, 2000). The results have shown substance use dissipates during treatment, but relapse to substance use occurs at high rates following treatment discharge (Catalano, Hawkins, Wells, Miller, & Brewer, 1991; Godley, Godley, & Dennis, 2001). Despite the heterogeneity of post-treatment outcomes, the likelihood of post-treatment relapse is often dependent on a number of variables, including whether or not the adolescent participates in continuing care services, such as self-help groups. However, there remains a dearth of empirical studies examining the use and effectiveness of self-help groups among adolescent outpatients. Therefore, this research examined the effects of self-help group meeting attendance among adolescents during the three-month time period immediately following publicly funded outpatient substance abuse treatment.

Factors postulated within social-cognitive theory, social learning theory, group theory and included in cognitive and behavioral relapse prevention models were assessed to determine how they are influenced by self-help group attendance and whether these effects can be used to help explain all or some of these observed relations. The following research hypothesis was examined: at the end of the three-month time period following treatment, there will be no differences between male and female adolescents who attended self-help groups during that three-month time period and those who do not attend regarding substance use frequency, severity of substance-related problems, cognitive and behavioral factors (motivation, coping, self-efficacy), and social-environmental factors (social support, environmental risk). In addition, the following research question was incorporated: while controlling for gender and attending a self-help group, can severity of substance-related problems, motivation, coping, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency?

To examine the hypothesis and research question, a secondary analysis was performed using data from the Substance Abuse and Mental Health Services Administration’s Center for Substance Abuse Treatment (CSAT) Adolescent Treatment (AT) 2008 Outcome Dataset. The final dataset focused on adolescent outpatients and key questions from the original assessment that addressed the hypotheses and research question. Variables of interest were constructed,
using items from scales and indices that were part of the assessment. The secondary data were analyzed using PASW Statistics (formerly SPSS) and AMOS 18.0 software.

Analysis of variance (ANOVA) revealed no differences in the mean scores between self-help group attendees and non-attendees at the end of the three-months following treatment on motivation, social support, substance use frequency, and environmental risk. However, differences existed for coping, self-efficacy, and severity of substance-related problems. In addition, gender differences were found when adolescents entered treatment, in that females presented for treatment with higher environmental risk and higher severity of substance-related problems.

Path analysis was performed to test for the relationship of predictor variables in the model to the substance use frequency outcome variable. The findings revealed that higher severity of substance-related problems, higher coping, greater environmental risk, less self-efficacy, and no self-help group attendance during the first three-month period following treatment were the factors related to more substance use among adolescents in that period. In addition, environmental risk followed by severity of substance-related problems had the greatest total effects on substance use frequency following treatment.

There were also some indirect relationships to substance use, as severity of substance-related problems had indirect relationships on substance use through risk, and coping; coping was indirectly related to substance use through self-efficacy; and self-help group attendance was indirectly related to substance use through environmental risk. Overall, this model fit well with the observed data ($\chi^2=15.71$, $df=13$, $p=.265$, GFI=.995, AGFI=.983, RMSEA=.018). The model explained 40% of the variance in substance use frequency scores among adolescent outpatients.

Several implications were identified regarding methodology, research, and clinical practice. In light of the findings is the clinical importance of linking adolescents to continuing care services, such as self-help groups following treatment discharge. The results suggested that attending self-help groups following treatment was beneficial for some adolescents in the short-term, particularly those with greater severity. A second implication is that environmental risk factors played an important role in substance use decisions following treatment. These findings suggested that attending self-help groups might be a potential strategy to decrease these risks, which in turn decreased substance use. Third, these findings highlighted the importance of examining post-treatment factors, which typically account for the majority of the variance in
outcomes (Catalano et al., 1990–91; Latimer et al., 2000). Lastly, findings suggested that adolescent females responded similarly to substance abuse treatment and self-help groups when compared to males despite poorer initial clinical indicators.

While the current study identified post-treatment factors that appear to underlie substance use relapse among adolescent outpatients, little is known regarding the way each of these factors was differentially associated with subgroups characterized by distinct substance use trajectories. Consideration of how these factors changed during the early recovery period is key to understanding how substance abuse treatments and continuing care strategies may impact adolescents differentially.
CHAPTER ONE

INTRODUCTION

Reports have indicated that alcohol and other drug use among adolescents in the United States has risen during the last 15 years (Office of Applied Studies, 2009). The number of adolescents admitted to publicly funded substance abuse treatment programs has increased by more than 60% since 1993 (Office of Applied Studies, 2009). As a result, research activity into adolescent substance abuse treatment effectiveness has grown in quantity (Deas & Thomas, 2001; Muck, Zempolich, Titus, Fishman, Godley, & Schwebel, 2001; Williams & Chang, 2000). The results have shown substance use dissipates during treatment, but relapse to substance use occurs at high rates following treatment discharge (Catalano, Hawkins, Wells, Miller, & Brewer, 1991; Godley, Godley, & Dennis, 2001). Despite the heterogeneity of post-treatment outcomes, the likelihood of relapse to substance use following treatment is often dependent on a number of variables, including whether or not the adolescent participates in continuing care services, such as self-help groups.

Convergent evidence from research with adult substance abusers has found that self-help group attendance following treatment was significantly associated with enhanced abstinence outcomes and increases in cognitive and behavioral factors (motivation, coping skills, and self-efficacy) and social-environmental factors (social support, and decrease in environmental risks) that appear to underlie stable recovery and prevent relapse (Kelly, 2003; McKay, 2009). In addition, these factors have been implicated as probable therapeutic mechanisms through which self-help groups benefit members.

Although studies have supported the utility of self-help group attendance following treatment among adults, few studies addressing this aspect of adolescent substance abuse have been published. In a meta-analytic review of 107 studies on Alcoholics Anonymous (AA), not a single study that examined the use of AA by those under the age of 21 was found (Emrick, Tonigan, Montgomery, & Little, 1993). The majority of treatment approaches for adolescents have mostly been an extrapolation of the adult model, with an unexamined prescription of attendance in self-help groups. Thus, comparatively little is known regarding the use and effectiveness of self-help groups for adolescents following substance abuse treatment despite it being a commonplace recommendation (Bukstein, 1995). In addition, while females make up a
substantial minority of the substance abuse treatment and self-help group populations, relatively little attention has been paid to how aspects of substance abuse treatment and self-help groups compare across gender.

In theory, self-help groups could be helpful for adolescents in an increasingly cost-constricting, managed care environment. However, despite the potential benefits and widespread treatment recommendations for attendance, adolescents in treatment differ from adults because they tend to use multiple substances, experience fewer medical complications, have lower problem recognition, and have shorter histories of substance use. Adolescents also face logistical barriers not encountered by adults following treatment, as adolescents are more often dependent on parents for money and transportation. This suggests that adolescents may differ from adults in the extent to which treatment approaches are able to engage them and be effective for them. In addition, even though meetings dedicated to adolescents exist in some communities, statistics suggest that typical AA/NA meetings consist largely of adults (Passetti & Godley, 2008). This may have important implications for adolescent attendance since adults often face difficulties related to loss of employment, loss of housing, and troubled relationships with spouses that adolescents may not be able to identify with at meetings (Passetti & Godley, 2008).

Despite these developmental concerns, the handful of studies that have examined the use of self-help groups among adolescents have found that self-help group attendance following inpatient substance abuse treatment was associated with the maintenance of or enhancement of abstinence from substance use when compared to adolescents without such attendance (Alford, Koehler, & Leonard, 1991; Kelly, Myers, & Brown, 2000; Kennedy & Minami, 1993). These studies have also found that adolescents with more long-term and severe substance use problem severity were more likely to attend 12-step groups, attend frequently, and sustain attendance following treatment.

Self-help group attendance following treatment has been found to influence cognitive (e.g., self-efficacy, readiness/motivation) and behavioral (e.g., coping) factors thought to be important for recovery among adults (Humphreys, Mankowski, Moos, & Finney, 1999). Similarly, a preliminary study with adolescents found that 12-step attendance was associated with the maintenance of or increases in motivation, coping, and self-efficacy following residential treatment (Kelly, et al., 2000). This line of research has its theoretical roots in social cognitive learning theory (Bandura 1986) and the more specifically related cognitive-behavioral
relapse prevention theory (Kelly, Magill, & Stout, 2009; Marlatt & Gordon, 1985). From this perspective, self-help groups’ ability to mobilize cognitive and behavioral change processes common to both formal treatment models and self-changers may help explain how or why such attendance leads to positive outcomes.

Attendance in self-help groups has also been shown to impact social-environmental factors among adults primarily through the alteration of social networks by increasing the number of acquaintances who support quitting (development of a dry network), and inoculating members from the negative influence of a wet social network encouraging substance use (Groh, Jason, & Keys, 2008; Humphreys, et al., 1999; Kaskutas, Bond, & Humphreys, 2002). According to Humphreys and Noke (1997) AA possesses characteristics that are related conceptually to active ingredients in other social contexts in the overall recovery environment, such as family, friends and the workplace. Consequently, these social network changes may represent a further mechanism through which self-help group attendance benefits adolescents, particularly because social-environmental factors are often more salient features of post- treatment relapse among adolescents when compared to adults. For example, Godley, Dennis, Godley, Funk, & Kahn (2005) found that significant reductions in substance use and substance-related problems following treatment were related to reduced social risk (e.g., decreased involvement in negative peer networks), based on their sample of 552 adolescent outpatients. Other research has found that among adolescents in residential treatment, who were classified as either abstainers or those who had not experienced a major relapse, were significantly more likely to have higher levels of social support (Brown, D. Amico, McCarthy, & Tapert, 2001). In addition, a review of the adolescent treatment effectiveness literature concluded that effective adolescent substance abuse treatment programs should include strategies to enhance family and peer support for nonuse (Williams & Chang, 2000).

Similar to the adult literature, preliminary research with adolescents found that social support explained the relationship between 12-step attendance and affiliation and alcohol and drug abstinence (Chi, Kaskutas, Sterling, Campbell, & Weisner, 2009). Other research found that adherence to general continuing care criteria, which included self-help group attendance, was associated with reductions in environmental risk, which in turn was related to reduced adolescent substance use and substance-related problems nine months after treatment discharge (Garner, Godley, Funk, Dennis, & Godley, 2007).
While evidence is starting to accumulate that adolescents’ benefit from self-help group attendance following formal substance abuse treatment, conclusions remain limited because only a small number of studies have been conducted, and all published research has focused on adolescents following inpatient or residential treatment (Kelly & Myers, 2007). Information regarding the effectiveness of self-help groups among less intensively treated adolescents is desirable because of the reliance on less intensive or outpatient modes of care. According to the Office of Applied Studies, the majority of adolescents with substance use disorders are being treated in outpatient programs (2009). To date, no research has confirmed or refuted the idea that adolescents treated in less intensive outpatient settings do not benefit from self-help groups following treatment. Therefore, studying adolescent outpatients is imperative because the current knowledge is not reflective of the present treatment reality (Kelly & Myers, 2007; Passetti & Godley, 2008).

There also remains a dearth of information about attendance at and effects from all forms of self-help group involvement among women (Kelly, 2003). Until the early 1990s, the substance abuse treatment literature was based primarily on male samples, thus limiting the generalizability to women. Since then, considerable literature indicates that males and females differ on a number of factors regarding their substance abuse, such as: referral into treatment, psychological profile, experience of physical and/or sexual abuse, and family history of substance abuse (Toray, Coughlin, Vuchinich, & Patricelli, 1991). In regard to self-help group involvement, a meta-analytic review found that women were vastly underrepresented in the self-help literature, as the average sample size for men was 116, whereas for women it was 9 (Emrick et al., 1993). The limited available findings did suggest, however, that adult women may integrate more easily than men into self-help groups and derive similar benefits (Kelly, 2003). Comparable information on adolescent females is unknown.

**Theoretical Perspectives**

This study will be framed within several perspectives, including the cognitive and behavioral model of relapse which is rooted in social-cognitive theory, social learning theory, and group theory in an attempt to provide a more complete understanding of the cognitive and social-environmental factors that influence substance use behavioral change following formal substance abuse treatment. Knowledge of how such factors are influenced by self-help group
attendance, and whether these effects can be used to help explain all or some of the observed relations, can begin to clarify adolescent-specific effectiveness and change mechanisms.

**Cognitive and Behavioral Model of Relapse**

The cognitive-behavioral approach to the treatment of addictive behaviors specifically addresses the nature of the relapse process and suggests strategies useful in maintaining change (Marlatt & Gordon, 1985; Parks, Marlatt, & Anderson, 2001). It is based on a cognitive-behavioral model of relapse developed over the past 30 years by Marlatt and his colleagues (Marlatt & Gordon, 1985; Parks, et al., 2001; Witkiewicz & Marlatt, 2004). The model is rooted in social-cognitive theory (Bandura, 1986), and is based on the idea that addictive behaviors are acquired, over-learned habits with biological, cognitive, and environmental determinants.

The cognitive-behavioral model of relapse incorporates both a conceptual model of relapse and a set of cognitive and behavioral strategies to prevent or limit relapse episodes. Utilizing constructs postulated in social cognitive theory, the approach focuses on the immediate precipitating circumstances of relapse, as well as on the chain of events that may proceed and set-up a relapse. The model proposed by Marlatt and Gordon suggests that both immediate determinants (e.g., high-risk situations, coping skills, and the abstinence violation effect) and covert antecedents (e.g., lifestyle factors and urges and cravings) can contribute to relapse. The model also incorporates numerous specific and global intervention strategies that allow therapist and client to address each step of the relapse process. Specific interventions include identifying high-risk situations for each client, enhancing the client's coping skills, increasing the client's self-efficacy, eliminating myths regarding alcohol's effects, managing lapses, and restructuring the client's perceptions of the relapse process. Particular attention is paid to cognitive, situational, interpersonal, and psychological factors that precede a relapse and to the individual’s expectations and attributions in reaction to a lapse.

The cognitive-behavioral model of the immediate determinants of relapse, the taxonomy of high-risk situations, and the covert antecedents that set up lapses provide the conceptual basis for Relapse Prevention Therapy. The model delineates the immediate precipitants of relapse, or proximal predictors once an individual is placed in a high risk situation. A central aspect of the model is the detailed classification, or taxonomy of factors or situations that can precipitate or contribute to relapse episodes. This taxonomy of high risk situations includes intrapersonal and interpersonal determinants of relapse. Intrapersonal determinants include self-efficacy,
motivation, and coping (Bandura, 1977, 1986). Interpersonal determinants include social support, conflict, social pressure to use, and enhanced affective states. A high risk situation is conceived as any situation that poses a threat to an individual’s sense of control or self-efficacy and increases the potential for relapse (Marlatt & Gordon, 1985).

The model postulates that high risk situations frequently serve as the immediate precipitators of initial alcohol or drug use after abstinence. A coping response is a cognitive or behavioral strategy that is used to cope with a situation. Self-efficacy is thought of in terms of an individual’s confidence to execute a particular course of action necessary to deal with a high risk situation (Bandura, 1986). In its most recent conceptualization, the model places explicit consideration on the importance of motivation, coping, and dynamic interactions between multiple risk factors and environmental determinants (Witkiewicz & Marlatt, 2004).

While several studies have provided theoretical and practical support for the cognitive-behavioral model of relapse among adults, studies of adolescent relapse suggest that while components of the model are relevant to adolescent relapse, there are differences in both the content and process of adolescent relapse when compared to adults. Some research has considered ways in which the process of relapse is unique for adolescents (Anderson, Ramo, Schulte, Cummins, & Brown, 2007; Brown, 2004; Ramo & Brown, 2008; Tate, Brown, Unrod & Ramo, 2004). In their Addiction Relapse Model, Brown and colleagues have incorporated developmental features that have been shown to be important for youth relapse into the dimensions of the Cognitive Behavioral Model of Relapse proposed by Witkiewitz and Marlatt (2004). In particular, they emphasize that the prediction and measurement of treatment outcome should occur within the broader context of adolescent development.

The model highlights the fact that stage of development will determine the extent to which each of the factors influences the outcome process (e.g., quantitative differences), and the clinical course (e.g., qualitative differences) among adolescents. This developmental perspective emphasizes consideration of: (1) changes in the predictor over the course of adolescence (e.g., the number of substance using peers may increase), and (2) the relative importance of a predictor as a function of maturation (e.g., family influences may give way to peer influences on adolescents’ substance use behavior). As a result, these factors may differ quantitatively in predictive power for adolescents compared to adults. Empirical research supports consideration of each of the predictor domains and highlights important developmental differences among
adolescents compared to adults. For example, post-treatment factors, such as the recovery environment and positive affective states (e.g., using drugs to enhance a positive feeling), play a more salient role in influencing decisions regarding substance use among adolescents when compared to adults (Ramo & Brown, 2008; Tate et al., 2004). In addition, motivation to enter treatment among adolescents differs from that of adults, in that adolescent motivation is more extrinsic, because they are usually coerced into treatment. Viewed from the stages-of-change perspective developed by Prochaska and DiClemente (1982), many adolescents could be considered to be in the “precontemplation” stage, not perceiving that they have a substance abuse problem. Thus, adult models of relapse, which are often based on the notion that the individual is trying to maintain abstinence, may not fit as well for adolescents with substance use disorders.

**Social Cognitive Theory**

In 1986, Bandura officially launched the SCT with his book *Social Foundations of Thought and Action: A Social Cognitive Theory*. Bandura has led the efforts on cognitive SLT development (Bandura, 1977, 1986). Bandura’s work centers around the notion that people acquire new information through the process of learning that can be best described as a continuous and reciprocal interaction between behavior, cognition, and environmental influences, termed reciprocal determinism. The interaction between the three factors will differ based on the individual, the particular behavior being examined, and the specific situation in which the behavior occurs (Bandura, 1986).

In this process, human expectations, beliefs, and cognitive competencies are developed and modified by social influences and physical structures within the environment. These social influences can convey information and activate emotional reactions through such factors as modeling, instruction, and social persuasion (Bandura, 1986). In addition, humans evoke different reactions from their social environment as a result of their physical characteristics, such as age, size, race, sex, and physical attractiveness. Environment refers to the context that can affect a person’s behavior, and can be social (e.g., family, friends, society) or physical (e.g., house, temperature, etc.). SCT asserts that human cognition is a mediator between stimulus and response, placing individual control over behavioral responses to stimuli. While the SCT upholds the behaviorist notion that response consequences mediate behavior, it contends that behavior is largely regulated antecedently through cognitive processes, which change over time as a function
of maturation and experience (e.g., attention span, memory, ability to form symbols, reasoning skills).

Within this SCT perspective, humans are characterized in terms of five basic and unique capabilities: symbolizing, vicarious, forethought, self-regulatory, and self-reflective (Bandura, 1986). It is these capabilities that provide humans with cognitive means by which to determine behavior. Symbolizing capability maintains that most external influences affect behavior through cognitive processes and suggests that it is symbols that serve as the mechanism for thought. It is through this process that humans are able to model observed behavior. Vicarious processes refer to the human ability to learn not only from direct experience, but also from the observation of others. Observational learning allows one to develop an idea of how a new behavior is formed without actually performing the behavior oneself (Bandura, 1977, 1986). Forethought capability includes previous experiences that can create expectations of the outcome that will occur as a result of performing a behavior. Bandura proposes that self-regulatory systems mediate external influences and provide a basis for purposeful action, allowing people to have personal control over their own thoughts, feelings, motivations, and actions. Self-efficacy is the major determinant of self-regulation, as self-efficacy has become a central focus of this research. People develop perceptions about their own abilities and characteristics that subsequently guide their behavior by determining what a person tries to achieve and how much effort they will put into their performance (Bandura, 1977). A person's self-efficacy develops as a result of his or her history of achievement in a particular area, from observations of others successes and failures, from the persuasion of others, and from one's own physiological state (e.g., emotional arousal, nervousness, or anxiety) while performing a behavior (Bandura, 1977, 1986).
Social Learning Theory

As early as 1939, sociologist Edward Sutherland’s differential association theory identified one of the causes of substance use behavior by suggesting that delinquent behaviors are socially learned in small informal groups. Sociologists (Akers, 1977) and cognitive psychologists (Bandura, 1977, 1986) have built upon the assertion that adolescents acquire their beliefs about behaviors from their role models, especially their parents and friends. Bandura’s SLT is characterized by a broader and more generalized scope. All social learning theories focus on the learning that occurs within a social context. They consider that people learn from one another through observational learning, imitation, and modeling. General principles of social learning theory are: people can learn by observing the behavior of others and the outcomes of those behaviors; learning can occur without a change in behavior, as social learning theorists postulate that because people can learn through observation alone; learning may or may not result in a behavior change; and cognition plays a role in learning.

All of the SLT versions state that learning is primarily achieved through two main processes: modeling and social reinforcement. Specifically, SLT posits that learning is likely to have three sequential effects, beginning with the observation and imitation of behavior, continuing with social reinforcement for that behavior, and culminating with the expectation of positive social and physiological consequences from engaging in the behavior. The major premise of Bandura's social learning theory is observational learning, or modeling, as this type of learning can be used to explain a wide variety of behaviors. According to the theory, modeling can have more impact than direct experience.

*Figure 1. Bandura's social cognitive theory (1986)*
The four variables that are involved in modeling are: attention, retention, reproduction, and motivation. One must be paying attention, be capable of retaining what they have observed, be able to translate the observation into action, and be motivated to imitate the observed action. Basic social learning concepts include: people can learn through observation (e.g., observational learning); mental states are important to learning; learning does not necessarily lead to a change in behavior; and not all observed behaviors are effectively learned. Whether learning occurs depends on factors involving both the model and the learner. In essence, this theory proposes that behavior is a function of positive norms and expectations learned through observing friends and family members who engage in and model that behavior. Observing family and friends who perform the behavior can instill positive expectancies for the effects of engaging in that behavior.

**Group Theory**

Some early psychoanalysts, especially Alfred Adler, a student of Sigmund Freud, believed that many individual problems were social in origin. In the 1930s Adler encouraged his patients to meet in groups to provide mutual support. At around the same time, social work groups began forming in mental hospitals, child guidance clinics, prisons, and public assistance agencies. Following from this, group therapy emerged as a special form of therapy in which a small number of people meet together under the guidance of a professionally trained therapist to help themselves and one another. Some group therapists have argued that there are unique mechanisms of action intrinsic to all group therapies. An early voice noted that groups have unique properties of their own, which are different from the properties of their subgroups or of the individual members, and an understanding of these three units is critical in explaining the success or failure of small groups (Lewin, 1947). Later writers argued that a sound understanding of group dynamics was as important to a group therapist as knowledge regarding physiology is to a physician. Thus, the conventional clinical wisdom for decades has been that if one is going to offer treatment in a group, one must be aware of the intrinsic group mechanisms of action responsible for therapeutic change in members. Stemming from this, the clinical and empirical scholars have sought to understand the therapeutic factors and mechanisms that have been linked with healthy well-functioning therapy groups. Addressing this issue Yalom and Leszcz (2005) identified eleven curative factors that are the primary agents of change in group therapy. These include: universality, altruism, instillation of hope, imparting information, corrective recapitulation of the primary family experience, development of socializing techniques, imitative
behavior, cohesiveness, existential factors, catharsis, interpersonal learning, and self-understanding.

**Application of Theory**

Social-cognitive theory and the more specifically related cognitive-behavioral model of relapse has been applied to self-help group research among adults and adolescents when examining the hypothesized cognitive and behavioral change mechanisms of self-efficacy, coping, and motivation (Kelly et al., 2009). This theory highlights the importance of cognitive factors as critical mediators in the increase or decrease of the probability of relapse (Kelly et al., 2009). Social cognitive mechanisms have been shown to mediate the relationship between self-help group attendance and substance use outcomes in both adult and adolescent samples (Connors, Tonigan, & Miller, 2001; Kelly et al., 2000, 2002; Morgenstern, Bux, LaBouvie, Blanchard, & Morgan., 1997).

In its most recent conceptualization, social cognitive theory recognizes substance use as a dynamic process involving transactional relationships between risk factors, cognitive processes, and behaviors, such as coping in the context of high risk situations (Witkiewitz & Marlatt, 2004). From a social cognitive theory perspective, observations and interactions are likely to influence and support cognitions regarding substance use (Bandura, 1986). These cognitive variables that pertain to a person’s self-appraisal of the extent to which they believe they can consume alcohol and drugs in moderation and are confident that they can successfully abstain (e.g., self-efficacy) relate directly to the central tenet of abstinence in self-help groups. Bandura has posited that models can shape both use self-efficacy and refusal self-efficacy. For instance, observing peers buy and inhale marijuana cigarettes can provide adolescents with the necessary knowledge and skills to obtain and use marijuana. Conversely, observing a friend resist the pressures to use alcohol can boost an adolescent’s refusal skills and self-efficacy by displaying the necessary skills to avoid using alcohol.

An adolescent does not have to observe substance use among role models for it to be socially modeled and reinforced. In fact, simply hearing models speak favorably about substance use and people who use substances might promote the onset of problematic substance use. In this way, many of the processes in self-help groups have implications for increasing self-efficacy as exposure to substance-abstaining models can impact refusal self-efficacy. For example, the practice of “testifying” to their personal struggle to overcome addiction and mental problems
includes declarations of commitment to change, evidence that the struggle for recovery can be successful (e.g., self-efficacy), and examples of specific actions, or coping strategies that helped. It is further postulated that the testimony and sharing of past and present experiences—a central component of self-help group meetings—may serve to remind those in attendance of past negative consequences resulting from their own use while emphasizing benefits of being abstinent. In this way, expectancies and cognitions supportive of continued abstinence are reinforced.

In the 1970s, social learning theory emerged as a conceptual framework for developing new psychosocial treatment interventions for substance-abusing individuals and forms the conceptual basis for the cognitive-behavioral model of relapse and relapse prevention therapy (Marlatt & Gordon, 1985). Within this theory, substance use is viewed as a maladaptive learning process. According to SLT, substance use originates in the substance-specific attitudes and behaviors of the adults and peers who serve as an individual’s role models. One of the main mechanisms in which social learning theory explains substance use behavior is through imitation and modeling, which occurs in a social context. Modeling effects begin with observation and imitation of substance-specific behaviors, continue with reinforcement for substance use, and culminate in substance use. Social learning theory proposes that substance use is a function of positive norms and expectations about substances from family members and friends who engage in and model substance use behaviors.

When applied to self-help groups, SLT posits that through increasing exposure to abstinent models, the social network may be altered or its influence moderated over time, as there can be a significant temporal lapse between cause and effect (Kelly, et al., 2000; Moos, 2008). Thus, the key according to social learning theory is to make substance-using role models less salient and substance-abstaining role models more salient. Following from SLT, self-help groups can provide exposure to a new social context in which abstinent and recovery behaviors are learned, modeled, and supported (Kelly et al., 2009). Modeling effects begin with the observation of abstinent behaviors from other members and continue with social reinforcement for abstinence and the negative consequences of substance use. Other member’s describing the consequences of their behavior can effectively increase the appropriate behaviors (e.g., abstinence) and decrease inappropriate ones (e.g., substance abuse). This can involve discussing with other members about the rewards of abstinence and the consequences resulting from substance use. Modeling provides the means for shaping and teaching new recovery and
abstinence-oriented behaviors. These provide a script for the learning of new behaviors and their appropriateness. Later, these scripts get activated in the context of adolescents’ own social interactions and serve as basis for their behavioral reactions, which may ultimately serve to decrease substance use.

Self-help groups occur in a social context that has theoretical underpinnings in social learning theory by incorporating observational learning (hearing and seeing how others recovered), positive attention, and strong reinforcement for abstinence (Kelly et al., 2009; Moos, 2008). For example, while family members and friends who drink presumably reward substance abuse with approval, members who support abstinence provide social approval and encouragement for not using alcohol and drugs. In addition, the composition of self-help groups entails three particular aspects of social learning theory: exposure to abstinence-oriented models, exposure to abstinence-oriented norms, and the expectations of the negative consequences of substance use (Moos, 2008).

Following from group theory, self-help groups encompass many therapeutic factors. Self-help groups utilize the power of the group to offer multiple relationships to assist the individual in growth and problem solving. For example, group members share a universal problem which serves to remove a group members sense of isolation, validate their experiences, and raise self-esteem. In a mixed group that has members at various stages of development or recovery, a member can be inspired and encouraged by another member who has overcome the problems with which they are still struggling. The group can thus serve as a place where members can help each other. The experience of altruism, or being able to give something to another person, can lift a member's self esteem and help develop more adaptive coping styles and interpersonal skills.

Statement of the Problem

Research examining the relationship between self-help group attendance and substance use outcomes has been increasing; however, adolescent outpatients remain understudied. It is important to know not just whether these groups produce salutary effects, but why and for whom. The proposed research examined the effects of self-help group meeting attendance among adolescents during the three-month time period immediately following publicly funded outpatient substance abuse treatment. Male and female adolescents who attended self-help groups during that three-month time period were compared to those who did not at intake into treatment (time 1) and at the end of the three-month time period (time 2) in relation to: substance
use frequency, severity of substance-related problems, cognitive and behavioral factors (motivation, coping, self-efficacy), and social-environmental factors (social support, environmental risk). The following research question was incorporated: while controlling for gender and attending a self-help group, can severity of substance-related problems, motivation, coping, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency? Such knowledge can improve the specificity and efficiency of substance abuse treatment and continuing care recommendations for adolescents with substance use disorders.

**Hypothesis and Research Question**

$H_0$. At the end of the three-month time period following outpatient substance abuse treatment (time 2), there will be no differences between male and female adolescents who attended self-help groups during that three-month period and those who did not attend in relation to the following factors (variables):

a) Severity of substance-related problems, as measured with the Substance Problem Scale (SPS) which assessed problems related to substance use or substance using behavior.

b) Coping, as measured with the Problem Orientation Scale (POS), which examined recognition of problems and the relationship of those problems to substance use.

c) Motivation, as measured with two indices. The Treatment Motivation Index (TMI), which examined the adolescents’ perception of his/her own need for treatment and hope for help through treatment, and the Treatment Resistance Index (TRI), which examined difficulties in being treated.

d) Self-efficacy, as measured with the Self-efficacy Scale (SES), which assessed the number of high-risk situations an adolescent believed s/he could avoid using substances.

e) Social support, as measured with the General Social Support Index (GSSI), which assessed sources of social support the adolescent had, including professionals, family, friends, schoolmates, or work colleagues.

f) Environmental risk, as measured with the Environmental Risk Scale (ERS), which assessed the adolescent's living environment, vocational, school, and social peer networks. It indicated how many individuals the respondent regularly lives with, works or goes to school with, and hangs out with socially who are involved in illegal activities, violence, and substance use.
g) Substance use frequency, as measured with the Substance Frequency Scale (SFS), which is the average # of days during a 90-day period that an adolescent reported each of the following: days of “any” substance use, days of heavy substance use, days of alcohol use, cannabis use, crack/cocaine use, and heroin/opioid use.

Research Question
R1. When controlling for gender and self-help group attendance during the three-month time period immediately following outpatient substance abuse treatment, can severity of substance-related problems, coping, motivation, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency at the end of that three-month period?

* Control variables (No self-help group attendance=0, self-help group attendance=1; Male=1, Female=2)

Figure 2.1 Predictors of Adolescent Substance Use Frequency Path Model.

Definition of Terms
Adolescent: an individual who is between the ages of 12-17 years old.
Coping: the recognition of problems and the relationship of those problems to substance use (GAIN; Dennis, 1999).

Continuing care: the stage of treatment that follows formal primary treatment which can be delivered in a variety of formats and modalities (Kelly, 2003).

Environmental Risk: the characteristics of an adolescent's social networks, including the extent to which one's family and friends are engaged in substance use, illegal activity, and violence (GAIN; Dennis, 1999; Garner et al., 2007; Godley et al., 2005).

Gender: a social, psychological, and biological condition of being male or female.

Level of Care: the patient-placement criteria that are an evolving set of criteria for placing, continuing, and discharging participants along a continuum of care.

Level 0.5 Early Intervention: the level of care that targets participants who do not meet criteria for abuse or dependence or for whom additional information is being collected.

Level 1 Outpatient Services: the level of care that targets individuals meeting criteria for abuse or dependence who have stable or manageable symptoms of withdrawal and medical or psychological problems, recognize their problems, appear able to resist use, and do not have a hostile home environment.

Level 3 Residential: the level of care that targets participants who have unsafe living environments and need time to develop their recovery skills, and it includes medical monitoring of manageable medical or psychological problems.

Motivation: readiness for treatment and perceived difficulty in abstaining from substances (Bandura, 1986; Deleon & Jainchill, 1986; GAIN; Dennis, 1999; Simpson & Joe, 1993).

Mutual help group: a group in which group members give and receive advice, encouragement, and support (Humphreys et al., 2004).

Self-efficacy: a cognitive process describing patients’ confidence in their ability to abstain from substance use in high-risk relapse situations (Bandura, 1977; GAIN; Dennis, 1999).

Self-help group: a community-based group devoted to helping individuals who have substance use, abuse, and related problems (Humphreys et al., 2004).

Severity of substance-use related problems: the diagnosis made regarding problems related to substance use or substance using behavior based on 16 symptoms: 7 corresponding to DSM-IV criteria for dependence, 4 for abuse, 2 for substance-induced health and psychological problems, and 3 on lower severity symptoms of use (GAIN; Dennis, 1999).
Site: a CSAT grantee that is included under a grant program.

Social Support: the number and kinds of social support the adolescent has stemming from professionals, family, friends, schoolmates, and work colleagues (GAIN; Dennis, 1999; Godley et al., 2005).

Substances: commonly abused drugs which can include psychoactive substances (e.g., cannabis, alcohol, and amphetamines); toxins (i.e., heavy metals, fuel, and paints); or prescribed medications.

Substance Abuse: the diagnosis given when a person meets criteria for dependence and meets one or more of the following criteria: (1) recurrent substance use resulting in failure to fulfill major role obligations at work, home, or school; (2) recurrent substance use in situations in which it is physically hazardous; (3) recurrent substance-related legal problems; and (4) continued substance use despite social or interpersonal problems cause by exacerbated use.

Substance Dependence: a diagnosis given when a person meets 3 or more of the following 7 criteria: (1) tolerance, as defined by either of the following (a) a need for markedly increased amounts of substance to achieve intoxication or desired effect, or (b) markedly diminished effect with continued use of the same amount of the substance; (2) withdrawal, as manifested by either of the following: (a) the characteristic withdrawal syndrome for the substance, or (b) the same substance is taken to relieve or avoid withdrawal symptoms; (3) the substance is often taken in larger amounts or over a longer period of time than was intended; (4) there is a persistent desire or unsuccessful effort to cut down or control substance use; (5) a great deal of time is spent in activities necessary to obtain the substance, or recovering from its effects; (6) important social, occupational, or recreational activities are given up or reduced because of substance use; and (7) the substance is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been cause or be exacerbated by its use.

Substance-related disorders: a general description of drug and alcohol diagnoses that are on an independent line on a rank with schizophrenia, mood disorders, and other classes in axis I of the DSM-IV.

Substance Use: use of any commonly abused drug such as psychoactive substances (e.g., cannabis, alcohol, and amphetamines); toxins (i.e., heavy metals, fuel, and paints); or prescribed medications during the course of the study.
Treatment type: the type of substance abuse treatment intervention model which relies on a particular theoretical orientation, approach to treatment, and treatment components.

Trial: a CSAT funded grant study, which can also include multiple sites.

12-step organization: a type of self-help group that relies on a particular philosophy of recovery that emphasizes the importance of accepting addiction as a disease that can be arrested but never eliminated (Humphreys et al., 2004).

Assumptions

One of the main assumptions underlying this study was that the adolescents had the ability and opportunity to respond to the questionnaire in the most accurate and honest manner possible. Further, it was assumed that adolescents responded to the best of their ability and that interviewers were well-trained and performed in a scientific manner. Also, it was assumed that data collection methods and procedures were standardized across sites. Another assumption was that the sample was representative of adolescents who would typically present and be appropriate for publicly funded outpatient substance abuse treatment in the United States. Consistent with the U.S. public treatment system, the characteristics of adolescents in the CSAT AT 2008 Outcome Dataset were predominately male (72.6%), white (46%), between the ages of 15-17 years old (74.8%), and treated in outpatient settings (71%).

Limitations

The study was limited to the original data and sample collected as part of the Center for Substance Treatment’s 2008 AT Outcome dataset. The researcher of this study had no control of the design and methodology and of the questionnaire used from the dataset. As a result, only adolescent self-reported data were accessible. However, this should not introduce any bias to the study, as previous studies have found adolescent self-report of substance use to be generally valid (Buchan, Dennis, Tims, & Diamond, 2002). Also, the data collection points were limited to those used in the dataset, thus there was no end of treatment assessment available. Other variables were not contained in the dataset that may be important to examine in future research, such as self-help group characteristics (e.g., age composition, geographic accessibility) and therapist information (e.g., referrals to self-help groups).

Delimitations

The researcher did not use all of the available data contained in the dataset. The researcher decided to use the intake into treatment assessment (time 1) and the 6 month
assessment to constitute the three-month time period immediately following treatment (time 2). As a result, data collected at other follow-up time points were not included. In addition, adolescents were defined as being between the ages of 12-17 years old. Also, due to the purpose of the study, only adolescents who participated in early intervention or outpatient levels of care were included. Furthermore, the variables and the selected measures were delimited to those that fit within the constructs of the theoretical and conceptual frameworks used.

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AA</td>
<td>Alcoholics Anonymous</td>
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<td>ACRA</td>
<td>Adolescent Community Reinforcement Approach</td>
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<tr>
<td>ASAM</td>
<td>American Society of Addiction Medicine</td>
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<tr>
<td>CBT</td>
<td>Cognitive-Behavioral Treatment/Therapy</td>
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<tr>
<td>CHS</td>
<td>Chestnut Health Systems Outpatient Intervention</td>
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<tr>
<td>CSAT</td>
<td>Center for Substance Abuse Treatment</td>
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<tr>
<td>DSM-IV</td>
<td>Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association</td>
</tr>
<tr>
<td>DSM-IV-TR</td>
<td>Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association Revised</td>
</tr>
<tr>
<td>EAT</td>
<td>Effective Adolescent Treatment</td>
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<td>EI</td>
<td>Early Intervention</td>
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<tr>
<td>FFT</td>
<td>Functional Family Therapy</td>
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<tr>
<td>FSN</td>
<td>Family Support Network</td>
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<tr>
<td>GCC</td>
<td>Gain Coordinating Center</td>
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<tr>
<td>IP</td>
<td>Inpatient/Residential</td>
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<tr>
<td>MET</td>
<td>Motivational Enhancement Therapy</td>
</tr>
<tr>
<td>MET/CBT5</td>
<td>Motivational Enhancement Therapy/Cognitive-Behavioral Therapy - 5 Sessions</td>
</tr>
<tr>
<td>MET/CBT 7</td>
<td>Motivational Enhancement Therapy/Cognitive-Behavioral Therapy - 7</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>MI</td>
<td>Other Motivational Interviewing</td>
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<tr>
<td>MST</td>
<td>Multisystemic Therapy</td>
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<tr>
<td>NA</td>
<td>Narcotics Anonymous</td>
</tr>
<tr>
<td>OP</td>
<td>Outpatient</td>
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<tr>
<td>O</td>
<td>Other (treatment)</td>
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<tr>
<td>OSAP</td>
<td>Other Student Assistance Programs</td>
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<tr>
<td>SAMSHA</td>
<td>Substance Abuse and Mental Health Services Administration</td>
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<tr>
<td>SCT</td>
<td>Social Cognitive Theory</td>
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<tr>
<td>SCY</td>
<td>Strengthening Communities-Youth</td>
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<tr>
<td>SLT</td>
<td>Social Learning Theory</td>
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<tr>
<td>SUD</td>
<td>Substance Use Disorder</td>
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<tr>
<td>TCE</td>
<td>Targeted Capacity Expansion</td>
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<tr>
<td>TSA</td>
<td>Twelve Step Affiliation</td>
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<tr>
<td>TSF</td>
<td>Twelve Step Facilitation</td>
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</table>
CHAPTER TWO

REVIEW OF THE LITERATURE

In this chapter several related bodies of research are examined. The literature review is not exhaustive, but attempts to review and summarize the important research relevant to this topic. The adult literature is briefly summarized throughout the chapter with the aim of highlighting this research because it has provided the conceptual basis for the adolescent research literature. The review begins with a discussion of adolescent relapse, followed by a brief overview of the history of self-help groups for substance use disorders and the integration of self-help groups and formal substance abuse treatment. Attention is subsequently given to four main areas: (1) research regarding predictors of self-help group attendance, (2) research examining the relationship between self-help group attendance and substance use outcomes, (3) studies examining how or why self-help groups benefit members, and (4) research on the cognitive and behavioral factors (motivation, coping, self-efficacy) and social-environmental factors (social support, environmental risk) included in this study. Lastly, the limitations of the current literature and a summary of the existing research are presented.

Adolescent Relapse

A primary goal of addictions treatment involves the prevention of relapse, as relapse serves as an early warning sign of a failure to maintain desired behavioral change (Chung & Maisto, 2006). Although operational definitions of relapse differ, total abstinence from alcohol and illicit drugs is the standard used most often in determining whether a relapse occurred during or after an episode of formal substance abuse treatment. Reviews of adolescent treatment outcome studies document relatively low rates of abstinence following treatment. For example, one review found relapse rates of more than 60% during the 3-12 month period following treatment completion (Williams & Chang, 2000). These studies suggested that similar to findings with adults, the period of highest risk for relapse to substance use occurs in the first three-months following treatment (Chung & Maisto, 2006). In addition, although the number of studies that have examined gender has increased, few have addressed how aspects of substance abuse treatment may relate to relapse and how these aspects compare across gender among adolescents.
The majority have focused on comparing the incidence and prevalence rates of relapse across gender, with results suggesting that relapse rates appear to be similar. However, males often have higher rates of substance use and delinquent behavior associated with substance use; whereas, females often have poorer pre-treatment prognostic characteristics.

Few studies have reported rates of relapse separately for different substances. Even when data on other substances were available, results were typically presented as a combined alcohol or drug use outcome (Chung & Maisto, 2006). The limited available research suggested that the path to different substances varied; however, the relapse process was highly similar across the different drugs of abuse (Witkiewicz & Marlatt, 2004).

Although a relatively high degree of heterogeneity characterizes adolescent post-treatment substance involvement, research has begun to identify key factors that underlie the process of relapse and recovery. Reviews of the adolescent outcome literature have categorized these factors into pre-, during, and post-treatment domains. Compared to pre- and during treatment factors, post-treatment factors have been shown to have the strongest relationship to substance use outcomes among both adult and adolescent substance abusers, and have covered a broad range of cognitive, social, and environmental variables (Kelly & Myers, 2007). Post-treatment factors consistently associated with better substance use outcomes among adolescents included: motivation, parent and peer support, coping skills, low levels of peer substance use, and participation in continuing care services (Chung & Maisto, 2006).

As an informal source of continuing care, self-help groups focused on substance abuse, such as those in the 12-step tradition, hold promise as an enduring support in an increasing constrictive, economic climate. Convergent evidence from self-help group research with adults suggested that post-treatment attendance in such groups leads to enhanced abstinence outcomes (Kelly, 2003; Kelly & Myers, 2007). In addition, a number of studies have begun to document other benefits of self-help groups such as decreases in high risk determinants (substance using peers) and increases in factors that prevent relapse (motivation, coping skills, self-efficacy, social support). Furthermore, these factors have been shown to explain how and why self-help groups benefit members. Research aimed at examining the effectiveness of such attendance on the relapse/recovery process among women and adolescents is still in its beginning stages, leaving the possible effects of such groups on these populations a much understudied question (Kelly & Myers, 2007; Passetti & White, 2007).
Large self-help fellowships intended to help individuals suffering from substance use disorders (SUDs) are not new. Organizations with similar aims have existed for over 150 years in the United States (Passetti & White, 2007). Americans participate in a variety of self-help groups for chronic health problems, including Alzheimer’s disease, diabetes, cardiovascular disease, obesity, and serious mental illness. About 18% of American adults have attended a self-help group in their lifetime (Kessler, Mickelson, & Zhao, 1997). The term *mutual help group* is also used to reflect the fact that group members give and receive advice, encouragement, and support. Self-help groups do not charge fees and are not equated with professional treatment services. Several key elements are shared by all self-help groups, which include: a focus on overcoming a specific personal difficulty; individual transformation; reciprocal support; sharing of personal experiences; and peer-direction rather than professional management or expertise (Humphreys et al., 2004). Another shared key element is their low cost, as these groups are usually free except for an optional small donation. Finally, the membership is voluntary.

*Self-help group/organization for substance use disorders* refers to “non-professional, peer operated organizations devoted to helping individuals who have addiction-related problems” (Humphreys et al., 2004, p. 151). According to the Office of Applied Studies, an annual average of 5.0 million people aged 12 or older attended a self-help group because of their use of alcohol or illicit drugs (2009). *Twelve-step organizations* are a type of addiction-related self-help group and refer to those “self-help groups that rely on a particular philosophy of recovery that emphasizes the importance of accepting addiction as a disease that can be arrested but never eliminated, enhancing individual maturity and spiritual growth, minimizing self-centeredness, and providing help to other addicted individuals” (Humphreys et al., 2004, p. 152). Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) are the best known of the subset of self-help organizations that rely on the 12 steps.

In the 1920s and 1930s, a religious organization, based on first-century Christianity and known as The Oxford Group, began and became a refuge for alcoholics. Although not explicitly a program of alcoholism recovery, its meeting structure and program of personal change contributed substantially to the program and fellowship model of Alcoholic Anonymous (AA). AA, as a separate entity, was started in 1935 by two Oxford Group members, a New York stockbroker (William Wilson) and an Akron, Ohio, physician (Robert Smith), in reaction to the
Oxford Groups’ religious emphasis and nonspecific focus on alcoholism. The AA organization was distinct in that it focused specifically and exclusively on helping individuals recover from alcoholism and, concomitantly, developed a policy of having no opinions on outside issues of any kind. Thus, AA declined outside contributions with the intention of minimizing distraction, controversy, and disunity.

AA groups spread progressively across the United States and internationally. Today, this organization comprises approximately 100,000 registered groups with more than two million members in over 150 countries. AA is considerably larger and has lasted much longer than any of its predecessors. Its widespread adoption, acceptance, and perceived effectiveness in helping people with substance use disorders have given rise to several additional organizations. The more well-known of these are Narcotics Anonymous (NA, founded 1953), Cocaine Anonymous (CA, founded 1982), Women for Sobriety (WFS, founded 1976), Secular Organization for Sobriety (SOS, founded 1985), Rational Recovery (RR, founded 1986), Moderation Management (MM, founded 1993), and Self Management and Recovery Training (SMART, founded 1996). Despite having similar potential utility to AA, these newer non-12-step groups have grown more slowly, and remain understudied (Passetti & White, 2007).

Self-help groups for young people and adolescents seeking recovery from alcohol and other drug problems have evolved over the past two centuries in tandem with adolescent substance abuse trends (Passetti & White, 2007). Several events contributed to the rise of young people and young adolescents entering AA, such as a lowered age of onset of regular alcohol and drug use in the U.S., which accelerated the development of severe drug problems and triggered help-seeking at younger ages, and increased public awareness of alcohol and drug problems, which increased the flow of young people into AA (Passetti & White, 2007). These recovery support structures for young people in the mid-twentieth century rose from three sources: AA, adaptations and alternatives to AA, and faith-based recovery ministries (Passetti & White, 2007). Young people’s groups (young people then being defined as AA members under the age of 35), in AA began in the 1940s in cities such as Cleveland, Los Angeles, Philadelphia, New York City, and San Diego. The number of groups increased in the 1940s to the point that they commanded a section of the 1950 International Convention of AA (Passetti & White, 2007).

In 1958, the growing network of young peoples’ groups formed the International Conference of Young People in Alcoholics Anonymous and hosted their first convention in New
York. The annual event now draws more than 3,000 AA members from all over the U.S. A review of articles published in the AA *Grapevine* between 1948 and 1978 reveals that young people who entered AA in these years were subject to suspicion, criticism, and disdain (Passetti & White, 2007). A review of similar articles over the past 25 years reveals a weakening of such attitudes as the average age of members has progressively declined (Passetti & White, 2007). Between 1948 and 2006, more than 100 articles have appeared in the Grapevine that focused on young people in AA (Passetti & White, 2007). The first recovery support group organized specifically for adolescents in recovery is Teen-Anon, established in 1999.

**Self-help Groups and Substance Abuse Treatment Integration**

Despite AA maintaining a completely nonprofessional stance, its philosophy has been integrated with formal substance abuse treatment in the United States primarily in one of two ways: (1) through treatment modalities, which have incorporated the 12-step philosophy and (2) by encouraging participation in community based self-help groups following discharge from a variety of formal substance abuse treatment programs. As a result of this integration, the majority of research in this area has been informed through studies within the context of formal substance abuse treatment (Kelly, 2003).

Beginning in the 1950s, the AA philosophy was borrowed by and incorporated into professional substance abuse treatment programs with what became known as the *Minnesota Model, or 12-step treatment*. As a result, the community based fellowship of AA often became confused with the Minnesota Model (McElrath 1997). This treatment modality was essentially a self-help model, but also used a multidisciplinary approach advocating abstinence, behavior change, as well as ongoing involvement in AA as part of a continuum of care (Kelly et al., 2009). The 12-step treatment is typically a residential program in which patients receive various interventions, are educated in-depth about AA and the 12 steps, and may formally work through some of these steps (Kelly et al., 2009). A national study by Roman and Blum of a representative sample of 450 substance abuse treatment centers, found that 90% of the facilities based their treatment on the 12-step principles of AA. Furthermore, the largest public substance abuse treatment system in the United States, run by the Department of Veterans Affairs (VA), places heavy emphasis and reliance on this treatment model (Kelly et al., 2009). The AA philosophy has also influenced a professional intervention specifically designed to engage clients in AA by encouraging AA attendance and prescribed AA-related behaviors and practices, called
Twelve-Step Facilitation (TSF). Studies with adults have provided relevant evidence for the effectiveness of 12-step influenced treatments on various substance use and psychosocial outcomes (Ouimette, Finney, & Moos, 1997; Project MATCH Research Group, 1997, 1998).

The community-based fellowship of AA has also been used as a form of continuing care, as substance abuse treatment providers often encourage participation and attendance at 12-step meetings and/or affiliation (e.g., working the 12-steps, getting a sponsor) with 12-step groups following formal substance abuse treatment discharge. This has been driven in large part by recent research supporting the view that alcohol and drug dependence is similar to other chronic illnesses (e.g., asthma, hypertension, and type 2 diabetes), necessitating longer term interventions and monitoring. As a form of continuing care, self-help groups can be an important enduring support for recovery from the chronic health problem of substance use, and can complement rather than compete with formal substance abuse treatment interventions. Due to the purpose of this paper, the literature reviewed in this chapter focuses on self-help groups utilized in this regard.

Despite its widespread use and integration into professional formal substance abuse treatment over the past 40 years, it has been only in the last 15 years that self-help organizations have attracted any systematic empirical focus (McKay, 2003). In 1989, a lack of investigation in this area gained the attention of the National Academy of Sciences, which stated that Alcoholics Anonymous, one of the most widely used approaches to recovery in the United States remains one of the least rigorously evaluated. The report called for well-designed studies to elucidate the impact and mechanisms of change within AA. Subsequently, the last 10 years have brought greater scientific rigor to examining the effectiveness of both self-help organizations, as well as 12-step influenced substance abuse treatments. As a result, the majority of research on self-help groups for individuals with substance use disorders has focused on 12-step based groups, namely AA, with NA being the next most commonly studied self-help organization (Humphreys et al., 2004). Very little outcome research has been conducted on non 12-step based self-help groups (Humphreys et al., 2004).

Predictors of Self-help Group Attendance

While the popularity of self-help groups for people with substance use disorders has been documented, there is less understood concerning who choose to attend. To help make practical decisions about when and how to refer individuals to self-help groups, information regarding
who elects to attend these groups is important (Moos & Moos, 2005). The research literature indicates consistent relationships between some predictors, while research on other factors is more complex. The majority of studies have focused on AA and formal substance abuse treatment samples. Few studies have been conducted using adolescents or outpatients (McKay, 2009). It is important to note that while a number of studies have examined predictors of self-help groups, such as greater religiosity, better cultural fit, and others, the literature reviewed here is limited to those characteristics relevant to the study.

Severity of Substance-related Problems

**Adult Samples.** Among adults, the most consistent predictor of self-help group attendance following treatment has been indices related to more severe substance use severity (Kelly, 2003). On the whole, studies with adults have reported that participants with more long-term and severe substance use severity were more likely to attend 12-step groups following treatment and to attend frequently (Connors, Tonigan, & Miller, 2001; Humphreys, Mavis, & Stofflemayer, 1991; Kelly, Stout, Zywiak, & Schnieder, 2006; Kissin, McLeod, & McKay, 2003). In addition, several studies with adult drug abusers have reported findings consistent with the alcohol literature (Brown, O’Grady, Farrell, Flechner, & Nurco, 2001; McKay, McLellan, Alterman, Cacciola, Rutherford, & O’Brien, 1998).

Most of the research has measured severity with objective indices, such as the number of DSM-IV substance dependence criteria, frequency of substance use or substance-related problems, or substance use history. Project MATCH was a large randomized controlled trial that compared the effectiveness of Twelve-Step Facilitation (TSF), Cognitive-Behavioral Coping Skills Treatment (CBT) and Motivational Enhancement Therapy (MET) among 480 outpatient and 434 aftercare clients (Connors, Tonigan & Miller, 2001). Using a subset of this study, researchers examined intake symptomatology, AA participation, and outcome. Intake symptomology was measured by alcohol dependence, alcohol involvement, psychiatric distress, and readiness to change. Engagement in prescribed AA-related activities was grouped according to whether respondents encompassed AA program behaviors (e.g., step work and attending meetings) or fellowship behaviors (e.g., having a sponsor and celebrating an AA birthday). The percentage of days abstinent was the main outcome variable. Intake symptomatology positively predicted AA participation during the first six months following treatment, irrespective of treatment type. Similarly, alcohol consumption per occasion (drinks per drinking day) and
greater alcohol-related consequences were associated with greater participation during the first year following treatment (Kelly, Stout, Zywiak, & Schnieder, 2006). Psychological, family/social, and substance abuse problems also distinguished self-help group attendees from non-attendees in an outpatient sample of adults (Humphreys, Mavis, & Stofflemayr, 1991).

Findings with adult drug users mirror those of the alcohol literature. For example, male veterans who met criteria for lifetime diagnoses of both alcohol and cocaine dependence, alcohol dependence only, and cocaine dependence only, reported that more years of cocaine use (in cocaine dependent patients), greater current legal problems, and a lack of current alcohol dependence (in alcohol dependent patients) predicted greater attendance during the first three-months following intensive outpatient substance abuse treatment (McKay et al., 1998).

Substance use severity has also predicted self-help group attendance over longer intervals of time. For example, continuous attendees (met criteria for attendance at all follow-up time points) reported greater severity of substance-related problems over a 30 month follow-up period among a large sample of adults seeking public substance abuse treatment (Kissin, McLeod, & McKay, 2003). Similarly, frequent 12-step attendees (attended an average of 30.6 meetings per month) had more severe drug histories than infrequent attendees (attended an average of 0.4 meetings per month) and non-attendees (Brown et al., 2001). Specifically, frequent attendees reported longer histories of drug use, more arrests and treatment experiences, and an earlier age of first use of alcohol.

**Adolescent Samples.** Across studies, indices related to more severe substance use severity have predicted self-help group attendance following 12-step based residential treatment during various follow-up time points. Intake into treatment substance use severity has been assessed in several ways, including objective indices, such as the number of DSM-IV substance dependence symptoms (Kelly et al., 2002, 2000).

Intake into treatment levels of coping, motivation, self-efficacy, severity of substance-related problems, frequency of substance use, and gender were examined in regard to their relation with self-help group attendance among samples of 99 and 74 adolescents respectively (Kelly et al., 2002, 2000). Severity of substance-related problems, which was measured using DSM IV substance dependence criteria predicted post-treatment AA attendance and was related to motivation. The researchers concluded that adolescents in treatment who display a greater degree of substance dependency may be more motivated to cease their substance use, which is
related to an increased likelihood of post-treatment attendance in 12-step groups. Substance problem severity also predicted more days of self-help group attendance up through six years following treatment discharge among a sample of 166 adolescents (Kelly et al., 2008). Intake into treatment measures of severity of substance-related problems, have been predictive of a higher likelihood of affiliation at three years following treatment intake (Chi et al., 2009).

Subjective indices related to substance use severity have predicted post-treatment attendance, which may be due to the lower levels of intrinsic substance use problem recognition among adolescents (Kelly & Myers, 2007). Researchers have suggested that many adolescents could be considered to be in the precontemplation stage, not perceiving that they have a substance abuse problem, which consequently may influence the decision to attend self-help groups. The perception that one suffered from an alcohol problem predicted 12-step attendance at six months and six years among an adolescent sample (Kelly, et al., 2008). Specifically, adolescents were more likely to participate if they had a greater history of alcohol/drug involvement, thought they had a problem with alcohol, and did not consider themselves to be able to control their substance use in moderation (Kelly, et al., 2008).

**Demographic Factors**

Women make up about one third of substance abuse treatment admissions and about one third of AA members; however, there remains a dearth of information about attendance at and effects from all forms of self-help group involvement among women (McKay, 2003). The average sample size across studies for men was 116, whereas for women it was 9. The few limited findings regarding the use of self-help groups among women, suggested that adult women may integrate more easily into AA than men, and benefit just as much (Kelly, 2003). In Project MATCH, women attended AA meetings as frequently as men and reported a higher degree of involvement than men; however, there was no gender by treatment interactions (Del Boca, Mattson, Fuller, & Babor, 2003).

A review of the literature concluded that there is little research supporting gender differences in attendance rates (Emrick & Tonigan, 2004). For example, men and women in outpatient and aftercare groups in Project MATCH had similar rates of attendance at AA meetings. However, other research found that women were more likely to attend self-help groups following treatment than men (Humphreys et al., 2004). With regard to race and ethnicity, Hispanic clients assigned to the Twelve-Step Facilitation (TSF) condition reported significantly
less AA attendance relative to Non-Hispanic White clients in TSF, and no differences in AA attendance rates were found between Hispanics encouraged and not encouraged to attend AA (Tonigan, Miller, Juarez, & Villanueva, 2002). In another study, 12-step attendance was lower in non-Hispanic White clients when compared to clients from other racial and ethnic groups (Mankowski, Humphreys, & Moos, 2001).

**Adolescent Samples.** The limited available evidence has not found significant relationships between demographic predictors and post-treatment AA/NA attendance among adolescents (Kelly, 2003). Females and non-Caucasian adolescents did not differ from males or Caucasian adolescents, respectively, in their prior participation in AA/NA (Kelly, Myers, & Rodolico, 2008). Similarly, demographic variables did not predict AA/NA attendance at 6 months, 1 year, 4 years, or 8 years following residential substance abuse treatment (Kelly et al., 2008). With regard to affiliating with 12-step groups, age, gender, and race/ethnicity did not predict affiliation following treatment (Chi et al., 2009).

**Social-Environmental Variables**

Among adolescents, the precursors for relapse often involve social factors (Brown, 2004). Thus, post-treatment attendance may be influenced by the environmental context as friends who support substance use in an adolescents’ social network may be a deterrent to their attendance (Kaskutas et al., 2002). The role of social networks as predictors of self-help group attendance following treatment among adolescents has yielded mixed results (Chi et al., 2009; Hohman & LeCroy, 1996; Garner et al., 2007). In a discriminant analysis, adolescents who had friends who used drugs, had no prior treatment experience, had greater parental involvement while in treatment, and were more hopeful were less likely to affiliate with A.A. In addition, having friends who used drugs was the greatest discriminator of the chosen variables between the two groups. In contrast, adolescents who attended 10 or more 12-step meetings reported more peers using drugs in the previous 6 months among other studies (Chi et al., 2009). In addition, social risk, or the extent to which one’s friends are involved in illegal activity, violence, or substance use, was not predictive of general continuing care adherence (including self-help group attendance) among a sample of 183 adolescents following residential substance abuse treatment (Garner et al., 2007).
Rates of Attendance

Nonattendance and dropout rates from self-help groups are high among both adults and adolescents, despite clinical recommendations and facilitation to attend (Kelly, 2003; McKay, 2009). Across studies, rates of attendance are high in the first few months following treatment but diminish steadily over time.

**Adult Samples.** Approximately half of the sample of male veterans in a Veteran’s Administration study had not attended a single 12-step meeting during the three months following treatment (Humphreys et al., 1999). Similarly, rates of 12-step attendance and involvement declined very sharply over time among a subsample of Project MATCH clients despite receiving a twelve step facilitation treatment. Specifically, in the outpatient facilitation treatment, 41% of clients who initiated AA attendance discontinued their attendance during the following nine months (Tonigan et al., 2002). Furthermore, AA’s own triennial surveys carried out through 1996, suggested that dropout rates in AA were high (AA, 2007).

**Adolescent Samples.** An even smaller proportion of adolescents attended 12-step groups following treatment when compared to adults (Kelly & Myers, 2007; Passetti & White, 2007). Formal 12-step based residential substance abuse treatment programs facilitated early following treatment AA/NA attendance, rates of nonattendance were high, and rates of attendance diminished over time. Sixty percent of adolescents in one study were attending AA/NA meetings during the first three-months following treatment; however, rates dropped to 38% at 12 months (Kennedy & Minami, 1993). Similarly, 60% of adolescents attended at least one meeting during the first three-months following treatment, but rates dropped during the second three-month period, with 59% attending at least one AA/NA meeting (Kelly, Myers, & Brown, 2000).

Rates of attendance rates diminished steadily over time, as 83% of adolescents reported attending at least weekly during the first six months following treatment, with just under one-third (range 31 to 46%) attending at two to 8 years following treatment. Similar findings have emerged with regard to affiliation, as only 14% of adolescents reported involvement in at least one of the seven steps during the three years following treatment (Chi et al., 2009).

Adolescent nonattendance and dropout rates may be high due to the member–group fit with certain self-help organizations. The etiology of adolescent substance use disorders, including that adolescents tend to report lower addiction severity, experience fewer withdrawal symptoms, and have less secondary medical complications when compared to adults, may make
involvement in an abstinence-focused organization, like AA, less relevant or appealing (Kelly, Myers, & Rodolico, 2008; Passetti & White, 2007). To enhance understanding of why adolescent nonattendance and dropout rates from 12-step groups are high, two clinical samples of AA/NA-exposed adolescents were examined (Kelly, Myers, & Rodolico, 2008). Attendees reported that AA/NA groups were, on the whole, quite important to attend and helpful in their recovery efforts; however, just over one in four perceived participation to be of little or no importance. The sample, on average, also reported feeling quite connected to groups, although about one in five reported little or no feeling of connection. Aspects of 12-step meetings that adolescents reported liking the best were related to general group-therapeutic, and not 12-step specific, processes, and the major reasons given for discontinuing AA/NA attendance were related to boredom/lack of fit and relapse.

Adolescents may also face barriers related to their life-context. For the most part, self-help meetings are comprised of older adults, with the average age of an AA member reported to be 46 years old (Passetti & White, 2007). Consequently, issues pertinent to this older life stage (e.g., marital relations, children, employment problems) may not be perceived as relevant to adolescents. Greater age similarity was found to positively influence attendance rates and the perceived importance of attendance among adolescents, and was marginally related to increased step-work (Kelly, Myers, & Brown, 2005). However, greater age similarity was not related to an increased likelihood of having a sponsor or engaging in social activities with 12-step members (Kelly et al., 2005).

Treatment providers’ perceptions about the utility and benefits of 12-step groups have been found to play a crucial role in the likelihood that adult patients will participate in 12-step groups and thus may play a similar role with adolescents (Project MATCH Research Group, 1997; Tonigan et al., 2002). A preliminary study with 114 clinical staff from a mix of adolescent outpatient and residential treatment settings found that staff rated AA/NA participation as very important and helpful to adolescent recovery and referral rates were uniformly high (Kelly, Yeterian, & Myers, 2008). Findings suggested lower adolescent participation in 12-step groups was not due to a lack of clinician enthusiasm or referrals, but appeared to be due to other factors, such as intrinsic factors (e.g., adolescents lower motivation for abstinence, low problem recognition) and/or extrinsic factors (e.g., predominantly adult composition of AA/NA groups, lack of parental support for attendance, lack of transportation).
Post-treatment Self-help Group Attendance and Substance Use

The effectiveness of self-help groups can be conceptualized in a number of ways, including how fast a group/organization grows, how it handles change, and whether its members are satisfied with it. However, most clinicians, agency directors, and policy makers are interested in how effective self-help groups are in reducing substance use (Humphreys et al., 2004). In examining this relationship, the most common index of participation has been attendance at 12-step meetings, measured as a dichotomous variable (yes/no) and/or a frequency variable (number of meetings attended in a specified follow-up period). The primary outcome variable assessed across studies has been the number of abstinent days or percentages of days abstinent within a specified follow-up period (Kelly, 2003). The convergent evidence from this outcome research suggested that AA/NA attendance over follow-up periods led to enhanced abstinence outcomes among both adult and adolescents substance abusers (Kelly, 2003; Kelly & Myers, 2007; Kownacki & Shadish 1999; Ouimette, Finney, & Moos, 1998; Project MATCH Research group, 1997, 1998). In addition, studies have found that although an individual’s primary drug of choice may not match that of a specific substance-focused 12-step group exactly, an individual’s overall substance-use profile may mean they can still benefit from attendance (Kelly, 2003).

Adult Samples

12-step group attendance following a variety of formal substance abuse treatment programs was associated with more favorable substance use outcomes across adult samples. This body of work has included meta-analytic reviews (Emrick, et al., 1993; Tonigan, Toscova, & Miller, 1996), randomized controlled trials (Project MATCH Research group, 1997, 1998), and large scale effectiveness studies (Ouimette et al., 1998).

A review of AA effectiveness concluded that AA had positive, but moderate, salutary effects on drinking behavior and psychosocial functioning (Emrick et al., 1993). A later meta-analytic review found that studies of outpatient samples identified stronger relationships between AA involvement and drinking outcomes and between AA attendance and improved psychosocial outcomes than studies of inpatient samples due to the greater range of substance-use severity and attendance rates among outpatients (Tonigan, et al.,1996). However, the studies examined in both reviews were judged to be methodologically poor.

Since these reviews, evidence of the effectiveness of self-help groups has been generated among studies conducted with greater analytical rigor, including a large multisite randomized
clinical trial of treatment for alcohol dependence, called Project MATCH (Tonigan, Connors, & Miller, 2003). Project MATCH was a large randomized clinical trial that compared the outcome of Twelve-step Facilitation (TSF), Cognitive-behavioral Therapy (CBT), and Motivational Enhancement Therapy (MET). Across treatment conditions, patients who attended AA more often in each 3 month interval after treatment were more likely to maintain abstinence from alcohol in that interval. In addition, more frequent AA attendance in the first 3 months after treatment was related to a higher likelihood of abstinence and fewer alcohol-related consequences in the next 3 months (Tonigan et al., 2003). Regardless of which original treatment patients received, individuals who attended 12-step self-help groups had significantly better drinking outcomes. Findings indicated that self-help may be a valuable adjunct to treatment, even in programs where it is not formally emphasized. In addition, significant and positive direct effects between AA participation and subsequent percentage of days abstinent at 12 months following treatment were found among both outpatient and aftercare samples (Connors, Tonigan, & Miller, 2001).

Similar findings have emerged among drug-addicted adults. A controlled trial sponsored by the National Institute of Drug Abuse with cocaine-dependent patients randomized 487 patients to one of four manual-guided treatments: individual drug counseling (12-step focused), individual cognitive therapy, individual supportive–expressive therapy, or a group drug counseling condition (Crits-Christoph, Siqueland, Blaine, Frank, Luborsky et al., 1999). Despite the fact that patients assigned to the individual drug counseling (12-step) condition attended significantly fewer therapy sessions than did patients in either of the other two psychotherapy conditions, they experienced the best drug-use outcomes of any group at one year following treatment discharge. A subsequent study conducted with this sample found that those in the individualized 12-step treatment condition were attending 12-step meetings at significantly higher levels (Weiss, Griffin, Gallop, Onken, Daley, et al., 2000).

An effectiveness study carried out in the Department of Veterans Affairs examined whether substance abuse patients self-selecting into one of three continuing care groups (outpatient mental health treatment only, 12-step group attendance only, or outpatient mental health treatment in combination with 12-step group attendance) and patients who did not, differed on one year substance use and psychosocial outcomes (Ouimette, Moos, & Finney, 1998). The researchers found that patients who participated in both outpatient treatment and 12-
step groups combined, fared the best on one year substance use and psychosocial outcomes, with those in the 12-step group having favorable outcomes as well. Specifically, on the primary substance use outcome, 63% of patients in the combination aftercare group (outpatient and self-help) were abstinent and 49% of the 12-step-only group reporting abstinent; whereas, only 24% of the patients in the no-aftercare group and 29% of the outpatient-only group were abstinent.

Quasi-experimental studies have also demonstrated positive effects of AA attendance, including that AA attendance during the first year following outpatient treatment uniquely accounted for 14% of the variance in substance use outcomes, after controlling for patients pretreatment, outpatient, and following treatment factors (Miller, Ninonuevo, Klamen, Hoffman, & Smith, 1997). AA attendance following inpatient treatment further predicted better one and five month outcomes after controlling for other possible demographic, treatment, and symptom confounds (Morgenstern, Labouvie, McCrady, Kahler, & Frey, 1997).

**Adolescent Samples**

The few studies using adolescent samples have found that early post-treatment AA attendance and/or affiliation following formal 12-step based residential substance abuse treatment was associated with both concurrent and future abstinence (Kelly et al., 2000, 2002; Kelly & Myers, 2007; Passetti & White, 2007). Some studies have reported that attendees were more likely to be abstinent than the non-attendees (Hohman & LeCroy, 1996). Others have reported that 12-step meeting attendance in the first 3 months still contributed uniquely to both substance use outcome variance in the first 3 months and the second 3 months post-discharge, after partialing out the effects of aftercare attendance and number of days abstinent at intake into treatment. A linear relationship was found between frequency of attendance and the frequency and severity of substance use. Specifically, 84% of high frequency attendees (defined as one or more meetings per week, with an average of greater than five meetings each month) were abstinent/essentially abstinent at a two year follow-up (Alford, Koehler, & Leonard, 1991). In addition, of those who did not attend AA or NA, 31% were found to be abstinent-essentially abstinent, 7% low frequency-intermittent users and 62% high frequency-chronic users.

Early AA attendance has been predictive of longer-term salutary outcomes (Kelly et al., 2008). AA/NA attendance in the first six and twelve months following treatment was significantly associated with better substance use outcomes (percentage of days abstinent) up to eight years following treatment. The relationship between early (six month) attendance and days
abstinent gradually declined in magnitude over the eight year follow-up, without ongoing attendance. In addition, among those who do not attend, there was a large variability in outcomes; whereas, among attendees, the large majority had high rates of abstinence. Self-help meeting attendance has also been identified as one of the most powerful discriminators of abstinence status up to six and twelve months following inpatient/residential substance abuse treatment among adolescents (Hsieh, Hoffman, & Hollister, 1998).

Other dimensions of AA involvement, or affiliation (e.g., getting a sponsor, engaging in social activities) have impacted outcomes over and above measures of attendance among adults and have also been studied among adolescents (Humphreys et al., 2004). Affiliation was uniquely associated with improved outcomes among a sample of adolescents; however, a high degree of colinearity between the measure of 12-step attendance and affiliation was found (Kelly et al., 2000). This suggested that adolescents who attended 12-step groups were also likely to be those who affiliated and became actively involved. 12-Step activity involvement was also associated with 30 day alcohol and drug abstinence (Chi et al., 2009). In particular, adolescents involved in three or more activities had significantly higher abstinence rates from alcohol and drugs than those reporting fewer; while those involved in one to two activities had abstinence rates no different from those with none.

Greater knowledge of which adolescents are most likely to benefit from self-help groups would enhance the efficiency of clinical efforts, with potential treatment matching effects (Kelly & Myers, 2007). The only study that has examined any kind of interaction effect among adolescents found that the effect of pretreatment drug involvement on substance use outcome was moderated by AA/NA participation (Kennedy & Minami, 1993). Specifically, across the entire sample the most severe cases had the worst outcomes, but those severe patients who attended AA/NA showed similar outcomes to patients who were low in pretreatment drug involvement. However, the degree to which addiction severity moderated the influence of AA attendance on outcome was not examined.

Characteristics of 12-step groups may represent potential moderators of effectiveness among adolescents. For example, greater age similarity among group members during the first three months following treatment was not associated with lower rates of substance use during the same three month period among a sample of adolescents (Kelly, Myers, & Brown, 2005).
However, greater age similarity was marginally related to decreased substance use in the ensuing three month period.

**Thresholds of Attendance**

**Adult Samples.** Adults who attended 12-step groups frequently, or continued to attend 12-step groups over a longer interval of time were more likely to maintain abstinence than those who stopped attending, or attended minimally (Kelly, 2003). However, estimates varied widely depending on what time frame was examined. Continuous 12-step attendance, as reflected by attendance in 6 or more meetings in the prior 6 months, has been associated with better concurrent alcohol and drug use outcomes (Kissin et al., 2003). The duration of attendance mattered as attendance in years 2-3 and 4-8 was related to a higher likelihood of abstinence at 16 years following treatment (Moos & Moos, 2006).

**Adolescent Samples.** Little is known about the optimal levels of participation or whether some minimum dose of attendance is needed before benefits are realized among adolescents. Some research indicated that adolescents who attended 10–19 or 20 or more meetings had alcohol and drug abstinence rates significantly higher than those reporting fewer (Chi et al., 2009). In addition, those who attended one to nine meetings had alcohol and drug abstinence rates that were lower or not different from non-attendants. Significant thresholds of days of self-help attendance associated with past 90 day abstinence among adolescents have been found as attending 11-62 days and attending 63-90 days was related to significant improvements in abstinence (Passetti, Dennis, Funk, Godley, & Godley, 2008). Even small amounts of AA/NA were associated with benefits among adolescents, with a strong linear association evident up through three meetings per week (Kelly et al., 2008). Specifically, for every AA/NA meeting adolescents attended, there was an additional subsequent gain of almost two days of abstinence over and above the effect of other factors. Similar findings have emerged with regard to affiliation, as adolescents involved in three or more activities had significantly higher abstinence rates from alcohol and drugs than those reporting fewer; while those involved in one to two activities had abstinence rates no different from those with none (Chi et al., 2009).

**Mechanisms of Change**

Determining exactly how and why self-help groups are helpful has been a comparatively new line of inquiry that has gathered increasing momentum as the broader alcohol treatment and recovery field has moved toward understanding mechanisms of behavior change. The renewed
emphasis on mechanisms of change stems from the consistent finding that, despite a burgeoning of empirically-supported treatments for alcohol and other drug use disorders, these theoretically disparate interventions appear to produce very similar outcomes under rigorous testing conditions (Dennis et al., 2004; Project MATCH Research Group 1997). To date, such investigations have only been carried out on 12-step organizations and have been primarily been limited to examination among adults (Kelly & Myers, 2007). As noted by Kelly, “AA’s pragmatic community approach was never designed to facilitate empirical validation and many AA constructs have eluded explicit operationalization. Consequently, “what is known is colored by the research lens that observes it” (2003, p. 249). A limited, but growing body of studies provided support for broad areas through which 12-step groups exert beneficial effects, with the mechanisms of focus generally falling into two classes: (1) cognitive and behavioral and (2) social-environmental (Kelly, 2003; Kelly, et al., 2009).

**Cognitive and Behavioral Factors**

A number of studies have examined cognitive (e.g., self-efficacy, motivation) and behavioral (e.g., coping) factors thought to be common factors important to recovery from substance abuse regardless of the type of treatment received, but that have been more explicitly implicated in cognitive and behavioral substance abuse treatments (Connors et al., 2001; Humphreys et al., 1999; Morgenstern et al., 1997). These treatments have theoretical roots in social cognitive learning theory (Bandura, 1986) and the more specifically related cognitive-behavioral relapse prevention (RP) theory explicated by Marlatt and Gordon (1985). Following from this, self-help groups may help individuals recover through common factors that are targeted in cognitive and behavioral interventions, such as increasing self-efficacy, enhancing coping skills, and fostering motivation.

Motivation has been defined as readiness (Connors et al., 2001), commitment to abstinence (Morgenstern et al., 2002), or motivation to abstain (Kelly et al., 2000, 2002). Coping has primarily been defined as abstinence-focused coping (Kelly et al., 2000, 2002) or cognitive-behavioral coping, with the latter measuring dimensions of active coping (Humphreys et al., 1999) and problem-solving strategies (Humphreys et al., 1999; Morgenstern, et al., 1997). Self-efficacy has been defined as perceived self-efficacy, or the confidence to resist relapse in commonly reported high risk relapse situations (Connors et al., 2001; Morgenstern et al., 1997, 2002), or as the respondents’ belief about the likelihood that they will use substances in the
future (Kelly et al. 2000, 2002). The convergent evidence from these studies suggested that self-help group participation leads to increases in self-efficacy, motivation, and coping, with these factors explaining some of self-help groups’ beneficial effects in preventing relapse (Humphreys et al., 1999; Kelly et al., 2000, 2002; Morgenstern et al., 1997, 2002).

**Adult samples.** One study examined whether cognitive and behavioral factors improved during formal 12 step treatment and whether improvements were sustained after treatment discharge (Morgenstern et al., 1997). The sample consisted of 100 individuals entering residential or intensive substance abuse treatment at two private hospital-based programs. The cognitive and behavioral factors included: cognitive and behavioral coping, self-efficacy, and primary appraisal of harm. Affiliation with AA was significantly associated with each cognitive and behavioral factor, and it uniquely predicted increased active coping efforts. Affiliation with AA also significantly and uniquely predicted high levels of commitment to abstinence, primary appraisal of harm, and self-efficacy at follow-up, even after controlling for prior levels of these variables. In addition, these processes appeared to explain the positive relationship between AA involvement and substance use abstinence.

Using data from Project MATCH, six month self-efficacy, readiness to change, social support for drinking, AA participation, and days abstinent were examined (Connors et al., 2001). The hypothesis was that the relationship between AA-related practices and abstinence could be partially explained by changes in self-efficacy. Self-efficacy accounted for a significant reduction in the direct effect of AA participation on later drinking. In particular, AA participation was positively related to self-efficacy to avoid drinking, which, in turn, predicted more days abstinent across treatment conditions. In addition, the effect of self-efficacy was also maintained at the three year follow-up.

**Adolescent Samples.** The emphasis on cognitive and behavioral factors and the use of behavioral substance abuse treatment approaches that focus on a range of cognitive processes and behavioral coping skills represents a recent trend in the management of adolescent substance abuse (Waldron & Kaminer, 2004). The theoretical basis supporting the role of cognitive and behavioral factors in adolescent substance abuse treatment has stemmed from studies on adults, in that abstinence can be predicted by an increased variety of coping responses and cognitive coping behaviors (Burleson & Kaminer, 2005). Among adolescents, behavioral treatment strategies have been shown to reduce substance use and substance-related problems (Dennis et
These treatments offer a strategy for managing adolescent substance abuse given that high risk behaviors and maladaptive thoughts often place adolescents at risk for relapse (Myers & Brown, 1996). Coping studies of adolescents have indicated that when adolescents use maladaptive coping strategies, these strategies often take the form of substance abuse (Longabaugh & Morgenstern, 1999; Maisto, Chung, Cornelius, & Martin, 2003). Adolescent abstainers and minor relapers were more likely to use problem solving coping strategies than were major relapers (Myers & Brown, 1990). In particular, the approach to coping in a relapse-risk situation significantly affected the outcome (Myers & Mott, 1993).

Motivation has gained increasing attention in the adolescent literature, and has stemmed from concern regarding problems in attracting and retaining substance abusers in treatment. This has led to a focus on motivation as a construct that may contribute to a greater understanding of treatment entry, engagement, and outcome. It has also led to the development of interventions that may enhance motivation and thereby increase treatment engagement (Battjes, Onken, & Delany, 1999; Miller & Rollnick, 2002). The importance of motivation in the recovery process has been emphasized in various theoretical perspectives on recovery, including neurobehavioral programming, relapse prevention, and stages of change, and has also been important in therapeutic community treatment approaches. These perspectives share a view of recovery as a transitional process that depicts the abuser as moving from a stage of active use and problem denial to an interest in and desire for help and then to a commitment to change, with such movement being important to achieving and maintaining abstinence (De Leon, Melnick, & Tims, 2001). Research on adults has demonstrated that motivation is an important factor in seeking, engaging, and remaining in treatment, and in achieving positive following treatment outcomes (De Leon, 1996; McBride, Curry, Stephens, Wells, Roffman, & Hawkins, 1994; Prochaska, DiClemente, & Norcross, 1992; Simpson & Joe, 1993). Motivation has also been found to remain important even among individuals who enter treatment because of external pressure (Broome, Knight, Knight, Hiller, & Simpson, 1997; Knight, Hiller, Broome, & Simpson, 2000). Two distinct aspects of motivation have been identified, namely motivation to change one’s behavior, and motivation, or readiness to engage in treatment as a means of achieving change (Battjes et al., 1999; De Leon, 1996). The greater focus on motivational constructs as predictors of change in substance use behavior aligns with the revised cognitive–behavioral model of relapse (Witkiewitz & Marlatt, 2004).
Motivation is a particularly important concept with regard to adolescent substance abuse treatment, especially since research has suggested that adolescents are less internally motivated for treatment than adults and are more likely to enter treatment as a result of external influences. For example, pre-treatment motivation was significantly predictive of adolescent substance abusers’ treatment engagement (Broome, Joe, & Simpson, 2001), short-term retention in treatment (Melnick, DeLeon, Hawke, Jainchill, & Kressel, 1997), and treatment outcome (Friedman, Glickman, & Morrissey, 1986; Friedman, Granick, & Kreisher, 1994). In addition, greater readiness to change substance use assessed at the start of treatment predicted less substance use at follow-up (Maisto, Chung, Cornelius, & Martin, 2003). Readiness to change included problem recognition and taking steps to change, which predicted alcohol use severity at one year following treatment (Maisto et al., 2003). Furthermore, treatment readiness predicted treatment engagement, which accounted for one third of the variance in substance use scores; whereas, background factors such as social support, family and peer deviance, behavioral problems, and legal status were only associated with engagement indirectly (Broome et al., 2001). Motivational interventions designed to enhance adolescents’ motivation have demonstrated effectiveness in reducing adolescent substance use and substance-related problems (Dennis et al., 2004).

Perceived self-efficacy is a cognitive process describing patient’s confidence in their ability to abstain from drug use in high risk situations (Bandura, 1977). Such cognitive expectancies are thought to be proximal mediators of the choice to engage in various activities and serve a prominent role in the initiation and maintenance of behavioral change (Burleson & Kaminer, 2005). Ratings of self-efficacy have predicted drinking behavior and smoking cessation among adults (McKay, Maisto, & O’Farrell, 1993). The Situational Confidence Questionnaire (SCQ) assesses the extent to which clients ‘believe they are able to resist drinking in several imaginary situations (Annis & Graham, 1988). The scale was based on Marlatt’s taxonomy of high risk domains developed to understand one or more of five intrapersonal determinants (e.g., Negative Emotional State, Negative Physical State, Pleasant Emotional State, Testing Personal Limits, and Urges and Temptations), and/or three interpersonal determinants (e.g., Interpersonal Conflicts, Social Pressure to Use drugs, and Positive Emotional State) which may put the client at increased risk for relapse (Marlatt & Gordon, 1985). Among adult alcoholics, self-efficacy has increased over the course of treatment, with abstinent patients
showing greater levels of self-efficacy than patients who relapsed (Burling, Reilly, Moltzen, & Ziff, 1989; Solomon & Annis, 1990).

Little has been published about adolescent self-efficacy relative to the adult literature. Some literature suggested that self-efficacy was a protective factor that promoted resilience among high risk youth (Masten, Best, & Garmezy, 1990) and lower levels of substance involvement following treatment (Burleson & Kaminer, 2005). Another study of adolescents reported that having a psychiatric disorder was associated with decreased situational confidence to resist heavy drinking across various situations (Moss, Kirisci, & Mezzich, 1994).

Self-efficacy to resist substance use in certain high risk situations may be more salient for adolescents than others. For example, among a sample of 88 adolescent substance abusers who were randomly assigned to either CBT or psycho-education group therapy, the less likely the intake into treatment substance use under Positive Affect situations, the less likely the drug use during treatment (Burleson & Kaminer, 2005). Therefore, for adolescents who have not yet developed nearly as many adverse physical and emotional symptoms from a lifetime of substance use as have older adults, the lack of self-efficacy in resisting the lure of the Positive Affect resulting from substance use is much more powerful a predictor of subsequent use than is the ability to deal with their negative feelings, on the one hand, or their temptations, on the other.

Two studies that used mostly the same sample have formally examined the relationship between cognitive and behavioral factors and self-help group participation among adolescents (Kelly, et al., 2002, 2000). The researchers examined (a) the relationship between 12-step attendance and substance use outcome (number of abstinent days) in the 6 months post-discharge from inpatient substance abuse treatment and (b) a process model of how 12-step attendance during the first 3 months post-discharge affects proximal outcomes of motivation, coping, and self-efficacy, measured at 3 months, and how these, in turn, affect ultimate substance use outcome in the following 3 months. Motivation was measured with two items: "On a scale of 1-10, how important is it for you not to use alcohol?", and "On a scale of 1-10, how important is it for you not to use drugs?" (1 = not at all important and 10 = very important). Self-efficacy was measured with: "On a scale of 1-10, how likely is it that you will use alcohol again in the future?", and "On a scale of 1-10, how likely is it that you will use drugs again in the future?" (1 = won't happen, 10 = happen for sure). The researchers’ measured coping, in a way that self-efficacy has been measured in previous studies-as the confidence to resist relapse in a
hypothetical, commonly reported substance use situation (e.g., at a party with other people, the adolescent is offered drugs and something to drink). Coping, self efficacy, and motivation all increased over and above intake into treatment levels in relation to AA/NA attendance, with motivation mediating the effect of 12-Step attendance on days of abstinence. A subsequent study with this sample found that 12-step affiliation was mediating the effects of 12-step attendance on the three month measures of motivation, coping, and self-efficacy (Kelly et al., 2002).

**Social-Environmental Factors**

The concept of fellowship in AA has been studied, but has most often been reframed as social networks in the research literature (Groh, Jason, & Keys, 2008; Kelly, Magill, & Stout, 2009). Specifically, social support and changes in social networks have been examined as mechanisms at work in the relationship between AA/NA and substance use behavioral change. Social support has often regarded by treatment professionals as a significant benefit of self-help groups for substance abuse (Woff, Toumbourou, Herlihy, Hamilton, & Wales, 1996). AA additionally possesses characteristics that are related conceptually to active ingredients in other social contexts in the overall recovery environment, such as family, friends, and the workplace. Humphreys and Noke (1997) noted that social support is such an integral component of AA that more of its 12 steps deal with improving relationships than abstinence. For example, one step encourages members to compile a list of people they have harmed and make amends to these individuals (Alcoholics Anonymous, 2007). In addition, members tend to incorporate AA into daily life as a social resource and use AA as an opportunity for community service (Humphreys, Finney, & Moos, 1994).

Social support has been distinguished in the research literature by structure, function, and source (Groh et al., 2008). Whereas, structural support quantifies the composition of an individual’s social network and may include elements such as the number, the interconnectedness, and the different types of relationships, functional support assesses the extent to which network members provide meaningful and useful aid to each other. The number of drinking influences vs. the number of abstainers in one’s social network (Kaskutas, Bond, & Humphrey, 2002), and general friendship quality have been examined (Humphreys et al., 1999). Another focus has been the source of social support, such as AA-based or family-based and the generality and the specificity of support (Bond, Kaskutas, & Wesner, 2003). Whereas general
support promotes overall well-being, specific support is directly tied to certain functions, such as alcohol use or abstinence.

**Adult samples.** AA involvement has been found to be related to higher friendship quality (Humphreys et al., 1999, lower support for alcohol use by friends (Humphreys & Noke, 1997), and greater support for abstinence by friends (Humphreys et al., 1999). Furthermore, these social network variables have been found to play a mediating role in the relationship between AA involvement and abstinence (Bond, Kaskutas, & Weisner, 2003; Groh et al., 2009; Humphreys et al., 1999; Kaskutas et al., 2002; Kelly et al., 2009). General friendship quality (Humphreys et al. 1999), social network support for abstinence (Humphreys et al. 1999; Kaskutas et al., 2002), and reduced pro-drinking influences (Kaskutas et al. 2002) have shown partial mediating effects on later reductions in drinking, and AA-specific network support has demonstrated mediation effects three years later (Bond et al. 2003).

Changes in active coping responses and enhanced friendship networks were examined as the mechanisms through which self-help group attendance and affiliation influenced substance use outcomes among 2,867 male veterans at treatment intake and at one year after treatment at one of fifteen inpatient programs (Humphreys, et al., 1999). Self-help group participation was associated with increases in coping responses, general friendship quality, and friends support for abstinence at the one year follow-up. In addition, the strength of the relationship between self-help group participation and substance use decreased substantially when active coping and friendship networks were added to their model. This suggested that part of the effect of 12-step involvement on abstinence is due to increases in coping, general friendship quality, and friends' support for abstinence.

Changes in social networks have been examined as mediators of the relationship between AA involvement and severity of alcohol problems (Kaskutas et al., 2002). The direct influence of AA involvement on alcohol problem severity at one year follow-up was lowered by 36% when social network pro-drinking influences was included in their model. In addition, regression analyses demonstrated that the influence of AA involvement on follow-up alcohol problem severity (with intake into treatment problem severity controlled) was reduced by 33% when network size and drinking influences were introduced. Findings suggested that increasing network support for abstinence was a particularly salient mechanism through which AA/NA promoted abstinence.
The source of support, in addition to the amount of support to cut down or abstain in a person’s social network was important (Bond, et al., 2003). AA-based support has been found to reduce the magnitude of the coefficient between AA involvement and 90-day abstinence by 16%. This suggested the number of people from AA who supported the respondent’s effort to reduce drinking was a particularly salient mechanism.

**Adolescent Samples.** Longer-term outcomes among adolescents often depend on social-environmental factors, as these factors often play a more salient role in adolescent relapses (Garner et al., 2007; Godley et al., 2005; Kelly et al., 2000). Two such emerging factors that appear related to following treatment outcome among adolescents are: the degree of social support available from family, friends, and professionals, and characteristics of social networks, including environmental risks, such as the extent to which one’s family and friends are engaged in substance use, illegal activity, and violence (Garner et al., 2007; Godley et al., 2005). Association with substance-using peers has been found to be the most robust predictor of substance use in adolescence (Brown, 1993). As adolescents have less control over their post-treatment environments, level of involvement in initial and subsequent use episodes appears to be influenced more by environmental risks (Brown 1993). Social factors and positive affective states thus play more prominent roles in adolescent than adult initial following treatment drug use and influence decisions more substantially regarding continued use, return to regular use or progression to involvement with other substances (Brown, 2004).

Peer substance use six months following treatment was significantly associated with adolescents’ alcohol and marijuana use at twelve months following treatment (Latimer, Newcomb, Winters, & Stinchfield, 2000). Significant reductions in substance use and substance-related problems following treatment were related to reduced social risk (decreased involvement in negative peer networks), among a sample of 552 adolescents who participated in outpatient substance abuse treatment (Godley, et al., 2005). Adolescents with higher levels of social support were more likely to be classified as either abstainers or minor relapers following residential treatment (Brown, D.Amico, McCarthy, & Tapert, 2001). Reviews of the adolescent treatment effectiveness have concluded that effective adolescent substance abuse treatment programs should include strategies to enhance family and peer support for nonuse (Williams & Chang, 2000). Thus, self-help group attendance may improve substance use outcomes among adolescents through exposure to an abstinent social network and increasing the number of
acquaintances who support quitting (development of a ‘dry’ social network), or inoculating members from the negative influence of a ‘wet’ social network encouraging substance use, as evidenced in the adult-based literature.

Among adolescents, 12-Step attendance and affiliation and its association with substance use outcomes was examined during the 3 years following intake into substance abuse program in a private, managed-care health plan (Chi et al., 2009). Social support was associated positively with both 12-step attendance and affiliation and both alcohol and drug abstinence. Multivariate logistic regression analyses revealed that after controlling for individual characteristics and treatment utilization across time, 12-Step attendance at 1 year predicted 3-year alcohol, but not drug abstinence. When social support was included in the model, the effect of 12-step attendance and abstinence was reduced by 30.4%.

The impact of adherence to general continuing care criteria following residential substance abuse treatment on social and environmental risk factors, as well as subsequent substance use and substance-related problems was examined in a sample of 183 adolescents (Garner et al., 2007). The General Continuing Care Adherence (GCCA) scale was used to assess the adolescent’s degree of involvement in continuing care, such as weekly treatment, weekly 12-step meetings, relapse prevention, communication skills training, problem solving training, urine testing, meeting with parents more than once, weekly telephone contacts, contact with probation, referral to other services, follow-up on referrals, and discussing probation/school compliance. Environmental risk was assessed with 2 scales: Recovery Environment Risk Index (RERI) and the Social Risk Index (SRI). Greater adherence to continuing care criteria was associated with reductions in environmental risk, which in turn was associated with reduced adolescent substance use and substance-related problems nine months following treatment discharge.

**Factors at Multiple Levels of Scale**

Mechanisms of behavior change can often be conceptualized at multiple levels of scale, and can thus be simultaneously explained by social, psychological, behavioral, and neurobiological processes (Humphreys et al., 1999; Morgenstern, Bux, LaBouvie, Blanchard, & Morgan, 2002). Thus, studies have compared cognitive and behavioral factors to other potential change mechanisms, such as 12-step specific factors (Morgenstern et al., 2002) and social factors (Humphreys et al., 1999).
Cognitions at discharge and substance use outcomes were assessed in a sample of adults (Morgenstern, et al., 2002). Nine treatment process factors, six of which were unique to the 12-step or disease model: powerlessness, higher power, disease attribution, abstinence-violation effect, commitment to AA/NA, and identifying with others in recovery and two processes were cognitive and behavioral factors related to several approaches to treat substance abuse: commitment to abstinence and intention to avoid high-risk relapse situations were examined. Two cognitive and behavioral factors (commitment to abstinence and intention to avoid high-risk situations), and commitment to AA/NA, were significantly correlated with abstinence at six and twelve months. Furthermore, the set of cognitions was a significant predictor of abstinence at the six month outcome, accounting for an additional 13.2% of the variance in outcome, and was a significant predictor of abstinence at the twelve month outcome, accounting for an additional 14.9% of the variance in outcome. In addition, cognitive process measures significantly mediated outcomes; whereas, processes unique to the 12-step approach did not.

Changes in active coping responses and enhanced friendship networks were assessed as potential mechanisms through which self-help groups influenced abstinence (Humphreys et al., 1999). Post-treatment participation in AA/NA/CA was associated with increases in active coping responses, general friendship quality, and friends’ support for abstinence at the one year follow-up. In addition, these variables partially explained the relationship between self-help group participation and abstinence.

**Summary**

Due to the integration of self-help groups and formal substance abuse treatment, the independent effects of self-help groups are difficult to estimate. A review by Tonigan, Toscova, and Miller (1996) concluded that because the substance abuse treatment industry in the United States has developed around a self-help model, almost all prior research carried out on AA has come from studies within the context of formal treatment. Thus, little is known about non-treatment AA samples. In addition, some formal substance abuse treatment programs, such as those with a 12-step theoretical orientation, may strongly emphasize AA participation while others do not, and this is rarely assessed, reported, or included in analyses. The adult literature suggested that both the intensity of care (e.g., residential, outpatient) and the theoretical focus of the treatment (e.g., CBT vs. 12-step) moderated the degree of AA/NA participation and outcomes. For example, research with adult samples has demonstrated that as the degree of a
treatment programs’ emphasis on 12-Step approaches increases, the positive relationships of 12-Step group participation to better substance use and psychological outcomes becomes stronger (Humphreys, Huebsch, Finney, & Moos, 1999).

There are also several criticisms of the existing literature with regard to methodology. Literature reviews of AA studies have rated the methodological quality of studies as poor, because they lacked prospective designs, validated measures, did not control for potential confounds, and used homogeneous samples (Tonigan et al., 1996). Randomized controlled trials of AA/NA have been rare because researchers do not have control over the variability between 12-step meetings, and AA/NA membership requires a desire to stop drinking, which implies an intrinsically recognized need to cease alcohol use. Consequently, randomizing individuals to attend AA, some of whom may not have this desire, goes against this requirement. A further barrier is the founding principle of anonymity (Kelly, 2003). In addition, proactive discouragement of attendance at self-help groups, such as AA/NA, is viewed by many clinicians as unethical, thus limiting interest in no self-help control conditions.

Due to the difficulties in assessing 12-step groups, the majority of studies employed quasi-experimental or correlational designs, which do not lend themselves to uncomplicated cause-and-effect interpretation. Such correlational studies do not prove that the self-help group caused the positive outcome from a purely scientific standpoint they only show that there was a positive outcome. Since the vast majority of studies are naturalistic, they further possessed inherent problems of self-selection, making the effects of self-help confounded with the reasons individuals may have for initial attendance (e.g., motivation). Also, most studies have not taken into consideration the potential influence of relevant confounds that may vary over time and influence outcomes, including the use of professional treatments preceding follow-up periods.

Differences also existed in how variables were measured as well as the measures used. Available measures frequently lacked adequate psychometric validation and insufficient content validity in terms of capturing the constructs of interest. Another issue is the generalizability of the current research to other treated populations, such as females and adolescents. In addition, while other non-12 step groups have existed for some time, they have received little empirical attention.

Conclusions regarding the effectiveness of 12-step groups for adolescents are tentative at this time because: (1) only a small number of studies have been conducted; (2) all published
research has concentrated on adolescents discharged from residential or inpatient treatment; (3) research designs have been observational in nature, restricting the ability to make judgments about their effectiveness; and (4) the 12-step construct has been largely measured in terms of attendance, pointing toward the need for research related to other dimensions of involvement (Kelly & Myers, 2007). As a result, “these shortcomings in existing youth studies obfuscate the connection between AA/NA attendance and outcomes” (Kelly & Myers, 2007, p. 1469).

Although correlational designs by their nature preclude clear cause-and-effect interpretation, some well-designed adult-based studies have found consistent beneficial effects for attendance in 12-step groups on various substance-use and psychosocial outcomes measured at various follow-up time points, even after controlling for potential confounding variables. Similar to findings with adults, adolescents with more severe alcohol/drug use severity, appear to be more likely to attend, and become involved in self-help groups following formal 12-step based residential substance abuse treatment (Kelly & Myers, 2007). The limited available research using adolescent samples has shown significant relationships between 12-Step group attendance and various substance use and psychosocial outcomes.

As evidenced in the adult-based literature, motivation and social support appear to explain some of the relationship between attendance and substance use outcomes among adolescents. However, research is needed to test and explicate the mechanisms of change for male and female adolescent outpatients, because adolescents in treatment differ from adults in both qualitative and quantitative ways. In light of the gaps in the current body of research, the main goal of this study was to use the cognitive behavioral model of relapse, social learning theories, and group theory as backdrops to examine the relationship between self-help group attendance and substance use outcomes among adolescent outpatients. More knowledge regarding the effectiveness of and mechanisms through which adolescents benefit from self-help groups “would help target and redirect intervention efforts and consequently enhance the efficiency of a large sector of the adolescent substance use disorder treatment industry in the U.S.” (Kelly & Myers, 2007, p. 267).
CHAPTER THREE

METHODOLOGY

The purpose of this study was to examine the effects of self-help group meeting attendance among adolescents during the three-month time period immediately following publicly funded outpatient substance abuse treatment. Male and female adolescents who attended self-help groups during that three-month time period were compared to those without such attendance at intake into treatment (time 1) and at the end of the three-month time period (time 2) in relation to: substance use frequency, severity of substance-related problems, cognitive and behavioral factors (motivation, coping, self-efficacy), and social-environmental factors (social support, environmental risk). A path model was used to examine the research question: while controlling for gender and self-help group attendance during the three-month period immediately following treatment, can severity of substance-related problems, motivation, coping, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency?

Data used for this study were from the Substance Abuse and Mental Health Services Administration’s Center for Substance Abuse Treatment (CSAT) Adolescent Treatment (AT) 2008 Outcome Dataset, under contract # 270-2007-00004C, 270-00-6500. The CSAT AT 2008 Outcome Dataset included data with 16,009 adolescents from 132 local evaluations. The combined data set represented all of the major levels of care, and included multiple efforts to replicate evidenced based practice in publicly funded programs. All of the sites used a standardized biopsychosocial assessment called the Global Appraisal of Individual Needs (GAIN; Dennis, 1999; Dennis, Titus, White, Unsicker, & Hodgkins, 2003) at intake into treatment and at 3, 6, 9, and 12 months post-intake.

Considering the advantages and disadvantages of using secondary datasets, the following reasons are presented as to why the CSAT AT 2008 Outcome dataset was selected: 1) the dataset constituted recent representative national studies of adolescent substance abusers, 2) the variables of interest that would address the research questions for the current study were available, and 3) the focus on longer-term treatment effects were present. The following sections of this chapter describe the population and current study sample, data collection process, instrumentation, and data analysis plan used. A more detailed description of the original CSAT
AT 2008 Outcome Dataset, along with an overview of the entire sample and selected statistics are presented in Appendix A.

**Population and Current Study Sample**

The target population for this study was adolescents with substance use disorders who would be appropriate for and usually present to publicly funded outpatient substance abuse treatment. Consistent with the U.S. public treatment system, the characteristics of adolescents in the CSAT AT 2008 Outcome Dataset were predominately male (72.6%), white (46%), between the ages of 15-17 years old (74.8%), and treated in outpatient settings (71%).

Due to the purpose of the study, the original pool of applicants in the dataset was reduced using the following steps: (a) cases were excluded if the adolescent received treatment in a Corrections Based site, since opportunities for substance use are severely limited in restricted settings; (b) cases were included if the adolescent received treatment in an Outpatient (OP) or an Early Intervention (EI) level of care, and the adolescent was between the ages of 12-17 years. In addition, variables that were optional to collect across sites, limited the investigation to sites where those variables were included. A key non Core GAIN variable the researcher studied was social support, which was measured with the General Social Support Index (GSSI). In order to include this variable, the dataset was restricted to cases from sites that collected the GSSI. Similarly, since several trials were ongoing and the researcher was interested in examining self-help group attendance effects during the three-months immediately following outpatient treatment, cases that were not due for follow-up assessments at that time were excluded by design. By excluding those not due for a follow-up, the follow-up rate was not artificially reduced. Applying these criteria resulted in a sample of 721 adolescents.

The sample of adolescents participated in one of four different randomly controlled trials: (1) Assertive Adolescent Family Treatment (n= 42); designed to explore assertive community and family interventions for adolescents with substance use disorders, which used the Adolescent Community Reinforcement Approach (ACRA); (2) Strengthening Communities-Youth (n=122); designed to support cooperative agreements that encouraged communities to strengthen their drug and alcohol identification, referral, and treatment systems for youth; (3) Effective Adolescent Treatment (n=490); developed to encourage agencies, particularly those in areas with unmet needs to adopt or expand their use of a treatment protocol that combines two types of therapy: Motivational Enhancement Therapy and Cognitive Behavioral Therapy - 5 sessions
(MET/CBT 5); and (4) The Targeted Capacity Expansion (n=67); designed to address gaps in treatment capacity by supporting rapid and strategic responses to demands for alcohol and drug treatment services to meet unmet needs in communities with emerging substance abuse problems. See Figure 3.1 for an illustration of how the current study sample was derived.

**Figure 3.1 Composition of the Sample for the Current Study**

### Data Collection Process

The development of this study was supported using pooled data from the Substance Abuse and Mental Health Services Administration’s Center for Substance Abuse Treatment (CSAT) Adolescent Treatment (AT) Outcome Dataset, under contract # 270-2007-00004C, 270-00-6500 using data provided by 132 grantees. The goal of the CSAT grant was to improve treatment capacity in several systems of care to better understand: (1) the pattern of services that adolescents received, (2) how these services varied by need, and (3) how services were associated with initial treatment outcomes.

Use of the data for secondary analysis is under the supervision of the GAIN Coordinating Center (GCC), operated by Chestnut Health Systems, a covered entity under HIPAA, which acts as a data clearinghouse and manages data in various stages of de-identification from both covered and non-covered entities of CSAT grants. Pooled, multi-site, and de-identified data may only be accessed with appropriate protections and permission (see Appendix C for an overview of the approval process).
In order to access data obtained since the implementation of the Health Insurance Portability and Accountability Act of 1996 formal Data Sharing Agreements between Chestnut Health Systems, each of the participating agencies, and the researcher per 45 CFR Parts 160 and 164, Subparts A and E were done. Under the terms of the Health Insurance Portability and Accountability Act and 45 C.F.R. Part 2 (the “privacy rule”), two or more organizations sharing data involving full or limited protected health information are required to enter into data sharing agreements that spell out the terms of their interactions. Data were then received that were de-identified as spelled out in the data sharing agreement. For permission purposes, the researcher signed the 3 (GCC Limited) data sharing agreements with Chestnut Health Systems, and received permission from Florida State’s Institutional Review Board (IRB; see Appendix C). An additional step required by Chestnut Health was to submit an abstract proposing the specific analysis to be conducted and the data being requested (for a feasibility review and recommendations for any changes). The abstract identified the sample to be used (inclusion/exclusion criteria), the questions to be asked or hypotheses (with an explicit link to variables as possible), the time periods (intake only, or which specific follow ups may also be needed), the type of analyses planned, and the target audience. GCC staff then conducted a preliminary review to make sure that the proposed analyses were feasible in terms of available data, sample size, variables, and commented on any potential methodological problems.

Following the above stated protocol, the researcher sent an abstract to Chestnut Health for review (see Appendix C). The researcher then participated in several conference calls in which the site Principal Investigators had a chance to ask further questions, upon receiving the final abstract. Sites were then given a period of 2 weeks to formally deny the use of their data for this study. All of the sites participating in the CSAT dataset approved the use of their data for this study.

Procedure

During the 1st week of publicly funded outpatient substance abuse treatment, adolescents and an accompanying parent–caregiver were approached for participation in the studies, including an explanation of the nature and conditions of the study as part of the informed consent process, which followed IRB-approved procedures specific to each site. Participation in all studies was voluntary. Adolescents were recruited for the studies if a parent and adolescent consented to the adolescent’s participation. Diagnoses were done with a semistructured interview
using the Global Appraisal of Individual Needs (GAIN; Dennis, 1999; Dennis, Titus, White, Unsicker, & Hodgkins, 2003). Other eligibility criteria were: 1) the participation of a resource person who can provide corroborative information, 2) adequate ability to understand and comprehend the measures, 3) participants lived within a certain radius of the study’s catchment area, and 4) the participant did not meet criteria for a higher level of care. Data were collected by trained interviewers at intake and at 3, 6, 9, and 12 months post-intake. All participants who passed inclusion and exclusion criteria and signed the informed consent were retained for follow-up interviews. For purposes of this study, the adolescents’ intake into treatment GAIN assessment data (time 1), and 6 month follow-up GAIN assessment data (time 2) were used to capture the data points of interest.

**Instrumentation**

Adolescent intake into treatment and follow-up data were collected as part of a semistructured interview using the Global Appraisal of Individual Needs (GAIN), which is a comprehensive biopsychosocial assessment designed to integrate research and clinical assessment into one structured interview. Currently, more than 700 substance abuse treatment programs use the GAIN, making it one of the most widely used measures in adolescent treatment. The GAIN assesses information on eight core sections: background, physical health, substance use, risk behaviors, environment, mental health, legal, and vocational components (Dennis, Ives, Funk, & Modisette, 2008). The GAIN is based on a measurement model that combines both classical scales (i.e., truth + error) and summative indices (i.e., effect indicator or formative sums of unique variance) into a hierarchical system that gives clinicians and researchers information to look at overall severity, major sources of variation (substance use severity, internal distress, external behavior problems, crime/violence), clinically orientated subscales (e.g., dependence, depression, anxiety, conduct disorder), and even the item level for salient issues (e.g., suicide attempts). For more detailed information about the GAIN, and a list of research publications using the GAIN, see Appendix D.

The GAIN has demonstrated good reliability and validity, as well as excellent internal consistency on core scales related to frequency of substance use. The internal consistency of the classical scales has been consistently good to excellent across over two dozen studies with populations varying by gender, race, age, and geography, as well as across levels of care and several clinical subgroups (e.g., pregnant woman, injection drug users, homeless people, people...
with co-occurring mental disorders). The summative indices have also been demonstrated to be both reliable and predictive across this range of populations (Lennox, Dennis, Ives, & White, 2006). The psychometrics of the GAIN and the scale norms have been established for both adults and adolescents by age and by level of care (Modisette, Hunter, Ives, Funk, & Dennis, 2009). A 1- to 3-day test-retest study with 75 adults 2 years after intake revealed good reliability in terms of the need for treatment (kappa = .78), frequency of use (r = .94) and substance problems (r = .81), recovery environment risk (r = .75; Dennis, Scott, & Funk, 2003). Studies with adults and adolescents have found good reliability in test/retest situations on days of use and symptom counts (r = .7 to .8), as well as diagnosis (kappa of .5 to .7). Self-reports were consistent (kappa in the .5 to .8 range) with parent reports, on-site urine and saliva testing, and laboratory-based EMIT and GC/MS urine testing. Self-reports on the GAIN were found to be consistent with a multi-method estimate based on any self-report or positive urine or saliva test for any drug (kappa = .56), cocaine (kappa = .52), opioids (kappa = .55), and marijuana (kappa = .75), with no one method being superior across all drugs.

The GAIN-Initial (GAIN-I) is the full biopsychosocial assessment that was used as the intake into treatment assessment. The GAIN-I meets major reporting requirements and integrates research and clinical practice for diagnosis and placement. Administration time to complete the full GAIN-I is approximately 120 minutes. For each of the follow-up assessments, the GAIN–Monitoring for 90 Days (GAIN-M90) was used, which is a quarterly follow-up to monitor how participants respond to treatment, as well as how they do after they have been discharged. It is largely a subset of the GAIN-I, with administration time being 45-60 minutes.

**Variables of Interest in the Current Study**

In this study the following variables of interest are described and explained. Since it is understood that no variable can be measured without error, the instruments selected for use in this proposed study were based on reliability coefficients that exceeded .70. This level of reliability meets the recommended minimum standards for measurement error within the social and behavioral science fields (Funk, Ives, & Dennis, 2007). The variables and their operational definitions are presented below. Actual survey questions from the GAIN selected for the current study can be found in Appendix E.
**Demographic information.** The GAIN included a background section regarding demographic questions about age, race, and gender. Gender was coded as a dichotomous variable (male=1, female=2) and was asked with one question, “what is your gender?”

**Self-help group attendance.** Self-help group attendance was assessed with answers to one GAIN question asked at the end of the three-month time period following treatment: During the past 90 days, on how many days have you attended one or more self-help group meetings (such as AA, NA, CA, or Social Recovery) for your alcohol or other drug use. Responses were coded as a dichotomous variable (0=no self-help group attendance; 1=self-help group attendance).

**Motivation.** Motivation was assessed by examining adolescents’ readiness for treatment as researchers believe that motivation is better described on a multidimensional continuum of readiness (Bandura, 1986; Deleon & Jainchill, 1986; Simpson & Joe, 1993). This was assessed using the Treatment Motivation Index, which was a count of items regarding the perception of his/her own need for treatment, support for treatment, and hope for help through treatment, and the Treatment Resistance Index which was a count of items regarding difficulties in being treated or resisting substance use. The indices were intended to map onto the ASAM dimension B4 criteria: Treatment Acceptance and Resistance for patient placement purposes and were based upon existing motivation measures (De Leon & Jainchill, 1986; Simpson & Joe 1993). Both indices consisted of yes-no items and were summative.

Since these were summative indices, they did not require items to be internally consistent with one another; however, they have been highly predictive of key outcomes in related studies (Modisette, et al., 2009). As a result, they often have low inter-item correlation and alphas are often less than .7. In this study, the calculated alpha for the TMI was .481 and the TRI was .322. A factor analysis was run to check the dimensionality of the indices, to see which items loaded the highest on which dimensions. As a result of this, a subset of 5 items was identified, with scores ranging from 0-5: you can get the help you need in an alcohol or other drug treatment program, you need to be in treatment for at least a month, you will probably need to come back to treatment again one or more times during your lifetime, you need support from friends and relatives to deal with your alcohol or other drug use, and your old friends may try to get you to drink or use other drugs again. The reliability for this subset within this study was α = .710.
**Self-efficacy.** The Self-efficacy Scale (SES) was used to assess self-efficacy as a perceived cognitive process that described confidence in the ability to abstain from drug use in high-risk situations (Bandura, 1977). The scale was based on the Alcohol Abstinence Self-Efficacy Scale (AASE), developed by DiClemente, Carbonari, Montgomery, and Hughes (1994), and Marlatt and Gordon’s (1985) taxonomy of high-risk situations for relapse. It was designed to assist treatment placement decisions related to ASAM dimension B5: Relapse Potential. The scale consisted of yes–no items that range from 0 to 1, with higher scores indicating higher levels of confidence about resisting relapse in high risk situations. Cronbach's alpha for the reliability of the scale was .303. A reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations, so the researcher ran a factor analysis that identified a subset of 4 items, with scores ranging from 0-4. These items were: Do you currently think you: could avoid using alcohol or drugs at home, could avoid using alcohol or drugs at work or school, could avoid using alcohol or drugs with your friends, and could avoid using alcohol or drugs when people around you were using them. The reliability for this subset within this study was α = .728.

**Coping.** The Problem Orientation Scale was used to assess coping as it related to the recognition of problems and the relationship of those problems to substance use. It is based on D'Zurilla and Goldfried’s (1971) problem-solving therapy which is a cognitive-behavioral intervention that focuses on training in problem-solving attitudes and skills. The scale was developed to assist treatment placement decisions related to ASAM dimension B5: Relapse Potential. The 6 item scale consisted of 6 yes–no items that ranged from 0 to 1. Higher scores indicated higher problem recognition and the ability to solve problems. The question asked was: Do you currently think you have any problems related to alcohol or drug use, you have a good understanding of how drug and alcohol use is related to your problems, your problems can and will go away, you know the course most of your problems will follow, your problems are out of control, and your problems are solvable. The reliability within this study was α = .941.

**Environmental risk.** The Environmental Risk Scale (ERS) was used to assess risk in the adolescent's living, vocational, school, and social environments. It was intended to facilitate treatment placement decisions related to ASAM dimension B6: Environment. It included 21 items, consisting of questions asked about people with whom the adolescents regularly lived with, regularly worked or went to school with, and regularly socialized with: who were
employed or in school or training full-time, used any drugs during the past 90 days, were
involved in illegal activity, weekly got drunk or had 5 or more drinks in a day, used any drugs
during the past 90 days, would describe themselves as being in recovery, shout, argue, and fight
most weeks, and have ever been in drug or alcohol treatment. When testing the reliability of the
scale, Cronbach’s alpha was .671. Because a reliability coefficient of .70 or higher is considered
"acceptable" in most social science research situations, the researcher ran a factor analysis to see
which items loaded the highest on which dimensions. As a result, a subset of 12 items was
identified across the living, school, and social environments: used any drugs during the past 90
days, were involved in illegal activity, weekly got drunk or had 5 or more drinks in a day, used
any drugs during the past 90 days, and shout, argue, and fight most weeks. The response set for
these items was: 4=all, 3=most, 2=some, 1=a few, and 0= none, with the reliability within this
study of α =.819.

Substance use frequency. The Substance Frequency Scale (SFS) was used to measure
substance use frequency. The SFS is an average of days during a 90-day period that an
adolescent reports each of the following: days of “any” substance use, days of heavy substance
use, days of alcohol use, cannabis use, crack/cocaine use, and heroin/opioid use. A higher
number indicated more overall reported use. The measure had been demonstrated to be a better
overall predictor of substance-related problems (e.g., withdrawal, abuse/dependence symptoms,
illegal activity, and emotional problems) than individual self-report items (e.g., past-month
abstinence, days of use, peak use, and recency of use), biometric measures (e.g., urine and
saliva), or various combinations of these measures in both adults and adolescents. The question
asked about alcohol, marijuana, hashish, blunts, crack, smoked rock or free base, other forms of
cocaine, heroin, non-prescription methadone, painkillers, opiates or other analgesics, PCP or
angel dust, acid, LSD, ketamine or other hallucinogens, downers, sleeping pills, barbiturates or
other sedatives, or any other drug. The SFS had good internal consistency, with the reliability
within this study of α = .769.

Severity of substance-related problems. Severity of substance-related problems was
measured with the Substance Problem Scale (SPS) which assessed problems related to substance
use or substance using behavior based on DSM–IV Axis I criteria and ASAM dimension A:
Diagnosis. It is based on recency ratings (e.g., past month, 2–12 months ago, more than 12
months ago, or never) on 16 symptoms: 7 corresponding to dependence, 4 for abuse, 2 for
substance-induced health and psychological problems, and 3 on lower severity symptoms of use (e.g., hiding use, people complaining about use, weekly use). The scale score ranged from 0-16. The scale had good internal consistency, with the reliability within this study of $\alpha = .876$.

**Social support.** The General Social Support Index (GSSI) assessed sources of social support the adolescent had, including professionals, family, friends, schoolmates, or work colleagues. It was intended to map onto ASAM treatment placement criteria for dimension B6: Environment. It consisted of 9 yes–no items. Higher scores reflected more sources of social support. The questions asked about: people at work or school you could talk to about day-day things, a professional counselor or other health provider to talk to, friends or colleagues from other companies or schools you could talk to without worry about things getting back to others at work or school, people at work or school you could talk to about day-to-day things, people at work or school who could help you get your assignments done, family members or close partners you could talk to and rely on, friends you could just hang out with and not talk about work or family issues, a (legal) hobby or activity that you enjoyed and did for yourself, someone you felt like you could talk to about needs and emotions, or someone you felt could help you figure out how to cope with any problems you were having or might have. The reliability within this study was $\alpha = .780$.

**Data Analysis Plan**

Permission to conduct this secondary data analysis was obtained through a formal Data Sharing Agreement between Chestnut Health Systems and each of the participating grant sites, and Florida State’s Institutional Review Board (IRB; see Appendix C). The secondary data were analyzed with PASW Statistics (formerly SPSS) and Analysis of Moment Structures (AMOS) Version 18.0 software (Arbuckle, 2007).

**Preliminary Analysis of the Data**

To test for normality, the skewness and kurtosis of the composite measures were assessed. According to Kline (2005), variables are non-normal when their skew indices (i.e., skew statistic/SE) are above three or when their kurtosis indices (i.e., kurtosis statistic/SE) are above 20. In the current study, bivariate correlations between variables were examined to check whether there existed any issue of multi-collinearity. The tolerance and variance-inflation factor (VIF) were also consulted in the path analysis to detect multicollinearity. In addition, any issues with missing data were assessed, as this can impact any kind of interpretation. Rates of missing
data that are less than 1% are generally considered trivial, with 1-5% manageable. (McDermeit, Funk, & Dennis, 1999). In the current study, follow-up rates were excellent overall (>90%), so substantial bias in the treatment effect estimates was not introduced (Scott, 2004). Listwise deletion was used to resolve any issues with missing data, which resulted in a loss of respondents that was <5%.

**Primary Analysis of the Data**

**Research Hypothesis**

A 4-way ANOVA was conducted to test the multi-part research hypothesis: at the end of the three-month time period immediately following publicly funded outpatient substance abuse treatment (time 2), there will be no differences between male and female adolescents who attended self-help groups during that three-month period and those who did not attend in relation to the variables of interest. Differences in the mean scores across 4 groups (female non-attendees, female attendees, male non-attendees, male attendees) for intake into treatment (time 1) and time 2 measures of: environmental risk, social support, motivation, self-efficacy, coping, severity of substance-related problems, and substance use frequency were examined.

**Research Question**

Path analysis was conducted as the primary method to test the research question. Path analysis is a subset of Structural Equation Modeling and is an extension of the regression model. The overall goal of path analysis is the determination of whether the variances and covariances logically implied by the researcher’s model are reasonably close to the observed variances and covariances computed from the data (Kline, 2005).

The research question was: while controlling for gender and self-help group attendance during the three-month period immediately following treatment, can severity of substance-related problems, motivation, coping, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency? The tolerance and variance-inflation factor (VFI) were consulted to detect any issues with multicollinearity, which can make it difficult to assess the relative importance of the predictor variables in causal modeling. In estimating coefficients in the hypothesized path model, maximum likelihood estimation (MLE) was used. MLE is the most commonly used method and created estimates based on maximizing the probability that the observed covariances are drawn from a population assumed to be the same as that reflected in the
observed data (Kline, 2005). In essence, MLE picked estimates that have the greatest likelihood of reproducing the observed data.

To evaluate the model, or determine if it is consistent with or fits the empirical data, the global assessment of fit comprising an overall test of the model fit along with consideration of several global fit indices was conducted. The overall test of model fit was done with the chi-square statistic, which tested the null hypothesis that the population reproduced covariance matrix was equal to the population covariance matrix. Smaller values of the chi-square statistic reflected better model fit. Several global fit indices were consulted that had a relatively low occurrence of Type I and Type II error rates (Bentler, 1990; Hu & Bentler, 1999; Tucker & Lewis, 1973). These included: (a) the comparative fit index (CFI; a measure of the improvement in fit of the model compared with a null model), and (b) the root mean square error approximation (RMSEA; a measure of fit between the actual covariances reproduced by the model per degree of freedom). Values of .95 or higher for the CFI, and .06 or lower for the RMSEA suggested good fit (Hu & Bentler, 1999).

A more detailed assessment of the fit of the model can help to pinpoint the location of fit problems and was conducted using the covariance residuals and modification indices (Tate, 1998). The covariance residuals were considered to identify specific areas of problematic fit. Standardized residuals greater than 2.5 suggested misfit that is unlikely to have occurred by chance. Modification indices identified paths that were added to the model to improve its overall fit.
CHAPTER FOUR

RESULTS

The purpose of this study was to examine the effects of self-help group meeting attendance among adolescents during the three-month time period immediately following publicly funded outpatient substance abuse treatment. Male and female adolescents who attended self-help groups during that three-month time period were compared to those without such attendance at intake into treatment (time 1) and at the end of the three-month time period (time 2) in relation to: substance use frequency, severity of substance-related problems, cognitive and behavioral factors (motivation, coping, self-efficacy), and social-environmental factors (social support, environmental risk). One research question was incorporated: while controlling for gender and self-help group attendance during the first three-month period following treatment, can severity of substance-related problems, motivation, coping, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency at the end of that three-month period?

This chapter is organized into four sections. The first section includes demographic and clinical characteristics of the study sample. The second section provides results of the analyses related to the hypothesis and research question. The third section discusses related findings. The final section provides a summary of all the findings in this study.

Sample Demographics

The sample of adolescents participated in one of four different randomly controlled trials: Assertive Adolescent Family Treatment (n= 42); Effective Adolescent Treatment (n=490); Strengthening Communities-Youth (n=122); and Targeted Capacity Expansion (n=67). As evidenced in Table 1.1, study participants were primarily male (74.1%), White (58.3%), and between 15 and 17 years of age (81.6%; M=15.6, SD=1.3).
Table 1.1
*Demographic Characteristics of Sample at Intake into Treatment (Time 1)*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74.1</td>
</tr>
<tr>
<td>Female</td>
<td>25.9</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>58.3</td>
</tr>
<tr>
<td>African American</td>
<td>14.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>15.7</td>
</tr>
<tr>
<td>Other/Mixed</td>
<td>10.7</td>
</tr>
<tr>
<td>Asian</td>
<td>0.4</td>
</tr>
<tr>
<td>Native American/Alaskan</td>
<td>0.6</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1.8</td>
</tr>
<tr>
<td>13</td>
<td>5.5</td>
</tr>
<tr>
<td>14</td>
<td>11.1</td>
</tr>
<tr>
<td>15</td>
<td>22.7</td>
</tr>
<tr>
<td>16</td>
<td>30.7</td>
</tr>
<tr>
<td>17</td>
<td>28.2</td>
</tr>
<tr>
<td>In school during the past 90 days</td>
<td>89.9</td>
</tr>
<tr>
<td>Employed during the past 90 days</td>
<td>30.9</td>
</tr>
<tr>
<td>Current Living situation</td>
<td></td>
</tr>
<tr>
<td>House/apt</td>
<td>90.3</td>
</tr>
<tr>
<td>Friend/relative</td>
<td>4.3</td>
</tr>
<tr>
<td>Foster/Public housing</td>
<td>4.3</td>
</tr>
<tr>
<td>Other</td>
<td>1.1</td>
</tr>
<tr>
<td><em>Socioeconomic Status</em></td>
<td></td>
</tr>
<tr>
<td>Very poor (0-49% of POPI)</td>
<td>30.0</td>
</tr>
<tr>
<td>Working class (100-299% of POPI)</td>
<td>25.6</td>
</tr>
<tr>
<td>Upper middle class (300-999% of POPI)</td>
<td>21.1</td>
</tr>
<tr>
<td>Poor (50-99% of POPI)</td>
<td>15.6</td>
</tr>
<tr>
<td>Upper class (1000%+ of POPI)</td>
<td>7.8</td>
</tr>
</tbody>
</table>

* Percent of poverty (POPI) threshold according to the HHS Poverty Guidelines represented for a given family size and income

The majority of the sample reported being in school during the past 90 days (89.9%) and 30.9% reported being employed in the past 90 days. The majority of the adolescents lived in a house or apartment (90.3%). Around 30.0% of the adolescents reported that they were in the very poor bracket according to the Health and Human Services socioeconomic status criteria.
Clinical Characteristics

As evidenced in Table 2.1, the current data represented a sample of adolescents with serious substance-related disorders and a wide range of co-occurring disorders. Most of the adolescents (73.6%) began using alcohol or other drugs before the age of 15 years with 11.9% using alcohol weekly. Of the sample, 28.8% reported past year alcohol abuse symptoms and 25.5% reported past year alcohol dependence symptoms. More than half (56.6%) reported past year cannabis abuse symptoms and 57.0% reported past year cannabis dependence symptoms. However, they were not alone in their substance use, as 70.3% reported a family history of substance use. Approximately, 40.2% reported receiving prior mental health treatment and 22.1% had at least one prior substance abuse treatment episode. Most of the sample had prior involvement with the juvenile justice system (77.8%), with over half of the adolescents also reporting engaging in illegal activity in the past year (57.1%).

Over half (59.5%) of the adolescents reported symptoms of one or more other mental health disorders. These included externalizing mental health disorders (55.3%) and internalizing mental health disorders (34.7%). For example, 29.7% reported a major depressive disorder and 68.9% reported conduct disorder.

Across the trials, 48.5% of the adolescents stayed in treatment 30-89 days. The treatment adolescents received varied in theoretical orientation. The primary treatment received was Motivational Enhancement Therapy/Cognitive Behavioral Therapy (67.8%). Seven percent received the Family Support Network, 5.8% Adolescent Community Reinforcement Approach, 2.6% Multisystemic Therapy, and 8.1% Chestnut Health Systems Treatment Manual-Outpatient and Intensive Outpatient Treatment. For the purposes of this study, preliminary analyses revealed there was no relationship between treatment type and substance use frequency at time 2.
Table 2.1

Clinical Characteristics of Sample at Intake into Treatment (Time 1)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of first use (years)</td>
<td></td>
</tr>
<tr>
<td>&lt;10</td>
<td>5.5</td>
</tr>
<tr>
<td>10-14</td>
<td>68.1</td>
</tr>
<tr>
<td>15-17</td>
<td>24.8</td>
</tr>
<tr>
<td>Alcohol Pattern</td>
<td></td>
</tr>
<tr>
<td>Weekly alcohol use</td>
<td>11.9</td>
</tr>
<tr>
<td>Weekly drunk (or had 5+drinks in a day)</td>
<td>5.4</td>
</tr>
<tr>
<td>Past year alcohol abuse symptoms</td>
<td>28.8</td>
</tr>
<tr>
<td>Past year alcohol dependence symptoms</td>
<td>25.5</td>
</tr>
<tr>
<td>Drug Pattern</td>
<td></td>
</tr>
<tr>
<td>Weekly marijuana use</td>
<td>39.7</td>
</tr>
<tr>
<td>Past year cannabis abuse symptoms</td>
<td>56.6</td>
</tr>
<tr>
<td>Past year cannabis dependence symptoms</td>
<td>57.0</td>
</tr>
<tr>
<td>Prior History of Substance Use and Illegal Activity</td>
<td></td>
</tr>
<tr>
<td>Family history of substance use</td>
<td>70.3</td>
</tr>
<tr>
<td>Ever received mental health treatment</td>
<td>40.2</td>
</tr>
<tr>
<td>Ever received substance abuse treatment</td>
<td>22.1</td>
</tr>
<tr>
<td>Ever involved with criminal justice</td>
<td>77.8</td>
</tr>
<tr>
<td>Past year engaged in any illegal activity</td>
<td>57.1</td>
</tr>
<tr>
<td>Length of Stay (days)</td>
<td></td>
</tr>
<tr>
<td>1-29</td>
<td>7.8</td>
</tr>
<tr>
<td>30-89</td>
<td>48.5</td>
</tr>
<tr>
<td>90+</td>
<td>41.1</td>
</tr>
<tr>
<td>Past Year Mental Health</td>
<td></td>
</tr>
<tr>
<td>1+ Mental Health Disorder</td>
<td>59.5</td>
</tr>
<tr>
<td>Externalizing Disorder</td>
<td>55.3</td>
</tr>
<tr>
<td>Internalizing Disorder</td>
<td>34.7</td>
</tr>
</tbody>
</table>

As noted by Dennis et al. (2004), it is possible that these similarities in outcomes may have been driven more by general treatment factors rather than from differences in the specific components of each respective treatment. For purposes of this study, this should help enhance the robustness and generalizability of the current findings. For detailed comparisons of the treatments and their rationale, see Appendix B.
Preliminary Analyses

To test for normality, the skewness and kurtosis of the composite measures were assessed. According to Kline (2005), variables are non-normal when their skew indices (i.e., skew statistic/SE) are above three or when their kurtosis indices (i.e., kurtosis statistic/SE) are above 20. Obtained estimates of population skew and kurtosis indicated that three variables deviated from normality. To correct this, squared transformation was used for intake into treatment self-efficacy and time 2 self-efficacy; whereas, substance use frequency at time 2 was transformed using square-root transformation. Following these procedures, all three variables were within the acceptable range of both skewness and kurtosis, such that the use of parametric tests could be conducted (Kline, 2005).

Primary Analyses

Description of the Variables

The variables in this study were chosen because they represented theoretical and clinical factors relevant to the treatment of adolescent substance use disorders. In addition, these factors fit within the constructs of social learning theories and current theories of relapse (e.g., cognitive behavioral model of relapse). Table 3.1 includes the range of levels for each variable studied.

Severity of substance-related problems was measured with the Substance Problem Scale. The scale assessed severity of substance-related problems and criteria related to abuse and dependence symptoms. Cognitive and behavioral factors constituted a set of variables that included motivation, self-efficacy, and coping. Motivation was measured with the Treatment Motivation Index, which is a sum of items regarding the individuals’ perception of their own need for treatment, support for treatment, hope for help through treatment, along with the Treatment Resistance Index, which is a sum of items regarding difficulties in being treated or resisting substance use. The Self-efficacy Scale measured perceived situational self-efficacy as a cognitive process describing confidence in the ability to abstain from substance use. Higher scores indicated greater confidence to avoid using substances across various high risk situations. The Problem Orientation Scale was used to assess coping and was a count of items related to recognition of problems and the relationship of those problems to substance use. Higher scores indicated higher problem recognition and the ability to solve problems.
Table 3.1
*Potential Scale Ranges for Each Variable*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Scale</th>
<th>Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity of substance-related problems</td>
<td>Substance Problem Scale</td>
<td>0-16</td>
</tr>
<tr>
<td>Substance Use</td>
<td>Substance Frequency Scale</td>
<td>0-1</td>
</tr>
<tr>
<td>Motivation</td>
<td>Treatment Motivation Index</td>
<td>0-5</td>
</tr>
<tr>
<td></td>
<td>Treatment Resistance Index</td>
<td>0-1</td>
</tr>
<tr>
<td>Coping</td>
<td>Problem Orientation Scale</td>
<td>0-6</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Self-efficacy Scale</td>
<td>0-4</td>
</tr>
<tr>
<td>Social Support</td>
<td>General Social Support Index</td>
<td>0-9</td>
</tr>
<tr>
<td>Environmental Risk</td>
<td>Environmental Risk Scale</td>
<td>0-48</td>
</tr>
</tbody>
</table>

Social-environmental factors included environmental risk and social support. The Environmental Risk Scale was used to assess risk in the adolescent's living, vocational, school, and social environments. A subset of items assessed people who were engaged in violence, substance use, and illegal activity across these environmental contexts. Higher scores indicated greater risk. The General Social Support Index assessed how many sources of social support the adolescent had, including professionals, family, friends, schoolmates, or work colleagues. Higher scores indicated more sources of social support. Substance use frequency was measured with the Substance Use Frequency Scale. A higher number indicated more overall use.

**Research Hypothesis**

A 4-way ANOVA was conducted to determine if there were any differences between male and female adolescents who attended self-help groups during the first three-month period following treatment (time 2) and those who did not attend such groups. Intake into treatment data was presented to assess any differences across groups. For any difference which had a significant
F value, post hoc tests were conducted to determine whether the difference was between gender or attendance groups. For each variable, there were 6 possible combinations of pairwise comparisons (a-f). The results of these analyses are presented in Table 4.1. The research hypothesis was stated as follows:

H0. At the end of the three-month time period following outpatient substance abuse treatment (time 2), there will be no differences between male and female adolescents who attend self-help groups during that three-month period and those who do not attend in relation to the following factors (variables) being examined:

a) Severity of substance-related problems, as measured with the Substance Problem Scale (SPS) which assessed problems related to substance use or substance using behavior.
b) Coping, as measured with the Problem Orientation Scale (POS), which measured the recognition of problems and the relationship of those problems to substance use.
c) Motivation, as measured with two indices. The Treatment Motivation Index (TMI), which was a count of items endorsed regarding the individual's perception of his/her own need for treatment and hope for help through treatment, and the Treatment Resistance Index (TRI), which was a count of items endorsed regarding difficulties in being treated.
d) Self-efficacy, as measured with the Self-efficacy Scale (SES), which assessed the number of high-risk situations a client believes s/he could avoid using substances.
e) Social support, as measured with the General Social Support Index (GSSI), which assessed how many sources of social support the adolescent had, including professionals, family, friends, schoolmates, or work colleagues.
f) Environmental risk, as measured with the Environmental Risk Scale (ERS), which assessed the adolescent's living environment, vocational, school, and social peer networks. It indicated how many individuals the respondent regularly lived with, worked or went to school with, and hung out with socially who were involved in illegal activities, violence, and substance use.
g) Substance use frequency, as measured with the Substance Frequency Scale (SFS), which was the average # of days during a 90-day period that an adolescent reported each of the following: days of “any” substance use, days of heavy substance use, days of alcohol use, cannabis use, crack/cocaine use, and heroin/opioid use.
As displayed in Table 4.1, the ANOVA results revealed differences between the mean scores for several of the variables: environmental risk at intake into treatment, social support at intake into treatment, self-efficacy at intake into treatment, motivation at intake into treatment, coping at intake into treatment, severity of substance-related problems at intake into treatment, substance use frequency at intake into treatment, coping at time 2, self-efficacy at time 2, and severity of substance-related problems at time 2. Post hoc tests for gender and self-help group attendance for each variable follow.

Table 4.1

Differences across Self-Help Attendance Groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group Means</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female No</td>
<td>Female Yes</td>
</tr>
<tr>
<td>Severity of Substance-related</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake into treatment</td>
<td>1.15&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>1.49&lt;sup&gt;acd&lt;/sup&gt;</td>
</tr>
<tr>
<td>Time 2</td>
<td>0.90&lt;sup&gt;abc&lt;/sup&gt;</td>
<td>1.35&lt;sup&gt;ad&lt;/sup&gt;</td>
</tr>
<tr>
<td>Coping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake into treatment</td>
<td>0.20&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.30&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Time 2</td>
<td>0.06&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.13</td>
</tr>
<tr>
<td>Motivation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake into treatment</td>
<td>2.07</td>
<td>2.11</td>
</tr>
<tr>
<td>Time 2</td>
<td>1.10</td>
<td>1.53</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake into treatment</td>
<td>0.85&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.83</td>
</tr>
<tr>
<td>Time 2</td>
<td>0.87</td>
<td>0.77</td>
</tr>
<tr>
<td>Social Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake into treatment</td>
<td>7.17&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>5.72&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Time 2</td>
<td>7.23</td>
<td>7.75</td>
</tr>
<tr>
<td>Environmental Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake into treatment</td>
<td>11.33&lt;sup&gt;a&lt;/sup&gt;</td>
<td>12.42</td>
</tr>
<tr>
<td>Time 2</td>
<td>8.09</td>
<td>6.86</td>
</tr>
<tr>
<td>Substance Use Frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intake into treatment</td>
<td>0.12</td>
<td>0.13</td>
</tr>
<tr>
<td>Time 2</td>
<td>0.06</td>
<td>0.04</td>
</tr>
</tbody>
</table>

a-e indicates significant differences between pairs
* p≤ .05

Hypothesis 1 a: Severity of Substance-related Problems
There were differences among the four groups regarding severity of substance-related problems at intake into treatment (time 1) and the end of the three-months following treatment (time 2). Post hoc tests indicated female non-attendees reported higher severity than male non-attendees at intake into treatment (time 1). In addition, female attendees reported higher severity than male attendees and female non-attendees at intake into treatment (time 1). For severity at the end of the three-month period following treatment (time 2), female non-attendees reported higher severity than male non-attendees, female attendees reported higher severity than female non-attendees, and male attendees reported higher severity than male non-attendees. Therefore, the null hypothesis for 1a was rejected.

**Cognitive and Behavioral Factors**

**Hypothesis 1b: Coping**

There were differences among the four groups regarding coping at intake into treatment (time 1) and the end of the three-months following treatment (time 2). Post hoc tests indicated female non-attendees showed higher levels of coping at intake into treatment than male non-attendees. For coping at time 2, male attendees reported higher levels of coping than male non-attendees. Therefore, the null hypothesis for 1b was rejected.

**Hypothesis 1c: Motivation**

There were differences among the four groups regarding motivation at intake into treatment (time 1). Post hoc tests indicated that female non-attendees reported higher motivation than male non-attendees. There were no differences among the four groups regarding motivation at time 2, therefore, the null hypothesis for 1c failed to be rejected.

**Hypothesis 1d: Self-efficacy**

There were differences among the four groups regarding self-efficacy at intake into treatment (time 1) and the end of the three-months following treatment (time 2). Post hoc tests indicated male non-attendees reported higher self-efficacy at intake into treatment than female non-attendees. For self-efficacy at time 2, male attendees showed less self-efficacy than male non-attendees. Therefore, the null hypothesis for 1d was rejected.

**Social-Environmental Factors**

**Hypothesis 1e: Social Support**

There were differences among the four groups regarding social support at intake into treatment (time 1). Post hoc tests indicated female attendees reported fewer sources of social
support than female non-attendees at intake into treatment. Male attendees differed from male non-attendees in that male attendees reported fewer sources of social support at intake into treatment. No significant differences were found between the mean scores of any pairs at time 2, therefore, the null hypothesis for 1e failed to be rejected.

**Hypothesis 1 f: Environmental Risk**

There were differences among the four groups regarding environmental risk at intake into treatment (time 1). Post hoc tests indicated female non-attendees reported greater risk at intake into treatment than male non-attendees. No significant differences were found between the mean scores of any pairs at time 2, therefore, the null hypothesis for 1f failed to be rejected.

**Hypothesis 1 g: Substance Use Frequency**

There were differences among the four groups regarding substance use frequency at intake into treatment (time 1). Post hoc tests indicated that female non-attendees reported more substance use than male non-attendees. There were no differences among the four groups regarding substance use frequency at time 2, therefore, the null hypothesis for 1g failed to be rejected.

**Self-help Attendance Group Summary**

To summarize the findings regarding self-help group attendance effects, male attendees differed from male non-attendees in regard to social support at intake into treatment, self-efficacy at time 2, coping at time 2, and severity at time 2. In particular, male attendees reported fewer sources of social support at intake into treatment, less self-efficacy at time 2, higher coping at time 2, and higher severity at time 2 when compared to male non-attendees.

Among females, attendees differed from non-attendees in regards to social support at intake into treatment, severity at intake into treatment, and severity at time 2. Specifically, female attendees reported fewer sources of social support at intake into treatment, more severity at intake into treatment, and more severity at time 2, when compared to female non-attendees.

Post hoc tests also indicated that female attendees differed from male attendees in that they reported higher severity than male attendees at intake into treatment. Post hoc tests also revealed several gender similarities as both male and female attendees differed from non-attendees with regard to social support at intake into treatment, and severity of substance-related problems at time 2. Both male and female attendees differed from non-attendees in that they
presented for treatment with fewer sources of social support and both male and female attendees differed from non-attendees in that they reported higher severity at time 2.

**Gender Summary**

In conclusion, post hoc tests indicated female non-attendees and male non-attendees differed in regard to seven variables: environmental risk at intake into treatment, motivation at intake into treatment, self-efficacy at intake into treatment, coping at intake into treatment, severity of substance-related problems at intake into treatment, substance use at intake into treatment, and severity of substance-related problems at time 2. Females differed from males in that they presented for treatment with higher severity of substance-related problems, greater environmental risk, higher motivation, and more substance use. In contrast, males reported higher self-efficacy and less coping than females at intake into treatment. At time 2, females who did not attend groups continued to report higher severity of substance-related problems than males who did not attend groups.

**Research Question**

**Path Analysis**

A path model for predicting substance use frequency was analyzed using AMOS 18.0. The correlation coefficients are provided in Table 5.1. There was a moderate correlation between coping and motivation; however, the tolerance was greater than .20 and the variance-inflation factor (VIF) was less than 4 for all of the predictors, which suggested that multicollinearity was not a problem.

Significant correlations were found between the dependent variable substance use frequency and most of the independent variables in the model (see Table 5.1). Environmental risk and severity of substance-related problems had the strongest relationships with substance use at the end of the three-months immediately following treatment. In addition, significant correlations were found between other variables that will not be discussed in the path analysis. For example, self-help group attendance was positively related to severity of substance-related problems, in that higher severity of substance-related problems was related to self-help group attendance. Coping and motivation were positively correlated as higher coping was related to higher motivation.
Table 5.1

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Gender ^</td>
<td>1</td>
<td>.044</td>
<td>.004</td>
<td>-.050</td>
<td>.031</td>
<td>.048</td>
<td>.073</td>
<td>.150**</td>
<td>.003</td>
</tr>
<tr>
<td>2 Self Help attendance ^</td>
<td>1</td>
<td>.183**</td>
<td>-1.127**</td>
<td>.088*</td>
<td>-0.028</td>
<td>.041</td>
<td>.288**</td>
<td>-0.056</td>
<td></td>
</tr>
<tr>
<td>3 Coping</td>
<td>1</td>
<td>-.242**</td>
<td>.411**</td>
<td>.212**</td>
<td>-.023</td>
<td>.382**</td>
<td>.294**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Self efficacy</td>
<td>1</td>
<td>-.141**</td>
<td>-.100**</td>
<td>.033</td>
<td>-.203**</td>
<td>-.203**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Motivation</td>
<td>1</td>
<td>.248**</td>
<td>.102**</td>
<td>.378**</td>
<td>.194**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Environmental risk</td>
<td>1</td>
<td>.058</td>
<td>.325**</td>
<td>.565**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Social support</td>
<td>1</td>
<td>-.005</td>
<td>-.078*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Severity of substance problems</td>
<td>1</td>
<td>.349**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Substance use</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^ Dummy coded (Self-help group attendance: 0=no; 1=yes; Gender: 1=males; 2=females)
* p ≤ .05; ** p ≤ .01

Adolescents were analyzed in accordance with their gender, and time 2 measures of severity of substance-related problems, motivation, coping, self-efficacy, environmental risk, social support, self-help group attendance, and substance use frequency.

R₁. When controlling for gender and self-help group attendance during the three-month time period immediately following publicly funded outpatient substance abuse treatment (time 2), can severity of substance-related problems, coping, motivation, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency at the end of that three-month period?

Path analysis produced a measure of explained variability of the model (R²) and a coefficient (B) for each path within the model. The overall test of model fit was done with the chi-square statistic. In addition, other goodness of fit model tests were calculated to determine...
how well the model fit the data collected. These included: (a) the comparative fit index (CFI; a measure of the improvement in fit of the model compared with a null model), and (b) the root mean square error approximation (RMSEA; a measure of fit between the actual covariances reproduced by the model per degree of freedom). Evidence suggests that values of .95 or higher for the CFI, and .06 or lower for the RMSEA suggest a good fit to the data (Hu & Bentler, 1999). In determining optimal paths, modification indices were used to refine the model (Kline, 2005). The inclusion of these paths resulted in improvement in the goodness-of-fit indices. The path diagram for adolescents with beta coefficients is presented in Figure 4.1.

Substance use frequency was the main dependent variable in the model. Substance use frequency was directly related to severity of substance-related problems, self-help group attendance, coping, self-efficacy, and environmental risk. Severity, coping, and risk were all positively related to substance use, in that higher severity, higher coping, and greater environmental risk were related to more substance use. In addition, environmental risk had the greatest total effect on substance use. Self-efficacy and self-help group attendance were inversely related to substance use, in that lower self-efficacy and no attendance were related to more substance use.

With regard to the social and environmental factors in the path model, environmental risk was directly related to self-help group attendance. Specifically, it was inversely related to attendance, in that adolescents who did not attend self-help groups reported greater environmental risk. When examining the cognitive and behavioral factors in the model, both coping and self-efficacy were directly related to substance use. Coping was also directly and positively related to motivation and inversely related to self-efficacy. In other words, greater coping was related to more motivation and less self-efficacy. Severity of substance-related problems was directly related to motivation, coping, and environmental risk. Specifically, problem severity had positive relationships with motivation, coping, and environmental risk.
There were also several indirect relationships to substance use frequency in the path model. Motivation was indirectly related to substance use through coping, in that higher motivation was related to higher coping, which was in turn related to more substance use. Similarly, coping was indirectly related to substance use through self-efficacy, in that higher
coping was related to lower self-efficacy, and ultimately more substance use. Severity of substance-related problems had indirect relationships to substance use through environmental risk and coping. Thus, greater severity was related to more environmental risk and higher coping, which in turn, led to more substance use. Self-help group attendance was indirectly related to substance use through environmental risk in that adolescents who did not attend self-help groups reported greater environmental risk, and in turn more substance use.

**Mechanisms of Change**

It appeared that some of the variables may be functioning as potential mediators. Although the conditions necessary to establish true statistical mediation as outlined by Baron and Kenny (1986) were not met in this study, it appeared that coping and risk may be intermediary factors in the relationship between severity of substance-related problems and substance use frequency. In addition, it appeared that environmental risk functioned as a mechanism of change in the relationship between self-help group attendance and substance use frequency. Similarly, self-efficacy seemed to function as an intermediary factor in the relationship between coping and substance use frequency.

When examining these relationships further, severity of substance-related problems was significantly related to risk, coping, and substance use frequency. Specifically, higher severity was related to greater risk and higher coping, which in turn were related to more substance use. Similarly, coping was related to self-efficacy and substance use, in that higher coping led to less self-efficacy, which led to more substance use. Self-help group attendance was related to environmental risk and substance use frequency. Particularly, self-help group attendance was related to less environmental risk, which in turn was related to less substance use.

**Model Fit**

The direct, indirect, and total effects for the model are presented in Table 6.1. The variables having the greatest total effects on substance use frequency three-months following treatment were environmental risk followed by severity of substance-related problems. The model accounted for approximately 40% of the observed variance in substance use scores of the adolescents in this study. The models global chi-square statistic was 15.71 ($df=13$, $p=.265$). The GFI was .995, the AGFI .983, and the RMSEA was .018. With a GFI and AGFI greater than 0.9, and a RMSEA less than 0.6, it can be concluded that the hypothesized model fits the sample well. Thus, the observed data supported the research question for this study.
Table 6.1

Direct, Indirect, and Total Effects on Substance Use

<table>
<thead>
<tr>
<th>Variables</th>
<th>Direct Effects</th>
<th>Indirect Effects</th>
<th>Total Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity of substance problems</td>
<td>.17*</td>
<td>.23</td>
<td>.40</td>
</tr>
<tr>
<td>Self-help attendance^</td>
<td>-.12*</td>
<td>-.04</td>
<td>-.17</td>
</tr>
<tr>
<td>Gender^</td>
<td>.00</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Coping</td>
<td>.14*</td>
<td>.06</td>
<td>.20</td>
</tr>
<tr>
<td>Motivation</td>
<td>-.04</td>
<td>.11</td>
<td>.07</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>-.11*</td>
<td>.00</td>
<td>-.11</td>
</tr>
<tr>
<td>Environmental risk</td>
<td>.48*</td>
<td>.00</td>
<td>.48</td>
</tr>
<tr>
<td>Social Support</td>
<td>-.09</td>
<td>.00</td>
<td>-.09</td>
</tr>
<tr>
<td>$R^2$=.400</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^ Dummy coded (Gender: 1=males; 2=females; Self-help group attendance: 0=no; 1=yes)
*p<.05

Related Findings

Relationship between Intake into Treatment (Time 1) Variables and Self-help Group Attendance at Time 2

Since there is a dearth of research examining the use of self-help groups among adolescent outpatients, an additional analysis was conducted to examine what intake into treatment factors (time 1) were related to self-help group attendance during the first three-month period following outpatient substance abuse treatment (time 2). Intake into treatment (time 1) measures of environmental risk, social support, self-efficacy, motivation, coping, severity of substance-related problems, substance use, age, gender, and race were analyzed with regard to attendance in such groups. Chi-square tests were conducted to test for differences between categorical variables (gender, race) and self-help group attendance at time 2. Pearson correlation procedures were conducted to test the relationship of variables that were measured on at least an interval scale and self-help group attendance at time.

Approximately 12% of adolescents reported that they had ever attended a self-help group at intake into treatment (time 1). During the first three-month period following treatment (time 2), 17% of the current sample of adolescents attended a self-help group (M=1.83, SD=.38). Upon further examination into the frequency of self-help group attendance, about 7% of adolescents attended 1-10 days, 8% attended 11-62 days, and 2% attended 63-90 days (range: 0-90).
The correlation coefficients are provided in Table 7.1. Although there was a moderate correlation between intake into treatment (time 1) measures of substance use and severity of substance-related problems, multicollinearity was not perceived to be a problem. The results of the correlational analyses revealed that five intake into treatment (time 1) variables were related to self-help group attendance at time 2: severity of substance-related problems, coping, and substance use were positively associated with self-help group attendance; whereas, social support and age were inversely associated with self-help group attendance. In addition, severity of substance-related problems and social support had the strongest relationships with self-help group attendance at time 2. In other words, adolescents who presented for outpatient substance abuse treatment with high severity and fewer sources of social support were more likely to attend self-help groups during the first three-month period following outpatient substance abuse treatment.

The chi-square test indicated that there was no difference for self-help group attendance and gender ($\chi^2(1) = 1.202$, $p = .273$). Similarly, there was no difference for self-help group attendance and race ($\chi^2 (4) = 4.99$, $p = .288$).
Table 7.1  
*Correlations between Intake into treatment (Time 1) Measures and Attendance at Time 2*

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Substance use (time 1)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Age</td>
<td>.062</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coping (time 1)</td>
<td>.265*</td>
<td>.032</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Self-efficacy (time 1)</td>
<td>-.262*</td>
<td>.080*</td>
<td>-.261**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Motivation (time 1)</td>
<td>.220**</td>
<td>-.012*</td>
<td>.398**</td>
<td>-.339**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Environmental risk (time 1)</td>
<td>.337**</td>
<td>.001</td>
<td>.195**</td>
<td>-.084*</td>
<td>.173**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Severity of substance-related problems (time 1)</td>
<td>.526**</td>
<td>.082*</td>
<td>.448**</td>
<td>-.303**</td>
<td>.427**</td>
<td>.354**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Social support (time 1)</td>
<td>.066</td>
<td>.138**</td>
<td>.010</td>
<td>.076</td>
<td>.082*</td>
<td>.101**</td>
<td>.025</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9. Self-help attendance (time 2) ^</td>
<td>.081*</td>
<td>-.088*</td>
<td>.100**</td>
<td>-.042</td>
<td>.048</td>
<td>.009</td>
<td>.147**</td>
<td>-.192**</td>
<td>1</td>
</tr>
</tbody>
</table>

^ Dummy coded (0=No self-help attendance; 1=Self-help attendance)  
* p < .05  
** p < .01
A binary logistic regression was then conducted to examine if support, substance use, severity, age, and coping predicted self-help group attendance at time 2 (see Table 8.1). Two tests of the model goodness of fit, the Pearson chi-square test and the Homer-Lemeshow test, both produced a fail to reject decision, meaning that there was no difference between observed and model-predicted values, thus implying that the model's estimates fit the data at an acceptable level. The overall relationship was statistically significant with the likelihood ratio test at the .05 level \( (G^2 = 46.9, x^2(5; \alpha = 0.05) = 11.1, p<0.001) \). In addition, severity of substance-related problems and social support were statistically significant at the 0.05 level.

Table 8.1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Support</td>
<td>-0.199</td>
<td>0.000*</td>
</tr>
<tr>
<td>Substance Use</td>
<td>-0.169</td>
<td>0.868</td>
</tr>
<tr>
<td>Severity of Substance-related Problems</td>
<td>0.571</td>
<td>0.005*</td>
</tr>
<tr>
<td>Age</td>
<td>-0.119</td>
<td>0.143</td>
</tr>
<tr>
<td>Coping</td>
<td>0.360</td>
<td>0.290</td>
</tr>
</tbody>
</table>

*p<0.05

Environmental Risk and Severity of Substance-related Problems

The top factor influencing substance use in the path analysis was environmental risk followed by severity of substance-related problems. These two variables were investigated further to test and examine possible determinants. Environmental risk was measured with the Environmental Risk Scale (ERS), which includes 3 subscales (Living Risk Index, Vocational Risk Index, Social Risk Index) that assessed risk in the adolescent's living, school, and social environments. A subset of 12 risk items were used across these environmental contexts: used any drugs during the past 90 days, were involved in illegal activity, weekly got drunk or had 5 or more drinks in a day, used any drugs during the past 90 days, and shout, argue, and fight most weeks. Higher scores indicated more time spent with people involved in risk behaviors. These subscales were assessed individually to examine which had the strongest relationship to time 2 substance use frequency.
Results of correlational analyses found that all 3 scales were statistically significant at the 0.01 level, with social risk having the strongest relationship with time 2 substance use. Thus, more frequent substance use was due to greater time that the adolescent spent with people in their social environment who were using alcohol and/or drugs, weekly got drunk or had 5 or more drinks in a day, used any drugs during the past 90 days, and shout, argue, and fought most weeks, the more frequent substance use.

Environmental risk at time 2 was then modeled with five independent variables rooted in previous literature (Garner et al., 2007; Godley et al., 2005): gender, severity of substance-related problems at time 2, length of stay in treatment, substance use at time 2, and social support at time 2. Results of the regression analysis are presented in Table 9.1. The model $R^2$ was .349, reflecting the overall strength of the relationship ($F=72.11, F[.05; 5, 674]=2.21, p<0.001$). The adjusted $R^2$ compensating for the positive bias of $R^2$ was .344, which suggested that approximately 34% of the variability in environmental risk at time 2 was explained by these factors. In addition, length of stay, severity of substance-related problems, substance use, and social support were statistically significant at the 0.05 level.

Table 9.1

<table>
<thead>
<tr>
<th>Factors Related to Environmental Risk at Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Length of Stay</td>
</tr>
<tr>
<td>Severity of Substance Problems</td>
</tr>
<tr>
<td>Substance Use</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Social Support</td>
</tr>
</tbody>
</table>

* $p<.05$

The GAIN’s Substance Problem scale (SPS) was used to measure severity of substance-related problems. It is based on recency ratings (e.g., past month, 2–12 months ago, more than 12 months ago, never) on 16 symptoms: seven corresponding to *DSM–IV* criteria for dependence, four for abuse, two for substance-induced health and psychological problems, and three on lower severity symptoms of use (hiding use, people complaining about use, weekly use). Severity of substance-related problems at time 2 was modeled with five independent variables based on
previous literature: gender, length of stay in treatment, substance use at time 2, social support at time 2, and environmental risk at time 2. The results of the regression analysis are presented in Table 10.1. The model $R^2$ was .166 reflecting the strength of the relationship ($F=28.21$, $F[.05;5,674]=2.21$, $p<0.001$). In addition, substance use, gender, and environmental risk were statistically significant at the 0.05 level.

Table 10.1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Stay</td>
<td>.000</td>
<td>.001</td>
<td>.999</td>
</tr>
<tr>
<td>Gender</td>
<td>.049</td>
<td>3.621</td>
<td>.000*</td>
</tr>
<tr>
<td>Social Support</td>
<td>.010</td>
<td>.272</td>
<td>.786</td>
</tr>
<tr>
<td>Environmental Risk</td>
<td>.195</td>
<td>4.693</td>
<td>.000*</td>
</tr>
<tr>
<td>Substance Use</td>
<td>.246</td>
<td>5.935</td>
<td>.000*</td>
</tr>
</tbody>
</table>

* $p<.05$

Self Help Group Attendance and Rates of Abstinence from Substance Use

Given that self-help groups, particularly those in the 12-step orientation emphasize complete abstinence from all substances as a requirement for participation, further investigation into the relationship between self-help group attendance and rates of complete abstinence was conducted. Results revealed that among adolescents who attended self-help groups following treatment, 58.3% reported complete abstinence. Of those who did not attend a self-help group following treatment, 41.7% reported complete abstinence. A chi-square test determined there was a difference between self-help group attendance at time 2 and complete abstinence at time 2 ($\chi^2(1) =10.03, p=.002$). It is important to note that this finding should be interpreted cautiously because very few adolescents attended groups and the majority fell into the attending 0-11 days category.

Thresholds of Self-help Group Attendance

Similar to pharmacological interventions when it is critical to find the minimum dose that produces a therapeutic effect, clinical knowledge of any threshold or dose of attendance associated with significant decreases in abstinence following treatment is important. The sample was split into three subgroups based on days of attendance (0-10, 11-62, 63-90) and examined
with a dichotomously coded (yes/no) abstinence outcome variable. Among adolescents reporting 0-10 days of attendance, 41.5% reported complete abstinence from substances. Out of those attending 11-62 days, 75.4% reported complete abstinence from substances, and 91.7% who attended 63-90 days reported complete abstinence from substances. As seen in Table 12.1, a chi-square test indicated that there was a statistically significant difference between attendance groups and abstinence ($X^2(2) = 34.77$, $p = .000$). These results need to be interpreted cautiously however, because very few adolescents fell into the attended groups 11-62 days and the 63-90 days categories.

**Summary of Results**

The final section offers a summary of the findings of the analysis of the hypothesis and the research question for this study. The minimal standards used to reject the null hypothesis was *$p \leq .05$*. This information has been summarized in Table 11.1 with rejection decisions and significance levels for the hypothesis tested. For the research question, $B$ coefficients for each model path, $R$ square, and significance levels of coefficients have been provided.
Table 11.1
*Summary of Findings Related to Hypothesis and Research Question*

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Significance</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H_0): At the end of the three-month time period following outpatient substance abuse treatment (time 2), there will be no differences between male and female adolescents who attend self-help groups during that three-month period and those who do not attend in relation to the following factors:</td>
<td>.000*</td>
<td>Rejected</td>
</tr>
<tr>
<td>Severity of substance-related problems</td>
<td>.000*</td>
<td>Rejected</td>
</tr>
<tr>
<td>Coping</td>
<td>.064</td>
<td>Fail to Reject</td>
</tr>
<tr>
<td>Motivation</td>
<td>.006*</td>
<td>Rejected</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>.580</td>
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</tr>
<tr>
<td>Environmental Risk</td>
<td>.176</td>
<td>Fail to Reject</td>
</tr>
<tr>
<td>Social Support</td>
<td>.677</td>
<td>Fail to Reject</td>
</tr>
</tbody>
</table>

**Research Question #1**

**Final Model**

R₁: When controlling for gender and self-help group attendance during the first three-month time period following outpatient substance abuse treatment (time 2), can severity of substance-related problems, coping, motivation, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency at the end of that period?

**Model Paths**

- Severity of substance-related problems to Motivation  
  B = .38*

- Severity of substance-related problems to Coping       
  B = .24*
<table>
<thead>
<tr>
<th>Path</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation to Coping</td>
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</tr>
<tr>
<td>Self-help to Coping</td>
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</tr>
<tr>
<td>Severity of substance-related problems to Self-efficacy</td>
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</tr>
<tr>
<td>Severity of substance-related problems to Environmental Risk</td>
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</tr>
<tr>
<td>Severity of substance-related problems to Support</td>
<td>-.06</td>
</tr>
<tr>
<td>Motivation to Support</td>
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<tr>
<td>Coping to Environmental Risk</td>
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<tr>
<td>Coping to Self-efficacy</td>
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</tr>
<tr>
<td>Self-help to Environmental Risk</td>
<td>-.14*</td>
</tr>
<tr>
<td>Gender to Support</td>
<td>-.08</td>
</tr>
<tr>
<td>Severity of substance-related problems to Substance Use</td>
<td>.17*</td>
</tr>
<tr>
<td>Motivation to Substance Use</td>
<td>-.04</td>
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</tr>
<tr>
<td>Social Support to Substance Use</td>
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<td>Self-help to Severity of substance-related problems</td>
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<td>Gender to Severity of substance-related problems</td>
<td>-.15*</td>
</tr>
<tr>
<td>Gender to Self-help</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---</td>
</tr>
<tr>
<td>$R^2=.400$</td>
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</table>

*p<.05*
CHAPTER FIVE
DISCUSSION

This investigation examined a number of theoretical and clinical factors relevant to the
treatment of adolescent substance use disorders. Justification for the analyses was based upon the
dearth of empirical studies examining the use and effectiveness of self-help group attendance
among adolescent outpatients. This chapter summarizes the pertinent findings and offers
implications for theory, research, and clinical practice. Finally, conclusions will be reported on
the topic of adolescent substance abuse treatment.

Summary of the Study

The development of this study was supported using pooled data from the Substance
Abuse and Mental Health Services Administration’s Center for Substance Abuse Treatment
(CSAT) Adolescent Treatment (AT) 2008 Outcome Dataset. Adolescent data were collected
using a semistructured biopsychosocial interview with the Global Appraisal of Individual Needs
(GAIN). For purposes of the study, the adolescents’ intake into treatment GAIN assessment
constituted the intake into treatment data point (time 1), and the adolescents’ 6 month GAIN
assessment constituted the end of the three-month period immediately following publicly funded
outpatient substance abuse treatment (time 2). The final analytic sample consisted of adolescents
who presented outpatient substance abuse treatment. Adolescents and an accompanying parent–
caregiver were approached for participation in the studies, including an explanation of the nature
and conditions of the study as part of the informed consent process during the 1st week of
treatment.

The data were used to test a proposed model for predicting frequency of substance use at
the end of the three-month period immediately following outpatient substance abuse treatment
among adolescents. The variables and their corresponding scales were the Treatment Motivation
and Treatment Resistance Indices used to assess readiness or motivation; the Problem
Orientation Scale to assess coping and problem recognition; the Self-efficacy Scale to measure
self-efficacy to resist substance use; the General Social Support Index to assess the number and
types of social support the adolescent had; the Environmental Risk Scale to assess risk in the
adolescents living, work, peer, and school environments; the Substance Frequency Scale to
measure substance use frequency; and the Substance Problem Scale to assess severity of substance-related problems.

In order to guide the process of investigating the variables of interest, updated relapse prevention models, social learning theory, and group theory were integrated as underlying conceptual frameworks. These frameworks were used to examine the cognitive and behavioral factors (motivation, self-efficacy, coping) and social-environmental factors (social support, environmental risk) factors that underlie post-treatment behavioral change. Specifically, this study examined the effects of self-help group meeting attendance among adolescents in relation to: substance use frequency, severity of substance-related problems, cognitive and behavioral factors (motivation, coping, self-efficacy), and social-environmental factors (social support, environmental risk).

The multi-part research hypothesis examined whether there were differences between male and female adolescents who attended self-help groups during the three-month period following treatment and those who do not attend in relation to substance use frequency, severity of substance-related problems, cognitive and behavioral factors (motivation, coping, self-efficacy), and social-environmental factors (social support, environmental risk) at the end of that three-month period. The multi-part hypothesis was tested with a 4-way ANOVA to determine whether the differences were between gender and/or attendance groups.

One research question was used in this study to assess the predictability of the model in determining frequency of substance use. The research question was stated as follows: when controlling for gender and self-help group attendance during the three-month period following outpatient substance abuse treatment, can severity of substance-related problems, coping, motivation, self-efficacy, social support, and environmental risk be integrated to predict substance use frequency? The research question was tested through the use of several quantitative techniques, including path analysis in order to assess the relationships and influence of the variables within the model. Overall, goodness of fit indices indicated that the data fit the model well ($x^2=15.71, df=13, p=.265, GFI=.995, AGFI=.983, RMSEA=.018$) and explained 40% of the variance in substance use scores. In addition, several additional analyses were conducted that investigated other aspects of adolescent self-help group attendance and substance use.
Discussion of the Findings

Discussion of Methodology

One of the major limitations of using secondary data is related to whether the measures are reliable in capturing the essence of what the researcher seeks to know or examine conceptually. Therefore, it is important to ensure that variables measured what they are intended to measure, so as to not present interpretation problems or bias. In an attempt to meet the recommended minimum standards for measurement error within the social and behavioral science fields, the complete indices were not used for certain variables, including motivation, environmental risk, and self-efficacy. This may have impacted the results. However, the resulting reliability met the minimum acceptable standards for the discipline. Also, the measure of self-efficacy used herein may have been oversimplified in that the question asked about hypothetical high risk situations without specifying during what period of time. Similarly, substance use frequency was examined as a combined alcohol or drug use outcome, thus rates of relapse could not be presented separately for different substances of abuse. Another potential concern is the complete overlap between the time window in which self-help group attendance was assessed and the time window for the hypothesized predictors and outcomes. Hence, one could use the present data to argue for a different process interpretation. This potential shortcoming could not be fully addressed until nine or twelve month data were available. Moreover, there was no end of treatment assessment contained in the dataset. Although intake into treatment data was taken into consideration, it is difficult to determine what changes were treatment effects versus self-help group attendance effects.

Generalizability concerns to other treated adolescents were raised due to the way the sample was derived. For instance, the sample consisted of adolescents who participated in publicly funded early intervention and outpatient levels of care, thus other levels of care were excluded. Because adolescents were not randomly assigned to attend self-help groups, one could argue that the apparently positive outcome results were due to self-selection. In addition, the data collected in this study relied predominately on mono-method self-report, which may bias estimates of population parameters due to reporting bias. Another generalizability concern arose from the decision to use listwise deletion as a strategy to handle missing data and obtain modification indices in AMOS. On the key items in this study, the percentage of missing data did not exceed 5%. Recent work has shown that listwise deletion is less hazardous if it involves
minimal loss of sample size (minimal missing data or a sufficiently large sample size) and there is no structure or pattern to the missing data (McDermeit, Funk, & Dennis, 2009).

The follow-up period was relatively short, pointing to the need for lengthier prospective follow-ups to help elucidate the impact of these relationships in the long-term. This is particularly important, because in this study, the outcomes and predictors were measured concurrently, which does not allow for establishing temporal precedence, a condition necessary to establish true statistical moderation and mediation as outlined by Baron and Kenny (1986). Therefore, only a single outcome was measured in the path analysis (frequency of substance use). Also, the majority of adolescents did not attend self-help groups following treatment which may have impacted the results.

Secondary data may not promote an understanding of why something happened or why a particular condition existed. Although path analysis often assumes the name causal modeling, the lack of experimental control may mean that unspecified variables may have accounted for observed relationships. Because secondary data were not used for the same purpose as the original research, the goals and purposes of the original researcher can possibly bias the study and may not include all of the information needed to address the research questions. In this study, certain variables that may have provided additional valuable information about this topic, such as therapist information and the characteristics and composition of the self-help groups attended, were not contained in the dataset.

Despite these methodological limitations, there were several advantages or strengths in using this secondary dataset. The dataset contained recent representative national studies of adolescent substance abusers, the variables of interest that would address the research question for this current study were part of this dataset, and longer-term treatment effects were contained. Also, all of the treatments received by the adolescents constituted rigorously evaluated evidence-based treatments. The ability to analyze a large sample of this size within this dataset enhanced statistical power, reliability, and improved the use of modeling and regression analysis. Furthermore, the secondary dataset was collected by large research institutions and governmental units which had the personnel, resources, and support to train interviewers and collect and analyze data for public use. The data for the most part were very user friendly and came with GAIN technical support and training from Chestnut Health, a covered entity under HIPAA.
Discussion of the Primary Analyses

Discussion of the Hypothesis

The multi-part hypothesis was stated as follows: at the end of the three-month time period following outpatient substance abuse treatment (time 2), there will be no differences between male and female adolescents who attended self-help groups during that three-month period and those who did not attend in relation to severity of substance-related problems, motivation, coping, self-efficacy, social support, environmental risk, and substance use. This was tested with a 4 way ANOVA comparing differences in mean scores for intake into treatment and time 2 measures among female non-attendees, female attendees, male non-attendees, and male attendees. This was done in order to differentiate self-help group attendance effects and gender effects, along with intake into treatment and time 2 scores of the variables.

At the end of the three-months following treatment (time 2), differences were found regarding the mean scores between attendance groups for self-efficacy, coping, and severity of substance-related problems. When looking at attendance effects across gender, the only difference between male and female attendees was for severity of substance-related problems at intake into treatment.

Male attendees at time 2 reported less self-efficacy or the confidence to resist substance use in various situations when compared to non-attending males. With regard to self-efficacy, research with adults has suggested that self-efficacy may not be affected by self-help groups (Kelly et al., 2000; Morgenstern et al., 1997). It may be that because adolescents have not yet developed nearly as many adverse physical and emotional symptoms from a lifetime of substance use as have older adults, the lack of self-efficacy in resisting substance use may not be a powerful effect of attendance (Burleson & Kaminer, 2005). In addition, self-efficacy was higher among those who chose not to attend and it remained higher, therefore, it seemed that having a high self-efficacy may have prevented attendance among this sample of adolescent males.

The decrease in self-efficacy may also have been an artifact of the outpatient treatment received, suggesting that most of the deterioration in self-efficacy occurred immediately after discharge from treatment, rather than the decrease being gradual. One limitation of this study is that assessments of cognitions at discharge were not investigated; thus, it is unclear when or why this deterioration occurred. Research with adults has found that endorsement of certain
cognitions at follow-up was even lower than at entry into treatment, which suggested that cognitions may be especially difficult to maintain after leaving treatment (Morgenstern et al., 1997).

An alternative explanation may be because the cognitive and behavioral factors included in this study appeared to be interrelated. Several researchers have suggested that an adolescent’s cognitions regarding substance use may be interconnected and thus may fluctuate over time (Burleson & Kaminer, 2005). Coping measured problem recognition and understanding of how problems are related to substance use. Similar to research with adult males, self-help groups helped adolescent males in this regard in understanding how their problems are related to their substance use and helping them identify substance use as a problem (Humphreys et al., 1999). However, this greater recognition of substance use as a problem appeared to decrease their self-efficacy or confidence to resist substance use in high risk situations.

Frequency of substance use was not different between attendees vs. non-attendees at time 2, and thus did not appear impacted by post-treatment attendance. This may have been attributed to the way substance use was measured. Subsequent examination into this relationship revealed that higher percentages of adolescent attendees reported complete abstinence from all substances when compared to those without such attendance. This finding is similar to previous research with adolescents which found that substance use frequency may not be impacted by self-help group attendance (Kelly et al., 2000). This is not surprising given that self-help groups, particularly those in the 12-step orientation emphasize complete abstinence from all substances as a requirement for participation. Furthermore, there appeared to be a linear relationship between attendance and abstinence in that the more meetings attended the higher percentage of adolescents who reported complete abstinence. Thus, when complete abstinence is the way the substance use outcome was measured adolescent attendees fared better than non-attendees. This suggests that among adolescents who do not attend groups, there is a range of outcomes. By contrast, among those who attend regularly, the large majority have high rates of abstinence. These results need to be interpreted cautiously however, because very few adolescents attended groups 11-62 days and 63-90 days.

When looking at gender differences, most of the differences occurred when the adolescents entered treatment, which may stemmed from identification processes that referred them into treatment programs. Previous research has suggested that higher severity females are
often overrepresented in clinical settings when compared to males, due to females being identified and referred to the treatment system at later stages than males. In the current study, females presented for treatment with higher severity of substance-related problems, greater environmental risk, higher motivation, and more substance use. In contrast, males reported higher self-efficacy and less coping than females at treatment intake. Despite females presenting for treatment with poorer initial clinical indicators, they appeared to respond favorably to or just as favorably as males to substance abuse treatment and self-help groups. At time 2, only severity differed between males and females as females who did not attend groups reported higher severity than males who did not attend groups. While comparatively little is known about females in relation to self-help use and effects, these findings suggested females may have integrated more easily than males into self-help groups and derived similar benefits (Kelly, 2003).

Who elects to attend self-help groups among adolescent outpatients was investigated further due to the lack of research examining this. Results of subsequent correlational analyses and ANOVA analyses together suggested that adolescents who entered outpatient substance abuse treatment (time 1) with higher severity of substance-related problems and less social support were more likely to attend self-help groups during the three-month period immediately following treatment. The finding that objective indices of severity, as measured by the number of DSM-IV abuse and dependence criteria were related to post-treatment attendance was comparable to previous research with adolescent inpatients and adults (Kelly et al., 2000). This may be in part because those with higher severity may be more willing to utilize such resources following treatment discharge. ANOVA results indicated that this finding appeared to only be true for females, as female attendees reported the highest severity when compared to male attendees and female non-attendees at intake into treatment. It is unclear at this time whether or not these females were more likely to be referred to groups by therapists when they were discharged from treatment. The few limited findings regarding the use of self-help groups among adult women, suggested that women may integrate more easily into AA than men (Kelly, 2003). For example, women in Project MATCH attended AA meetings as frequently as men and reported a higher degree of involvement than men.

ANOVA results also indicated that both males and females with fewer sources of social support when they entered treatment attended groups following treatment. A qualitative study
with adolescent inpatients found that adolescents liked the general group processes of AA/NA best, such as universality, support, and instillation of hope (Kelly et al., 2005). This suggested that general group therapeutic factors may be more salient for these adolescents at this stage of their recovery and/or degree of post-treatment AA/NA exposure.

Results of subsequent correlational analyses revealed that in addition to the objective measure of severity, a subjective measure of severity (i.e. coping) was related to post-treatment attendance. This meant that adolescents who perceived they had a problem with alcohol/drugs and were aware of how alcohol/drugs were related to their problems when they entered treatment were more likely to attend self-help groups during the first three-months following treatment. A similar measure also predicted attendance in a previous study conducted with 160 adolescent inpatients (Kelly et al., 2008).

In sum, the present findings suggested that the most severe adolescents had the worst outcomes, but those with higher severity who also attended groups following treatment showed outcomes similar to those lower in severity. Therefore, outpatient substance abuse treatment and self-help group attendance may be beneficial for some adolescents in their recovery in the short-term, particularly those who are more severely affected by substance use. In addition, females appeared to respond similarly to males with regard to treatment and self-help groups.

**Discussion of the Research Question**

The second part of the analysis was conducted with a path analysis to test the research question. Goodness of fit indices indicated that the data fit well with the model and explained 40% of the variance in time 2 substance use frequency scores. Higher severity of substance-related problems, higher coping, greater environmental risk, less self-efficacy and no self-help group attendance during the first three-month period following treatment were the factors related to more substance use among adolescents in that period.

Environmental risk had the greatest total effect on substance use. This meant that adolescents were at risk for substance use following treatment when they were involved with living, social, and vocational networks in which more members were using alcohol to the point of intoxication, using drugs, involved in illegal activities, or fighting regularly. These findings are consistent with prior research that has examined the relationship between post-treatment environmental risk and an adolescent’s own substance use (Brown, 1993; Godley et al., 2005; Latimer et al., 2000). For example, lower recovery environment risk and social risk were found
to be associated with significantly lower substance use and substance-related problems nine months after discharge from residential treatment among adolescents (Garner et al., 2007).

Results of additional correlational analyses revealed that out of these environmental risk networks, social risk had the strongest relationship with frequency of substance use following treatment. This meant that the more time that the adolescent spent with peers who used alcohol and/or drugs, weekly got drunk or had 5 or more drinks in a day, used any drugs during the past 90 days, and shouted, argued, and fought most weeks, the more frequently they used substances. These findings are consistent with prior research that has examined the relationship between the substance use of peers and an adolescent’s own substance use (Brown, 1993; Godley et al., 2005; Latimer et al., 2000). For instance, Latimer et al. (2000) found that peer substance use 6-months post-treatment was significantly associated with adolescents’ alcohol and marijuana use 12-months post-treatment. Theories of risk for and maintenance of substance abuse and related problems as well as empirical research have reached similar conclusions regarding the importance of close peers in facilitating abstinence or relapse (Brown, 1993; Brown et al., 2001; Catalano, Hawkins, Wells, Miller, & Brewer, 1991; Richter et al., 1991). Although it may be a difficult task for treatment and continuing care interventions to assist adolescents in altering the nature of their relationship with close peers, this research implied that the degree of post-treatment environmental risk is key for ongoing treatment and continuing care interventions to target among adolescents.

Environmental risk was also related to self-help group attendance and severity of substance related problems. Specifically, adolescents who did not attend self-help groups following treatment reported greater environmental risk. Although meditational analyses were outside the scope of this study, findings suggested that environmental risk functioned as an intermediary factor in the relationship between self-help group attendance and substance use. Therefore, decreasing environmental risk explained how attendance impacted substance use frequency. This finding mirrors previous research with adults that found participation in self-help groups operated via the alteration of social networks (Kelly, Myers, & Brown, 2000). Social network changes have been found to play a mediating role in the relationship between AA involvement and abstinence among adults (Bond, et al., 2003; Groh et al., 2008; Humphreys et al., 1999; Kaskutas et al., 2002; Kelly et al., 2009). Therefore, increasing involvement in self-help groups may help develop a protective factor for adolescents by altering these network
affiliations. This may be crucial for adolescents since previous research has found that peer abstinence does a better job of predicting the substance use of recovering adolescents (Latimer et al., 2000).

Severity of substance-related problems posited both direct and indirect influences on substance use. It was directly related to motivation, coping, and environmental risk. It was indirectly related to substance use through coping and environmental risk. Therefore, adolescents with higher severity were more likely to have people on their living, social, and vocational networks who were involved in risk behaviors, were more likely to be motivated for treatment and more likely to recognize substance use as a problem in the initial months following treatment discharge. This mimics previous research which has found that adolescents with more serious substance-related problems reported higher levels of motivation (Breda & Heflinger, 2007).

With regard to the cognitive and behavioral factors in the model, coping and self-efficacy were directly related to substance use. These variables also appeared to be interconnected; however, they were not related to the social-environmental factors in the model. Therefore, adolescents with greater problem identification and a sense of how their problems were related to their substance use were also more motivated for treatment and less confident that they could resist substance use when faced with high risk situations.

Implications for Theory, Research, and Clinical Practice

Implications for Theory

The pattern of findings contained important theoretical implications. The most prominent and well-explicated adult model of relapse to date is the cognitive-behavioral model of relapse proposed by Marlatt and Gordon (1985). The model emphasizes important constructs from Bandura's social-cognitive theory (Bandura, 1986), such as self-efficacy and coping responses. When applied to substance use, these factors are posited as crucial mediators in the capacity to resist using substances in a situation in which one is at high risk for relapse. An updated cognitive-behavioral model of relapse (Witkiewicz & Marlatt, 2004) includes explicit consideration of motivational constructs regarding substance use and proposes that greater motivation, self-efficacy, and coping skills in the face of high-risk situations will decrease the likelihood of relapse to substance use. The current study provided some empirical support for the model as it proved useful for modeling and predictive analysis. In particular, coping and self-efficacy which are included in updated cognitive and behavioral relapse models, contributed to
the prediction of substance use at the end of the first three-months following treatment. These variables are thus pertinent to include in future investigations into adolescent substance abuse.

Motivation did not retain power when predicting substance use. Motivation was also not impacted by self-help group attendance. Some of the explanation for this may lie in the way motivation was measured. A major assumption of the cognitive behavioral model of relapse is that an individual is motivated to abstain (or sustain controlled moderate use) from the use of psychoactive substances. An individual's motivation for abstinence is postulated to subsequently influence coping efforts and necessarily forms an integral part of the model. In the current study, motivation was measured as treatment readiness; therefore since it was measured after treatment this may explain the finding.

Of substantive theoretical and practical importance is knowledge of how factors postulated within a social-cognitive formulation and included in cognitive and behavioral relapse prevention models (i.e., motivation, coping, and self-efficacy) are influenced by self-help group attendance for adolescents and whether these effects can be used to help explain all or some of these observed relations. Findings suggested that some of these factors were impacted by attendance at the end of the three-months following treatment; however, they did not seem to explain the mechanisms responsible for how attendance benefitted adolescents.

Self-efficacy was lower among male attendees. According to social cognitive theory, role models can shape both use self-efficacy and refusal self-efficacy. Therefore, self-help group members may not have not impacted refusal self-efficacy, or impacted it enough to compensate for the substance using family and friends found in the adolescent’s post-treatment environment. Furthermore, the testimonials and admonitions from other members who have relapsed, often heard at self-help meetings did not appear to enhance confidence among this sample of adolescents that they can resist substance use in their lives. This may be because adolescents generally underestimate the riskiness of certain situations following treatment and inadvertently or purposefully find themselves in these situations in which using alcohol and/or drugs becomes an attractive option (Myers & Brown, 1990).

Self-help group attendance was associated with increases in coping among males. From a social cognitive perspective, the testimony and sharing of past and present experiences, a central component of self-help group meeting process, may have served to help adolescents recognize
how their problems were related to substance use and remind them of past negative consequences resulting from their own use.

While components of the cognitive and behavioral model of relapse are relevant to adolescent relapse, there are differences in both the content and process of adolescent relapse when compared to adults. Building upon this updated cognitive and behavioral model of relapse, some research has considered ways in which the process of relapse is unique for adolescents (Anderson, Ramo, Schulte, Cummins, & Brown, 2007; Brown, 2004; Ramo & Brown, 2008; Tate, Brown, Unrod & Ramo, 2004). In their Addiction Relapse Model, Brown and colleagues have incorporated developmental features that have been shown to be important for youth relapse. This model proposes that environmental and personal characteristics directly influence treatment outcomes through processes impacted by treatment. The current findings provided support for this developmental model, as both personal characteristics (self-efficacy, severity, coping) as well as the post-treatment environment (environmental risk) were important for predicting adolescent substance use outcomes. Also, the precursors to relapse appeared to differ quantitatively in predictive power for adolescents when compared to findings from adult based studies, in that social risk factors played a more salient role in influencing substance use decisions among this sample of adolescents.

The findings also lend additional support to social learning theory which posits that substance use originates in the substance-specific attitudes and behaviors of the adults and peers who serve as role models. When applied to substance use, social learning theory assumes that although substance-specific cognitions are the strongest predictors of adolescent substance use, the roots of substance use do not originate in an adolescent’s own substance specific cognitions, but instead from the adolescent’s role models. In essence, when applied to substance use, this theory proposes substance use is a function of positive norms and expectations about substances and family members and friends who engaged in and modeled substance use (Bandura, 1977; Maisto et al., 1999). Social learning theory asserts that an adolescent’s involvement with substance using models is likely to have three sequential effects, beginning with the observation and imitation of substance-specific behaviors, continuing with social reinforcement for use, and culminating in positive expectations about future use. The current findings and previous research have provided support for social learning theories because of the strong relationship between the
substance use of people in the adolescent’s post-treatment environment and an adolescent’s own substance use (Brown, 1993; Godley et al., 2005; Latimer et al., 2000).

Consistent with social learning theory, decreasing exposure to substance using social models will reduce substance use. Although changing the peer networks of adolescents can be a very challenging task (Brown, 1993), the present analyses provided support for decreasing exposure to substance using models found in the adolescents’ post-treatment environment as a way to decrease substance use among adolescents. In addition, decreasing environmental risk seemed to explain how or why self-help group attendance decreased substance use frequency among adolescents in the current study.

When applied to self-help groups, social learning theory proposes that increasing exposure to a new abstinent social network, such as that found in self-help groups can help alter substance use or at least moderate the influence of a substance using social network. By encouraging abstinence-oriented friendships, involvement in self-help groups can shield adolescents from the negative influence of substance-using friends. This point appeared to bear out as self-help meeting attendance was related to decreased environmental risk which in turn was related to less substance use. From a social learning perspective, if an individual's friends do not use substances, stimuli to use are removed from the social environment and positive social activities that do not involve substance use are more available. Furthermore, while drinking friends presumably reward substance abuse with social approval, friends who support abstinence efforts provide social approval and encouragement for not using alcohol and drugs. Hence, self-help group involvement may involve salubrious social network mechanisms similar to those employed in treatment, but offer them for a more extended and readily available period that makes continued abstinence normative.

With regard to social support, both adolescent females and males who presented for treatment with fewer sources of social support were more likely to attend self-help groups following treatment. Based on group theory, self-help groups encompass many of the therapeutic factors which adolescents may have sought out and benefited from, particularly since preliminary qualitative research with adolescents indicated general group therapeutic factors and not 12-step specific processes are the major factors that adolescents rated the highest with regard to self-help groups (Kelly et al., 2008). Self-help groups utilize the power of the group to offer multiple relationships to assist the individual in growth and problem solving. In particular, group
members share a universal problem that serves to remove a group member’s sense of isolation. Therefore, an understanding of these factors may be critical in explaining the success or failure of self-help groups for adolescents, and thus, represents a future area of inquiry to investigate.

Implications for Research

Some of the limitations in this study may serve to guide future research in this area. It would be useful for future research to include collateral informant (parents) and biological assays to minimize reporting bias. The follow-up period was also relatively short, pointing to the need for lengthier prospective designs to evaluate the impact of these initial relationships in the long-term. Prior research has shown relapse among both adults and adolescents is most likely to occur during the initial months following discharge, so the identification of factors during this juncture may be important to longer term success. In addition, adolescent self-help attendance during this time period has been shown to have long-term beneficial effects up to eight years following treatment discharge (Kelly et al., 2008).

The sample was limited to adolescents participating in early intervention and outpatient levels of care, therefore, the inclusion of adolescents treated in intensive outpatient settings is needed to examine the effects of meeting attendance for this group. Moreover, the self-help construct was limited to attendance, so little was known about whether adolescents utilized an AA or NA sponsor, read and comprehended AA/NA literature, or incorporated 12-step practices. There is some evidence from adult-based studies that other dimensions of involvement may impact outcomes above measures of attendance. Other aspects of involvement may be fruitful to investigate among adolescents (Kelly & Myers, 2007).

While the current study found a linear relationship between attendance and abstinence, it was assumed that adolescents were attending on a regular basis, which may not have been the case. For example, among adolescents that reported higher frequencies of attendance, it could be that they attended frequently early on and then less or not at all later on. Future studies should examine the temporal patterning of attendance in relation to outcome to help elucidate this further.

Little is known about which groups adolescents attended. Results from AA’s triennial survey revealed the average age of AA members in the U.S. to be 46 years old, with only 2% under the age of 21 (Kelly & Myers, 2007). This may have hindered identification and presented a barrier to participation among adolescents. Some preliminary evidence indicates that age
differences could be a significant barrier to engagement (Kelly et al., 2005). Further study is needed to determine the optimal age composition within groups for adolescents. While, clinician behavior plays an important role in facilitating attendance among adults, there was no information available in the dataset on clinician behavior in the current study (Passetti & White, 2008). More formative qualitative research with clinician and their referral practices may guide adolescent facilitation approaches.

The inclusion of other developmental factors may help explain additional variance in substance use scores, such as broader psychosocial domains of functioning, including school and work performance, interpersonal relationships, and familial and emotional difficulties. A number of developmentally specific differences have been observed between adults and adolescents treated for a substance use disorder and may help elucidate why non-attendance at self-help groups was so high. These include differences in topography, severity, and related sequelae. Such differences may have implications for the fit of adolescents in self-help groups and for the specific fit regarding the type of fellowship adolescents should be encouraged to attend. In addition, the effects of initial attendance may be influenced by these factors. Among adults, the extent of professional 12-step facilitation and emphasis placed on AA/NA may substantially influence the likelihood of attendance, and may also increase the extent of derived benefits (Tonigan et al., 1996). Comparable information on adolescent facilitation methods is not available; therefore, future studies using qualitative designs regarding adolescents’ beliefs and attitudes could inform facilitation strategies targeting adolescents.

Although the analyses seemed to produce results consistent with mediation, true statistical mediation conditions were not met, and therefore the statistical significance of the mediational effect cannot be judged. Future research with adolescents needs to be conducted to assess potential mediators and moderators of both treatment and self-help group effectiveness. In particular, the extent to which attendance moderates the influence of severity of substance-related problems and vice versa is a worthy area of investigation with adolescents, irrespective of the level of care they have received.

While self-help group attendance seemed to benefit some adolescents, it had modest explanatory power. Research is needed to identify other effective continuing care strategies with this age group, in relation to the key components, the relative cost associated with them, and the minimum length of stay for continuing care to adequately maintain primary treatment gains.
Specifically, there is a need to examine potential continuing care treatment matching effects among adolescents, as there appears to be a high degree of heterogeneity in adolescent’s post-treatment course. The current study identified some of the post-treatment factors that appeared to underlie substance use among adolescent outpatients; however, little is known regarding the way each of these factors was differentially associated with subgroups characterized by distinct substance use trajectories. Consideration of how these factors changed during the early recovery period is key to understanding how substance abuse treatments and continuing care services may impact adolescents and thus warrants future investigation.

**Implications for Clinical Practice**

There are several clinical implications from the findings of the present study. The first is the importance of linking adolescents, especially those with higher severity of substance-related problems to continuing care services, such as self-help groups following treatment discharge. In contrast to the historical stepped approach to aftercare (in which individuals are “stepped” down to a less restrictive level of care after completion of an earlier phase of treatment), the more recent view of substance abuse as a chronic illness that may require multiple interventions, monitoring, and support, has led to the current conceptualization of continuing care, which is defined as facilitating the level of care needed by the patient at the time of discharge (Garner et al., 2007; Godley et al., 2005). The protective role of continuing care services during the initial months following discharge cannot be overstated, given that the majority of adolescents experience relapse during this time period (Brown, 1993; Godley et al., 2005). The present findings suggested that self-help group attendance may be a beneficial continuing care strategy for some adolescents in the short-term, particularly those who are more severely affected.

A second implication of this study is that post-treatment environmental risk played an important role in substance use decisions following treatment. Participation in self-help groups appeared to decrease these risks, which in turn decreased substance use frequency. Third, these findings highlighted the importance of examining post-treatment factors, which typically account for the majority of the variance in substance use outcomes (Catalano et al., 1991; Latimer et al., 2000). Lastly, results suggested that adolescent females responded favorably to substance abuse treatment and self-help groups, despite poorer initial clinical indicators when compared to adolescent males. Therefore, despite these initial risk factors, females may actually integrate more easily into treatment and self-help groups, as well as benefit just as much. Therefore,
clinicians working with females, particularly higher severity females, may want to emphasize attendance as part of a relapse prevention plan.

The findings may help clarify potential attribute-treatment matching effects for adolescents. In particular, clinical knowledge of certain intake predictors could enhance the specificity and efficiency of recommending adolescents to self-help groups in treatment settings. Adolescents in the current study were more likely to attend if they had fewer sources of social support and higher substance related problem severity when they entered outpatient treatment. This may prove useful as an efficient screening question for tailoring interventions for these adolescents. Similarly, clinicians emphasizing self-help participation as part of a relapse prevention plan may enhance expectancies by informing adolescents that one of the early benefits is feeling more supported in their recovery efforts, particularly for those more severely affected. For adolescents with less severity of substance-related problems, an alternative emphasis could be placed on other treatment alternatives.

Adolescents were at highest risk for substance use when their living, social, and vocational networks consisted of people who were using alcohol to the point of intoxication, using drugs, involved in illegal activities, or fighting regularly. This suggested that a key to clinical efforts lies in making substance-using people in the adolescents’ post-treatment environment less salient and substance-abstaining people more salient. Thus, continuing care interventions might be more potent if they assess and alter the degree of social and family-related risk in the adolescent’s post-treatment environment. This may be particularly important for clinicians working with adolescent girls as females presented for treatment with greater environmental risk. In addition, since adolescents were at risk for substance use when people in their living environment were also using substances, the inclusion of family members in counseling for substance abuse treatment is recommended.

Clinician behavior may play an integral role in facilitating such attendance among adolescents, particularly since previous research with adults suggested that the extent of 12-step facilitation and emphasis placed on AA substantially influenced the likelihood of self-help participation (Tonigan et al., 2003). A recent study with adults found that patients in programs in which staff encouraged self-help involvement during treatment were more likely to attend following treatment, despite being at high risk for dropout based on intake predictors (Kelly & Myers, 2007). Analyses of interviews with clinicians treating adolescents from eight sites across
the U.S. revealed that staff located on sites with the highest overall rates of self-help meeting attendance tended to engage in certain activities that the other sites did not or did to a lesser extent (Passetti & Godley, 2008). Based on these findings, clinicians may want to actively link adolescents to groups in the following ways: (1) by bringing them to sober social activities sponsored by support groups; (2) by working with service structures of support groups to host meetings and locate good role models for adolescents; (3) by creating formal and informal networks of trusted people to accompany adolescents to meetings and/or introduce them to groups; (4) by monitoring recovery support group attendance post-discharge through continuing care case management; and (5) by helping adolescents identify and approach potential sponsor and then by interacting with and screening those sponsors for appropriateness.

In addition, professionals working with adolescents may want to examine the characteristics of local meetings; investigate the variety of recovery support groups offered in any given area to provide adolescents with a menu of options; interact with recovery support group service structures and develop a list of reliable group members to connect adolescents to the recovering community; help adolescents structure their time before and after meetings; and implement assertive rather than passive referral strategies, including connecting adolescents to sober social activities, monitoring attendance, and monitoring reactions to self-help group experiences and program concepts.

Including and educating parents and other family members is vital to not just provide education about the nature, content, and safety of meetings, but also to emphasize the importance of attendance (Kelly & Myers, 2007). If a counselor is already aware of adolescent meetings in the community, family consensus regarding a meeting attendance schedule could be reached in advance and included in a relapse prevention plan.

Clinical knowledge of other potential logistical barriers not faced by adults may further moderate the likelihood of attendance among adolescents. For example, an adolescent’s beliefs regarding self-help groups may present a barrier to attendance. Similarly, a recent study of adolescents discharged from residential treatment found that in general, they perceived AA/NA to be important and helpful in their recovery; although 1 in 4 perceived participation to be of little or no importance (Kelly et al., 2005). Thus, it may be critical for clinicians to assess these beliefs before discharge to tailor referrals and relapse prevention plans based to an adolescent’s beliefs and preferences.
It is also important for clinicians to form effective and efficient referral strategies with the larger network of adolescent programs that are both the source of referrals and the place to which adolescents may need services after treatment discharge. Many adolescent outpatient treatment programs draw from a large geographical area, so the coordination process should include consent to participate in continuing care services early in the outpatient treatment stay.

When examining thresholds of self-help group attendance, the current findings suggested that adolescents may benefit from limited exposure following treatment. Therefore, it may not be critical for a clinician to prescribe the adult-based criterion of attending 90 meetings in 90 days. Researchers have suggested that this recommendation may prove unrealistic for adolescents ultimately resulting in greater resistance, which in turn may result in a therapeutic compromise (Kelly et al., 2008). Furthermore, preliminary qualitative investigations of AA/NA attendance among adolescents suggested that while adolescents may not immerse themselves as intensely into 12-step program content as adults, they still may derive benefit from the general group processes inherent in meetings (Kelly et al., 2005).

Self-help group attendance had modest effects on the frequency of post-treatment substance use; therefore, other continuing care interventions may be more effective in relation to the clinical profile of the adolescent at treatment discharge. These include multisystemic therapy and home visits using the community reinforcement approach plus case management (Godley et al., 2001). Early community reinforcement studies with adult alcoholic individuals included social programming components to compete with and replace high probability drinking occasions (e.g., Saturday evenings) by implementing alcohol-free social events for individuals in outpatient treatment or after outpatient treatment (Godley et al., 2001). Preliminary research with adolescents found that being assigned to an assertive aftercare condition, which included case management, had a direct effect on increasing adolescents’ adherence to general continuing care and several indirect effects on decreasing the adolescents’ substance use and substance-related problems via two broad environmental risk factors: recovery environment and social risk (Garner et al., 2007). This may be a fruitful strategy for adolescents given that post-treatment environmental factors played such a prominent role in post-treatment substance use decisions.

**Conclusion**

The findings from this study contained many contributions to the field of adolescent substance abuse treatment. The multitude of studies with adults suggested there is no uniform
way to treat substance use disorders. This seems to hold true for adolescents as well. Findings suggested that environmental risk factors played an important role in substance use decisions following outpatient substance abuse treatment. Post-treatment attendance in self-help groups proved beneficial for some adolescents, particularly those more severely affected. The main mechanism through which self-help group attendance decreased substance use frequency appeared to lie in the reduction of environmental risk. Findings also highlighted the importance of examining post-treatment factors, which typically account for the majority of the variance in substance use outcomes (Catalano et al., 1991; Latimer et al., 2000; Williams & Chang, 2000). Lastly, the results suggested that adolescent females responded similarly to adolescent males in regard to outpatient substance abuse treatment and self-help groups, despite poorer initial clinical indicators.

Reviews of the adolescent treatment outcome literature indicated that treatment is superior to no treatment; however, caveats in this research remain. This is particularly evident with regard to continuing care strategies, as straightforward applications of adult practices would most likely be ineffective with most adolescents. Multivariate designs, such as those contained in this study may help to identify continuing care strategies that are promising for adolescents and stimulate future research inquiries in this area. In summary, substance abuse treatment approaches and continuing care strategies need to address or link adolescents to services that decrease environmental risk. Focusing on the reduction of post-treatment environmental risk would prevent relapse during the critical initial months following formal substance abuse treatment discharge. These results underscore the need for further studies to examine more complex models to diagnose weak links in the chain of substance abuse treatment and determine which adolescents are vulnerable at these junctures. The current findings are encouraging for adolescents, their families, and treatment providers, as they suggest that substance abuse treatment and self-help group attendance provide benefits to adolescents, especially those higher in severity and thus may help long-term recovery efforts.
APPENDIX A

OVERVIEW OF CSAT DATASET

<table>
<thead>
<tr>
<th>CSAT Adolescents Outcome Data Set</th>
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<tbody>
<tr>
<td>Recruitment: 1997-2006 (national sample)</td>
</tr>
<tr>
<td>Sample: The 2008 CSAT adolescent treatment data set included data with 5 to 5 follow-ups on 14,809 adolescents from 32 local evaluations.</td>
</tr>
<tr>
<td>Level of Care: Outpatient, Intensive Outpatient, Short &amp; Long-term Residential, Outpatient Based (Outpatient), and Peak Residential Treatment (Peak).</td>
</tr>
<tr>
<td>Follow-up: Over 90% with 1 to 5 follow-ups at 3, 6, 9, &amp; 12 months post intake.</td>
</tr>
<tr>
<td>Funding: CSAT grants 2006-2009 (3,600,600,000) and 1,121 individual grants.</td>
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</tbody>
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<table>
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<tr>
<th>Current CSAT Adolescent Data Set by Age</th>
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<tbody>
<tr>
<td>12-14 (5,502)</td>
</tr>
<tr>
<td>15-17 (12,954)</td>
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</table>

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<thead>
<tr>
<th>Current CSAT Adolescent Data Set by Level of Care</th>
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</thead>
<tbody>
<tr>
<td>LTCB: Long Term Residential 14% (n=1,066)</td>
</tr>
<tr>
<td>CC-IDP: Continuing Care 61% (n=3,131)</td>
</tr>
<tr>
<td>PR: Residential Treatment 8% (n=8,530)</td>
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</tbody>
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<table>
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<tr>
<th>Current CSAT Data Set by Treatment Type</th>
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<tbody>
<tr>
<td>Ta-Mac: Specific Methadone Maintenance Treatment (14.4%) (n=1,750)</td>
</tr>
<tr>
<td>ACR: Acupuncture 3% (n=43)</td>
</tr>
<tr>
<td>MFT: Medication Therapy 1% (n=2,000)</td>
</tr>
<tr>
<td>Other: Non-specific Treatment 8% (n=671)</td>
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</tbody>
</table>

<table>
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<tr>
<th>Current CSAT Data Set by Grant Program</th>
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<tbody>
<tr>
<td>AMT: Adolescent Treatment (2006-2007: 1,240) from 10 grants</td>
</tr>
<tr>
<td>GDRE: General Developmental Research (2006-2007: 1,277) from 10 grants</td>
</tr>
<tr>
<td>SDR: Strengthening Complementary Treatments (2006-2007: 1,249) from 10 grants</td>
</tr>
<tr>
<td>AAD: Adolescent Adolescent Treatment (2006-2007: 1,261) from 10 grants</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Current CSAT Data Set by Grant Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other: Non-specific Treatment 8% (n=3,085) from 10 grants</td>
</tr>
</tbody>
</table>

Source: CSAT 2010-2011 Adolescent Treatment Data (n=23,754)
APPENDIX B
OVERVIEW OF THE TREATMENTS

**A-CRA**: based on a behavioral approach. The underlying theory of A-CRA is that rearranging environmental contingencies so that non-using behavior is more rewarding than using behavior will prevent or reduce substance use. Sessions are usually held weekly in the office or in the home for a fixed length of time (12–14 weeks). 10 of the sessions are conducted individually with adolescents, 2 sessions are conducted with parents or other caregivers only, and 2 sessions are with the adolescents and their caregivers combined. Included among the intervention procedures and case management activities are (a) functional analysis of substance using/prosocial behavior; (b) an adolescent self-assessment of happiness; (c) goals of counseling; (d) prosocial recreation planning; (e) relapse prevention skills; (f) communication skills; (g) problem-solving skills; (h) family relationship skills (i.e., problem solving, communication, and relationship happiness); (i) homework assignments; (j) review of homework; (k) job-seeking skills; (l) regular case management; (m) other case management; (n) crisis management; and (o) urine testing (see Godley et al., 2001, for detailed descriptions).

**MET/ CBT**: based on a behavioral approach. This is a five-session treatment that comprises two individual sessions of motivational enhancement therapy (MET) and three group sessions of cognitive behavioral therapy (CBT). The MET sessions focus on factors that motivate clients to change. In the CBT sessions, clients learn skills to cope with problems and meet their needs in ways that do not involve turning to marijuana or alcohol (see Sampl & Kadden, 2001 for detailed descriptions).

**FSN**: based on a family systems approach. Treatment consists of the MET5+CBT7 treatment combined with additional support for families (home visits, parent education meetings, parent support group), aftercare, and case management. The 6 parent education sessions are designed to: build competence among parents that leads to healthy families, offer methods for coping with the pressures of parenting, and promote ways to establish or restore appropriate authority, roles, rules, boundaries, communication, and routines. (see Hamilton, Brantley, Tims, Angelovich, & McDougall, 2001 for detailed descriptions).
**CHS**: the primary modes of treatment in the OP/IOP program are skills and counseling groups. Skills groups cover fourteen different topics are offered during the week. Topics addressed in skills groups are varied and include anger management, stress management, relapse prevention, decision-making, drug education, and relationships. Counseling groups are offered four nights a week. These groups provide the opportunity for adolescents to discuss personal issues. Multi-family counseling is offered during Family Night, and primary counselors are also encouraged to offer family counseling sessions for individual families. CHS counselors incorporate the techniques of motivational interviewing, solution-focused brief therapy, and the CHS theoretical foundations into the program’s various change mechanisms (see Godley, Risberg, Adams, & Sodetz, 2003 for detailed descriptions).

**MST**: based on a systems approach. This is an intensive family- and community-based treatment that addresses the multiple determinants of serious antisocial behavior in juvenile offenders. The multisystemic approach views individuals as being nested within a complex network of interconnected systems that encompass individual, family, and extrafamilial (peer, school, neighborhood) factors. Intervention may be necessary in any one or a combination of these systems. MST is provided using a home-based model of services delivery. The usual duration of MST treatment is approximately 4 months (see Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998 for more detailed description).
APPROVAL MEMORANDUM

Date: 3/29/2010

To: Jennifer Gangi

Address: 1490
Dept.: FAMILY & CHILD SCIENCE

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
THE IMPACT OF SELF-HELP GROUPS FOLLOWING OUTPATIENT SUBSTANCE ABUSE TREATMENT AMONG ADOLESCENTS: SUBSTANCE USE OUTCOMES AND MECHANISMS OF CHANGE

The application that you submitted to this office in regard to the use of human subjects in the research proposal referenced above has been reviewed by the Human Subjects Committee at its meeting on 03/17/2010. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to
weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 3/16/2011 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Carol Darling, Advisor [cdarling@fsu.edu]
HSC No. 2010.4021
HIPAA Data Sharing Agreement Decision Tree (version 11-12-08)

Is the agreement with the GAIN Coordinating Center (GCC)?

Yes

Are you going to use the GCC’s quality assurance services or its web-based software or submit data with full or partial protected health information (PHI) to the GCC?^1

Yes

Are you a covered entity?^2

No

Will you ever receive multisite data back from the GCC?^2

No

Use data sharing agreement 1 (GCC Full CE)

Yes

Use data sharing agreement 2 (GCC Full non-CE)

No

Use data sharing agreement 3 (GCC Limited)

No data sharing agreement required

No

Yes

Are you and the other organization going to exchange any protected health information (PHI)?^1

No

Will you ever supply the other organization with data?

Yes

Use data sharing agreement 4 (other business associate)^3

No

Use data sharing agreement 5 (other limited)^4

No

Use data sharing agreement 4 (other business associate)^3

No

Use data sharing agreement 5 (other limited)^4

No

Use data sharing agreement 5 (other limited)^4

^1 PHI includes names, addresses, phone numbers, and other contact information; medical, state, insurance, license, bank account, and other (non-research) identifiers; photographs and biometric identifiers; and all other information defined as PHI by your organization’s privacy policy.

^2 Covered entity within the meaning in the Health Insurance Portability and Accountability Act Privacy Rule and 45 C.F.R. Part 2 (the privacy rule).

^3 Or other business associate agreement as determined by local organization and covering the same issues.

^4 Or other data use agreement as determined by local organization and covering the same issues.
Appendix B

Model Data Use Agreement
For Receiving Analytic Files
(3. GCC Limited, version 6-23-03)

This Data Use Agreement (the "Agreement") is entered into as of July 28, 2009 (the "Effective Date") by and between Chestnut Health Systems (the "Covered Entity") and Jennifer Long (the "Recipient"), (collectively, the "Parties").

WHEREAS, Chestnut Health Systems is a "Covered Entity" and has received limited data sets from other covered entity, as that term is defined in the Health Insurance Portability and Accountability Act Privacy Rule, 45 C.F.R. §§160-164, as amended from time to time (the "Privacy Rule");

WHEREAS, [Insert Name of Recipient] is a recipient of a Limited Data Set from the Covered Entity;

WHEREAS, pursuant to the Privacy Rule, the Recipient must agree in writing to certain mandatory provisions regarding the use and disclosure of the Limited Data Set; and

WHEREAS, the Parties wish to enter into this Agreement to comply with the requirements of the Privacy Rule.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. Limited Data Set means a data set that has had the following Protected Health Information for the individual, his/her relatives, employers or household members removed:
   - Names;
   - Street or Postal address information (other than town/city, state, zip code)
   - Telephone numbers
   - Fax numbers
   - Electronic mail addresses
   - Social Security numbers
   - Medical record numbers
   - Health plan beneficiary numbers
   - Account numbers
   - Certificate/license numbers
   - Vehicle identifiers and serial numbers, including license plate numbers
   - Device identifiers and serial numbers
11. Recipient will not (re)identify or contact the individuals who are the subjects of the information.

12. This Agreement shall remain in effect for as long as Recipient maintains the Limited Data Set.

13. Recipient shall indemnify and hold the Covered Entity harmless from and against all claims, liabilities, judgments, fines, assessments, penalties, awards or other expenses, of any kind or nature whatsoever, including, without limitation, attorney’s fees, expert witness fees, and costs of investigation, litigation or dispute resolution, relating to or arising out of any breach of this Agreement by Recipient as determined by a court of competent jurisdiction.

14. None of the provisions of this Agreement is intended to create, nor shall any be construed to create, any relationship between the parties other than that of independent entities contracting with each other solely to effectuate the provisions of the Agreement.

15. The Parties agree to take such action as is necessary to amend this Agreement from time to time as is necessary for the Covered Entity to comply with the requirements of the Privacy Rule or the Security Rule or any other applicable federal or state regulations. Any amendment shall require the mutual written consent of the parties.

16. This Agreement shall not in any manner whatsoever confer any rights upon or increase the rights of any third-party.

17. The Parties shall each be solely responsible for their own compliance with all applicable law.
18. The Parties acknowledge that this Agreement represents the entire understanding between the Parties regarding the Limited Data Set and that there are no other agreements, either oral or written, between them.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year written below.

SITE: Florida State University
Corporate Representative:
By: 
Title: 
Date: 

Technical Representative:
By: 
Title: 
Date: 7/28/09

GCC: CHESTNUT HEALTH SYSTEMS, INC.
Corporate Representative
By: Mark D. Gooley, Ph.D.
Title: Director of Research and Development
Date: 8/7/09

Technical Representative 2
By: Michael Dennis, Ph.D.
Title: Senior Research Psychologist
Date: 9/10/09
ABSTRACT FOR DATA APPROVAL

**Date of Request**: June 26, 2009

**Working Title**: The Impact of Self-help Group Attendance Following Adolescent Outpatient Substance Abuse Treatment: A study of outcome effects and mechanisms of change.

**Lead Author**: Jennifer Gangi, MPH

**Proposed Forum**: Doctoral Dissertation at Florida State University, Peer-Reviewed Journals, Presentation at National Meetings

**Target Date**: Data Analysis: Summer/Fall 2009; Writing: Spring 2010; Submission: Spring 2010

**Data Sources**: The CSAT 2008 GAIN dataset. I propose to use the GAIN-I Full and M-90 data (all waves). Cases will be aggregated across self-help group attendance by state, with sites not being identified individually. Adolescents will be defined by age 12-17 years old. Outpatient treatment will be defined as Early Intervention and Outpatient, without Criminal Justice sites, ATM, or CYT sites.

**Project Abstract**: As an informal source of continuing care, substance-use disorder focused self-help groups are a potential source of support that can complement formal treatment interventions by maintaining treatment gains and preventing relapse. It has only been in the last 15 years, that self-help organizations, mostly in the 12-step tradition, such as Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) have attracted systematic empirical focus, with the body of work examining outcome effects among adults. When evidence from these studies is viewed conjointly, self-help group attendance following treatment among adults is found to be significantly associated with better substance-use and psycho-social outcomes at various time points. Comparatively little is known regarding the applicability of self-help groups for adolescents, and even less is known regarding the use and effectiveness of these groups after treatment despite it being a commonplace recommendation. This research is needed because the majority of treatment approaches for adolescents have been an extrapolation of the traditional adult model with a largely unexamined behavioral prescription of attendance at 12-step meetings. Mechanisms for which salutary effects are exerted for youth are not yet clear. Studies have examined intra-individual variables (motivation, coping, self-efficacy) that have been shown to mediate the relationship in adult studies to some extent. Social factors (social support, social...
risk) may also be particularly relevant for adolescents, given that longer term outcomes often depend on these factors. Information regarding the effectiveness of self-help group attendance among less intensively treated adolescents is desirable because of the reliance on less intensive (outpatient) modes of care. To date, no research has confirmed or refuted the idea that adolescents treated in less intensive outpatient settings do not benefit from self-help groups.

**Primary Research Objective:** Assess the impact of self-help group attendance following treatment on substance use outcomes among outpatient adolescents, and test whether effects are mediated by: intra-individual factors (motivation for abstinence, coping and self-efficacy), and/or social factors (social support and social risk). This research can improve understanding of youth-specific effectiveness and change mechanisms to inform clinical practice guidelines for youth.

**Methods/Design/Analytic Plan:** The approach to data analysis will involve three levels of examination: 1) univariate statistics (descriptive statistics will be used to provide sample summaries about the sample and all of the study measures); 2) bivariate analysis for descriptive purposes (depending on the variable type, correlations, t-tests, ANOVA, and chi-square tests will be performed to document the association between independent and outcome variables; and, 3) path analysis with Amos 7.0 software to answer the research questions and to test all three steps of the mediational analysis.

**Requested Variables:** Requested variables include those listed in the table below. In addition to scales and subscales noted, I am requesting all of the individual variables that comprise the named scales. I would like the data from the Intake, 3-, and 6-month time periods. I am requesting horizontal files.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Variables/Scales/Subscales</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background</strong></td>
<td>Age (b2a), Gender (b1), Race (racegrps), TxPI</td>
</tr>
<tr>
<td><strong>Substance Involvement</strong></td>
<td>Substance Frequency Scale (SFS 8p), S2x, Current Withdrawal Scale (CWS), S5a, S6, S6a, S6c, S7, Substance Abuse Treatment Index (SATI), Treatment Resistance Index (TRI), Treatment Motivation Index (TMI:S8e-j), Self-</td>
</tr>
<tr>
<td>Mental and Emotional Health</td>
<td>Efficacy Scale (SES S8k-q), Problem Orientation Scale (POS S8s-w), Substance Problem Scale (SPS), SAI, Substance Dependence Scale (SDS), Personality Coping Styles Scale (PCSS).</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Internal Mental Distress Scale</td>
<td>Internal Mental Distress Scale (IMDSM1a1-4, M1b1-10, M1c1-5, M1d1-12, M2a-p)</td>
</tr>
<tr>
<td>Environment and Living Situation</td>
<td>E1, E2d, E2f, Recovery Environment risk index (mRERI113p:s6a, E1b, E1d, E2c-e, E3, E8, E8p, Ept, E9u, E14a-b), Environmental risk scale (Ers21:E5a-g, E6a-g, E7a-g) (and the subscales Living risk index (LR17); Vocational Risk Index (VR17) and Social Risk index (mSRI7: E7a-g), Strength Self-efficacy index (SSEI E12a1-10), General Social Support Index (GSSI E12c1-9)</td>
</tr>
<tr>
<td>Supplemental CSAT GPRA</td>
<td>CGG5</td>
</tr>
<tr>
<td>Treatment Transition Log</td>
<td>Discharge Status (DCSTATC) TxTyphen, Segdur (segment duration if discharged)</td>
</tr>
</tbody>
</table>


APPENDIX D

OVERVIEW OF THE GAIN

Development and Purpose

The Global Appraisal of Individual Needs (GAIN) 1 originated in 1993 as a collaboration between clinicians, researchers, and policymakers from over a dozen behavioral healthcare agencies to create a comprehensive biopsychosocial assessment tool. It is a progressive and integrated series of measures and computer applications designed to support a number of treatment practices, including initial screenings; brief interventions; referrals; standardized clinical assessments for diagnosis, placement, and treatment planning; monitoring of changes in clinical status, service utilization, and costs to society; and subgroup- and program-level needs assessment and evaluation.

Utilization

The GAIN is an evidence-based assessment used with both adolescents and adults and in outpatient, intensive outpatient, partial hospitalization, methadone, short-term residential, long-term residential, therapeutic community, and correctional programs. It has been adopted by hundreds of agencies and systems of care in communities ranging from large urban areas (Chicago, Los Angeles, Miami, New York City, Oakland) to moderately sized and small urban communities (Bloomington, IL; Farmington, CT; Mobile, AL; Peoria, IL; Phoenix and Tucson, AZ; and St. Petersburg, FL) and rural areas and reservations (Four Corners, NM; Iowa City, IA; Madison County, IL; Sault Ste. Marie, MI; Seven Counties, KY). It is used as the core clinical and research measure across several major multisite studies, including the Adolescent Residential Treatment (ART) program, the Co-occurring Disorder program, the Adolescent Treatment Model (ATM) program, the Assertive Continuing Care (ACC) experiment, the Cannabis Youth Treatment (CYT) experiment, the Drug Outcome Monitoring System (DOMS), the Early Re-Intervention (ERI) experiment, Mothers at the Crossroads, the Persistent Effect of Treatment Study (PETS), Strengthening Communities for Youth, and Reclaiming Futures. Funding for these studies has come from the Center for Substance Abuse Treatment (CSAT), the Interventions Foundation, the National Institute on Drug Abuse (NIDA), the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and the Robert Wood Johnson Foundation (RWJF).

Content
The GAIN has eight core sections (Background, Substance Use, Physical Health, Risk Behaviors and Disease Prevention, Mental and Emotional Health, Environment and Living Situation, Legal, and Vocational). Each section contains questions on the recency of problems, breadth of symptoms, and recent prevalence as well as lifetime service utilization, recency of utilization, and frequency of recent utilization. The items are combined into over 100 scales and subscales that can be used for DSM-IV–based diagnoses, ASAM-based level-of-care placement, JCAHO-based treatment planning, and DOMS-based outcome monitoring. The GAIN also includes items designed to support most state and federal reporting requirements, to compare to community samples from the National Household Survey on Drug Abuse (NHSDA), and to estimate changes in the cost to society based on the work of Dr. Michael French and his colleagues.

Applications
GAIN materials are available in hard copy and electronic forms. The GAIN can be administered by computer or with paper and pencil, and clients with sufficient cognitive functioning can self-administer it. The computer applications are written in Assessment Building System (ABS) to address HIPAA security concerns. They are scalable to multiple types and levels of platforms and able to export the data to an ASCII file, and they can be used to generate individual or group-level reports on demand. Existing reports produced by ABS can identify and correct key-rekey responses, maintain internal consistency across questions, identify methodological red flags, and generate interpretation and recommendation reports in both statistical and narrative forms for clinical use. ABS can be used to create individualized versions of the GAIN, adding subsets of items to the Core group of required items. The applications conduct range checks, follow response skips, add notes, and generate code to export the data into other software (such as SPSS and SAS), and they can import modules for new forms, reports, or functions.

Norms
The psychometrics of the GAIN and the scale norms have been established for both adults and adolescents overall and by level of care (within age). Using the diverse data collected in the abovementioned studies, we are in the process of generating additional norms by gender and race as well as looking at variability in the degree of co-occurring mental disorders and involvement in family, school, work, welfare, and juvenile and criminal justice systems.

Scales and Internal Consistency
The GAIN includes over 100 scales and indices. Most of these scales have two to four subscales, and we are currently completing an article demonstrating that the psychopathology scales consistently fall into four main statistical dimensions across age and level of care: substance problem severity (.90), internal mental distress (.94), external behavior problems (.91), and crime and violence (.90). Other scales provide measures of personal strengths, spirituality, and reasons for and readiness to quit using alcohol and other drugs.

Reliability and Validity
Studies with adults and adolescents have found good reliability in test/retest situations on days of use and symptom counts ($r = .7$ to $.8$), as well as diagnosis ($\text{kappa of .5 to .7}$). Self-reports were consistent ($\text{kappa in the .5 to .8 range}$) with parent reports, on-site urine and saliva testing, and laboratory-based EMIT and GC/MS urine testing. In fact, self-reports on the GAIN were found to be consistent with a multi-method estimate based on any self-report or positive urine or saliva test for any drug ($\text{kappa = .56}$), cocaine ($\text{kappa = .52}$), opioids ($\text{kappa = .55}$), and marijuana ($\text{kappa = .75}$), with no one method being superior across all drugs.9, 10 Using discriminant analysis, the GAIN scales could also reliably predict independent and blind staff psychiatric diagnoses of co-occurring psychiatric disorders including ADHD ($\text{kappa = 1.00}$), Mood Disorders ($\text{kappa = .85}$), Conduct Disorder/Oppositional Defiant Disorder ($\text{kappa = .82}$), Adjustment Disorder ($\text{kappa = .69}$), or the lack of a non-substance use diagnosis ($\text{kappa = .91}$) and to discriminate the primary other disorders across these conditions ($\text{kappa = .65}$).

Licensure, Training, and Support
The GAIN is copyrighted by Chestnut Health Systems. Licensing to use any of the GAIN family of instruments is $100 per agency for 5 years of use. Multisite licenses are available as well. GAIN trainings are held several times per year in open or specially arranged workshops that are part of a continuing education and certification process, and Chestnut has been accredited by the American Psychological Association to offer continuing education credits (CEU) for attendance at these trainings. Samples of the clinical reports, as well as different versions of the GAIN and other related information, at http://www.chestnut.org/li/gain

GAIN Publications

126

GAIN Bibliography - (Updated 4/30/10) A list of bibliographical information for the GAIN. Retrieved from: http://chestnut.org/LI/gain/publications/Full_Bibliography_for_GAIN.pdf
APPENDIX E

GAIN QUESTIONS

B1. What is your gender?

Male ........................................ 1
Female ..................................... 2
Transgender (Male to Female) ...... 4
Transgender (Female to Male) ..... 5
Other (Please describe) .......... 99

B2. What is your date of birth?

Month / Day / Year

B3a. Which races, ethnicities, nationalities or tribes best describe you? (Any others?)
(Record and circle all that apply)

v1. ____________________________________________

v2. ____________________________________________

v3. ____________________________________________

MENTIONED

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alaskan Native (Please record Tribe above)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. Asian</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. African American/Black</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. Caucasian/White</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. Hispanic, Latino or Chicano</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>a. Puerto Rican</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>b. Mexican</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>c. Cuban</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>e. Dominican</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>f. Other Central American</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>g. Other South American</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>z. Other (Please describe above)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. Native American (Please record Tribe above)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. Native Hawaiian</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. Pacific Islander</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>99. Some other group (Please describe above)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>S2. Substance Use Frequency Grid</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(Read from left to right for those substances used in the past 90 days.)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(If this is a self-administered assessment, please ask for staff assistance in completing the following questions.)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. used any kind of alcohol?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. gotten drunk or had 5 or more drinks?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. used marijuana, hashish, blunts or THC?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. used crack, smoked rock or freebase?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. used other forms of cocaine?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. used inhalants or huffed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. used heroin (alone or mixed)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. used nonprescription or street methadone?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. used painkillers, opiates, or other analgesics?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. used PCP or angel dust?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>k. used acid, LSD, ketamine, special K, mushrooms, or other hallucinogens?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>l. used anti-anxiety drugs or tranquilizers?</td>
<td></td>
<td>5v. What did you use?</td>
</tr>
<tr>
<td>m. used methamphetamine, crystal, ice, glass, or other forms of methedrine?</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>n. used speed, uppers, amphetamines, ecstasy, MDMA or other stimulants?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o. used downers, sleeping pills, barbiturates or other sedatives?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p. used any other drug?</td>
<td></td>
<td>5v. What did you use?</td>
</tr>
</tbody>
</table>
Have you ever attended Alcoholics Anonymous (AA), Cocaine Anonymous (CA), Narcotics Anonymous (NA), Social Recovery (SR), or another self-help group for your alcohol or other drug use?  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

S6a. During the past 90 days, on how many days have you attended one or more self-help group meetings (such as AA, NA, CA, or Social Recovery) for your alcohol or other drug use?  

<table>
<thead>
<tr>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

GSSI E12cm. During the past 90 days, did you have the following kinds of social support?  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A professional counselor or other health provider to talk to.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. Friends or colleagues from other companies or schools you could talk to without worry about things getting back to others at work or school.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. People at work or school you could talk to about day-to-day things.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. People at work or school who could help you get your assignments done.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. Family members or close partners you could talk to and rely on.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. Friends you could just hang out with and not talk about work or family issues.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. A legal hobby or activity that you enjoyed and did for yourself.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. Someone you felt like you could talk to about needs and emotions.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9. Someone you felt could help you figure out how to cope with any problems you were having or might have.</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
**Do you currently feel that....**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. being in a treatment program is too demanding?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>b. you have too many other responsibilities now to be in a treatment program?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>c. it will be hard for you to resist alcohol or other drugs where you currently live, work or go to school?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>d. your old friends may try to get you to drink or use other drugs again?</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Do you currently feel that....**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>e. there is a lot of pressure for you to be in alcohol or other drug treatment?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>f. you can get the help you need in an alcohol or other drug treatment program?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>g. you need to be in treatment for at least a month?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>h. you will probably need to come back to treatment again one or more times during your lifetime?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>i. you need support from friends and relatives to deal with your alcohol or other drug use?</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Do you currently think you...**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>k. spend a lot of time thinking about alcohol or other drugs?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>m. could avoid using alcohol or other drugs at home?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>n. could avoid using alcohol or other drugs at work or school?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>p. could avoid using alcohol or other drugs with your friends?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>q. could avoid using alcohol or other drugs when people around you were using them?</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Do you currently think...**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. you have any problems related to alcohol or other drug use, including those things we just talked about?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>s. you have a good understanding of how alcohol and other drug use is related to your problems?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>t. your problems can and will go away?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>u. you know the course most of your problems will follow?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>v. your problems are out of control?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>w. your problems can be solved?</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
When was the last time that...

<table>
<thead>
<tr>
<th>Question</th>
<th>Past month</th>
<th>2-12 months</th>
<th>1+ years</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) you tried to hide that you were using alcohol or other drugs?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>(d) your parents, family, partner, co-workers, classmates or friends</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>complained about your alcohol or other drug use?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) you used alcohol or other drugs weekly or more often?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>(f) your alcohol or other drug use caused you to feel depressed,</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>nervous, suspicious, uninterested in things, reduced your sexual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>desire or caused other psychological problems?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) your alcohol or other drug use caused you to have numbness,</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>tingling, shakes, blackouts, hepatitis, TB, sexually transmitted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>disease or any other health problems?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) you kept using alcohol or other drugs even though you knew it was</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>keeping you from meeting your responsibilities at work, school or home?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) you used alcohol or other drugs where it made the situation unsafe or</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>dangerous for you, such as when you were driving a car, using a machine,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or where you might have been forced into sex or hurt?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(j) your alcohol or other drug use caused you to have repeated problems</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>with the law?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(k) you kept using alcohol or other drugs even though it was causing</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>social problems, leading to fights, or getting you into trouble with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other people?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(l) you needed more alcohol or other drugs to get the same high or found</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>that the same amount did not get you as high as it used to?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(m) you had withdrawal problems from alcohol or other drugs like shaking</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>hands, throwing up, having trouble sitting still or sleeping, or you</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>used any alcohol or other drugs to stop being sick or avoid withdrawal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>problems?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n) you used alcohol or other drugs in larger amounts, more often or for</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>a longer time than you meant to?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(o) you were unable to cut down on or stop using alcohol or other drugs?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>(p) you spent a lot of time either getting alcohol or other drugs, using</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>alcohol or other drugs, or feeling the effects of alcohol or other drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(high, sick)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(q) your use of alcohol or other drugs caused you to give up, reduce or</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>have problems at important activities at work, school, home or social</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>events?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(r) you kept using alcohol or other drugs even after you knew it was</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>causing or adding to medical, psychological or emotional problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>you were having?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Using Card C...

### E5m

**During the past 90 days,** how many people would you say you have **regularly lived with,** including your parents and family? [IF 0, GO TO E6]

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>A Few</th>
<th>Some</th>
<th>Most</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>f.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>g.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Using the number of people...

### E6m

**During the past 90 days,** how many people would you say you spend most of your time with at work, a training program or school? [IF 0, GO TO E7]

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>A Few</th>
<th>Some</th>
<th>Most</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e.</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>f.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>g.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Using Card C...

### E7m

**During the past 90 days,** how many people would you say you spend most of your free time with or hang out with? [IF 0, GO TO E]

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>A Few</th>
<th>Some</th>
<th>Most</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>f.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>g.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
REFERENCES


Project MATCH Research Group (1998). Matching alcoholism treatments to client heterogeneity:
Treatment main effects and matching effects on drinking during treatment. *Journal of Studies on Alcohol, 59*(6), 631-639.


Ms. Jennifer Gangi currently works at the University of South Florida in higher education. In addition to this commitment, Ms. Gangi has a background and work experience that includes a myriad of community, health, and educational opportunities that have afforded her direct community empowerment, development, and leadership. Her research work with adolescents and community-based substance use organizations has helped propel the use of several evidence based adolescent substance abuse treatment models. These models have been used in a number of projects and programs and have been replicated and utilized in many agencies across the country. Ms. Gangi possesses a strong commitment to the prevention and treatment of adolescents with substance use disorders and research in the field of adolescent health and risk behaviors.

Ms. Gangi holds a Bachelors of Arts Degree in Psychology from the University of South Florida. She also holds a Master of Public Health Degree in Maternal and Child Health from the University of South Florida.