PREDICTORS OF RECIDIVISM IN AN ADOLESCENT
SUBSTANCE ABUSING POPULATION

by

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ABSTRACT

Predictors of Recidivism in an Adolescent Substance Abusing Population

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Many adolescents with substance use disorders have ongoing problems with abuse and/or dependence throughout their lives. Little research has been conducted examining the differences among adolescents who do and do not continue to have difficulties. This study compared adolescents who recidivate versus those who do not recidivate after receiving treatment for substance abuse. Adolescents were compared on four categories of variables: (a) demographic variables, (c) delinquency/substance use history, (c) social/educational support, and (d) treatment history. It was found that the most powerful predictors of recidivism within these categories were criminal history severity, age at intake, and treatment completion. The implication of this finding is discussed. It may be possible in the future for treatment providers to identify adolescents most at risk for recidivism, as these teens should perhaps receive more
intensive treatment, a different type of treatment, and/or more intensive monitoring during and after treatment.
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CHAPTER I
INTRODUCTION

Substance use disorders (SUDs) among adolescents are usually associated with a variety of serious problems, including increased school-dropout rates, maladaptive social interpersonal development, and criminal activity (Hawkins, Lishner, Catalano, & Howard, 1985). The *Diagnostic and Statistical Manual IV* (DSM-IV; American Psychiatric Association, 2000) classified SUDs into two main categories based on severity of the problem, substance abuse and substance dependence. Substance abuse includes at least one of the following symptoms: failure to fulfill role obligations due to substance use, recurrent use in hazardous situations, recurrent legal problems related to substance use, and/or continued substance use despite social or interpersonal problems due to or exacerbated by substance use. Substance dependence represents greater severity and includes at least three of the following symptoms: tolerance, withdrawal, unsuccessful efforts to cut down or control substance use, excess time spent in obtaining the substance or recovering from use of the substance, giving up other activities because of substance use, continued use despite knowledge of the problems associated with use, and/or taking the substance in larger amounts than intended. In a national survey, the number of 12- to 17-year-old adolescents classified as having substance abuse or dependence in 2004 was 8.8%. Further, 65% of these teens were classified as being substance dependent (Department of Health and Human Services, 2004).

Many, but not all, adolescents with SUDs have committed multiple criminal offenses. Specifically, up to two thirds of adolescents in the juvenile justice system
may evidence at least one alcohol, drug, and/or mental health disorder (Teplin, 2001).
The high correlation is concerning in light of growing numbers of cases handled by
juvenile courts. Between 1987 and 1996, the number of cases handled by juvenile
courts increased by 49% (Teplin). However, there is often a lack of effective treatment
available in the community for adolescents with these comorbid problems. The lack of
empirically supported treatment is compounded by decreasing public funds for services,
and an increase in the number of uninsured children (Teplin). This often leaves the
juvenile justice system to determine how to best manage these adolescents.

The question of how to best manage adolescents with SUDs who have
committed criminal offences is complicated by the fact that adolescence is an important,
ever-changing developmental period. It is a period in life that requires adjustment to
many social, cognitive, and psychological changes (Lerner & Galambos, 1999).
Substance abuse is a critical developmental problem of adolescence that could have
detrimental effects on adult outcomes (Hawkins et al., 1985). Specifically, the
adolescent brain is still developing, especially the prefrontal cortex, which is important
for executive functioning, including planning, impulse control, and delaying
gratification. It has been suggested that substance abuse in adolescence delays the
development of the prefrontal cortex. The implications of this are the continuation of
impulsiveness and poor judgment into adulthood (G. Hanson, personal communication,
July 18, 2006).

Helping teen SUD offenders is especially important because of the prevalence of
SUDs in adolescents. Presently, fewer adolescents are classified as having a SUD now
than in the past. However, in a national survey, the number of 12- to 17-year-old adolescents classified as having substance abuse or dependence in 2004 was 8.8%. Further, 65% of these teens were classified as being substance dependent (Department of Health and Human Services, 2004).

Given that SUDs may derail normal cognitive ability development by impairing adolescents’ abilities to plan, inhibit impulses, and delay gratification, optimal treatment is essential. However, there is considerable variability in substance abuse treatment outcomes among adolescents. Some adolescents (50-75%) receiving treatment continue to use drugs and/or have persistent legal trouble, while others appear to recover and lead successful lives (Latessa, Shaffer, & Lowenkamp, 2002). Presently it is unclear why some adolescents continue to have problems into adulthood and others recover and lead successful lives. However, given the high rate of problems after treatment, it appears that current treatments may not be meeting the needs of all adolescents. Therefore, additional research on the question of how to help adolescents with SUDs recover is needed.

Given that one of the most consistently reported correlates of serious drug and alcohol use among adolescents is criminal activity (Teplin, 2001), a key outcome of interest among juvenile, substance-abusing offenders is criminal recidivism. Criminal recidivism is referred to as any rereferral, rearrest, or reconviction. The assessment of recidivism in SUD treatment studies is important because the consequences of rearrest and detention following treatment can undermine or interrupt progress in other areas.
Indeed, while research has examined predictors of recidivism in a general adolescent delinquent population (Cottle, Lee, & Heilbrun, 2001; Dembo et al., 1998; Myner, Santman, Cappelletty, & Perlmutter, 1998), there has been little examination of possible predictors of recidivism among adolescent SUD offenders. For example, the research on the general adolescent criminal population is mixed regarding whether substance use disorders are predictive of recidivism. Some studies have found evidence that substance abuse is a strong predictor of recidivism (e.g., Benda, Corwyn, & Toombs, 2001; Niahros & Routh, 1992; Sudipto, 1995). In contrast, other studies have found that substance abuse predicts nonrecidivism (e.g., Wierson & Forehand, 1995; Wilson, Rojas, Haapanan, Duxbury, & Steiner, 2001). Finally, some studies have found no relation between substance abuse and recidivism (Vermeiren, De Clippele, & Deboutte, 2000; Vermeiren, Schwab-Stone, Ruchkin, De Clippele, & Deboutte, 2002).

In addition, when correlates of recidivism have been reported by researchers, it often appears that evaluation of the predictors was of secondary interest. This is reflected, for example, in studies whose primary goal is to determine whether one treatment is more effective than another (e.g., juvenile drug court evaluations). Recidivism statistics are often reported only descriptively; they are not commonly associated with statistical analyses from which one might draw inferences (e.g., Criminal Justice Council’s Statistical Center, 1999; Keir, 2002; State of Florida Department of Juvenile Justice, 2001).
In summary, SUDs continue to be a major problem in society. Among adolescents with SUD issues, delinquency and criminal behavior are serious, comorbid problems. Therefore, clinicians and researchers interested in evaluating the quality of their intervention program should assess a variety of outcomes among SUD offenders, including recidivism and its correlates. While many predictors of general criminal recidivism have been identified in the general adolescent population, it is currently unknown if these predictors generalize to adolescents with SUDs. The juvenile justice system and treatment providers are faced with the question of who among adolescent SUD offenders may benefit most from contemporary psychosocial treatments. Thus, it would be useful if the field could be provided with a deeper understanding of the predictors of recidivism in the adolescent SUD offender population receiving such treatment. The purpose of this study was to examine the variables that predicted recidivism in an adolescent SUD population of youths who had been in treatment for a SUD. By doing this, we can identify which adolescents current treatment methods seem appropriate for what type of adolescent, and which adolescents are in need of different treatment methods.
CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this review was to critique and synthesize the research published to date on predictors of recidivism in a population of adolescents with SUDs. First, this review will identify the variables that have been investigated to date as predictors of general, criminal recidivism and the relationships among these variables that have been found. Criminal recidivism (recidivism) in this study refers to any referral to the juvenile court system and arrest or conviction that the adolescent has either during or after treatment. The second objective of this literature review was to draw conclusions about characteristics within an adolescent SUD offender population that may predict recidivism, based on available empirical evidence and theory. Such data can guide the development of hypotheses for future studies. Finally, suggestions will be made regarding future research on predictors of recidivism in an adolescent offender population.

Variables Investigated

The variables investigated herein can be conceptually placed into four categories. First, demographic characteristics were examined. These variables include gender, race/ethnicity, and age at time of admission to treatment. The second category of variables investigated was delinquency/substance abuse history. Variables include age at first delinquency referral, offense history (including number of prior arrests, type of prior offenses, and number of adjudicated charges), age at first substance use, and
drug of choice. The third category of interest included social/educational support. This included variables such as the adolescents' living situation, employment, and education. The final category included treatment characteristics, including restriction level of treatment setting, length of treatment, and treatment completion. In the case where there was no previous research on a particular topic, research from the general adolescent criminal recidivism population was used.

Predictors of Criminal Recidivism

Nine studies were identified that examined predictors of recidivism in an adolescent SUD population. Eight of the nine studies involved juvenile drug court (treatment) evaluations. The other one specifically examined “psychopathy” as a predictor of recidivism in an SUD population (O’Neill, Lidz, & Heilbrun, 2003). In addition, research on predictors of recidivism in an adolescent general criminal population was occasionally included when there was no information available in the research pertaining to an adolescent SUD offender population.

Demographics

Demographics that were examined included gender, race/ethnicity, and age at treatment admission. These characteristics are important because they are more or less adequately considered when designing a treatment program, and may interact with treatment program components to influence its treatment effectiveness. Therefore, while it is unlikely that a treatment provider would make an admission decision based on any one of these variables alone, when considered with each other or with other
variables, such as delinquency history and social/educational support, these variables could have predictive value.

**Gender.** There is a consistent difference in general recidivism rates between males and females in the adolescent SUD population. Six of the nine studies examined the relationship between gender and delinquency recidivism. Overall, it appeared that being male correlated modestly with increased rates of recidivism. Of the six studies, five found that being male was positively correlated with increased rates of recidivism. One study reported that gender was not a significant predictor.

Thompson (2001) examined gender as a predictor, along with racial/ethnic status, family status, age at start of study, age at first referral, number of referrals, and group membership in a logistic regression. In this study, males were 3.51 times more likely than females to recidivate. In fact, only group membership (e.g., drug court or other treatment) proved to be predictive of recidivism after gender was accounted for. In addition, Latessa and colleagues (2002) also performed a logistic regression analysis and found that gender (being male) was a major predictor of recidivism ($B = -.656$, $p = .051$). These results suggest that gender is an important variable above and beyond other predictors of recidivism.

Three of the studies compared the percentages of male to female recidivists (Criminal Justice Council’s Statistical Center, 1999; Keir, 2002; State of Florida Department of Juvenile Justice, 2001). Each of these studies found that males tended to recidivate more than females, with 22-43% of females recidivating and 32-64% of the males recidivating. White females were found to be the least likely to reoffend or be
recommitted. However the authors noted that a confounding variable may be offense
history, as females tend to be less likely to have a serious offense (State of Florida
Department of Juvenile Justice).

One study found that gender was not a significant predictor of recidivism using
a univariate ANCOVA (Northwest Professional Consortium [NPC], 2004). However
this study only included 21 participants and, therefore, the lack of effect may be due to a
small sample size. The majority of the evidence found supported the assertion that
males are more likely to recidivate than females.

In summary, given that males and females appear to differ in rates of recidivism,
it is likely that being male is in turn, associated with predictors of recidivism that differ
from those of females. However, no published research is available that has explored
this difference in an adolescent SUD offender population.

Race/ethnicity. The substance abuse literature tends to show that being African-
American or Hispanic are protective factors against abusing substances during
adolescence (Kilpatrick et al., 2000). In addition, data suggest that the pathways
leading to SUDs may be different for White compared to ethnic minority teens
(Kilpatrick et al.; Maiddahian, Newcomb, & Bentler, 1988; Williams & Ayers, 1999).
However, the recidivism literature indicated a broader trend in which ethnic minorities
were more likely to recidivate. So, while ethnic minorities were less likely to use
substances compared to White youths, those that did use substances and became
involved in the juvenile justice system were at greater risk for continued involvement in
the system.
Three studies examined the relationship between race/ethnicity and recidivism. Criminal Justice Council's Statistical Analysis Center (1999) found that African-American (60.5% recidivated, \( n = 81 \)) and Hispanic youth (66.7% recidivated, \( n = 6 \)) were significantly more likely to be rearrested than White youth (33.1% recidivated, \( n = 121 \); Pearson's chi square \( p = .001 \)).

Similarly, the State of Florida Department of Juvenile Justice (2001) found that African-American youth have higher reoffending rates than White youth. Further, African-American males in particular have the highest rates of readjudication or conviction and recommitment or adult probation or prison. Finally, the Keir (2002), found that there was a disproportionate number of African-Americans in the problem population (45.1%). In this study, the "problem population" refers a subpopulation of recidivating adolescents (6.9% of all referrals), who committed almost half (49.5%) of the new referrals. In contrast one study, Latessa and colleagues (2002) found that in a logistic regression analysis being an ethnic minority did not significantly increase an adolescent's chances of recidivism after gender was accounted for.

While it generally appears that teens who are members of ethnic minority groups may be more likely to recidivate, two confounding variables that may qualify this conclusion. First, ethnic minority youth tend to have more serious offense histories (Anspach, Ferguson, & Phillips, 2003), which in itself is known to relate to rates of recidivism. Second, ethnic minority youth are less likely to live with both parents, which also puts them at increased risk for recidivism (Criminal Justice Council's Statistical Analysis Center, 1999). Although some studies examine broad race/ethnicity
group differences in terms of recidivism, few studies examine the predictors associated
with recidivism in specific racial/ethnicity subgroups. Given the previously mentioned
possible explanatory or interactive variables, racial/ethnicity differences should be
examined in relation to other predictor variables when studying recidivism in an SUD
adolescent offender population.

Age at treatment admittance. Four studies examined adolescents’ age at entry
into the drug court system and likelihood of recidivism. One of these studies, Criminal
Justice Council’s Statistical Analysis Center (1999) found that older age at time of entry
into drug court is correlated with reduced rereferral ($r = -0.582, p = .007, n = 21$). The
other two studies reported the percent of recidivists within each age group. The
Multnomah County Department of Community Justice (Keir, 2002) found that the
overall recidivist population was more likely to be 15 to 16 years of age; however, 14-
year-olds have the largest percent of recidivists (e.g., 39% of 14-year-olds recidivated).
Likewise, the State of Florida Department of Juvenile Justice (2001) indicated that rates
for reoffending in youth ages 9-19 seem to be the highest for youth ages 12 to 14 years
old. Interestingly, these researchers found that after this peak, all recidivism rates tend
to decline for every subsequent age group except 17- and 18-year-olds. The 17- and 18-
year-olds tended to have slightly higher rates for rereferral or rearrest and to be charged
with more serious times when they reoffend, even though readjudication or conviction
rates are actually lower. In contrast, as previously mentioned, Thompson (2001) found
in his logistic regression analysis that age (at start of the research study) did not predict
recidivism, beyond the variable of gender ($B = -0.414$).
Overall, evidence shows that age of admission into juvenile drug court programs is a predictor of recidivism, with younger teens being the more likely to recidivate than older teens. However, few studies have systematically compared the differences between age groups. Therefore, in the future, age of admission into treatment programs for adolescent SUD offenders should be examined as a possible predictor of outcome.

Delinquency History

Delinquency history includes both substance abuse history and criminal history. Age at first substance use, and drug of choice fall under the category of substance abuse history. In addition, age at first delinquency referral, type of offense, and number of prior referrals are commonly included under the category of criminal history. These variables may indicate to treatment providers the severity and duration of the teens' problems, and could be important indicators of future treatment success.

Age at first substance use. Age at first substance use has been found to be a risk factor for SUDs in adolescents. It is presumed that early substance use careers may relate to high chronicities and poorer rehabilitation outcome (Hawkins et al., 1985). However, very few studies have examined the relationship between age at first substance use and recidivism following treatment or adjudication. In fact, none of the nine studies that examined predictors of recidivism in an adolescent SUD population included age at first substance use in their analysis. In addition, only one study was located that examined the relation between substance use and recidivism in a general adolescent criminal population (Benda et al., 2000). In this study, the mean age of first use was found to be 12.09 years old (SD = 2.07 years). It was found that those who use
drugs (but not alcohol) at a younger age have higher rates of recidivism. It should be noted that this study included adolescents both with and without SUDs. Given the relationship between age at first substance use and SUDs, and the lack of research examining the relationship between age at first substance use and recidivism, more research is needed evaluating the relationship between this variable and adolescent SUD offender treatment outcomes.

*Drug of choice.* Drug of choice is generally assessed by asking the adolescent what drug he/she prefers. NPC (2004) found that primary and secondary drug of choice are not significant predictors of recidivism in a regression analysis. The lack of effect may be due to a small sample size \((n = 21)\). None of the other studies compared drug of choice with recidivism rates. Therefore, the research on drug of choice in the general criminal population was examined. However, this research was inconclusive. Two of the three available studies that examined recidivism in the general criminal population found that drug use/abuse is predictive of recidivism (Dembo et al., 1998; Lattimore, Visher, & Linster, 1995). In contrast, the third study found that alcohol abuse is more predictive of recidivism than drug abuse (Myner et al., 1998). Importantly, these studies did not examine drug use/abuse by specific category of drugs, which could contribute to the lack of consistent differences between alcohol and (broad) drug use/abuse. Further, it should be noted that these studies included both drug use and drug abuse, so these results may not generalize to an adolescent SUD population.

Experts have speculated that drug of choice may be an important predictor of recidivism. However, given the lack of research within the adolescent SUD population,
and the inconclusiveness of the research in the general adolescent criminal population, more research is needed about drug of choice as a predictor of recidivism. In particular, the category “drugs” is too broad a category and should be examined by more specific categories.

**Age at first delinquency referral.** The trends in the delinquency research indicate that age of first delinquency is a powerful predictor of recidivism, with younger adolescents being more likely to recidivate than older adolescents (Myner et al., 1998; Sudipto, 1995; Vermeiren et al., 2000, 2002; Wierson & Forehand, 1995). However, in the adolescent substance abuse literature, results are mixed. Thompson (2001) found (in a regression analysis) that younger age at first delinquency referral did not increase the likelihood of recidivism after gender was accounted for (coefficient $r = .296$). In contrast, two studies found that there is a relationship between age at first delinquency referral and recidivism. Specifically, the Multnomah County Department of Community Justice (Keir, 2002) found that the 60% of the “problem population” had their first delinquency referral at age 13 or younger.

Myner and colleagues (1998) examined predictors of recidivism in a general population. In a multiple regression analysis, a strong relationship emerged between age of first conviction and recidivism ($r^2 = .34$, $p = .001$), with younger adolescents being more likely to recidivate. Interestingly, when age at first conviction was taken out of the regression model, alcohol abuse was no longer a predictor of recidivism. Overall, current research suggests that age of first conviction may be an important
indication of increased likelihood of recidivism in an adolescent SUD population. However, more research is needed in this population to clarify the relationship.

*Criminal history.* While many studies examine prior offense/court history, few of these studies look at the same factors within this category. It appears that prior arrest history is predictive of future recidivism, depending on the variable measured. The State of Florida Department of Juvenile Justice (2001) found that when combined with age (younger age) and gender (being male), prior offense history (average number and types of charges) becomes a good predictor of recidivism risk. In a regression analysis, Latessa and colleagues (2002) found that individuals with prior arrests were significantly more likely to be rearrested even after gender was accounted for ($B = .325$, $p = .008$). In contrast, NPC (2004) found that number of drug-related referrals and total number of referrals is not a significant predictor in a regression analysis. However, as previously mentioned, the sample size in this study was small ($n = 21$). Thompson (2001) also found that number of referrals is not a significant predictor of recidivism when gender is accounted for in a regression analysis (coefficient = .386).

Type of offense at initial referral may be related to recidivism. Specifically, youth with property offenses at referral may be most likely to recidivate. Anspach and colleagues (2003) found that offenders with prior property-related offenses are approximately two times more likely to recidivate than offenders with no prior property offenses. In contrast, youths charged with possession of a drug may be less likely to recidivate. For example, the Multnomah County Department of Community Justice
(Keir, 2002) found that individuals charged with possession of a drug or a person crime may be the least likely to recidivate.

Severity of the crime has also been examined as a predictor of recidivism. Anspach and colleagues (2003) found that “low-risk offenders” who require a relatively low level of treatment are 2 to 3 times less likely to recidivate. However, The Multnomah County Department of Community Justice (Keir, 2002) found that the difference between average severity scores at initial referral between recidivists and nonrecidivists were “very slight,” with nonrecidivists scoring 11.24 and recidivists scoring 11.64 on a scale of 3 to 27.

Given that few studies have looked at various criminal history variables, it is important to examine their relationship with recidivism in an SUD population. Specifically, the following variables should be examined: number of previous arrests, number of drug referrals, type of offense, and severity of the offense.

Social Support and Educational Problems

Living arrangements. Family disruption is one of the most important predictors of childhood predictors of juvenile delinquency (Hawkins et al., 1985). However, very few studies have examined family factors as a predictor of recidivism in a population of adolescents who have been in treatment for substance abuse. One study examined the relationship between the youth’s family composition and recidivism. Specifically, the Criminal Justice Council’s Statistical Analysis Center (1999) examined family composition as a predictor of recidivism. These researchers found that youth who live with both parents were the least likely to be rearrested (30.9% rearrested, n = 68).
Interestingly, the authors of this study noted that ethnic minority youth were less likely to live with both parents, which may account for the disproportionate number of minority youth who recidivate.

_Education._ One study (Latessa et al., 2002) examined education as a predictor of recidivism in an adolescent SUD population. The authors found in a logistic regression that education was not a significant predictor of recidivism; however, they did not indicate what aspect of education was being examined. None of the other studies that examined predictors of recidivism in an adolescent SUD population included educational variables.

In a meta-analysis involving predictors of recidivism in a general adolescent criminal population, Cottle and colleagues (2001) found that history of special education placement was a significant predictor of criminal recidivism ($Z_r = 0.130$, $n = 432$). In contrast, school report of achievement ($Z_r = -0.028$, $n = 10,025$) and school attendance ($Z_r = -0.048$, $n = 299$) were not found to be significant predictors.

Certainly, other variables are no doubt related to recidivism. These might include type of school attended (e.g., regular school versus alternative school), achievement in school, and history of special education placement. These variables may act alone, or may interact with or confound other school variables. For example, adolescents in an alternative school setting may have better grades than adolescents in a regular education setting, because less is expected of them, thereby confounding the relationship between school achievement reports and recidivism. However, no research was located that investigated these variables in an adolescent SUD population.
Employment. Two studies examined the effects of employment on recidivism. Anspach and colleagues (2003) found that adolescents who were employed at the time of admission to drug court are two times less likely to recidivate than their unemployed counterparts. In addition, these researchers found that individuals who are employed take longer to recidivate than those who are not employed. In contrast, Latessa and colleagues (2002) found that being employed did not significantly change the likelihood of an adolescent recidivating after gender was accounted for ($B = -.007$).

Treatment History

Treatment history included restriction level at the treatment facility, length of treatment, and completion of treatment were included in this category. Restriction level refers to the intensity of treatment that the adolescent participates in. For example, some individuals participate in intensive inpatient treatment, some are in day treatment programs, and others are in outpatient community-based programs. Of those in outpatient programs, there are different levels of intensity of treatment. Current research is inconclusive about which type of treatment is the most effective for adolescent SUD treatment. However, it appears that community-based outpatient treatment may be best for adolescent criminal offenders (The Action Group, 2003).

Additional studies are needed relating the intensity of treatment to outcome. For example, it may be useful to examine more restrictive levels (e.g., group sessions every week along with individual session) compared to less intensive approaches (e.g., treatment that includes only individual sessions).
Restriction level. Restriction level refers to the level of intensity of treatment that the adolescent is enrolled in, for example standard out-patient treatment, intensive out-patient treatment or in-patient treatment. One study examined the impact of restriction level on recidivism rates. The State of Florida Department of Juvenile Justice (2001) found that youth released from moderate-, high-, and maximum-risk residential programs have the highest rates for referrals and rearrests after release. In addition, the crimes committed by youth in moderate-, high-, and maximum-risk residential programs tended to be more serious than youth in lower-risk programs. In contrast, youth released from minimum-risk nonresidential programs were the least likely to be rearrested. It appears that although adolescents with more severe problems are receiving more intensive treatment, that these teens have worse outcomes. Two possible explanations are proposed. First, perhaps more intensive treatment is not helpful, and, therefore, we should not be utilizing the additional resources. On the other hand, this could indicate that the level of treatment being provided may not be intensive enough, and more intensive treatment is needed. Given that only one study examined this variable, more research needs to be conducted to determine whether more intensive treatment is indeed helpful to adolescents.

Completion of treatment (drug court). The only studies found that examined completion of treatment (completers vs. noncompleters) in relation to recidivism rates were based on juvenile drug court evaluations. Overall, adolescents who completed drug court treatment programs had improved outcomes compared to individuals who did not complete the drug court program or individuals who were enrolled in alternative
treatment programs. For example, Thompson (2001) found that being part of the drug court group significantly added to a regression analysis as a predictor of recidivism after gender was accounted for (coefficient = 2.98). That is, in this study adolescents who completed drug court treatment were less likely to recidivate. In addition, Anspach and colleagues (2003) found that the drug court group was nearly two times less likely to recidivate than the control group of matched offenders. In addition, Latessa and colleagues (2002) found that 56% of the drug court group was rearrested, while 75% of the comparison group was rearrested. In a logistic regression analysis these researchers found that the treatment group was significantly less likely to recidivate than the comparison group ($B = .846, p = .040$), and that this difference persisted after accounting for gender. Criminal Justice Council’s Statistical Analysis Center (1999) also found a lower arrest rate following treatment for both girls and boys for the drug court group; however ethnic minority juveniles in this program did not have lower arrest rates than juveniles in the comparison program.

Length of treatment. It appears that length of treatment is generally positively correlated with improved outcomes in mental health treatment and in adult substance abuse treatment (Neilson et al., 2004). Paradoxically, length of treatment may be inversely related to treatment program completion among adolescents (NPC, 2004). One reason for this discrepancy may be that some programs are more lenient with high dropout risk adolescents with regard to program rules that stipulate the circumstances under which a teen should be terminated from treatment. In treatment programs that are more lenient, the highest risk adolescents may be kept in treatment longer in the attempt
to maximally help and support them; however, these adolescents may ultimately be more likely to be terminated from treatment. No studies were located that examined length of treatment with outcome (e.g., recidivism). Therefore, research is needed to discover if there is indeed a relationship, and what underlies this relationship.

Overall Summary and Organization of Predictors and Summary

The primary purpose of the preceding review just presented was to organize the findings of studies identifying predictors of recidivism in adolescent SUD populations. For the purpose of the present study, these predictor variables can be usefully organized into four groups: (a) demographic variables, (b) delinquency history, (c) social/educational support, and (d) treatment history. Overall, the summary of the review that follows, the variables that can be rationally placed in each of these four groups, and that have received the most consistent empirical support across studies will be highlighted.

Demographic Variables

Among the variables studied, it appears that gender is the most researched variable, and research consistently shows males as more likely to recidivate than females. Race/ethnicity has also been examined, and studies show that ethnic minorities tend to be more likely to recidivate. Age has also been shown to be related to recidivism. While the results are somewhat mixed, generally younger age at time of treatment is related to increased rates of recidivism. Given the difference found between these groups of adolescents, future studies should examine the predictors of recidivism separately for each group.
Delinquency History

Included in this category were factors related to substance use history and factors related to criminal history. Very little research has examined substance use history with predictors of recidivism in an adolescent SUD population. Age at first substance use has been correlated with increased risk of SUDs, and with increased rates of recidivism in the general adolescent criminal population. However, age at first substance use has not been examined as a predictor of recidivism in an adolescent SUD population. Likewise while drug of choice seems like it would be predictive of recidivism, no studies have been conducted in an adolescent SUD population comparing recidivism rates with drug of choice.

Criminal history severity was also examined as a predictor of recidivism, although few studies included the same predictor variables that are included in this category. Among the variables examined were number of prior arrests, type of offense at initial referral, and severity of the crime. There appears to be a trend in the literature that indicates that individuals with a more extensive criminal history are more likely to recidivate. Type of crime may also be related to recidivism. It appears that adolescents who commit property offenses tend to have slightly higher rates of recidivism, data on these variables were mixed and, therefore, inconclusive. However, within this category severity of the crime was not accounted for. That is, within one category of criminal offense, such as property offenses, there was a wide variety of severity of offense and this severity was not accounted for. More research should be conducted taking into account both type and severity of the offense committed.
Social Support and Educational Problems

Social support and educational variables appear to be studied less than the other categories of variables being examined. This category includes the adolescent's living situation, with adolescents living with both parents having lower recidivism rates; and education, with adolescents who have received special education services having higher rates of recidivism in the general adolescent criminal population. Also, employment was discussed as a possible predictor of recidivism in an adolescent SUD population.

Treatment History

Overall, being in a drug court treatment program appears to be more effective than being in a comparison group (usually detention). In addition, individuals in more restrictive treatment environments tend to have higher rates of rereferrals. However, initial level of severity of the drug problem may account for this finding. That is, adolescents with the most severe drug problems are likely placed into the most restrictive levels of treatment, and it may be the severity of the drug problem, not the level of treatment, that accounts for the difference in recidivism. Finally, research findings are mixed regarding the relationship between treatment length and recidivism. This may depend on the leniency of the individual program in enforcing their own rules for termination.

Hypotheses

The proposed study sought to identify characteristics of adolescents that
optimally predict outcome (recidivism) in a substance treatment program. The following hypotheses, generated by past research conducted on juvenile offenders or teens in substance abuse treatment programs were tested.

*Demographic Variables*

1. Females in the substance treatment program are less likely to recidivate than males. Further, females have different predictors of recidivism than males, especially in social and educational support areas such as who the child lives with, employment, grade-point average (GPA), and type of school attended.

2. White teens are less likely to recidivate than ethnic minority juveniles. Ethnic minorities also show different predictors of recidivism than Whites in areas of social and educational support.

3. Age is inversely related to recidivism. Specifically, younger adolescents are more likely to recidivate than older adolescents.

*Delinquency/Substance Use History*

1. Teens’ age at first substance use is inversely related to recidivism rates. That is, earlier age at first substance use is predictive of increased recidivism. Relatedly, younger age at first delinquency referral is predictive of increased rates of recidivism.

2. Adolescents with a greater number of previous referrals to the juvenile justice system are more likely to have higher rates of recidivism, such as chronicity and severity may undermine treatment.
3. Rates of recidivism are related to type of offense at referral. It is currently unknown whether types of offenses might be related to recidivism and that will be examined in this study.

4. Adolescents’ self-reported drug of choice is related to recidivism rates. Specifically, adolescents whose drug of choice is alcohol are less likely to recidivate than adolescents who abuse other drugs.

**Social Support and Educational Problems**

1. In general, adolescents experiencing a greater number of social supports elements are less likely to recidivate. Specifically:

   a. Adolescents who live with both parents have lower rates of recidivism as compared to adolescents who do not live with both parents.

   b. Adolescents who are employed will be less likely to recidivate than adolescents who do not work.

2. Teen substance abusers who have identified academic problems will be more likely to recidivate. For example:

   a. Adolescents who have received special education services are more likely to recidivate than adolescents who have never received special education services.

   b. Adolescents who attend alternative schools are more likely to recidivate than adolescents who attend in a regular school setting.
Treatment History

1. Individuals judged by case workers/staff as needing more intensive treatment are more likely to recidivate than those needing less intensive treatment.

2. Adolescents who are in treatment longer are more likely to recidivate than those who are in treatment for less time.

3. Adolescents who complete treatment are less likely to recidivate than those who do not complete treatment.

In summary, it is expected that a variety of demographic, delinquency/substance abuse history, social support, and treatment history variables are related to recidivism. In particular being female, White, being older, having limited history of substance use and criminal involvement, and having high social support coupled with completion of treatment is more likely among successful adolescents than unsuccessful adolescents. This will help us identify which adolescents' current treatment is working and which adolescents would benefit from a different type of treatment.
CHAPTER III
PROCEDURES

Treatment Program Description and Study Design

The study examined data from an adolescent treatment facility in Salt Lake County, Utah. Participants in the study were adolescents who were referred to treatment for a drug and alcohol evaluation by a judge, their probation officer, or an intake worker from the juvenile justice system. After the initial referral, every adolescent completed a drug and alcohol evaluation, which included a biopsychosocial interview and the Substance Abuse Subtle Screening Inventory (SASSI). The biopsychosocial interview is based on the American Society for Addiction Medicine (ASAM) criteria for treatment needs. Specifically, there are six ASAM dimensions on which each individual was assessed. These are as follows.

1. Acute intoxication and/or withdrawal, which measure cravings, withdrawal symptoms, seizures and impaired neuropsychological functioning.

2. Biomedical conditions and complications, which measure current health problems, including current medications, chronic health issues, memory problems, and history of illness/head trauma/accidents/surgeries/hospital.

3. Emotional, behavioral or cognitive conditions and complications, which measure dangerousness/lethality, past/current diagnoses, trauma history, current emotional/behavioral/cognitive symptoms, social functioning and course of illness.
4. Readiness to change, which includes stage of change, and how much of a problem the individual believes drugs and alcohol are causing.

5. Relapse, continued use, or continued problem potential, which measures the helpfulness of past treatment, relapses, triggers, strengths, and risk areas.

6. Recovery environment, which assesses family, peer, and school support.

Each adolescent is assigned a level of risk between I (minimal risk) and IV (extreme risk) on all dimensions. Every adolescent was also assigned a DSM-IV (APA, 2000) diagnosis at this time by a masters-level counselor. All files were also reviewed by the program coordinator who holds an Ed.D.

After the initial evaluation, the therapist who conducted the evaluation presented the case to the treatment team at the treatment facility (which consists of the two substance abuse therapists, at least one case manager and the program manager). This team reviewed all referred cases to decide what level of treatment intensity the adolescent needed and whether the treatment program could provide this treatment. The decision was based on the six ASAM levels of risk and the SASSI scores. This particular program accepted only adolescents whose level of risk was I or II, based on the aforementioned ASAM criteria.

After the adolescent was accepted into the treatment program, he or she was placed on a waiting list for treatment for approximately 2 to 4 weeks. After being placed in treatment, the first treatment session consisted of an intake session. During the intake session, the adolescents and their parents signed an informed consent for treatment. In addition, they signed a release of confidentiality allowing the treatment
facility to communicate with the juvenile justice system, service providers and the adolescents’ schools. Finally, each adolescent signed a release of information so that the treatment facility could communicate with their parents. During the intake session, the assigned therapist reviewed everything in the adolescent’s file, administered the Youth Outcome Questionnaire-Self Report (YOQ-SR), and devised a detailed treatment plan with the adolescent’s input. The plan emphasized setting goals the youth must accomplish to complete treatment. In addition, the therapist helped the adolescent and his or her family understand the treatment that the adolescent would be receiving. During treatment, the goals set during this initial intake session heavily influenced the course of treatment.

As previously mentioned, the treatment program offers two levels of treatment that the adolescent may be a part of, based on the ASAM criteria. Standard Outpatient Treatment (SOP) consisted of one hour a week of either individual therapy sessions or family therapy sessions. Adolescents in this level of treatment were on level I of the ASAM criteria, which meant that their level of risk on every ASAM dimension was I. The other level of treatment was the Intensive Outpatient Treatment. This consisted of at least six hours of services per week. These services consisted of 1 hour of individual or family therapy, 1.5 hours of group session, 1.5 hours of life skills class, 1 hour of school visits, and an hour home visit. Adolescents at this level of treatment were generally on ASAM level II.I, which means that at least one of the ASAM dimensions meet level II criteria, and Dimensions 1 and 2 are not higher than level III criteria. The
average length of treatment was around 60-90 days (60-day minimum), with SOP
tending to last longer than IOP.

Individual, family and group therapy sessions were based on the approach of
motivational interviewing (Miller & Rollnick, 2002). The therapist emphasized the
development of the therapist-client relationship. In addition, the ASAM dimensions
were used as a guide to assess which areas the youth needed more help in. For
example, if ASAM dimensions indicated that the individual had the most problems with
Dimension 5, relapse/continued use potential, then this would be a focus in therapy.

The life skills classes associated with the intensive outpatient treatment covered
a variety of empirically supported topics that are important areas of development for
adolescents. These topics included general skills such as communication skills, anger
management, and conflict resolution. In addition, topics unique to an SUD population,
such as relapse prevention, were also covered. The home visit was made by the case
manager, who traveled to the home to meet with the adolescent in his or her natural
environment. At this time, issues on the treatment plan were addressed with the whole
family, including parents and siblings. The school visit is also made by the case
manager, who went to the adolescent’s school once a week. At this time the case
manager tracked the adolescent’s attendance, and talked with teachers and counselors at
the school as needed. The adolescents were sometimes involved in this process.

Treatment was ended for two reasons. The first reason was completion of the
program, wherein the adolescent had completed his or her treatment goals and the
adolescent and therapist mutually agree that therapy can be ended. In addition, the
youth is required to bring a urinalysis (UA), which must have been clean in order for treatment to end. The other reason treatment could end was early termination. The only way an adolescent could be terminated early from the program was not showing up for his or her appointment more than three times (“three strikes and you’re out policy”), without a compelling excuse.

Participants

The adolescents \((N = 222)\) involved in this study all received treatment for a SUD. Participants were adolescents ages 13-18. The sample consisted of both males (73%) and females, and was made up of a diverse population, including both Hispanic (19%) and Caucasian teens. All adolescents who received treatment over the last 5 years were included.

Methods

Data for this study was derived from a review of existing treatment records of adolescents who participated in the substance abuse treatment program within the last 5 years between January 2000 and March 2005. Among the variables found directly in the adolescents’ files, two were computed from multiple indices. These variables were DSM severity and criminal history.

The DSM severity variable was the product of the number of DSM diagnoses the adolescent received and a dichotomous severity rating (i.e., whether the diagnosis was abuse or dependence). In the event of multiple DSM diagnoses, the diagnosis product ratings were added together. For example, if an adolescent had an alcohol
dependence diagnosis, a marijuana abuse diagnosis and a cocaine abuse diagnosis, his
total DSM severity rating would be: alcohol dependence \((1 \times 2 = 2)\), plus marijuana
abuse \((1 \times 1 = 1)\), plus cocaine abuse \((1 \times 1 = 1)\); for a total score of “4.” The DSM
severity rating variable was composed after it was found that drug of choice was not
significantly related to outcome. This variable was designed to thoroughly investigate
the impact that the adolescents’ substance abuse problems has on their likelihood of
recidivating.

The second variable that was created by the author was criminal history. This
variable began as five categories of severity ratings—one category for each type of
offense coded. The offenses originally included were drug, property, person, traffic,
misrepresentation, and status offenses. After the offenses were separated into
categories, each offense was assigned a relative severity rating (between 1-3) based on
severity of the crime and was compared to other types of crimes that were reported. For
example, in the “person” category, disorderly conduct, which seemed to be the least
severe type of offense, was assigned a relative severity rating of 1, followed by
“assault,” which seemed to fall in the middle and was assigned a relative severity rating
of 2, and “aggravated assault” seemed to be the most severe and was, therefore, given a
relative severity rating of 3. After this, the adolescent was assigned an overall severity
rating in each category, which was calculated by adding up the total number of offense
severity ratings in each category. Therefore, at this point each adolescent had a severity
rating from each of the categories. An example of each type of offense and the severity
rating associated with it is found in the Appendix. After the severity ratings were
completed, a correlation matrix was created. Because all of the variables except traffic ratings were correlated with each other, these categories were summed to form a single category denoted as "criminal history."

The outcome measure, recidivism, was obtained by examining arrest records from the time the adolescent was discharged from the program to the date of data collection (anywhere from 90 days to 4 years). Each adolescent was given a dichotomous rating designating whether he or she recidivated, based on whether the adolescent had a record of rearrest or reconviction. All adolescents had a minimum of 90 days of treatment.

Analyses

Preliminary analyses were performed to examine the general characteristics of the data. First, univariate descriptive statistics were produced for the independent and the dependent variables. This included means, standard deviations and frequencies, along with visual output such as histograms. This facilitated identification of data entry errors, outliers, and examination of the distributions of the sample.

Following univariate descriptive statistics, bivariate associations were examined. This included correlations within and between the independent variables, as well as with the dependent variable (adolescent recidivation). This allowed the researcher to examine simple correlative relationships among variables.

After these preliminary analyses, univariate logistic regression analyses were performed to formally examine the relationship between single hypothesized
independent variables and the dependent variable, recidivism. This step facilitated the choice of appropriate variable combinations to be further analyzed using multivariate logistic regression.

Next, multivariate logistic regression analyses were conducted to produce prediction models of recidivism. Because neither ethnicity nor gender was found to be a significant univariate predictor of recidivism, these variables were not used in a separate series of logistic regression analyses to determine if there were measures that differentiated the groups.

Three models of predictor variables were explored. The purpose of generating this model was to potentially assist practitioners in determining factors that might lead to better treatment placements in the future. First, logistic regression was performed that included all statistically significant predictor variables. The second model included only demographic variables, delinquency history, and social/educational support categories. The purpose of generating this model was to potentially assist practitioners in determining factors that might lead to better treatment placements in the future. Variables such as the teen's treatment history would not be relevant here because practitioners have no way of knowing this information (e.g., did the adolescent complete treatment?) before treatment had begun. The final model was based only on treatment variables that were predictive of recidivism.
CHAPTER IV
RESULTS

This section will report the descriptive statistics for the study sample. Then results from univariate logistic regression procedures are presented to highlight the predictive value of each independent variable with regard to recidivism. Finally, a model based on logistic regression is presented, which optimally predicts overall recidivism for this sample.

Descriptive Statistics

Demographic Variables

The sample consisted of 222 adolescents who previously participated in treatment for a substance use disorder. Seventy-three percent of the participants were male \( n = 163 \). Approximately 77\% of the participants classified themselves as White \( n = 171 \), 19\% of the participants classified themselves Hispanic/Latino/a \( n = 42 \), and one participant (0.5\%) classified himself/herself as Black. The average age at intake was 16.4 years old \( (SD = 1.10; \text{range 12-18.4}) \).

Delinquency/Substance Use History

Delinquency and substance use history included age at first substance use, age at first arrest, and previous number of court referrals (see Table 1).

The delinquency/substance abuse category also included reported drug of choice, which was split into two categories (a) alcohol (18.9\%), and (b) marijuana
Table 1

*Descriptive Statistics for Demographic Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample n</th>
<th>Mean</th>
<th>SD</th>
<th>range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake age</td>
<td>222</td>
<td>16.39</td>
<td>1.10</td>
<td>13.0 – 18.4</td>
</tr>
<tr>
<td>Arrest age</td>
<td>210</td>
<td>14.34</td>
<td>2.07</td>
<td>7.4 – 17.9</td>
</tr>
<tr>
<td>Previous number of referrals</td>
<td>222</td>
<td>3.57</td>
<td>2.85</td>
<td>0 – 20</td>
</tr>
</tbody>
</table>

(81.1%). When entered into the model of predictor variables, drug of choice was not found to be predictive. Therefore, a DSM-IV (APA, 2000) diagnosis severity rating was calculated for a more thorough analysis of drug use patterns. It was hypothesized that perhaps drug of choice was not powerful enough to predict recidivism because it did not account for the severity of the substance use. For example, two individuals may both have indicated that marijuana was their drug of choice, so these two would both be categorized the same way. However, one of these adolescents may have had a severe marijuana dependence disorder (e.g., using marijuana multiple times a day for the past 2 years); whereas, the other adolescent may have had a marijuana abuse disorder with a pattern of use that is not nearly as severe. However by classifying adolescents by drug of choice, these adolescents were combined into the same category and their differences were not noted. On the other hand, by classifying adolescents in terms of DSM severity (e.g., abuse vs. dependence disorders), the differences in use patterns may be better accounted for. Therefore, adolescents were divided into two groups (i.e., those with a substance abuse classification and those with a substance dependence classification). Teens receiving both abuse and dependence diagnoses were assigned to the dependence category (i.e., while they met abuse criteria, they technically met the more severe
Seventy-five percent of adolescents had only a substance abuse diagnosis, whereas 25% had at least one dependence diagnosis.

Adolescents were also classified based on the number and severity of DSM-IV (APA, 2000) substance use diagnoses that they were assigned. Adolescents were assigned 1 point for substance abuse diagnoses and 2 points for substance dependence diagnoses. These points were summed to produce an overall diagnosis severity rating. The minimum score for this was “0,” and the maximum score was “6,” with a mean severity score of 2.03 (SD = 1.02). A histogram representing the scores is represented in Figure 1.

Type of offense at referral was divided into five categories (person, property, status, drugs, and traffic) and each offense was assigned a severity rating between 1

![Histogram depicting number and severity of DSM-IV substance use diagnoses.](image)

Figure 1. Histogram depicting number and severity of DSM-IV substance use diagnoses.
(least severe) and 3 (most severe). The severity ratings were based on information such as the amount of damage that was done, the level of violence involved and the type of charge it was (e.g., felony vs. misdemeanor). Then the severity ratings were added together within each category to give the teen an overall severity rating for each category (see Table 2).

Most of the offense category indicators were weakly correlated with one other (see Table 3). Logistic regression analyses require that the independent variables are not statistically significantly correlated with one another; therefore, multicolinear offense categories were combined to create one overall category called “criminal history.” This variable represents an overall severity rating (which includes indicators of both number of offences and severity of the offenses) of the criminal offenses that the adolescent committed. A histogram of the criminal history severity variable is represented in Figure 2. The skewed distribution is noted, and while logistic regression procedures are generally robust to skewness, results will be viewed with caution.

Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person rating</td>
<td>1.51</td>
<td>3.04</td>
<td>0-20</td>
</tr>
<tr>
<td>Property rating</td>
<td>3.23</td>
<td>5.38</td>
<td>0-38.96</td>
</tr>
<tr>
<td>Status rating</td>
<td>1.05</td>
<td>1.47</td>
<td>0-8</td>
</tr>
<tr>
<td>Drugs rating</td>
<td>3.06</td>
<td>2.62</td>
<td>0-12</td>
</tr>
<tr>
<td>Traffic rating</td>
<td>.52</td>
<td>1.42</td>
<td>0-10</td>
</tr>
<tr>
<td>Misrepresentation rating</td>
<td>1.68</td>
<td>2.73</td>
<td>0-20</td>
</tr>
<tr>
<td>Criminal history severity</td>
<td>10.53</td>
<td>9.77</td>
<td>0-61</td>
</tr>
</tbody>
</table>

*Note. Sample size = 222.*
Table 3

*Correlations Between Offense Severity Category Indicators*

<table>
<thead>
<tr>
<th>Category</th>
<th>Person</th>
<th>Property</th>
<th>Status</th>
<th>Drugs</th>
<th>Traffic</th>
<th>Misrepresentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person</td>
<td>1</td>
<td>.20*</td>
<td>.15*</td>
<td>.11</td>
<td>.09</td>
<td>.43*</td>
</tr>
<tr>
<td>Property</td>
<td>1</td>
<td>.21*</td>
<td>.06</td>
<td>.20*</td>
<td>.42*</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>1</td>
<td>.24*</td>
<td>.07</td>
<td>.40*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs</td>
<td>1</td>
<td>.06</td>
<td></td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>1</td>
<td></td>
<td></td>
<td>.20*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misrepresentation</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$.

Figure 2. Histogram of criminal history severity rating.
Social Support and Educational Problems

Variables in this category included a designation of who the adolescent lived with at time of intake (mother or father only, 29%; both mother and father, 27%; and other, 41%), GPA, the average number of hours worked in a week by the adolescent, special education services (32% received special education services), and type of school (19.5% attended an alternative school). Descriptive statistics are listed in Table 4.

Treatment History

Individuals were assigned to one of two levels of treatment based on the ASAM criteria. Approximately 70% (155 participants) of the sample was assigned to level one. The average length of treatment was 99 days (SD = 64.49 days; range 5-476 days). Overall, approximately 27% of the participants (n = 55) fully completed treatment.

Univariate Logistic Regression

Univariate logistic regression procedures were completed to assess the predictive value of individual variables. Between 185 and 222 cases were included for

Table 4

Descriptive Statistics for Grade Point Average and Number of Hours Worked per Week (Employment)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample n</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>185</td>
<td>2.11</td>
<td>.95</td>
<td>0-4</td>
</tr>
<tr>
<td>Employment</td>
<td>208</td>
<td>5.17</td>
<td>10.10</td>
<td>0-40</td>
</tr>
</tbody>
</table>
each analysis depending on the information that was available for each participant. Each indicator variable was entered separately into a logistic regression procedure. The statistically significant \((p < 0.05)\) predictors of recidivism considered in isolation from one another were the following: (a) level of treatment, (b) treatment completion, (c) age at first arrest, (d) hours worked, (e) age at treatment intake, and (e) severity of criminal history (see Table 5).

Table 5

Univariate Logistic Regression Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>p-value</th>
<th>Exp B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.43</td>
<td>.32</td>
<td>.18</td>
<td>.65</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.34</td>
<td>.38</td>
<td>.36</td>
<td>1.41</td>
</tr>
<tr>
<td>Intake age</td>
<td>-.65</td>
<td>.16</td>
<td>.00*</td>
<td>.52</td>
</tr>
<tr>
<td><strong>Delinquency/substance use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug of choice</td>
<td>.84</td>
<td>.41</td>
<td>.04*</td>
<td>2.31</td>
</tr>
<tr>
<td>DSM diagnosis</td>
<td>-.40</td>
<td>1.09</td>
<td>.71</td>
<td>.67</td>
</tr>
<tr>
<td>DSM frequency</td>
<td>.38</td>
<td>.41</td>
<td>.35</td>
<td>1.46</td>
</tr>
<tr>
<td>Previous # of referrals</td>
<td>.08</td>
<td>.06</td>
<td>.14</td>
<td>1.09</td>
</tr>
<tr>
<td>Criminal history severity</td>
<td>.11</td>
<td>.03</td>
<td>.00*</td>
<td>1.11</td>
</tr>
<tr>
<td>Age at first arrest</td>
<td>-.23</td>
<td>.08</td>
<td>.00*</td>
<td>.80</td>
</tr>
<tr>
<td>Age at first use</td>
<td>-.14</td>
<td>.08</td>
<td>.09</td>
<td>.87</td>
</tr>
<tr>
<td><strong>Social support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living arrangements</td>
<td>-.33</td>
<td>.32</td>
<td>.30</td>
<td>.72</td>
</tr>
<tr>
<td>GPA</td>
<td>-.21</td>
<td>.17</td>
<td>.22</td>
<td>.81</td>
</tr>
<tr>
<td>Alternative school</td>
<td>-.22</td>
<td>.36</td>
<td>.55</td>
<td>.81</td>
</tr>
<tr>
<td>Special education</td>
<td>.25</td>
<td>.34</td>
<td>.47</td>
<td>1.28</td>
</tr>
<tr>
<td>Employment</td>
<td>-.03</td>
<td>.01</td>
<td>.03*</td>
<td>.97</td>
</tr>
<tr>
<td><strong>Treatment history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment completion</td>
<td>-1.60</td>
<td>.47</td>
<td>.00*</td>
<td>.20</td>
</tr>
<tr>
<td>Length of treatment</td>
<td>.01</td>
<td>.00</td>
<td>.08</td>
<td>1.01</td>
</tr>
<tr>
<td>Level of treatment</td>
<td>.91</td>
<td>.35</td>
<td>.01*</td>
<td>2.48</td>
</tr>
</tbody>
</table>

\* \(p < .05\).
Multivariate Logistic Regression

After univariate and bivariate analyses were completed, a series of exploratory multivariate logistic regression analyses were conducted to estimate the contribution of independent variables in predicting a youth's recidivism. The goal was to develop the most parsimonious predictive model for recidivism. The following steps were followed, as suggested by (Hosmer & Lemeshow, 2000). First, all potential independent variables were included in a multivariate logistic regression analysis. Based on this analysis, a second analysis was conducted using only variables that were statistically significant at a $p < .25$ level in the initial multivariate analysis. A third multivariate logistic regression analysis was then completed using variables that were statistically significant at a $p < .05$ level in the second analysis. At this step, the correlations between the remaining variables were examined, and when variables were significantly correlated with each other (at $p < .05$), the least explanatory variable (based on the significance level of each variable when used in the model without the variable it was correlated with) was removed from the model. Because criminal history severity and previous number of referrals were highly intercorrelated ($r = -.852$), the previous indicator variables for referrals were removed from the model. Criminal history severity alone was a more parsimonious explanation of the variance in the model than criminal history severity and previous number of referrals together. Last, a final analysis was run conducted using the remaining variables. The final model was comprised of criminal history, intake age, and treatment completion. The model
indicated that recidivism was best predicted by severity of criminal history, younger age at intake and early termination of treatment.

Results of Multivariate Logistic Regressions

First, all of the variables were entered into a multivariate logistic regression analysis (see Table 6).

Table 6

Multivariate Logistic Regression Including All Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Sig</th>
<th>Exp B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-1.13</td>
<td>.72</td>
<td>.12*</td>
<td>.32</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>1.16</td>
<td>.76</td>
<td>.13*</td>
<td>3.18</td>
</tr>
<tr>
<td>Intake age</td>
<td>-1.23</td>
<td>.45</td>
<td>.01*</td>
<td>.29</td>
</tr>
<tr>
<td>Delinquency/substance use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug of choice</td>
<td>-.12</td>
<td>.50</td>
<td>.84</td>
<td>.89</td>
</tr>
<tr>
<td>DSM diagnosis</td>
<td>-.40</td>
<td>1.09</td>
<td>.71</td>
<td>.67</td>
</tr>
<tr>
<td>DSM frequency</td>
<td>.38</td>
<td>.41</td>
<td>.35</td>
<td>1.46</td>
</tr>
<tr>
<td>Previous # of referrals</td>
<td>-.90</td>
<td>.27</td>
<td>.00*</td>
<td>.41</td>
</tr>
<tr>
<td>Criminal history</td>
<td>.58</td>
<td>.13</td>
<td>.00*</td>
<td>1.78</td>
</tr>
<tr>
<td>Age at first arrest</td>
<td>-.17</td>
<td>.19</td>
<td>.54</td>
<td>.89</td>
</tr>
<tr>
<td>Social support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lives with</td>
<td>-.41</td>
<td>.37</td>
<td>.27</td>
<td>.67</td>
</tr>
<tr>
<td>GPA</td>
<td>.66</td>
<td>.39</td>
<td>.09*</td>
<td>1.93</td>
</tr>
<tr>
<td>Alternative school</td>
<td>1.07</td>
<td>.83</td>
<td>.20*</td>
<td>2.92</td>
</tr>
<tr>
<td>Employment</td>
<td>-.02</td>
<td>.02</td>
<td>.55*</td>
<td>.98</td>
</tr>
<tr>
<td>Treatment history</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment completion</td>
<td>-1.04</td>
<td>.70</td>
<td>.14*</td>
<td>.36</td>
</tr>
<tr>
<td>Length of treatment</td>
<td>.00</td>
<td>.00</td>
<td>.30</td>
<td>1.00</td>
</tr>
<tr>
<td>Level of treatment</td>
<td>.01</td>
<td>.86</td>
<td>.99</td>
<td>1.01</td>
</tr>
</tbody>
</table>

*p < .25.
Second, based on the initial exploratory multivariate logistic regression analysis, independent variables that were significant at a $p < .25$ level were included in a second logistic regression analysis. Therefore, analysis included gender, ethnicity, GPA, alternative school attendance, level of treatment, treatment completion, treatment length, intake age, previous number of referrals, and criminal history severity (see Table 7).

Third, variables that were significant at $p < .05$ were entered into a new analysis to design a final model to include all variables that statistically significantly predict recidivism. These variables included alternative school attendance, treatment completion, intake age, previous number of referrals and criminal history (see Table 8)

Table 7

*Multivariate Logistic Regression Analysis 2: Variables That Were Significant at $p < .25$ in Analysis 1*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>S.E.</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-.82</td>
<td>.58</td>
<td>.16</td>
<td>.44</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.36</td>
<td>.62</td>
<td>.56</td>
<td>1.44</td>
</tr>
<tr>
<td>GPA</td>
<td>.38</td>
<td>.30</td>
<td>.21</td>
<td>1.46</td>
</tr>
<tr>
<td>Alternative school</td>
<td>1.41</td>
<td>.71</td>
<td>.05*</td>
<td>4.1</td>
</tr>
<tr>
<td>LOT</td>
<td>.28</td>
<td>.53</td>
<td>.60</td>
<td>1.33</td>
</tr>
<tr>
<td>Treatment completion</td>
<td>-1.29</td>
<td>.61</td>
<td>.03*</td>
<td>.28</td>
</tr>
<tr>
<td>Treatment length</td>
<td>.00</td>
<td>.00</td>
<td>.48</td>
<td>1.00</td>
</tr>
<tr>
<td>Intake age</td>
<td>-1.09</td>
<td>.31</td>
<td>.00*</td>
<td>.37</td>
</tr>
<tr>
<td>Previous # of referrals</td>
<td>-.83</td>
<td>.23</td>
<td>.00*</td>
<td>.44</td>
</tr>
<tr>
<td>Criminal history</td>
<td>.52</td>
<td>.12</td>
<td>.00</td>
<td>1.67</td>
</tr>
<tr>
<td>Drug of choice</td>
<td>.60</td>
<td>.70</td>
<td>.39</td>
<td>1.82</td>
</tr>
</tbody>
</table>

*p < .05.
Table 8

*Multivariate Logistic Regression Analysis 3: Variables That Were Significant at p < .05 in Analysis 2*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Sig</th>
<th>Exp B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment completion</td>
<td>-1.621</td>
<td>.529</td>
<td>.002</td>
<td>.198</td>
</tr>
<tr>
<td>Intake age</td>
<td>- .703</td>
<td>.211</td>
<td>.001</td>
<td>.495</td>
</tr>
<tr>
<td>Previous # of referrals</td>
<td>- .674</td>
<td>.164</td>
<td>.000</td>
<td>.510</td>
</tr>
<tr>
<td>Criminal history</td>
<td>.404</td>
<td>.081</td>
<td>.000</td>
<td>1.498</td>
</tr>
</tbody>
</table>

Upon examining the intercorrelations among the remaining variables, it was found that criminal history severity and previous number of referrals were highly intercorrelated ($r = -.852$; see Table 9). Therefore, previous number of referrals was removed from the model. Criminal history severity alone was a more parsimonious explanation of the variance in the model than criminal history severity and previous number of referrals together.

Finally, the remaining variables were entered into a fourth analysis to create a final model comprised of criminal history, intake age, and treatment completion. The model indicated that recidivism was best predicted by severity of criminal history, younger age at intake, and early termination of treatment (see Table 10).

A goal of the present study was to attempt to identify characteristics of teens that might help treatment providers identify who is most likely to recidivate. Because these variables cannot be known before the adolescent enters treatment (e.g., treatment length, treatment completion), a second model was constructed that includes only
Table 9

**Correlation Matrix Among Independent Variables, Analysis Step 3**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment completion</th>
<th>Intake age</th>
<th>Previous # referrals</th>
<th>Criminal history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment completion</td>
<td>1.00</td>
<td>.03</td>
<td>.18</td>
<td>-.13</td>
</tr>
<tr>
<td>Intake age</td>
<td></td>
<td>1.00</td>
<td>.14</td>
<td>-.25</td>
</tr>
<tr>
<td>Previous # referrals</td>
<td></td>
<td></td>
<td>1.00</td>
<td>-.85*</td>
</tr>
<tr>
<td>Criminal history</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 10

**Final Model of Predictors of Recidivism**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Sig</th>
<th>Exp B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment completion</td>
<td>-1.36</td>
<td>.50</td>
<td>.01</td>
<td>.26</td>
</tr>
<tr>
<td>Intake age</td>
<td>-.66</td>
<td>.19</td>
<td>.00</td>
<td>.52</td>
</tr>
<tr>
<td>Criminal history</td>
<td>.16</td>
<td>.04</td>
<td>.00</td>
<td>1.17</td>
</tr>
</tbody>
</table>

variables that can be known or assessed prior to treatment. This model included only variables that were previously significant and are known at time of intake (i.e., intake age and criminal history). The purpose of this model is to serve as a guide for clinicians when considering treatment options for adolescents. Results are reported in Table 11.

In summary, a final goal of the present study was to devise a model of treatment variables that predict recidivism. That is, are there specific characteristics about treatment that increases the likelihood of recidivism such as treatment length, level of treatment or treatment completion? Given that only one variable was a posttreatment predictor, a third model to predict variables that describe treatment that might predict
Table 11

Multivariate Logistic Regression, Analysis of Pretreatment Predictors

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>S.E.</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intakeage</td>
<td>-.77</td>
<td>.19</td>
<td>.00</td>
<td>.46</td>
</tr>
<tr>
<td>crimHX</td>
<td>.14</td>
<td>.03</td>
<td>.00</td>
<td>1.15</td>
</tr>
</tbody>
</table>

recidivism such as treatment length, or treatment completion was not feasible.

However, as seen in the univariate regression analysis, the treatment completion indicator by itself was predictive of recidivism.
Adolescents who have been in substance abuse treatment are frequently rearrested or rereferred to the juvenile justice system. The juvenile justice system is often faced with the task of how to best manage these adolescents. Currently there are few empirically validated treatments for adolescents available in the community for adolescents with substance abuse problems. In addition, there is a decreasing amount of public funds for treatment (Teplin, 2001). Therefore, treatment providers often struggle to treat these adolescents.

As many as 50-75% of adolescents who have been in treatment for substance abuse disorders continue to use drugs and/or have persistent legal problems. However, few studies have examined the characteristics of adolescents who are successful in treatment as compared to adolescents who continue to have legal and substance use problems. This study was designed to help treatment providers identify the adolescents most likely to recidivate and who, therefore, may need more intensive treatment, more monitoring during treatment or a different type of treatment. Specifically four categories of predictor variable (demographics, substance use/delinquency history, social and educational support and treatment history) were devised. First individual variables were examined to help determine which individual factors may be important predictors of continued problems. Second, the variables were entered into a model to determine which variables are the strongest predictors of recidivism when looked at in relation to each other.
Individual Predictor Variables

The overall goal of this study was to devise a model of variables that predict recidivism; however, as a preliminary goal, variables were first analyzed individually to identify which variables should potentially be included in the model. Individual variables are also important to examine because they may help guide clinicians and researchers as to what areas to focus on in research or treatment.

A few of the variables examined in this study had been shown in prior research to be significant predictors of recidivism. These variables include gender (e.g., Criminal Justice Council’s Statistical Center, 1999; Keir, 2002; Latessa et al., 2002; State of Florida Department of Juvenile Justice, 2001; Thompson, 2001); age at intake (Criminal Justice Council’s Statistical Analysis Center; Keir; State of Florida Department of Juvenile Justice); and treatment completion (Anspach et al., 2003; Criminal Justice Council’s Statistical Analysis Center; Latessa et al.; Thompson). Consistent with previous research, both intake age (with younger individuals being more likely to recidivate) and treatment completion (with individuals who did not complete treatment being more likely to recidivate) were found to be significant predictors of recidivism. On the other hand, gender was not found to be predictive of recidivism in the current study despite past research indicating that males are more likely to recidivate than females (Criminal Justice Council’s Statistical Center; Keir; Latessa et al.; State of Florida Department of Juvenile Justice; Thompson). The discrepancy between past research and the present investigation’s results could be due to the fact that although there was a significant difference between males and females...
on criminal history severity \( (p = .005; df = 220) \) with males having a more severe there was little difference between females and males on most other variables (e.g., intake age, DSM diagnosis frequency, treatment completion, or level of treatment). Because intake age and treatment completion were two of the most powerful predictors of recidivism and the males and females were similar on these characteristics, it is not surprising that there is little difference in recidivism between males and females in rates of recidivism. Another explanation for the lack of difference in rates of recidivism between males and females could be that the treatment program included in the present study addressed the needs of both males and females comparably, whereas in other programs studied to date, the needs of males were addressed less adequately.

Many of the variables included in the present study had previously been included in only a few prior studies. Therefore, there is not sufficient prior research to empirically support hypotheses regarding the relationship between recidivism and these variables. Included in this category of variables are ethnicity, previous number of referrals, criminal history, age at first arrest, living arrangements, employment, and level of treatment.

The present study found that individuals with a more severe criminal history were more likely to recidivate, younger individuals were more likely to recidivate, and individuals who were employed fewer hours were more likely to recidivate as hypothesized. It may be that relative youthfulness limits the number of hours some teens can work. Nevertheless, it is clear that precocious involvement in illegal activities places youth at higher risk of recidivism after treatment.
There were also many variables examined in this study that had not been studied in previous research but which have attracted the interest of other substance abuse or delinquency researchers. These variables include drug of choice, DSM diagnosis, age at first substance use, GPA, alternative school attendance, and history of special education services. Of these variables, drug of choice was the only variable that correlated with recidivism in the present study. In particular, adolescents whose drug of choice was marijuana were more likely to recidivate than adolescents whose drug of choice was alcohol. This is similar to results found in two studies using the general adolescent criminal population (Dembo et al., 1998; Lattimore et al., 1995).

One potential reason why individuals who use marijuana were more likely to recidivate may be that marijuana use is illegal, whereas alcohol use is more akin to a status offense because it is legal for adults. Therefore, adolescents who are using illegal substance such as, marijuana may also be more willing to engage in other high-risk behavior, or break the law in other circumstances. In addition, more laws may need to be broken to obtain marijuana than alcohol. Drug of choice should be reexamined in the future, as one past study involving general criminal population found that alcohol abuse was more predictive of recidivism than drug abuse in an adolescent criminal population (Myner et al., 1998). In addition, previous researchers examined both substance use and substance abuse, and they collapsed the different types of drug categories into one category labeled “drug use/abuse.” It may not be appropriate to include marijuana in the same category as the “hard substances” due to the relative addictive potential of the different classes of drugs. For example, in general the hard
substances are more addicting, have more severe side effects, and are more difficult to obtain than marijuana. Therefore, individuals who use the “hard substances” may be more likely to recidivate.

Models of Predictor Variables

While individual predictors of recidivism are helpful, it may be more useful to clinicians to have a model of the most powerful predictors of outcome of treatment. Three models of predictor variables were constructed. The first was a general model that included the statistically significant variables from all four categories of predictor variables. This model was designed to provide an overview of the variables that are the most important to consider. The second model was a pretreatment model, which included variables that can only be known to clinicians or researchers prior to treatment (e.g., demographic variables, delinquency/substance abuse variables, and social support variables). This particular model may be the most useful to clinicians, as it might allow them to know in advance which adolescents are most likely to continue to have trouble after treatment. The third model consisted of posttreatment variables that describe what happened during treatment (e.g., treatment history variables, which includes length of treatment, treatment completion, and level of treatment). This is an important model because it helps to pinpoint which aspects of treatment may be important.

General Model of Predictors

The first model of predictor variables consisted of all variables that contributed significantly to recidivism, including both pretreatment and posttreatment variables.
This model was designed as a general model that includes all important variables and can help both clinicians and researchers know what the most important factors are of the individual and about treatment in predicting outcome of substance abuse treatment. This model included treatment completion, intake age and criminal history severity. The model suggests that adolescents who are younger, have a more severe criminal history, and do not complete treatment are the most likely to recidivate. This is paradoxical, because one would expect adolescents who are older to have a more severe criminal history. However, note that the model suggests that it is a combination of being younger and having a severe criminal history best predict recidivism. This model is consistent with a theory of delinquency that distinguishes persistent delinquents, who essentially are in trouble from a very young age and continue to be in trouble into adulthood, from adolescent-limited delinquent teens who tend to cause trouble during an isolated time in mid- to late-adolescence (Moffitt, 1993).

Interestingly, many of the variables that were by themselves significant indicators of recidivism were not significant contributors to the model. These variables include drug of choice, age at first arrest, employment, and level of treatment. In addition, previous number of referrals, which was not a significant predictor of recidivism by itself, did contribute to the model, but only when criminal history severity was also considered. These results suggest that criminal history severity (which includes both previous number of referrals and the severity of the crime) is a more important factor than previous number of referrals (when considered alone). In addition, it is likely that criminal history severity also accounts for level of treatment
because individuals in a more restrictive level of treatment are more likely to have an increased severity of criminal history.

The criminal history severity variable as used in this study was likely a conservative estimate of outcome due to the nature of the way the data was collected (e.g., information was collected from the juvenile justice data base, so not a lot of information was available on the severity of the crimes committed). Despite this, criminal history severity was a powerful predictor of recidivism. Future researchers should continue to examine this variable as a predictor of recidivism. It may be helpful to design the study so that more information can be obtained about the nature of the crimes that adolescents have committed.

Age at first arrest was predictive when considered by itself; however, once entered into a logistic regression model, age at first arrest was no longer predictive of recidivism. It may be that age at first arrest is accounted for by intake age, given that individuals who come into contact with the system first are probably likely to enter into treatment first. Overall, age appears to be an important contributing factor with younger individuals tending to have greater recidivism. These results imply that younger adolescents may require more intensive treatment, should perhaps be placed in more structured treatment and possibly, be monitored more closely both before and after treatment. Certainly, future research should address the treatment needs of these younger adolescents so as to better address the problem of recidivism in this population.

Pretreatment Predictor Variables

The second model included relevant variables that clinicians and researchers
could assess before the individual enters treatment. This included demographic
variables, delinquency/substance abuse history variables, and social support variables.
This model may be especially useful for clinicians because it may allow them to know
in advance which adolescents are at the highest risk for recidivism or treatment
difficulties. The two variables found to be predictive of recidivism in this model were
intake age and criminal history. This suggests that individuals who are younger and
who have a more severe criminal history are most likely to recidivate. This finding, if
consistently replicated in future studies, would have important implications for
treatment providers, as it represents information readily available to them before
treatment. Younger individuals with a more severe criminal history may need more
intensive treatment or perhaps be monitored more closely than other teen offenders. In
addition, this is the teen subgroup that should be targeted for new interventions that are
being developed because it appears that current treatments may not be effective for
them due to their high recidivism rates.

Posttreatment Predictors

The final model is composed of variables within the treatment history category.
This is a potentially useful model as it examining factors about treatment (per se), that
are important for treatment outcome. A statistically significant multiple logistic
regression model was not obtained for this category of predictors. However, treatment
completion seems to be the most important predictor of recidivism in this category.
One hypothesis of the current study was that adolescents who are in treatment longer
may be more likely to recidivate because treatment providers are more lenient with
them. However, in the present study there was no difference in recidivism rates based on length of treatment. This suggests that it may indeed be beneficial to try to keep individuals in treatment for as long as possible before terminating them for program noncompliance.

Strengths and Weaknesses

A major strength of the present study is that it is one of the few investigations conducted to date that examined predictor variables of treatment outcome using inferential statistics. In addition, it is one of the only studies known conducted to date that examined recidivism in a regular treatment program (as opposed to, for example, a drug court program).

The examination of the criminal history severity variable is also a strength of this study. Previous researchers have measured variables such as number of referrals or type of offense, or severity of offense as individual variables. Generally these researchers have not found these variables to be consistently predictive of recidivism. However, the present investigation combines these constructs (severity of offense, type of offense, and number of referrals) for use as a predictor of recidivism. This study highlights that it is not the particular type of crime that was committed that is predictive of recidivism, but rather it is the number and severity of previous offenses that predicts recidivism. The severity variable was one of the strongest predictor variables in the study, although it is probably a conservative measure of the outcome due to the nature of the data. Importantly, knowing that criminal history severity is linked with high
recidivism rates will likely be useful for clinicians. This information (the number and severity of offenses committed) is generally available to clinicians, and clinicians can, therefore target individuals with the most severe criminal histories for more intensive intervention with more monitoring during and after treatment.

Among the potential weaknesses, the present results can probably be generalized only to programs similar to the type used for the present study (e.g., out-patient programs that use motivational interviewing techniques and base treatment on the ASAM criteria). Another weakness is that an existing data set was used and most measures relied heavily on self-report information. The self-report approach to documenting most variables may have compromised the validity of a number of indices, such as special education history, employment, who the child lives with, and GPA. Therefore, although these variables were not found to be statistically significant predictors of recidivism in the current study, future researchers should continue to examine their predictive validity. In future studies, it would be helpful to have this type of information (information that in this study was obtained via self-report, including special education history, employment, type of school attended, and GPA) verified by another source and also to follow up on the information upon termination to determine if there were important changes longitudinally. By obtaining more detailed and accurate information about these variables, it will allow researchers to examine the variables more thoroughly. For example, if researchers obtained more information about special education services, they could make this variable a continuous variable that accounted for the time spent in special education or the amount of services received
while in special education instead of using it as a dichotomous variable (were special education services ever received, yes or no?).

The present study also suffered from a lack of diagnostic specificity. Because this study was not designed prior to the execution of the treatment, the intake team did not obtain the same information regarding participants’ diagnoses. Some clinicians diagnosed disorders other than SUDs, whereas others considered only the SUDs. Therefore, it is likely that much information was not available on other DSM diagnoses such as depression, ADHD, or anxiety. It is advised that future studies control for diagnostic specificity before the study begins to enable them to collect data on all types of psychological disorders that adolescents may have.

Finally, as previously mentioned the validity of the criminal history severity variable may be questionable, which likely limited the strength of its predictive value in this study. Specifically, it was sometimes difficult to distinguish the severity of various crimes reported in the database. This could be corrected in future studies by obtaining permission in advance from the participants to follow up with outcomes (e.g., recidivism) to enable researchers to obtain more precise data about what offenses they commit.

Overall this study may provide useful information to clinicians and researchers. It seems that the three most important factors in predicting recidivism may be age at intake, severity of criminal history, and treatment completion. At intake, clinicians could use this information to target younger adolescents with a more severe criminal history and apply a more intensive intervention or monitoring throughout the
intervention. It is also important to note that treatment completion, but not treatment length was an important predictor of recidivism. This suggests that keeping adolescents in treatment until they complete treatment may be beneficial irrespective of the length of time they are in treatment.

In sum, it appears that adolescents who are prone to recidivism fit a profile commonly observed among adults who are substance abusers and criminal offenders including early evidence of impulse control (as evidenced by early age of arrest and intake into a substance abuse program), high risk-taking tendencies, high boredom/sensation-seeking, and other antisocial tendencies. These individuals are likely identifiable long before their substance use problems occur, because they often begin to get in trouble at a young age. However, they are also likely to be largely overlooked by parents, schools, and other authorities at this early age; therefore, they may not receive the help they need. Due to the systemic nature of the substance abuse problems (e.g., there are many factors that contribute to the etiology of substance abuse and conduct problems and these often include the family), prevention programs should be funded that target children with early conduct problems. In addition, research should be conducted that relates these early interventions to drug use outcomes.
REFERENCES


### Offense Type and Severity Rating

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<tr>
<th>Offense Category</th>
<th>Examples of offense committed</th>
<th>Severity rating</th>
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<tbody>
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<td>Aggravated assault</td>
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