Regular article

Long-term outcome of substance-dependent youth following 12-step treatment

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Abstract

The adolescent drug treatment outcome research literature primarily focuses on short-term follow-up periods (e.g., 1 year). This study extends the said literature by describing the pattern of drug use at 1, 4, and 5.5 years in three groups of adolescents: a Treatment group, which underwent a 12-step-based drug treatment program (n = 159); a Waiting List group (n = 62); and a Community Control group (n = 94).

The Treatment group consistently showed significantly lower levels of drug involvement than the Waiting List group. However, at all points, both the Treatment and Waiting List groups showed higher levels of drug use than the Community Controls. Within the Treatment group, completing treatment and involvement in aftercare were positively associated with improved outcomes. The treatment implications of the study are discussed. © 2007 Elsevier Inc. All rights reserved.

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1. Introduction

Most studies of adolescents treated for alcohol or other drug (AOD) problems report outcomes through 1 year of follow-up (Catalano, Hawkins, Wells, Miller, & Brewer, 1990–1991; DATOS-A, Grella, Hser, Joshi, & Rounds-Bryant, 2001; Williams, Chang, & Addiction Centre Adolescent Research Group, 2000). Several strategies have shown short-term promise in reducing drug use: family therapies (e.g., Henggler, 1993; Liddle, Dakog, Diamond, Barrett, & Tejeda, 2001; Waldron, Slesnick, Brody, Turner, & Peterson, 2001), cognitive–behavioral therapy (Kaminer, Burleson, & Goldberger, 2002; Latimer, Winters, D’Zurilla, & Nichols, 2003), motivational interviewing (Monti et al., 1999), and integrative models of treatment, such as the Cannabis Youth Treatment Study (Dennis et al., 2004). Studies of the clinical course of early-onset AOD problems are essential to determining the impact of treatment on long-term functioning and the factors and conditions associated with changes in illness severity over time.

Differences between adolescents and adults in substance abuse treatment may affect longer term clinical course. Compared with adults, treated adolescents are more likely to be polydrug users: More than half (51%) of adolescents reported a combination of alcohol and cannabis use as their primary reason for seeking treatment; 26% reported cannabis use only, and 9% reported alcohol use only (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2001). Adolescents are also more likely to be referred to treatment by the criminal justice system compared with adults (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2001).
Studios, 2001), which may influence motivation to change substance use behavior. Further, adolescents’ typically shorter history of substance use and lower severity of drug problems compared with adults (Deas, Riggs, Langenbucher, Goldman, & Brown, 2000) may impact longer term clinical course. Some longer term studies have begun to be reported in the literature of drug-abusing youth. The Pittsburgh Adolescent Alcohol Research Center has published two reports on the long-term outcome of adolescents with an alcohol use disorder (AUD). Maisto, Martin, Cornelius, and Martin (2004) showed that the non-problem drinkers were a heterogeneous group; over time, some youth showed a decreasing trend of alcohol problems, others showed an increasing trend, and some showed a mixed pattern.

We earlier reported on the 1-year clinical course in a group of adolescents who had been involved in substance abuse treatment and who were diagnosed with both marijuana use disorder and AUD (Winters, Stinchfield, Opland, Weller, & Latimer, 2000). Absolute and relative outcome analyses indicated that completing treatment was associated with far superior outcomes than not completing treatment or not receiving any treatment at all. The percentage of treatment completers who reported either abstinence or only a minor lapse from either alcohol or marijuana for the 12 months following treatment was 53%, compared with 15% and 28% for the noncompleter and Waiting List groups, respectively. Although cannabis was the preferred substance at intake, alcohol was the most common substance used during the follow-up period.

The purpose of this study was to extend the 1-year follow-up research by investigating the clinical course of this sample over 5.5 years and four assessments: intake, Year 1 follow-up, Year 4 follow-up, and Year 5.5 follow-up. AOD use and meeting diagnostic criteria for a substance use disorder (SUD) over the follow-up course will be described in three primary groups (Treatment, Waiting List, and Controls). Also, outcomes will be described as a function of three separate subanalyses within the Treatment group: effect of treatment involvement (completers vs. noncompleters), effect of treatment modality (residential vs. outpatient), and effect of aftercare participation (none/minimal vs. moderate/regular). The study adds to the growing literature on the long-term course of adolescents with an SUD and on the course of youth receiving a 12-step-based Minnesota Model approach to treatment, which is considered to be one of the most commonly applied treatment regimens for drug-abusing adolescents in the United States (Substance Abuse and Mental Health Services Administration, 1999).

2. Method

2.1. Participants

A summary of participant characteristics as a function of the three primary study groups (Treatment, Waiting List, and Controls) is provided in Table 1, and we describe them separately below.

2.1.1. Treatment sample

Consecutive adolescent admissions at a 12-step-based Minnesota Model program were approached by research staff during an 8-month period (1996–1997) during their treatment intake and were asked to participate. All lived in the seven-county Minneapolis metropolitan area. Inclusion criteria, which were determined by research staff, required that the individuals were 12–18 years old, met Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for at least one current psychoactive substance dependence disorder, and showed no evidence of acute psychotic disorder, developmental disability, acute intoxication, and withdrawal symptoms. One hundred seventy-nine admissions initially agreed to participate (71% of those eligible). All participants in this group reported meeting dependence criteria for at least one substance (alcohol and cannabis dependence disorders, 72% and 86%, respectively). Also, all Treatment group participants reported at least monthly use of at least one substance during the prior year.

In terms of setting, participants received either residential or outpatient treatment on the basis of clinical assignment by the facility staff at the conclusion of their intake evaluation. Five participants were temporarily transferred from the setting to which they were originally assigned to the other setting. However, these participants returned to their original setting after no more than 2 days, and thus, they retained their initial setting status. Whereas setting

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment</th>
<th>Waiting list</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>159</td>
<td>62</td>
<td>94</td>
</tr>
<tr>
<td>Male (%)</td>
<td>58</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>White (%)</td>
<td>86</td>
<td>84</td>
<td>83</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>15.7</td>
<td>15.9</td>
<td>16.1</td>
</tr>
<tr>
<td>SESa,b</td>
<td>48</td>
<td>47</td>
<td>50</td>
</tr>
<tr>
<td>Previous drug treatment (%)</td>
<td>26</td>
<td>28</td>
<td>&lt;1</td>
</tr>
<tr>
<td>At least 1 dependence diagnosis (%)</td>
<td>100</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>2 or more dependence diagnosis (%)</td>
<td>82</td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td>Monthly substance use during the past year (%)</td>
<td>100</td>
<td>100</td>
<td>19</td>
</tr>
</tbody>
</table>

* The three groups do not differ on this variable.
* Based on Hollingshead (1975); range = 17–66; higher scores indicate better SES.
* The Treatment and Waiting List groups differ from the Controls but do not differ from each other on this variable.
assignment is intended to be based on problem severity considerations, the reality of the process is that assignments are largely dictated by the terms and conditions of the client’s health insurance policy. The criteria for residential and outpatient assignment varied considerably among the participants’ various health insurance carriers, such that the upper threshold for allowable outpatient care for one carrier often exceeded the threshold for residential care for another carrier. Thus, it is not surprising to find that the two setting groups in the study are equivalent on the various intake problem severity measures. It is important to keep in mind that some residential participants received outpatient treatment and vice versa.

In terms of intensity, members of the Treatment group differed as to whether treatment was completed or not. Treatment completers (n = 124; 78%) received the full course of primary drug treatment, defined by an approved discharge by the client’s primary physician. All treatment completers participated for at least the full course of either residential-based therapy (approximately 30 days) or outpatient-based therapy (approximately 35 sessions), and a few even extended their participation. Treatment noncompleters (n = 35; 22%) left the program prior to staff approval; circumstances included elopement, discharge against staff advice, and expulsion due to violation of program rules. Most of these noncompleters (81%) left treatment within the first week (residential) or by the fifth session (outpatient), and none of the other noncompleters participated in more than 50% of the expected treatment length. It is important to keep in mind that some residential participants received outpatient treatment and vice versa.

### 2.1.2. Waiting list sample

This sample originally consisted of 66 participants who were recruited during the same period, who came from two drug evaluation facilities that were not affiliated with the treatment program noted above. The two evaluation centers were chosen by virtue of the expectation that they would yield clients who were similar to Treatment participants in terms of age, gender, ethnicity, socioeconomic status (SES), and clinical characteristics. As shown in Table 1, all Waiting List participants reported meeting dependence criteria for at least one substance (alcohol and cannabis dependence disorders, 74% and 85%, respectively), and similar to the Treatment group, all Waiting List participants reported use of any substance, at least on a monthly basis, in the previous year. These youth received a referral for drug treatment from the intake staff (indicating the clinical decision that their condition required it) and expressed a desire for care, but because of inadequate or absence of insurance funding, they had to be placed and kept on a waiting list to receive public funds for treatment.

It is important to emphasize that only two Waiting List participants actually received treatment at any time during the follow-up period (each participant received a short-term outpatient treatment).

### 2.1.3. Controls

The Community Control sample (n = 99) was recruited from a large public school that was geographically located in the same seven-county metropolitan area where the Treatment participants lived. Control youth were randomly selected to provide a close approximation of their age, ethnicity, and gender with those in the Treatment group. Thus, the Control sample’s distributions of gender and ethnicity, as well as their mean age, approximated those of the Treatment sample (59% males; 83% White; mean age, 16.1 years).

The absence of a current or lifetime substance dependence disorder at baseline was the inclusion criterion for Controls. Due to resource limitations, the Controls did not receive Year 1 assessment, but this group had complete data for intake, Year 4, and Year 5.5.

### 2.2. Background comparisons

The three primary groups did not differ on several variables (percentage of male participants, percentage of those who are White, mean age at intake, and SES at intake), but the Controls had significantly lower rates of prior drug abuse treatment, having at least one substance dependence disorder, reporting monthly or more frequent use of any substance compared with the Treatment and Waiting List groups (χ² = 17.3–141.5, all p values <.01).

The Treatment and Waiting List groups did not differ (p > .10) on any of the above variables, nor did they differ (p > .10) on other background and clinical variables measured at intake, including the proportion of those who were still attending school, the proportion of those with prior adjudication in the juvenile criminal justice system, and rates of item endorsement for diagnoses of attention deficit/hyperactivity disorder, conduct disorder, oppositional defiant disorder, depression, and anxiety disorders.

### 2.2.1. Sample sizes for analysis

Complete data at intake, Year 1, Year 4, and Year 5.5 were collected for 89% of Treatment participants (n = 159) and for 94% of Waiting List (n = 62) participants. There were, thus, no significant between-group differences in percentage of participants with data for all eligible time points (χ² = 3.7, p = .16). For Control participants, complete data for eligible assessments (intake, Year 4, Year 5.5) were available for 95% of this group (n = 94). All analyses were based on participants with complete data.

### 2.3. Treatment description

The 12-step-based adolescent drug program consisted of both residential and nonresidential units that were fully staffed by administrators, psychiatrists, psychologists, nurses, chemical dependency counselors, school teachers, and additional support staff. As a Minnesota Model program, it combined the principles of the Twelve Steps of
Alcoholics Anonymous (AA) and basic principles of psychotherapy, with the goal of abstinence from all drugs and alcohol. All clients were involved in a range of treatment components that typically span four consecutive weeks for residential clients and 30 sessions over six consecutive weeks for outpatient clients. Treatment components included group therapy and individual counseling, family therapy, lectures about the Twelve Steps of AA, a series of AA-based reading and writing assignments, school study sessions, and occupational and recreational therapy.

Step work focused on the first five steps of recovery: (1) admitting to the power of substances to make one’s life unmanageable, (2) believing that there is hope for change if one lets himself or herself be helped, (3) learning from the advice of others as one explores and makes different decisions about his or her life, (4) taking an in-depth moral inventory of one’s life, and (5) discussing one’s past wrongs with a peer, counselor, or significant other. These steps were intended to increase each youth’s recognition that drug involvement was causing problems in his or her life, that a significant lifestyle change was needed to reverse the current escalation of problems, and that support for change could be drawn from several sources in one’s home and community.

Families attended sessions one evening a week, on average, throughout the treatment program. Group therapy, lectures, and contact with other families and the staff offered the participants both information and support. At the conclusion of primary treatment, clients were expected to enter a half-year, outpatient, continuing care program, which met two to three times per week. Its purposes were to continue the treatment process, to provide ongoing assessment of the adolescent’s progress, and to provide referrals for additional or alternative assistance as needed.

2.3.1. Modifications for adolescents

As described in the program’s treatment handbook, the treatment model was adjusted for adolescents in several ways: Assessment process involved only adolescent instruments; there was a significant focus on family therapy; group therapy addressed adolescent issues (e.g., peer issues, sexuality); several hours a day included in-program schooling (for residential participants); and recreational activities were often used to promote recovery principles.

2.4. Measures

2.4.1. Drug involvement

Drug involvement measures were administered at all time points (intake, Year 1, Year 4, and Year 5) for Treatment and Waiting List participants and at intake, Year 4, and Year 5.5 for Controls. Two sets of measures were administered, both of which had a prior 12-month time frame: drug use frequency (DUF) and SUD. Follow-up ratings for treatment completers referred to the period since discharge; for treatment noncompleters, to the period since discharge; and for the Waiting List participants and Controls, to the period since the intake assessment.

The DUF variable involved assessing 12 major drug categories using a five-point scale (5 = about daily, 4 = about weekly, 3 = about monthly, 2 = about less than monthly, 1 = abstinence). The descriptions of the drugs are identical to the items from the national senior high school surveys (Johnston, Bachman, & O’Malley, 1985). These DUF items have shown high internal consistency (2 = .82–.93) and favorable 1-week test–retest stability (r = .86–.91) in drug-clinic-referred samples (Winters, Stinchfield, & Henly, 2001). We also asked about prior-year frequency of aggregate drug use using the same five-point scale to assess frequency of use across substances.

Parents were also administered a DUF measure that asked if they had any knowledge of their child’s alcohol or drug use during the follow-up period. Urine drug screens were collected at each follow-up to test for the presence of alcohol, THC at 20mg/ml, amphetamines, opiates, barbiturates, cocaine, and benzodiazepines. The laboratory used a two-step process in which any positive finding by immunoassay (or gas chromatography for alcohol) is verified by a second testing of gas chromatography/mass spectrometry.

As a means of validating the self-report, at each follow-up, all participants completed a revised DUF that asked if use had occurred during a period that corresponded to the time frame of the urinalysis (e.g., use of alcohol 10 hours prior to the test, any use of cannabis as recent as 2 days ago, daily use of cannabis within the prior 6 weeks).

Prior-year substance use dependence diagnoses were measured according to DSM-IV (American Psychiatric Association, 1994) criteria with the Adolescent Diagnostic Interview—a highly structured interview with favorable psychometric properties (Winters, Stinchfield, Fulkerson, & Henly, 1993). All Treatment participants at intake had a dependence diagnosis.

2.4.2. Aftercare involvement (treatment participants only)

Participation in aftercare (or in more intensive treatment—such as following a relapse) among Treatment participants was measured at each follow-up period using a procedure based on the timeline follow-back (Sobell & Sobell, 1994) to record the total number of sessions attended by each youth across the entire follow-up period. Participation in aftercare was counted for several types of posttreatment programs, including the aftercare offered by the treatment program, AA/Narcotics Anonymous, and individual and family counseling initiated by the family, as well as any retreatment experienced by the youth.

On the basis of an examination of the distribution of this variable across all follow-up assessments and considering several continuous scoring options, we formed the following dichotomous categorization to reflect level of attendance in any aftercare services: none/minimal (58%) and moderate/
regular (42%). For membership in the moderate/regular group, the individual’s pattern of involvement had to indicate at least one of the following: (1) weekly or nearly weekly attendance for any 6-month (or more) continuous period or (2) self-report of about monthly or greater attendance for any 12-month (or more) continuous period, with the allowance of no more than one gap in attendance of not more than two consecutive months.

2.5. Procedure

Prospective participants and their parent/guardian were told during recruitment that the study would examine youth functioning as a result of prior drug abuse and that participation was independent of referral and treatment decisions at the facility. All testing was conducted by trained research staff. Intake measures were administered as part of the evaluation appointment. Client and parent follow-up measures were administered either in person or over the telephone for long-distance clients (n = 18 cases with at least one follow-up by telephone).

3. Results

3.1. Intake refusers

Some Treatment (n = 17) and Waiting List (n = 4) participants refused to participate in the study. We combined all refusers (n = 21) and then compared their intake characteristics from archival data to the combined group of participants for which we had data for all assessment points (i.e., Treatment and Waiting List participants; n = 121). The only significant findings observed on a range of demographic and clinical variables were that the refusers reported significantly higher rates of previous mental health treatment and significantly higher rates of parental history of substance abuse compared with the combined participant group (both p < .05).

3.2. Validity of self-report

We performed analyses of correspondence between self-reports and urine testing across all follow-up assessments. We found unadjusted percentage of exact agreements of 94% between urinalysis and adjusted DUF score. We also calculated κ coefficients to adjust for prevalence rates, and the result was quite encouraging (κ = .82). In three cases, the self-report did not disclose cannabis use when the urinalysis was positive, and in one instance, the self-report disclosed cannabis use in the presence of a negative urine test. Furthermore, client–parent agreement rates were also quite high; overall percentage of agreement on abstinence versus nonabstinence status was 85% in the Treatment group, 89% in the Waiting List group, and 79% among Controls.

3.3. Course of AOD use and SUDs

As noted earlier, all Treatment participants at baseline reported either about weekly or about daily aggregate use of substances (typically alcohol, marijuana, or both) during the prior year. Also, all Treatment participants met DSM-IV criteria for a dependence disorder for at least one substance. To measure improvement over time (e.g., Maisto et al., 2002), we created separate bivariate categorizations of DUF and diagnostic status (SUD) at each time point. For DUF, we created a composite DUF variable that reflected an aggregate frequency of use across all substances. Participants were categorized as improved if they were abstinent or reported no more than about monthly use across all substances. Participants were categorized as not improved if they reported more frequent use of substances than monthly, specifically about weekly or about daily use across all substances. Similarly, improvement on SUD criteria was also measured at each follow-up point using the same metric as above: improved = no substance use diagnosis present or only a substance abuse disorder present; not improved = any substance dependence diagnosis is present.

Table 2 presents the percentages of improvers on the DUF and SUD measures for all three groups (Treatment, Waiting List, and Controls) and time points. In general, rates of improved status on both these measures were the highest for the Control group, the next highest for the Treatment group, and the lowest for the Waiting List group. Rates of improvement tended to drop across time points. These impressions were confirmed from the calculation of improved status odds ratios (ORs) computed for all groups and time points. All ORs for the DUF and SUD measures differed significantly between the Treatment and the Control groups and between the Waiting List and the Control groups (range = .48–.09, all p values <.01). Comparisons between the Treatment and the Waiting List groups on the DUF were significant at Year 4 (OR = 9.7) and at Year 5.5 (OR = 10.4). These two groups also differed significantly at Year 5.5 on the SUD measure (OR = 2.2), but no other comparisons of these groups yielded significant differences (p > .10).

We also compared the three groups on rates of self-reported abstinence over the prior 12 months across all follow-up points. Abstinence rates were low in all groups (Treatment, 6%; Waiting List, 0%; and Controls, 11%), and no pairwise comparisons (ORs) were significant (p > .10).

3.4. Survival analysis

Next, we compared the three groups on time to loss of “improved status” on the DUF and SUD measures, using survival analysis, as shown in Figs. 1 and 2, respectively. The Treatment versus Waiting List comparison indicated that being in the Treatment group was associated with significantly longer improved status rates on both the DUF and SUD (log rank = 4.8 [df = 1], p < .05 and log rank = 6.1
[df = 1], p < .01, respectively). This analysis also showed that the Control group had a much longer survival time compared with the other two groups for both outcomes (log rank = 61.9 [df = 2], p < .01 and log rank = 57.5 [df = 2], p < .01, respectively).

### 3.5. Trajectory analysis

Group analyses are not sensitive to outcome trajectory patterns. Given that Controls had one less assessment (n=3) than the other groups (n=4), we did not include Controls in this analysis. To analyze change trajectory for the Treatment and Waiting List groups (Controls had one fewer follow-up point and were not included), we focused upon the diagnostic status codes (1 = improved; 2 = not improved) measured at each of the three time points, for a total of eight (2³) possible code types. The frequency distribution of all obtained code types was then inspected, and we decided to rationally categorize code types rather than use statistically generated trajectory procedures.

We thus identified three rationally determined patterns that characterized most participants: persistors, desistors, and resistors. We labeled patients who showed no improved status for all three time points or those who showed improvement once but not at Year 5.5 as persistors. We labeled patients who showed improved status at both Year 4 and Year 5.5 or those who showed improved status only at Year 5.5 as desistors. Finally, we labeled as resistors those who showed improved status for all three follow-up points. These patterns accounted for all but two patients who were not included in these analyses.

As shown in Table 3, the distribution of these trajectory groups was significantly different between the Treatment and Waiting List groups, χ²(2) = 14.2, p < .01. The Waiting List group had a higher rate of persistors (75%) and lower rates of desistors and resistors (18% and 7%, respectively) compared with the Treatment group. It is noteworthy that there were 36% more persistors in the Waiting List group compared with the Treatment group (75% vs. 48%). One should cautiously interpret the findings from the trajectory

<table>
<thead>
<tr>
<th>Outcome variables</th>
<th>Tx (%)</th>
<th>WL (%)</th>
<th>Cont (%)</th>
<th>Tx vs. WL (OR)</th>
<th>Tx vs. Cont (OR)</th>
<th>WL vs. Cont (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved drug use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>49.7</td>
<td>38.7</td>
<td>–</td>
<td>1.56</td>
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<tr>
<td>Year 4</td>
<td>45.9</td>
<td>8.1</td>
<td>63.8</td>
<td>9.68***</td>
<td>0.48***</td>
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<tr>
<td>Year 5.5</td>
<td>34.6</td>
<td>4.8</td>
<td>57.4</td>
<td>10.40***</td>
<td>0.39***</td>
<td>0.05***</td>
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<tr>
<td>Improved SUD</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>44.0</td>
<td>37.1</td>
<td>–</td>
<td>1.33</td>
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<td>–</td>
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<tr>
<td>Year 4</td>
<td>44.0</td>
<td>33.9</td>
<td>84.0</td>
<td>1.54</td>
<td>0.15***</td>
<td>–</td>
</tr>
<tr>
<td>Year 5.5</td>
<td>42.8</td>
<td>25.8</td>
<td>79.8</td>
<td>2.15*</td>
<td>0.19***</td>
<td>0.10***</td>
</tr>
</tbody>
</table>

Note. Tx = Treatment group (n = 159), WL = Waiting List group (n = 62), Cont = Control group (n = 94).

* p < .05.
** p < .01.
*** p < .001.
Table 3  
Groups as a function of trajectory status

<table>
<thead>
<tr>
<th>Group</th>
<th>Persistors</th>
<th></th>
<th>Desisters</th>
<th></th>
<th>Resistors</th>
<th></th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>75</td>
<td>47.5</td>
<td>59</td>
<td>37.3</td>
<td>24</td>
<td>15.1</td>
<td>14.3*</td>
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<tr>
<td>Waiting list</td>
<td>46</td>
<td>75.4</td>
<td>11</td>
<td>18.0</td>
<td>4</td>
<td>6.6</td>
<td></td>
</tr>
<tr>
<td>Treatment completers*</td>
<td>50</td>
<td>40.7</td>
<td>51</td>
<td>41.5</td>
<td>22</td>
<td>17.9</td>
<td>9.6*</td>
</tr>
<tr>
<td>Treatment incompleters*</td>
<td>25</td>
<td>71.4</td>
<td>8</td>
<td>22.9</td>
<td>2</td>
<td>5.7</td>
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<tr>
<td>Residential*</td>
<td>40</td>
<td>49.4</td>
<td>28</td>
<td>34.6</td>
<td>13</td>
<td>16.0</td>
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<td>Outpatient*</td>
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<td>45.4</td>
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<td>40.3</td>
<td>11</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td>None/Minimal aftercare*</td>
<td>64</td>
<td>71.1</td>
<td>22</td>
<td>24.4</td>
<td>4</td>
<td>4.4</td>
<td>50.6*</td>
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<tr>
<td>Moderate/Regular aftercare*</td>
<td>11</td>
<td>16.2</td>
<td>37</td>
<td>54.4</td>
<td>20</td>
<td>29.4</td>
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</tr>
</tbody>
</table>

Note. Two participants (one each from the Treatment and Waiting List groups) were not assigned to a trajectory group (see text for details). Row percentages sum to 100%.

*a Refers to subgroups within the Treatment group (n = 158).

*p < .01.

3.6. Treatment setting, completion, and aftercare subgroups

The trajectory coding analysis was also used to analyze differences within the Treatment group as a function of setting (residential vs. outpatient), intensity (completers vs. noncompleters), and aftercare involvement (as reported in Table 3). Treatment setting was not related to trajectory status, χ²(2) = 0.6. However, both treatment completion, χ²(2) = 9.6, p < .01, and aftercare involvement, χ²(2) = 50.6, p < .01, were related to trajectory of improvement. Treatment completers had more desistor and resistor codes (42% and 18%, respectively) than the treatment noncompleters (23% and 6%, respectively). Similarly, those who attended aftercare at the moderate/regular level were more likely to be coded as a desistor or resistor (54% and 29%, respectively) than those who attended aftercare at a minimum level or those who did not attend aftercare (24% and 4%, respectively).

4. Discussion

This study of long-term outcome adds to the general literature on the course of adolescent SUDs and to the specific, albeit smaller, literature on the 12-step-based Minnesota Model approach to drug treatment (e.g., Harrison & Hoffmann, 1989). The Treatment group received Minnesota Model residential care followed by referral to aftercare. One comparison group met the same drug use criteria but was placed on a waiting list due to lack of insurance. A final Control group was composed of matched adolescents from the same community who had no history of substance use. All groups were followed up for 1, 4, and 5.5 years.

Several findings are noteworthy. First, we found that prior-year abstinence across all three time points was rare among all those in the Treatment group, and it was 0% among those in the Waiting List and Control groups.

Second, on the basis of significant decrease in DUF scores and the absence of a criteria meeting a DSM-IV substance dependence disorder, we found that those receiving treatment were more likely to show favorable status on these measures than the untreated, drug-abusing Waiting List group. For example, we observed improvement rates of 35% (DUF) and 43% (dependence) at Year 5.5 for the Treatment group but only 5% (DUF) and 26% (dependence) improvement rates at Year 5.5 for the Waiting List group. The Waiting List group was composed of adolescents who had levels of drug involvement and reported problems that were comparable with the Treatment group and those who applied for treatment (indicating at least willingness to be treated) but had inadequate or no insurance. These findings underscore how the lack of insurance coverage is a barrier to access to SUD treatment. Our data suggest that this lack of treatment contributed to a poorer outcome compared with those who were able to gain access to treatment.

A third significant finding from this study was that despite the relatively favorable results, as compared with those from the Waiting List group, those in the Treatment group did not show results as favorable as those in the Control group on these outcomes—they did not seem to achieve “normal” status. A final set of study findings derived from our exploration of factors within the Treatment group was associated with outcome. In this regard, and consistent with Williams et al. (2000), we found that completing treatment was associated with better outcomes but that treatment setting (residential vs. outpatient) was not related to outcome. However, because our design did not involve random assignment, one needs to be cautious about making definitive conclusions from this study about the role of intensity and setting on outcome.

Among the Treatment group, we found that greater aftercare involvement was significantly associated with assignment to the resistor and desistor groups—the two groups that reflect an improvement over time. The strength of this link between positive course and aftercare involvement is highlighted by the high rate of moderate/regular...
aftercare involvement among the desistors/resistors (84%), as compared with the much lower rate among persistors (16%). Perhaps, aftercare participation represents a barometer for several factors related to treatment effectiveness, including the client’s individual needs, motivation factors, social influences, and several characteristics of treatment itself, such as policy and practices, counselor relations, and connection to the treatment’s philosophy. There are some indications that aftercare participation by young people increases when the aftercare group contains a sizeable number of young people (Brown & Ramo, 2006; Godley, Funk, & Passetti, 2002). Indeed, a post hoc review of our aftercare survey among aftercare participants indicated that age of the group was commonly cited as an important factor for deciding to attend a particular group.

At Year 1, which is a key temporal juncture in terms of distinguishing whether those with longer term outcomes improved or not, alcohol was the most commonly used substance by the desistors and resisters, whereas cannabis was the most commonly abused substance by the persistors. This differential substance preference by the more treatment-resistant group is consistent with findings that relapse rates are higher among cannabis-abusing young people compared with those who abuse alcohol (e.g., Brown et al., 1989; Winters et al., 2000). Our earlier report on these data (Winters et al., in press) showed a significant co-occurrence of externalizing behaviors and being in the persistor group. This is similar to the findings of others that youth with conduct disorders show the worse outcomes following drug treatment (Myers, Brown, & Mott, 1995).

### 4.1. Limitations

The most important limitation of this study is that it did not involve random assignment. The Waiting List and Treatment groups did not differ on any intake variables, and SES did not differ between groups (based on the Hollingshead scale), despite the fact that the former group lacked health coverage. Nonetheless, caution should be exercised when interpreting the differences between these groups. Also, this study described outcomes among youth who received treatment in the mid-to-late 1990s, and our results may not apply to youth who receive treatment in more contemporary times.

An unmeasured factor that may have impacted outcomes was time in controlled environments during follow-up. Our only measure of this variable was incarceration in the criminal justice system. Only three participants reported any incarceration (two in the Treatment group and one in the Waiting List group); all of whom were in juvenile detention centers for no more than 2 days. Nonetheless, other unmeasured situations that led to time in controlled environments may have impacted our findings, especially if there were differential situations by group.

Some population characteristics of the Treatment group limit our ability to generalize findings. For example, samples from this group were predominantly White. Although this ethnic pattern is representative of the region, it is not so on a national level. Of additional concern is the fact that adolescents in the Treatment sample who refused to participate in the study reported significantly higher rates of previous mental health treatment and parental history of drug abuse than those who agreed to participate.

Another limitation is the inability to compare the effectiveness of the 12-step model with that of other models. Whereas our findings provide some evidence that a 12-step model can be effective for youth with an SUD, the lack of a comparison treatment group precludes any statements about this model’s relative effectiveness. Also, our analysis primarily focused on the impact of only one posttreatment variable—aftercare involvement—on post-treatment drug use behavior. Future analyses are being planned to explore the impact of other client and environmental variables with outcome. Several short-term outcome studies have found significant associations of various psychosocial factors and outcome, including peer influences, coping strategies, and comorbidity (Brown, 1993; Winters, 1999).

### 4.2. Conclusion

Our long-term (5.5 years postbaseline) outcome descriptive study revealed that, compared with the Waiting List and Control groups, drug-abusing youth who received treatment via the 12-step approach showed a more favorable outcome in terms of DUF and presence of a substance dependence disorder. Among youth who received treatment, a more favorable outcome was associated with those who not only completed treatment but also received aftercare services. However, the results of this study indicate that even among those with the most favorable outcome pattern, drug use abstinence is rare and diagnostic signs of abuse often persist.

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### References


