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Peer Influences on Adolescent Alcohol and Other Drug Use Outcomes

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Abstract

Purpose—To examine the role of family environment and peer networks in abstinence outcomes for adolescents 1 year after intake to alcohol and other drug (AOD) treatment.

Design—Survey of 419 adolescents 13 to 18 years of age at consecutive intakes to AOD treatment programs at four sites of a large health system, with telephone follow-up survey 1 year after intake.

Methods—Examined association of 1-year abstinence with baseline characteristics. Using logistic regression, we examined characteristics predicting 1-year abstinence and predicting having fewer than four substance-using friends at 1 year.

Results—We found that family environment scores related to family conflict, limit setting, and positive family experiences, were not related to abstinence outcomes, but peer networks were related. Adolescents with fewer (less than four) AOD-using friends were more likely to be abstinent than those with four or more AOD-using friends (65% vs. 41%, $p = .0002$). Having fewer than four AOD-using friends at intake predicted abstinence at 1 year (odds ratio [OR] = 2.904, $p = .0002$) and also predicted having fewer than four AOD-using friends at 1 year (OR = 2.557, $p = 0.0007$).

Conclusions—Although family environment is an important factor in the development of AOD problems in adolescents, it did not play a significant role in treatment success. The quality of adolescent peer networks did independently predict positive outcomes.

Clinical Relevance—For physicians, advanced practice registered nurses, and other primary and behavioral care providers who screen and care for adolescents with AOD and other behavioral problems, our finding suggest the importance of focusing on improving the quality of their peer networks.

Keywords

Adolescent substance use; treatment outcomes; peer networks; family environment

In this article we examine the role of family environment and peer networks in alcohol and other drug (AOD) outcomes in a sample of teens entering AOD treatment within a nonprofit, integrated healthcare system. We compare the influences of family and peers on abstinence outcomes at 1 year after intake.

Social networks, both families and friends, play a critical role in the development of adolescent AOD problems, their access to treatment, and their treatment outcomes (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000; Lindsey, Barksdale, Lambert, & Ialongo, 2010). The development of AOD problems is strongly related to negative family environments that include parents with AOD problems, high levels of family conflict, fewer positive family experiences, and poor limit setting (Biederman, Faraone, Monuteaux, & Feighner, 2000; Chilcoat & Anthony, 1996; Flewelling & Bauman, 1990; Kuperman et al., 2001; Wu, Lu, Sterling, & Weisner, 2004).

Friends become increasingly important to adolescents as they mature (Vandell, 2000; Youniss & Haynie, 1992), and the literature consistently shows that having friends who use AOD is an important determinant of drinking behavior (Ali & Dwyer, 2010; Barnow et al., 2004; Branstetter, Low, & Furman, 2011) and other drug use (Farrell & White, 1998; Guxens, Nebot, Ariza, & Ochoa, 2007; Petraitis, Flay, Miller, Torpy, & Greiner, 1998). A systematic review of cohort studies by Guxens et al. (2007) found that marijuana consumption by friends significantly influenced adolescent marijuana use, and a review of longitudinal studies by Kandel (1985) found that friends are especially important in the initiation of marijuana use. In a 1993 review (Dinges & Oetting, 1993), this influence extended to choice of drugs and styles of use.

By the time adolescents present to AOD treatment, their problems are often severe (Sterling, Kohn, Lu, & Weisner, 2004). Using the same sample as the current study, Wu et al. (2004) found that less supportive and less structured family environments were associated with greater problem severity in adolescents at intake to treatment. In addition to troubled families, adolescents arrived at AOD treatment with alcohol and drug-using friends (Sterling et al., 2004; Wu et al., 2004).

The literature suggests that the influence of family remains important over time. At the same time, peer influences clearly increase during adolescence, and many studies suggest they may become the more critical factor (Bjorkqvist, Batman, & Aman-Back, 2004; Bot, Engels, Knibbe, & Meeus, 2005; Garnier & Stein, 2002). One early study of 768 adolescents found associations with drug-using peers to have much greater impact than associations with parents who used or had pro-drug-using attitudes (Johnson, Marcos, & Bahr, 1987). Another study by Needle et al. (1986) examined 508 families comparing the influence on adolescents of parents, older siblings, and peers. For most substances, the drug-using attitudes and behaviors of older siblings and peers predicted frequency of use, each independent of the other, but parental influence was minimal (Needle et al., 1986). In more recent studies, Bjorkqvist et al. (2004) examined a Finnish sample of adolescents, comparing mothers, fathers, and best friends, and found that adolescent alcohol and tobacco use correlated most highly with friends' use. Examining statewide data from Florida, Eitle (2005) found that intact two-parent families (vs. blended families) were less protective against AOD use when the adolescent's exposure to AOD-using peers was high.

Although peer influence may become more critical during adolescence, family and peer influences remain closely interrelated (Bahr, Hoffmann, & Yang, 2005; Gerrard, Gibbons, Zhao, Russell, & Reis-Bergan, 1999; Kandel, 1985; Wood, Read, Mitchell, & Brand, 2004). In a longitudinal study, while drug use and delinquent behaviors by peers were the most powerful predictors of similar behavior in adolescents, peer relationships were in turn

influenced by family and early childhood experiences (Garnier & Stein, 2002). Examining a random sample of 27,000 adolescents, Bahr, Marcos, and Maughan (1995) noted the importance of family bonds, but that they are moderated through peers, that is, adolescents with strong family bonds are less likely to have peers who use. On the other hand, in a study of 266 adolescents, Gerrard et al. (1999) found that even for adolescents with strong relationships with their parents, association with peers who drank heavily reduced parental influence.

Studies of treatment programs have shown that peer networks are also important factors in determining treatment outcomes. Friends often assist each other in attempts to refrain from AOD use while they are in treatment (Passetti, Godley, & White, 2008) and may influence each other to stop some risky activities (Maxwell, 2002), such as driving while intoxicated (Flanagan, Elek-Fisk, & Galloway, 2004).

Conceptual Model for Examining Peer Influence on Adolescent AOD Use

The theoretical work of Aday and Anderson (Aday et al., 1999), modified for the AOD field (Donovan & Rosengren, 1999; Hser, Anglin, Grella, Longshore, & Prendergast, 1997; Sterling, Chi, Campbell, & Weisner, 2009; Weisner, Delucchi, Matzger, & Schmidt, 2003) informs our approach. It consists of demographic (age, gender, race or ethnicity), severity (comorbid medical and psychiatric status), and environmental (family environment, substance using peer networks, source of treatment referral, and 12-step participation) factors. Our choice of “extra-treatment” factors draw from the social enabling factors in the medical literature, again modified by the alcohol and drug literature (Hser et al., 1997). This model is well suited to the focus of this work, as it has a strong emphasis on family environment and peer networks in the context of other relevant influences.

Because in this sample and others both family environment and peer networks were related to severity as adolescents enter treatment (Flewelling & Bauman, 1990; Steinberg, Fletcher, & Darling, 1994; Wu et al., 2004), we hypothesized that both having a positive family environment and having a smaller peer network who use alcohol and other drugs would be related to abstinence. As adolescents have the opportunity to develop new peer groups during treatment, we also examine predictors of having more or fewer AOD-using friends at 1 year.

Methods

This study is part of a larger study that examined pathways to treatment and the course of problems over time of adolescents entering alcohol and drug treatment. This article addresses a set of questions that have not been analyzed in the other papers. The program, study sample, and measures used have been described in other published papers.

Sample

We recruited adolescents consecutively at intake to four outpatient AOD programs of Kaiser Permanente (KP). Participants were recruited whether or not they continued to receive services or have contact with the programs, and clinicians were not informed about which adolescents participated (Campbell, Chi, Sterling, Kohn, & Weisner, 2009; Sterling et al., 2009; Wu et al., 2004). Study personnel recruited 419 adolescents 13 to 18 years of age (average age 16 years). About two-thirds were boys, about 50% White, 20% Latino, 15% African American, 9% Native American, and 6% Asian. Participants were reinterviewed at 6 and 12 months by telephone (91% response rate at 6 months, 92% or 384 adolescents at 12 months)

The study compared those we recruited (64% of intake visits and 83% of those returning for a treatment visit) with those not recruited. Gender and age and whether parents had an AOD problem or participants were enrolled in school did not differ, and proportions who had used alcohol, marijuana, cocaine, hallucinogens, stimulants, and sedatives in the past 30 days did not differ. However, more of the recruited group had used inhalants, party drugs, tobacco, Ritalin, and painkillers, and the group had more Native Americans, Whites, and Latinos (Campbell et al., 2009; Sterling et al., 2009; Sterling et al., 2004; Wu et al., 2004).

The study has been approved annually by the institutional review boards of the Kaiser Foundation Research Institute and the University of California, San Francisco.

Study Site

KP Northern California is a large nonprofit health care organization that provides integrated care to its members, including its own on-site AOD services. It covers approximately 3.4 million members, with the majority commercially insured.

The AOD programs do not require referrals from a primary care or mental health provider. Although various sources, including the legal system, may recommend or refer individuals to treatment, participation in the adolescent program is completely voluntary. Kaiser does not accept formal legal mandates, and all adolescents participate in the same program.

The study selected four sites that were diverse geographically and in patient population. Their programs were typical of U.S. treatment approaches, including 12-step and family-centered services (Jainchill, 2000). Treatment components included group therapy, education, relapse prevention, and family therapy, with limited individual counseling and pharmacotherapy as needed. All programs were coordinated by a region-wide oversight committee and resembled each other with respect to staffing and standard of care. Adolescents were treated separately from adults and had their own staff. When necessary, they were referred out to contracted residential treatment. The full program was about 1 year, but actual length of treatment was based on individual need.

The first 6 to 8 weeks (Phase 1) included assessment and orientation followed by group sessions three times per week. The next 3 to 6 months (Phase 2) included group sessions twice a week and focused on continuing recovery and relapse prevention. Aftercare, which could last up to 10 months, entailed one group session per week. Regular attendance to 12-step meetings throughout the program and after was strongly encouraged (Campbell et al., 2009; Sterling et al., 2009; Wu et al., 2004).

To check the validity of self-report, the study randomly conducted an in-person interview, breathalyzer, and urinalysis (testing for 12 substances) at 12 months on a random subsample ($n = 41$) at one site. Of those reporting abstinence, 92% had negative urine tests ($\kappa = .79$). The subsample did not differ from other participants at that site on age, sex, or alcohol or drug use. The interview and test data were used only for research purposes (Campbell et al., 2009).

Data Sources and Measures

The health services survey instrument consisted of widely recognized measures used across numerous adolescent health services studies, including from the National Institutes of Health-Substance Abuse and Mental Health Services Administration-Center for Substance Abuse (NIH-SAMHSA-CSAT) Public Sector Managed Care Study (PSMCS), and the Comprehensive Adolescent Severity Inventory (CASI; described below). Computerized clinical and administrative health plan data on primary and secondary ICD-9 diagnoses were also used. See Table 1 for a complete list of variables used in the study.

Outcomes

We used measures from the CASI, a self-report questionnaire that measures adolescent health and functioning, including chemical dependency, psychosocial functioning, delinquency, and risk behavior (Meyers et al., 2006; Meyers, McLellan, Jaeger, & Pettinati, 1995). It has been widely used in adolescent research (Donovan & Rosengren, 1999; Whitmore et al., 1997). The instrument has a high internal consistency (alpha coefficients for the component subscales comprising each clinical dimension range from .78 to .96) and test-retest reliability (intraclass correlation coefficients range from .88 to .96 and all are significant at $p < .0001$), and concurrent validity and specificity. Validity was generalizable for both males and females, younger and older adolescents, and across different ethnic backgrounds (Meyers et al., 2006).

To determine the quantity and frequency of alcohol and drug use at intake and at 1 year, the CASI measures asked for days of alcohol use (any use and five or more drinks in 1 day) and use of tobacco and 11 other substances in the past 30 days. Participants were asked about alcohol, marijuana, heroin, cocaine or crack, stimulant, “party” drug (e.g., ecstasy), sedative or tranquilizer, hallucinogen, barbiturate, and opiate use. The participant was considered abstinent if he or she had used 0 days for every substance.

Demographic Characteristics

Participants reported their age, gender, and race or ethnicity. Age and gender were validated by the medical records.

Severity and Comorbidity

Medical, psychiatric and AOD diagnoses were obtained from the health plan’s Outpatient Summary Clinical Record. This record is an automated, clinical diagnostic database.

Environmental Characteristics

Participants reported number of visits to Alcoholics Anonymous, Narcotics Anonymous, or any other 12-step program. Participants also reported whether either of their parents or any other family members living in the home had an AOD problem.

Family environment—We used two sources for measures to assess family environment: the Family Conflict scale and Positive Family Experiences scale from the Family Environment Scale (FES; Moos & Moos, 1986), and the Limit Setting scale from the CASI. We asked about open conflict, arguing, criticism, physical violence, and positive conflict resolutions (Boyd, Gullone, Needleman, & Burt, 1997), and about positive family experiences. From the CASI’s Limit Setting scale we asked about family responsibilities, parental availability, rules and supervision, parents “covering” for the adolescent, feelings of being loved and safe, and the family receiving necessary services. For additional details, please see Wu et al. (2004). In order to properly score the results, we included the questions as written in the original CASI. In addition to the FES and CASI questions, we asked if anyone in the family or household had an AOD problem, if the adolescent lived with one or more parents, with other family, or was in another type of living situation.

Peer networks—Participants reported the number of friends using alcohol and drugs in the past 6 months. The measure was taken from the Six State Risk-Protective Factors Survey adapted for the SAMHSA-CSAT PSMCS. The PSMCS was a SAMHSA-sponsored study conducted in several states. The instrument was developed by a national panel of experts composed of services researchers, managed care industry consultants, representatives of state Medicaid and mental health authorities, national mental health organizations, mental

health consumers, and SAMHSA investigators (Ridgely, Giard, Shern, Mulkern, & Burnam, 2002). Based on the distribution found in our study data, we dichotomized the measure at less than four versus four or more AOD-using friends, as we had done in other reports on these data in medical journals. Earlier analyses found that having four or more alcohol drinking friends was significantly associated with AOD problem severity at intake (Wu et al., 2004).

Referral sources—Participants reported their referral source to treatment (school, legal, family, psychiatry, health provider, friend, self, or other). Multiple referrals could be selected.

Statistical Analyses

Chi-square tests for categorical variables and t-tests for continuous variables were conducted to examine bivariate differences in 30-day AOD abstinence 1 year after intake by baseline demographic, clinical, peer, and family variables. We also examined abstinence by participation in 10 or more 12-step meetings between baseline and the 1-year follow-up.

We applied a logistic regression model to determine effects of family environment measures and peer AOD use on 30-day abstinence rates at 1 year after intake, controlling for the demographic, clinical, and 12-step participation measures. We also conducted a logistic regression model to examine predictors of having fewer than four AOD-using friends at the 1-year follow-up, controlling for the same covariates. All statistical analyses were performed using SAS version 8.2 (SAS Institute Inc, Cary, NC).

Results

Baseline Characteristics and 1-year Abstinence

We examined the baseline characteristics of the adolescents who completed the 1-year interview to determine which characteristics were associated with 30-day abstinence at 1 year. As shown in Table 1, no demographic characteristics were significant except age, with the average age of those abstinent slightly younger than those not abstinent (15.9 years vs. 16.3 years, $p = .0005$).

In examining the role of social support, family environment scores (conflict, limit-setting, and positive family experience scales) were not related to abstinence outcomes. Peer networks were related. Adolescents with fewer (less than four) AOD-using friends were more likely to be abstinent than those with four or more AOD-using friends (65% vs. 41%, $p = .0002$). Adolescents referred to treatment by a friend were more likely to be abstinent (59% vs. 45%, $p = .0224$). Legal referrals, the only other referral source that was significant, were related to nonabstinence.

Given the strong relationship between positive peer networks and abstinence, we examined attendance at 12-step meetings between treatment intake and the 1-year follow-up. Participants who had attended 10 or more 12-step meetings over the year were more likely to be abstinent (54% vs. 43%, $p = .0462$).

Table 2 presents the results of a logistic regression model examining predictors of 30-day abstinence at 1 year. Having fewer than four AOD-using friends predicted abstinence ($OR = 2.904$, $p = .0002$), as did being female ($OR = 1.774$, $p = 0.0310$). The other family environment measures were not significant. We replicated the model (not shown) with the family environment measure of whether parents or other household members had an AOD problem, and the results were similar; fewer than four AOD-using friends was related to abstinence and having a family member with a problem was not.

In examining characteristics at intake associated with fewer AOD-using friends at 1 year (Table 3), the only significant predictor was having fewer AOD-using friends at treatment intake ($OR = 2.557, p = .0007$). Family and demographic characteristics were not significant.

Findings

When adolescents enter AOD treatment, family environment and peer networks often have played a significant role in the severity of their AOD problems (Flewelling & Bauman, 1990; Steinberg et al., 1994; Wu et al., 2004). In this article, we hypothesized that these factors would continue to play a significant role in AOD treatment outcomes, with positive family environments and peer-networks related to 30-day abstinence at 1 year, and with peer networks becoming increasingly important. However, our data showed that only positive peer networks predicted abstinence at 1 year and that none of the measures of family environment remained significant. Although research has long established that families do play a substantial role in the early development and severity of AOD problems, we did not find them to be a significant predictor of treatment success. Within adolescent social support, peers replaced families in importance and were the most important factor in achieving 1-year abstinence, independent of other factors.

AOD programs have long recognized the importance of family, so much so that most adolescent programs require family involvement. Our findings suggest that changing peer networks should be an equally major emphasis of program curricula. This is a major challenge; adolescents are often reluctant to change their friends, and troubled adolescents may find it especially difficult to make new ones (Williams, 2002).

In addition to their own treatment, most adolescent programs encourage, and many require, participation in 12-step programs, which can potentially help adolescents form “recovery” networks, an important source of support for abstinence (Chi, Kaskutas, Sterling, Campbell, & Weisner, 2009). Our findings on the vital role of positive (non-AOD-using) peer networks in positive outcomes point to the importance of facilitating these aspects of adolescent AOD programs. Adolescent programs should consider how to design and implement curricula that stress the development of positive peer networks. Strategies might include, for example, better assessment of the quality of peer networks for individual adolescents, incorporation of peer leadership elements in the program (Pearlman, Camberg, Wallace, Symons, & Finison, 2002), and, particularly for isolated teens, teaching skills for making positive friends. These issues could be addressed both in program design and improved clinician training.

Limitations

A limitation is the study’s setting in a health plan that is not representative of many other health plans. The study’s generalizability is increased, however, by changes in health care stemming from the Affordable Care Act, which calls for integrating behavioral care within overall health care. The study is an observational one with statistical methods to address concerns regarding lack of causation, and the findings lay the groundwork for testing interventions that would support changes in peer outcomes. Our findings also have implications for providers who see adolescents in other settings. In particular, physicians, advanced practice registered nurses (APRNs), and other primary and behavioral care providers increasingly screen for AOD and other behavioral problems in primary care. APRNs play a major role in providing care for adolescents in school-based health centers (Scudder, Sullivan, & Copeland-Linder, 2008) and in community-based clinics. APRNs usually spend more time with their patients than physician providers, and have more extensive communication at each visit (Van Leuven & Prion, 2007). When taking medical

histories, and when screening for alcohol and other drug use, APRNs have the opportunity to assess and discuss adolescents' peer networks, in addition to assessing their family problems (Van Leuven & Prion, 2007; Yi, Martyn, Salerno, & Darling-Fisher, 2009)

Conclusions

The study is relevant to the development of clinical care protocols. APRN education stresses care across the lifespan, with particular attention to the growth and development of mind and body during adolescence. During this high-risk period for alcohol and other drug use, understanding the important role of friendship and peer approval can improve the relevance and effectiveness of APRN care.

Clinical Resources

- CeASAR (The Center for Adolescent Substance Abuse Research): <http://www.ceasar-boston.org/>
- The CRAFFT Screening Tool: <http://www.ceasar-boston.org/CRAFFT/index.php>
- National Institute on Alcohol Abuse and Alcoholism, Underage Drinking: <http://pubs.niaaa.nih.gov/publications/aa67/aa67.htm>

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Table 1

Baseline Characteristics and 30-Day Abstinence at 1 Year

| Characteristic | Intake | 1-year abstinence | | <i>p</i> |
|-----------------------------------------------|--------|-------------------|------|--------------|
| | | Yes | No | |
| Gender (%) | | | | .2335 |
| Girls (<i>n</i> = 138) | 35.9 | 51.4 | 48.6 | |
| Boys (<i>n</i> = 246) | 64.1 | 45.1 | 54.9 | |
| Age, mean years (<i>SD</i>) | 16.1 | 15.9 | 16.3 | .0005 |
| Ethnicity (%) | | | | .2515 |
| African American (<i>n</i> = 57) | 14.9 | 50.9 | 49.1 | |
| Native American (<i>n</i> = 36) | 9.4 | 36.1 | 63.9 | |
| Latino (<i>n</i> = 77) | 20.1 | 44.2 | 55.8 | |
| Asian (<i>n</i> = 23) | 6.0 | 65.2 | 34.8 | |
| White (<i>n</i> = 190) | 49.6 | 47.4 | 52.6 | |
| FES Conflict Scale (%) | | | | .8178 |
| Score=6–9 (<i>n</i> = 141) | 37.0 | 45.4 | 54.6 | |
| Score=3.375–5.625 (<i>n</i> = 123) | 32.3 | 48.8 | 51.2 | |
| Score=0–3 (<i>n</i> = 117) | 30.7 | 48.7 | 51.3 | |
| CASI-A Limit Setting Scale (%) | | | | .1415 |
| Score=0.5–1 (<i>n</i> = 171) | 45.7 | 45.0 | 55.0 | |
| Score=0.25–0.33 (<i>n</i> = 88) | 23.5 | 42.1 | 58.0 | |
| Score=0 (<i>n</i> = 115) | 30.8 | 54.8 | 45.2 | |
| CASI-A Positive Family Experiences Scale (%) | | | | .7605 |
| Score=1 (<i>n</i> = 229) | 60.4 | 47.6 | 52.4 | |
| Score=0–0.67 (<i>n</i> = 150) | 39.6 | 46.0 | 54.0 | |
| Psychiatric diagnosis (%) | | | | .4622 |
| Had diagnosis (<i>n</i> = 214) | 55.7 | 49.1 | 50.9 | |
| No diagnosis (<i>n</i> = 170) | 44.3 | 45.3 | 54.7 | |
| Any medical diagnosis (%) | | | | .3347 |
| Had diagnosis (<i>n</i> = 281) | 73.2 | 45.9 | 54.1 | |
| No diagnosis (<i>n</i> = 103) | 26.8 | 51.5 | 48.5 | |
| No. of substance-using friends (%) | | | | .0002 |
| <4 substance-using friends (<i>n</i> = 82) | 23.5 | 64.6 | 35.4 | |
| ≥ 4 substance-using friends (<i>n</i> = 267) | 76.5 | 40.8 | 59.2 | |
| Referred by legal (%) | | | | .0222 |
| Was referred (<i>n</i> = 116) | 30.5 | 38.8 | 61.2 | |
| Was not referred (<i>n</i> = 264) | 69.5 | 51.5 | 48.5 | |
| Referral by friend (%) | | | | .0224 |
| Was referred (<i>n</i> = 76) | 20.0 | 59.2 | 40.8 | |
| Was not referred (<i>n</i> = 305) | 80.1 | 44.6 | 55.4 | |

| Characteristic | Intake | 1-year abstinence | | <i>p</i> |
|------------------------------------------|--------|-------------------|------|--------------|
| | | Yes | No | |
| Parent with substance problem | | | | .9254 |
| Had substance problem | 37.5 | 47.2 | 52.8 | |
| Had no substance problem | 62.5 | 47.7 | 52.3 | |
| <u>From baseline to 1-year follow-up</u> | | | | |
| Attended 10 or more 12-step meetings | | | | .0462 |
| Attended (157) | | 46.1 | 36.1 | |
| Did not attend (227) | | 53.9 | 63.9 | |

Note. CASI = Comprehensive Adolescent Severity Inventory; FES = Family Environment Scale.

Table 2

Multivariate Regression Predicting 30-Day Abstinence at 1 Year

| Characteristic | OR | 95% CI | <i>p</i> |
|---------------------------------------------------------------|-------|-------------|--------------|
| Gender | | | |
| Girls (vs. boys) | 1.774 | 1.052–2.889 | .0310 |
| Ethnicity (vs. Whites) | | | |
| African American | 1.057 | 0.535–2.089 | .8728 |
| Native American | 0.613 | 0.252–1.493 | .2811 |
| Latino | 0.717 | 0.395–1.300 | .2735 |
| Asian | 2.472 | 0.852–7.168 | .0957 |
| Age | 0.866 | 0.722–1.040 | .1234 |
| Having <4 substance-using friends (vs. having ≥ 4) | 2.904 | 1.664–5.068 | .0002 |
| Family dysfunction | | | |
| FES Conflict Scale score 6–9 (vs. 0–3) | 1.043 | 0.557–1.951 | .8953 |
| FES Conflict Scale score 3.375–6.625 (vs. 0–3) | 1.050 | 0.588–1.877 | .8689 |
| CASI-A Limit Setting scale score 0.5–1 (vs. 0) | 0.676 | 0.386–1.184 | .1709 |
| CASI-A Limit Setting scale score 0.25–0.33 (vs. 0) | 0.563 | 0.300–1.056 | .0735 |
| CASI-A Positive Family Experiences Scale score 1 (vs. 0–0.67) | 1.043 | 0.626–1.737 | .8727 |
| Having any psychiatric diagnosis (vs. having none) | 1.001 | 0.623–1.609 | .9967 |
| Having any medical diagnosis (vs. having none) | 0.803 | 0.475–1.358 | .4137 |
| Having attended 10 or more 12-step meetings at 1 year | 1.452 | 0.905–2.328 | .1220 |

Note CASI = Comprehensive Adolescent Severity Inventory; CI = confidence interval; FES = Family Environment Scale; OR = odds ratio.

Table 3

Multivariate Regression Predicting Having Fewer Than Four Substance-Using Friends at 1 Year

| Characteristic | OR | 95% CI | <i>p</i> |
|---------------------------------------------------------------|-------|-------------|--------------|
| Gender | | | |
| Girls (vs. boys) | 1.399 | 0.837–2.337 | .1998 |
| Ethnicity (vs. Whites) | | | |
| African American | 1.461 | 0.734–2.907 | .2806 |
| Native American | 0.653 | 0.267–1.595 | .3495 |
| Latino | 0.545 | 0.288–1.032 | .0626 |
| Asian | 1.325 | 0.491–3.581 | .5785 |
| Age | 1.007 | 0.837–1.212 | .9396 |
| Having < 4 substance-using friends (vs. having ≥ 4) | 2.557 | 1.482–4.412 | .0007 |
| Family dysfunction | | | |
| FES Conflict Scale score 6–9 (vs. 0–3) | 0.602 | 0.316–1.147 | .1227 |
| FES Conflict Scale score 3.375–6.625 (vs. 0–3) | 0.612 | 0.339–1.107 | .1047 |
| CASI-A Limit Setting Scale score 0.5–1 (vs. 0) | 1.061 | 0.601–1.873 | .8387 |
| CASI-A Limit Setting Scale score 0.25–0.33 (vs. 0) | 0.599 | 0.311–1.154 | .1254 |
| CASI-A Positive Family Experiences Scale score 1 (vs. 0–0.67) | 1.052 | 0.622–1.779 | .8492 |
| Having any psychiatric diagnosis (vs. having none) | 1.244 | 0.764–2.025 | .3804 |
| Having any medical diagnosis (vs. having none) | 1.081 | 0.629–1.857 | .7784 |
| Having attended 10 or more 12-step meetings at 1 year | 0.833 | 0.513–1.352 | .4588 |

Note. CASI = Comprehensive Adolescent Severity Inventory; CI = confidence interval; FES = Family Environment Scale; OR = odds ratio.