HELPING OTHERS AND ADOLESCENT ADDICTION:
VALIDITY OF SERVICE TO OTHERS IN SOBRIETY (SOS) QUESTIONNAIRE
IN AN ADOLESCENT SAMPLE

by

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Submitted in partial fulfillment of the requirements for the degree of
Master of Science

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January, 2014
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Dedication

This work is dedicated to the guides who spark us and bring out our best,
the companions who soothe and make us laugh, and the attitude adjustment reminder of being useful to others and the world around us.
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Preface

Helping others is a fundamental component of Alcoholics Anonymous (AA) and posited to correct a root cause of addiction—egocentric thinking. Given service has natural application with adolescents and is associated with improved outcomes, the dearth of quantification of AA-related helping (AAH) for recovering youth is surprising. Specific aims of this study are to: 1) explore youth AAH participation patterns as measured by “Service to Others in Sobriety (SOS)” questionnaire; 2) establish internal consistency, inter-informant reliability, and convergent validity of the SOS by youth-report; 3) examine the predictive validity of the SOS in relation to clinical outcomes; 4) identify SOS items that best distinguish abstinent youths as measured by positive versus negative urine toxicology screens; 5) identify the optimal SOS cut-off score in relation to child psychopathology with impaired interpersonal functioning; and 6) determine differences in other-oriented regard of youth with and without addiction matched by age, gender, minority status, and zipcode.

Study objectives are completed in two phases: an instrument validity study involving extensive psychometric analyses of the SOS, and a comparison of differences between youths’ AOD use, risky sexual behaviors, and prosocial behaviors in comparison to same item assessments collected with a normative youth sample from the same region. Chapter 1 addresses study aims 1-5 with a full report of Phase I’s instrument validity study; Chapter 2 addresses aim 6 with a full report of Phase II’s quasi-experimental evaluation of the dose-response association between addiction severity and low other-oriented regard.
Acknowledgements

This research was funded in part by my grant awards from the National Institute on Alcohol Abuse and Alcoholism (K01 AA015137) and the John Templeton Foundation, who had no further role in study design, collection, analysis, or interpretation of data. I was fortunate to work with several bright young scholars who furthered data collection of this project, including Jihad Jaber, Allyson Arbaelez, Shannon Johnson, Casey Onder, Rebecca Ionescu, Mike Scur, Paige Veta, and Katarina Hughes. Many others read drafts of this work and offered comments, including Renee Pagano, Francia Hamnett, and Dr. Michael Hamnett. For their collaboration, attention, and wisdom I am grateful to Drs. Scott Frank, Elizabeth Pehek, Stephen Post, John Kelly, Robert Pagano, and Robert Stout. Special thanks go to my husband Stefan Padfield for his sage editorial guidance, unwavering support, and clarity of thought that continues to enrich my thinking. Finally, this research could not have been conducted without the generosity of New Directions staff, especially Sue Tager and Mike Matone, and the young adults and their families who opened their doors and lives to me.
Abstract

by

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This study develops a brief assessment of Alcoholic Anonymous-related helping (AAH) by youth-report and explores differences in low other-regard between youth with and without addiction matched by gender, minority status, age, and zipcode. Psychometric properties of the Service to Others in Sobriety (SOS) questionnaire were adequate, including internal consistency ($\alpha=.90$), inter-informant reliability ($r=.5$), and concordant validity ($rs=-0.3-0.3$). Programmatic AAH activities distinguished abstinent youths in a random half-sample, and replicated on the other half-sample. The risk of driving under the influence, unprotected sex, and unprotected sex with a STD history was significantly greater for youth with addiction in comparison to youth with some use history, who had greater risk than their peers with no use history. The SOS appears to be a valid measure of youth AAH, can identify service activities salient to sobriety, and increase clients’ awareness of how their low other-regard contributes to this illness.
CHAPTER 1:
BACKGROUND AND OBJECTIVES

The 21st century has witnessed the greatest increase in alcohol abuse, prescribed controlled substances, and use of other drugs (AOD) use among our nation’s minors (CDC, 2003), potentiating the danger of risky sex, criminal activity, and school drop-out. The rising cost of AOD problems is estimated at $500 billion in increased criminal activity, higher health-care costs, and lost productivity (Bouchery et al., 2011). Efficient, cost-effective approaches for juvenile offenders are needed that alter youths’ deleterious life course trajectories while sustaining addiction recovery, developing new sober peer networks, and promoting character development.

In the United States, Alcoholics Anonymous (AA) is the most commonly sought source of help for AOD problems, and most alcoholism treatment programs encourage AA attendance (Emrick, 1999; Humphreys Mavis, & Stofflernayr, 1991). AA participation consistently is associated with improved AOD outcomes for mandated and non-mandated populations (Brecht, Anglin, & Wang, 1993), which has spurred national efforts to investigate how behavioral change is mobilized and sustained in AA (Kelly, Magill, & Stout, 2009). A growing body of literature has identified AA-related helping (AAH) as an active ingredient of the 12-step program. Reviews of AAH research report modest effect size estimates of AAH on increased abstinence, reduced depression, and reduced symptoms of extreme self-preoccupation (Pagano et al., 2011; Zemore & Pagano, 2008), which are not limited to individuals of a certain gender, ethnicity, problem severity, educational level, socioeconomic class, or religious orientation.
Service has natural application with adolescent populations: action-oriented for youths without higher-level cognitive skills; provides social and leadership opportunities; is associated with reduced narcissistic behaviors common during adolescence and to AOD populations (Lipsitz et al., 1994); is commonly encouraged in promoting adolescent development; and does not require parental permission, fees, or transportation (AA, 2008). Given AAH’ applicability and association with improved outcomes (Pagano et al., 2007), the dearth of AAH quantification in adolescent addiction investigations is surprising. One study (Chi et al., 2009) assessed youth service activity with two items: 1) performing service activities and 2) having sponsored anyone. While there was no association between providing sponsorship and AOD use, youths who performed services (8%) were more likely to be abstinent. However, youths may not understand what constitutes performing services, or be reluctant to endorse the title of being a sponsor while engaging in activities common to sponsors. The frequency and impact of youth AAH participation on outcomes may be greater with broader measurement of AAH.

For feasibility in clinical settings, AAH instrumentation needs to be brief and easily scored, capture the myriad ways alcoholics routinely help fellow sufferers, list AAH activities accessible to all individuals at various stages of recovery, assess support given outside of treatment settings, and estimate the degree of AAH participation rather than completed activity. Further, measured AAH activities are more meaningful when they are shown to distinguish abstinence from relapse, and relate activity thresholds to clinical severity. The “Service to Others in Sobriety (SOS)” questionnaire was developed to assess
common AAH activities including acts of good citizenship, formal service positions, public outreach, and transmitting personal experience to another fellow sufferer. The SOS has demonstrated adequate psychometric properties with treatment-seeking adults, with good internal consistency (Cronbach alphas=0.82-.92), construct validity (rs=0.3-.6), test-retest reliability (r=0.94), and feasibility (Pagano et al., 2004; Zemore & Pagano, 2008; Pagano et al., 2010; Kelly et al., 2011). These findings suggest that the SOS may be a useful tool with adolescents.

In this study, we examined the psychometric properties of a 12-item instrument, “Service to Others in Sobriety (SOS),” as completed by adolescents court-referred to treatment. This instrument validity study was informed in part by pioneering prior work (Chi et al., 2009), AAH instrumentation with adults (Pagano et al., 2010; Pagano et al., 2009), AA literature, altruism literature (Monroe, 2002), and pilot focus groups with young adult members of AA (M.E.P., unpublished data, 2005). The goals of this study were to: 1) explore youth participation patterns in AAH activities as measured by SOS items; 2) establish internal consistency, inter-informant reliability, and convergent validity of the SOS by youth-report; 3) examine the predictive validity of the SOS in relation to clinical outcomes; 4) identify SOS items that best distinguish abstinent youths as measured by positive versus negative urine toxicology screens; and 5) identify the optimal SOS cut-off score in relation to child psychopathology with impaired interpersonal functioning.

METHODS
Procedures. Recruitment for this study was conducted from February 2007 to August 2009 at a single site in Northeast Ohio. Inclusion criteria included: 1) aged 14–18 years, 2) English speaking, 3) stable address and telephone, 4) met DSM-IV diagnosis of alcohol and/or drug dependency disorder, and 5) medically stable. Exclusion criteria included: 1) a major chronic health problem other than substance use likely to require hospitalization, 2) currently suicidal or homicidal, and 3) expected incarceration in the subsequent 12 months. In the week prior to their scheduled date of admission, subjects were sent a packet of information that included an invitation letter to participate in the study. Following admission, subjects were approached to participate in the study. After a complete description of the study, eligible subjects signed statements of informed consent/assent. Ninety-minute interviews were conducted within the initial ten days of admission and repeated at discharge after 2 months of residential treatment ($M = 2.2, SD = 0.2$). Urine toxicology screens were collected prospectively each week of the 8-week treatment period by clinical staff as part of routine clinical procedures. Clinicians completed the SOS and one instrument validity measure at discharge. Clinical and research study staff were blind to instrument validity measurement scores. All procedures of this study were approved by the University Hospitals/Case Medical Center Institutional Review Board for human investigation, and a Certificate of Confidentiality from NIAAA was obtained. All subjects and their parent/legal guardian voluntarily provided written informed consent/assent and were paid $25 for completed assessments.
Subjects. A total of 482 adolescents were admitted into treatment during the enrollment period of the study. Subjects were recruited from New Directions (ND), the largest adolescent residential treatment provider in northeast Ohio. Of the 211 patients approached, none were ineligible and 16 refused to participate, resulting in an enrollment sample of 195 subjects. There were no significant differences between subjects enrolled (N = 195) versus not enrolled (N = 287) in terms of demographic profile, drug of choice, years of illicit drug use, trauma history, sexual orientation, treatment history, and treatment completion. Of the 195 youths enrolled at intake, 175 (90%) completed treatment, 10 (5%) were discharged prematurely against medical advice, 6 (4%) were discharged to a higher-level facility, and 4 (2%) were hospitalized for medical complications. Discharge interviews were unable to be scheduled for 5% of enrolled subjects: 3 treatment completers, 3 premature discharges, and 4 higher-level facility discharges. There were no significant differences between subjects with and without a discharge interview in terms of background characteristics or instrument validity study variables at baseline. Detailed information regarding the overall aims, research design, and baseline assessment of instrument validity study measures is explicated elsewhere (Kelly et al., 2011).

Measures. Background variables are first described, followed by the SOS and instrument validity study variables.

Background Variables. Background variables assessed at intake included: youth gender, race, ethnicity, age, years in school, parole/probation history, treatment history, parental marital status, parental education, and monthly household income.
**AA-Related Helping.** The 12-item SOS (Pagano et al., 2010) is a behavioral assessment of service participation within the 12-step program. To reflect the reality of degrees of participation as opposed to definitive yes/no activity, SOS items are rated on a 5-point Likert scale from 1 ("rarely") to 5 ("always") and summed for a total SOS score (range: 12–60). In addition to youth self-report of the SOS, the SOS was also completed by counselors to enable inter-informant reliability analysis with youth-report of the SOS. The majority of intra-correlations between SOS items were low to moderate (rs=0.1-0.3); one high correlation ($r=0.5$, $p<0.001$) emerged between SOS items, “reached out to another alcoholic” and “said something positive to another alcoholic.”

**Instrument Validity Study Variables.** Instrument validity study measures included prosocial variables, narcissistic variables, and clinical variables.

**Prosocial Behaviors.** Prosocial behaviors were assessed with two valid subscales that have been used with AOD populations and normative young adult populations. The 5-item “helping behaviors” subscale from the 10-item Altruism Self-Report (Rushton, Chrisjohn, & Fekken, 1981) assessed charitable activities performed in the past year: giving food or money to a homeless person, doing volunteer work for a charity, giving money to a charity, looking after a person’s home while they are away, and carrying a stranger’s belongings. Items are rated on a 6-point Likert scale from 1 ("more than once a week”) to 6 (“not at all”) and summed. These 5-items have shown good psychometric properties in AOD populations and normative young adult populations (Single, Robson, & Rehm, 1999; Rushton, Chrisjohn, & Fekken, 1981; Smith, 2005). Two items from the Daily Spiritual Experiences Scale (DSES; Underwood et al., 2002; Webb et
al., 2006; Loustalot et al., 2006), “I feel a selfless caring for others” and "I accept others even when they do things I think are wrong", are rated from 1 (“many times a day”) to 6 (“never or almost never”), reverse scored, and summed (range=2-12). The correlation between the two prosocial subscales was $r=0.2$, $p<0.05$.

**Narcissistic Behaviors.** At the opposite end of prosocial behaviors, narcissistic behaviors were measured with the Narcissistic Personality Inventory (NPI), a well-validated self-report of subclinical individual differences in narcissism (Raskin & Terry, 1988; Rasin & Hall, 1979). Three NPI subscales shown to be elevated in AOD populations were selected (Pagano et al., 2010): exhibitionism (7 items), entitlement (6 items), and vanity (3 items).

**Clinical Variables.** Clinical outcomes included two AOD indicators (toxicology screens, AOD cravings), and psychosocial functioning. Youths tested positive for substance use if either ethanol and/or any use of opiates, cannabinoids, cocaine, or phencyclidine were detected in urine samples. Cut-off concentrations (ng/ml) for the following drugs were: THC (50), opiates (300), and PCP(25). The Adolescent Obsessive Compulsive Drinking Scale (A-OCDS) is a valid measure of obsessive thoughts about AOD use and distress caused by these thoughts (Deas et al., 2002). With reference to the past week, 14 items are rated on a Likert scale from 0 (“none/never”) to 5 (“always/extreme”) and summed. Psychosocial functioning was assessed with the clinician-rated Children’s Global Assessment Scale (CGAS), a global assessment of a youth’s worst functioning at home, school, and with peers in the past month (Shaffer et al., 1983). Scores are rated on a scale from 1-100 (lower scores indicating worse
functioning), with “anchor points” that separated functioning into 10 decile increments. A CGAS score of ≤60 was considered a “definite case,” a cut-point supported empirically by epidemiological study of pediatric psychopathology (Bird et al., 1990) that separates subjects with no versus at least one close friend. Of the 3 clinical variables, one correlation was found between CGAS scores and positive toxicology screens (r=-0.3, p<0.01).

AA Involvement. Information on Alcoholics Anonymous involvement (meeting attendance, providing sponsorship, step-work) was assessed from the well-validated AA Involvement (AAI) scale (Tonigan, Connors, & Miller, 1996). Subjects completed the following three AAI items with reference to the assessment period: “how many meetings did you attend?,” “did you have a sponsor?,” and “what steps did you complete?”

Statistical Analytic Plan. Statistical analyses were conducted with SAS version 9.2 (SAS Institute Inc., 2008). Distributions of variables were examined for normality. Missing data for key variables at discharge ranged from 0.1-9.5%, and outcomes collected from medical charts were obtained for all subjects. Nonparametric analyses were performed for group comparisons using Fisher’s exact test for binary variables and Kruskal-Wallis chi-square test for continuous variables. To determine the SOS factor structure with theoretically correlated factors, an exploratory factor analysis (EFA) was conducted with promax-rotated matrices. Given the exploratory nature of the study, no criteria were specified for the number of factors to retain. Following Brand-Koolen (1972), the following qualifications were used for interpreting the magnitudes of factor loadings: < 0.2 ‘low,’ 0.2-0.4 ‘moderate,’ 0.4-0.7 ‘high,’ and > 0.7 ‘very high.’ Other SOS
psychometric analyses included item analysis, inter-informant reliability (youth-versus counselor-report of the SOS), internal consistency, convergent validity, receiver operator curve (ROC) analysis, and stepwise discriminant function analysis. For interpretation purposes, Cohen (1998) considers $r = 0.1$ “small,” $r = 0.3$ “medium,” and $r = 0.5$ “large.” Statistical significance was set at $p < 0.05$ (two-tailed).

RESULTS

Sample. We report intake characteristics of the sample, which are comparable to other studies of adolescents in residential treatment. Approximately half of the sample was male (48%) and from a single parent household (50%), 30% were African-American, and 8% were Hispanic. The average age was 16.2 years (SD=1.1) with 10.1 years of education (SD=1.2). Approximately half of the sample had a parent with a high school diploma (45%), and the average monthly income across all participants was $2,296 (SD=$1,944). The majority of youths entered treatment with drug dependency (99%), with comorbid alcohol dependency (60%), and had an assigned probation officer (84%). The most prevalent drug dependency types were marijuana dependency (92%) and narcotics dependency (21%). Few had received prior residential treatment (5%), and more than half of the sample had attended fewer than 2 meetings (median=2.0) in the 90 days prior to admission. There were no significant differences in background characteristics between male and female subjects at baseline.

Frequency of SOS Items. Table 1 shows the frequency of endorsed responses to SOS items. AAH activities that youths engaged in the most (i.e.,
SOS items rated “often” or “always”) were emotionally supportive acts to other alcoholics/addicts (saying something positive to another alcoholic) and the least were programmatic forms of service (taking calls or spending time with a sponsee). Very few youths (7%) did not engage in any AAH during treatment (i.e. all SOS items rated “never” or “rarely”). Individual SOS items and total scores were correlated significantly with counselor report of SOS items (Table 1). Youth AAH participation was higher generally than other programmatic activities (Table 2): approximately 1 of 4 youths (24%) had a sponsor, and 15% had completed a 4th step inventory.

Component Structure of the SOS. Resulting eigenvalues from the EFA in descending order were: 3.97, 1.04, 0.32, 0.24, 0.19, 0.14, 0.11, 0.08, 0.06, 0.05, 0.04, and 0.02. The first rotated factor accounted for 85% of the shared variance, the second factor accounted for 11% of the shared variance, and no items loaded strongly on both factors. The magnitude of factor loadings was moderate for all but two SOS items (Table 1), supporting an interpretation of a unidimensional scale. Using Hatcher’s (1994) criteria of the eigenvalue (> 1.0), inspection of scree plots, interpretability, and at least 3 significant variable loadings per retained component, a one-component solution was found to be the most appropriate. Inspection of ML hypothesis tests indicated rejection of the first null hypothesis of no common factors ($X^2=118.83, p<0.0001$), but failed rejection of the second null hypothesis of more factors needed ($X^2=15.47, p=0.07$). The Cronbach’s coefficient alpha for scale reliability was 0.90.

Correlations Between the SOS and Instrument Validity Study Variables. As shown in Table 2, the SOS was associated significantly with helping behaviors
and compassion subscale scores. The SOS was associated negatively with entitlement subscale scores, but not associated with vanity or exhibitionism subscale scores. When compared to clinical and AA involvement variables, the SOS was associated significantly with fewer AOD cravings, higher psychosocial functioning, higher meeting attendance, and greater step-work.

*Stepwise Discriminant Analysis of the SOS.* The sample was split randomly in half to generate two datasets with balanced toxicology group proportions relative to the population (N=195; 48% positive). The first split half from each toxicology group (i.e. negative versus positive) represented the calibration dataset (N=98; 48% positive); the second split half from each group represented a validation dataset (N=97; 47% positive) that was classified using discriminant analysis functions developed in the calibration dataset. As shown in Table 3, five SOS items assessing programmatic forms of AAH were shown to be useful in separating negative versus positive toxicology groups with a final Wilks’ lambda of 0.67 (X²=316.82, df=6, p<0.001). The cross validation model showed a predicted misclassification error rate of 24%.

*Selection of SOS Cut-Off Score.* Figure 1 shows the ROC curve for the SOS against CGAS scores ≤60 (N=90; 53%). The area under the curve (AUC), a measure of discriminating ability, was 0.73 with a standard error of 0.08; this score compares favorably with AUC data for the SOS as completed by adults (AUC=0.76; Pagano et al., 2009) and for other psychological assessments. A cut-off score of 40 or higher was found to provide the highest average of sensitivity and specificity (SN=0.81; SP=0.66), the highest Phi coefficient (phi=0.3), and the highest degree of concordance (k=0.3). Using this cut-off score to indicate high
AAH, 27% of subjects engaged in high AAH during treatment, similar to the rate observed among adults (28%; Pagano et al., 2010).

CONCLUSIONS AND SCIENTIFIC SIGNIFICANCE

This study is the first investigation to validate a brief adolescent self-report of AAH in one of the largest samples of substance-dependent juvenile offenders with equal gender proportions. Results from the current study indicate that the SOS possesses the requisite psychometric qualities to be useful as a brief assessment of prosocial behaviors relevant to addiction recovery. Data were derived from psychometrically strong instruments and multi-informants, utilizing youth self-reports, clinician-rated assessments, biomarkers, and medical chart review. The internal consistency of the youth administration of the SOS was excellent and every SOS item demonstrated a meaningful loading on the unidimensional scale. SOS scores were corroborated by counselor-report; low to moderate inter-informant correlations may have been higher if counselors observed youths’ AAH participation at both off- and on-site meetings. Convergent validity also was established; the SOS was correlated positively with 2 subscales of prosocial behaviors and negatively associated with narcissistic entitlement. AAH may offer a solution to faucets of narcissism, such as entitlement and hypersensitivity, which are theorized roots of alcoholism shown to be associated with worse AOD outcomes. The SOS also was associated with fewer AOD cravings and higher psychosocial functioning. Meeting attendance and step-work, significant predictors of long-term abstinence (Pagano et al., 2009), also were associated with AAH activity.
This study is the first to explore the prevalence of youth AAH activity during treatment, provide a preliminary threshold for high AAH activity tied to psychosocial and interpersonal functioning, and discern which forms of AAH best distinguish youth AOD outcomes. Most youths engaged in formal AAH activities at least some of the time, and only 7% of juvenile offenders did not engage in any AAH. Youth participated more in AAH than other 12-step activities such as step-work, paralleling earlier work by Tonigan and colleagues (1996) who noted lower participation in programmatic components of 12-step programs as compared to fellowship-oriented activities. There is evidence to support more encouragement of youth participation in programmatic AAH activities, which were better predictors of objective SUD biomarkers than general forms of help. The discriminant function correctly classified 76% of subjects, similar to the 78% correct classification rate of the AUDIT among adolescent populations (Kelly et al., 2002). Future research is warranted to replicate the factor structure, threshold of high AAH, and best set of AAH predictors among diverse samples of adolescents at various stages of recovery.

Some limitations of our study merit attention. First, youth AAH activity at meetings may be overestimated given the majority of youths attended 2-3 meetings each week of treatment. However, the 26% rate of high AAH at discharge approximates the rate of AAH (28%) by adult-report of the SOS three years post-treatment (Pagano et al., 2010). Conversely, study design elements (treatment setting, < 60 days of sobriety) may have constricted youth ability to hold a formal service position and provide sponsorship. EFA loadings for these two items may be higher when assessed post-treatment with more time sober.
Second, with exception of prospective assessment of urine toxicology screens, instrument validity study measures were assessed concurrently at discharge; thus the direction of causation between the SOS and clinical outcomes cannot be concluded. Third, findings may not generalize to youth populations with less severe SUDs and without judicial involvement. However, the most common referral source for adolescent treatment involves judicial sentencing, referrals which will increase with recent legislation changes. Fourth, as with any self-report measure, social desirability bias may be present in the SOS assessment. This potential bias is likely to be minimal, however, given the moderate correlation between youth- versus counselor-report of SOS total scores.

Despite these limitations, our results add to the growing number of empirical studies advancing understanding of how AA helps initiate and sustain behavioral change (Kelly et al., 2011). Brief screening tools for prosocial behaviors frequently are used as an indicator of mental health and in treatment planning (Goodman, 2001). More generally, Future research may explore timing of becoming a sponsor to substantiate the common suggestion of waiting a year or more into sobriety before offering sponsorship. In the meantime, there is a wealth of prescribed AAH activities to engage and benefit newcomers.

Given AAH participation during treatment significantly improves the likelihood of long-term abstinence (Pagano et al., 2004; Pagano et al., 2009), interventions that facilitate early engagement in AAH are critical in the short window of time youths are willing to change their behavior. As a brief, prosocial behavior screening tool, an SOS total score below 40 can identify youths low in service participation, and identifies AAH activities as resources. Instrumental
forms of AAH can be adopted without higher cognitive abstraction, processing, or instruction and can be practiced at meetings to satisfy sentencing mandates for greater benefit. Facing a rising prevalence of substance related problems, the chronic nature of SUDs, and limitations on reimbursement due to national healthcare reform, providers may find the SOS useful for assessing and monitoring levels of AAH. Encouraging such activities during and following treatment may enhance the effectiveness of formal treatment without additional cost, and facilitate more successful youth re-entry into the community.
CHAPTER II:
BACKGROUND AND OBJECTIVES

The 21st century has witnessed a dramatic increase in addiction among U.S. youth, with similar rates of alcohol and other drug (AOD) use disorders among both boys and girls (Mulye et al., 2008). The recent legalization of marijuana in several states, the plethora of prescription medications, and harder street drugs including methamphetamines gives youth the greatest access to controlled substances than our nation has seen since the initiation of the “War on Drugs” (Hurley & Mazer, 2013). Adolescent AOD use curtails brain development and scholastic achievements, increases incidence and spread of infectious disease, potentiates the danger of risky sex, teenage pregnancy, school drop-out, and criminal activity, and shortens life-course trajectories with associated medical comorbidities (Guerri & Pascual, 2010; Tapert & Brown, 2000; Dawson et al., 2004; SAHMSA, 2010; Barber & Erickson, 2001). The rising cost of AOD problems is estimated at $500 billion in increased criminal activity, higher health-care costs, and lost productivity (Bouchery et al., 2011).

In tandem, a confluence of national trends has fostered youth self-seeking and irresponsible behaviors. Millennial youth have been coined the “Me Generation” in reference to an increased sense of entitlement, diminished gratitude, and me-first orientation (Twenge, 2006). Youth have a greater focus on individualistic traits (Twenge & Foster, 2010) and extrinsic values, such as money, fame, and image and a decreased concern for self-acceptance and community (Twenge, Campbell, & Freeman, 2012). Youth volunteerism has dramatically declined in the past two decades, as well as their participation in
community organizations, clubs such as girls/boys scouts, after-school programs, and religious congregations (Putnam, 2000). Changes in healthcare policies have prolonged the period of adolescence until age 27, which delays youth maturation from ego-centric thinking and personal responsibility. As others have noted (O’Keeffe & Pearson, 2011), youth are developing their identities in a backdrop of consumerism that promotes “I” thinking, entitlement, and immediate gratification. With the rise of new technologies, youth are well versed with delayed, one-sided conversations and instant click-point results with little practice in listening skills, group cooperation, sensitivity to others, and tolerance. The epidemic problem of bullying and cheating (Nansel, et al., 2001; Schmelkin, Gilbert, & Silva, 2010) are signs of diminished deference to others, rules, and citizenship. The common family structure of a single-parent or both parents working full time, few multigenerational households, and little discourse with neighbors translates into sparse adult guidance and discipline of youth behaviors (Steinberg, Fletcher, & Darling, 1994; Goldstein, 1999). Consequences to these trends are lost health benefits from helping others (Pagano et al., 2010; Barber & Erickson, 2001); instilled altruistic values from religious membership; agency, group skills, and developed empathy from community involvement and club membership (Konrath, O’Brien, & Hsing, 2010). In sum, there are fewer stakes in place to offset self-seeking behaviors and elevated grandiosity during adolescence that rationalizes youth experimentation with AOD.

Alcoholics Anonymous has long emphasized ego-centric thinking as a root cause of addiction, and helping others as its antidote. AA is the most commonly sought source of help for AOD problems, 85% of AOD treatment programs
recommend AA participation as adjunct treatment (Kelly & Yeterian, 2008; Knudsen, Duscharme, & Roman, 2008), and municipal courts typically mandate AA meeting attendance for AOD-related offenses (Dill & Wells-Parker, 2006). In the backdrop of shrinking community circles and face-to-face communication, the grassroots movement of AA provides a natural mechanism for fostering group interactions, a sense of community, leadership opportunities, identity development, and sober recreation. With more than 2.1 million members and 100,766 groups in 150 countries, AA’s wide-spread availability, lack of membership fees, required health insurance, or parental permission, and anonymity has particular applicability with youth. With a primary purpose to stay sober and help others to achieve sobriety, service is at the core of the 12-step program. A growing body of high-rigor research points to giving service as integral to staying sober and in fostering awareness of others (Pagano, et al., 2013).

In the field of mental health, efforts to date in untangling social discourse patterns associated with addiction have primarily targeted narcissistic personality disorder (NPD; Cohen, et al., 2007). However, narcissism is a broad construct, facets of which include an exaggerated sense of self-importance, a need for attention and admiration, an unwarranted sense of entitlement, a preoccupation with fantasies of unlimited success and power, arrogant attitudes and behaviors, and a lack of empathy for others (American Psychiatric Association, 2000). There is empirical evidence to support an association between AOD use and select facets of narcissism. In a sample of 266 young adults, Carter and colleagues (2012) found higher levels of authority, entitlement,
exhibitionism, exploitativeness, and vanity in relation to substance dependency. Psychopathic traits that were significantly elevated among prescription drug misusers in comparison to normal controls included cold-heartedness, blame externalization, and impulsive nonconformity (Hall, Howard, & McCabe, 2010). Among females, there is evidence to suggest a correlation between select antisocial traits—blaming others and heightened defensiveness—and addiction (Vaughn et al., 2007; Guzikov, Zobnev, & Vale, 1997). While these findings have increased recognition of narcissism in the profile of alcoholics/addicts, the translation of research findings into practice is problematic. Formal diagnosis of NPD requires 18 years of age, is rarely conveyed to a patient, has no pharmaceutical therapies, and is discordant with the intake assessment of a patient’s strengths used for treatment planning.

There is evidence to suggest that poor other-oriented regard, often co-morbid with narcissistic facets, underlies the disease of addiction and may be more strongly associated with high AOD use (Vaughn, et al., 2007). The significant but low correlation between service participation and narcissistic behaviors (r=-.25, p<0.001) suggest overlapping but distinct constructs (Pagano, et al., 2013). Burgeoning neuroimaging research points to deficits in other-oriented awareness among offspring of alcoholics (Cservenka & Nagel, 2013). Psychosocial research with treatment-seeking populations has found higher callousness and lack of empathy associated with AOD use (Montgomery, et al., 2012). Minors with substance dependency have been shown to give less money to charity and the homeless than normative young adults in the General Social Survey (Pagano, et al., 2013). In a cross-sectional study of 80 adults with
addiction, Le Bon and colleagues (2004) found increased extravagance in substance abusers than a control sample. A longitudinal investigation of 1,065 youth found lowered engagement with others, especially family, to distinguish adolescents who developed problems with AOD (Henry, 2008). Findings to date characterize alcoholics/addicts as less empathetic, giving, and engaged with others. Yet, it is unclear whether there is empirical support for the classic descriptor of the alcoholic/addict as a “tornado roaring through the lives of others” (AA, 2001). Determining low other-oriented regard among alcoholics/addicts may better tailor interventions to further awareness of personal actions on others and adoption of suggested AA practices of helping others.

The purpose of this study is to determine whether addiction is associated with less consideration of one’s actions on others. This study explores the association between low other-oriented regard and addiction among adolescents. This quasi-experimental study utilizes data collected in 2009 among youth aged 14-18 with and without substance dependency living in the same region of the country. We hypothesize that substance dependent youth will show lower other-oriented regard (driving under the influence (DUI), DUI without a license, unprotected sex, unprotected sex while infected with a sexually transmitted disease (STD), and lower volunteerism) than youth without substance dependency matched by age group, gender, minority status, and zipcode. Main effects of AOD group (no use, some use, addiction) are also tested among youth subgroups of grade level (9-10th graders versus 11-12th graders) and gender (girls versus boys).
METHODS

Procedures

Normative Youth Sample. This study utilized data collected in the spring of 2009 among youth attending high school (grades 9-12) in Cuyahoga County (CC) as part of the 2009 Youth Risk Behavior Survey (YRBS). The YRBS is part of the Youth Risk Behavior Surveillance System of the Centers for Disease Control and Prevention (CDC), a biennial questionnaire covering priority health risk behavior categories among U.S. students in grades 9-12. States can modify the standard YRBS questionnaire within certain eligibility parameters: 1) two thirds of the questions from the standard YRBS questionnaire must remain unchanged; 2) additional questions are limited to eight mutually exclusive response options; 3) skip patterns, grid formats, and fill-in-the-blank formats cannot be used; and 4) item count is limited for questionnaire completion during a single class period of approximately 45 minutes by all students, even those who might read slowly (CDC, 2013; Murphy et al., 2004). The 2009 national YRBS questionnaire was based on the standard high school YRBS questionnaire, but included 11 additional items expanding assessment of youth psychosocial functioning, health safety precautions, and lifetime illicit drug use. The 2009 CC-YRBS further expanded the questionnaire with 3 additional items pertaining to volunteerism and sexual conduct that are included in this study. High schools in Cuyahoga County participating in the 2009 national YRBS followed the CDC data collection procedures of a 2-stage cluster sample design. In the first sampling stage, 30 high schools were selected at random from the pool of 79 schools in the 31 school districts in CC, with heavier weighting to schools enrolling greater numbers of
9th-12th grade students. Of the 30 high schools contacted to participate in the 2009 CC-YRBS, 20 (67%) agreed to participate. The non-participating high schools were relatively balanced between public (6 schools) and private (4 schools).

In the second sampling stage, individual classrooms were selected at random in each school. Passive parental permission was obtained by mailing home permission slips allowing parents to opt out their child from participating in the survey. Students were informed that their participation was voluntary and anonymous. Surveys were completed by students in selected classrooms on the day of the survey and whose parents did not object to their participation. Of the total eligible 6,597 students, 4,980 (76%) completed the survey, with non-response almost entirely accounted for by absenteeism. After data was cleaned and edited for inconsistencies, 4,525 usable student surveys (69%) remained. Participants endorsing either of the last two response categories to any of the 11 AOD survey item (3 recent items, 8 lifetime items) were excluded from this study, which represented 23% (1020/4525) of the total usable student surveys. Approximately 26% (1166/4525) of the total usable student surveys were categorized as never-users (i.e. participants endorsing no use to all AOD survey items. Non-weighted data is used given the overall response rate (46%) was below the accepted threshold for data weighting (60%).

Because the state of Ohio does not permit the CDC to distribute its YRBS data collection, the 2009 CC-YRBS data collection was obtained with permission from the Prevention Research Prevention Center for Health Neighborhoods. All procedures of this study were approved by the Case Western Reserve University
Institutional Review Board for human investigation, and a Certificate of Confidentiality from the National Institute on Alcohol Abuse and Alcoholism was obtained.

**Clinical Youth Sample.** The clinical sample of youths with AOD dependency was derived from the Service to Others in Sobriety (SOS) study, a prospective, longitudinal investigation of 12-step affiliation among juvenile offenders court-referred to AOD treatment (Pagano et al., 2013). Recruitment for this study was conducted from February 2007 to August 2009 at New Directions, the largest adolescent residential treatment provider in northeast Ohio. Inclusion criteria included the following: ages 14–18 years, English speaking, stable address and telephone, met diagnostic criteria (American Psychiatric Association, 2000) for current AOD dependency, and medically stable. Exclusion criteria included: a major health problem other than AOD use disorders likely to require hospitalization, currently suicidal or homicidal, or expected incarceration in the subsequent 12 months. Participants were referred to AOD treatment from a variety of sources, including juvenile court (83%), mental health professionals (65%), and non-psychiatric physicians (2%). Participants were admitted into AOD treatment one week after a 3-day AOD detoxification (if required). In the week before admission date, participants were sent an information packet with an invitation letter to participate in the study. Following admission, participants were approached to participate and given a brief description of the study. Eligible participants signed statements of informed consent/assent. Participants were paid $25 for completed assessments. Additional information regarding study design and methods is detailed elsewhere (Kelly et al., 2011).
Measures

The 2009 Youth Risk Behavior Survey (YRBS) is a national survey that has been collected among representative samples of civilian non-institutionalized adolescents biennially since 1990 (Kann et al., 2002; Murphy et al. 2004). The 2009 CC-YRBS was a self-administered survey consisting of 129 multiple choice items (see PRCHN, 2009). The YRBS has been used with minor populations with AOD use disorders and demonstrated good test-retest reliability ($\kappa=0.61-0.80$), internal consistency ($\alpha=0.74$), and construct validity (Shipp et al., 1995; DuRant et al., 1999; Kann et al., 2002; CDC, 2000; CDC, 2013).

Background. Background variables included gender, minority status, Hispanic status, age, grade, parental education, household structure, and household zip code. Race/ethnicity data were collected in compliance with National Institutes of Health guidelines; minority status and Hispanic status were self-designated by participants as black/African American and Hispanic/Latino, respectively. Grade levels ranged from junior high school (grades 9-10) and senior high school (grades 11-12). The highest level of education completed by either parent was used to assess parental education. Low parental education was considered as having less than a high school diploma. Family structure was assessed from youth’s report of the individuals living in their household. Youth without a father or stepfather in the household were classified as living in a single-parent household. An item assessing zip code was prefilled with 2 initial digits of the county region; the last 3 digits were completed by participants.
Low Other-Oriented Regard. Using a task orientation rather than an ego orientation, low other-oriented regard was defined as a behavior performed without focus on another’s needs and inclinations (Roth, 2008). Three behaviors indicative of low other-oriented regard included low volunteerism, driving under the influence (DUI), and unprotected sexual intercourse. Low volunteerism was assessed using a select item added to the 2009 Ohio YRBS: “In an average month, how many hours do you spend on volunteer work, community service, or helping people outside of your home without getting paid?” Item responses ranged from “0 hours,” “1 to 4 hours,” “5 to 8 hours,” “9 to 12 hours,” “13 to 20 hours,” to “21 or more hours.” Given the threshold of at least 5 hours/per month that is associated with better health outcomes (Post et al., 2011; Lum & Lightfoot, 2005), a binary variable (Y/N) was created to indicate low (<5 hours) versus high (5+ hours) volunteerism. This one item assessment of volunteerism has been used in other studies with normative populations of young adults (Murphy et al., 2004). Driving under the influence (DUI) of alcohol was evaluated using the YRBS item: “During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?” Item responses ranged from “0 times,” “1 time,” “2 or 3 times,” “4 or 5 times,” to “6 or more times.” A binary (Y/N) variable was created to reflect no recent history of driving under the influence of alcohol (“0 times”) versus recent history of driving under the influence of alcohol (e.g. 1 time or more). Unprotected sex was assessed with the YRBS item: “the last time you had sexual intercourse, did you or your partner use a condom?” Response categories ranged from “I have never had sexual intercourse” to “Yes” or “No.”
The frequencies of other-oriented regard variables in the 2009 CC-YRBS (46% no volunteerism, 9% DUI, and 37% unprotected sex) were comparable to rates in 2011 (47%, 7%, and 35%, respectively; PRCHN, 2011) and to 2009 YRBS rates in other regions (Indiana: 53%, 10%, and 40%, respectively; CDC, 2010).

**Physical Health.** Three physical health indices were assessed: body mass index (BMI), asthma, and health quality of life. BMI was assessed by youth self-report of height and weight. BMI was assessed using sex- and age-specific reference data from the 2000 CDC growth charts for adolescents (Kuczmarski et al., 2000). BMI progression lines increased in parallel with the transition from adolescence into young adulthood. Asthma history was measured with the item: “Do you still have asthma?” Item responses ranged from “I have never had asthma” to “Yes” or “No”. Health quality of life was assessed using the item: “How do you describe your health in general?” Response choices ranged from “Excellent,” “Very good,” “Good,” “Fair,” to “Poor”. Prior studies have demonstrated good construct validity of YRBS physical health indices in relation to biomarkers (Forrest et al., 1997; Himes & Faricy, 2001; Jeffrey, 1996) and perceived life satisfaction in adolescents (Zullig et al., 2005).

**Sexually Transmitted Disease.** Two STD-related indices were assessed: years of exposure (age of first sex) and STD history. Duration of STD exposure risk (years) was calculated by subtracting age of first sexual intercourse from youth age at intake. History of sexually transmitted diseases was assessed using the added select item: “Have you ever been told by a doctor or nurse that you had a STD?” Item responses ranged from “Yes” or “No” to “Not sure.” This one item assessment of STD history has been used in other studies with normative youth
populations (Upchurch et al., 2007). The frequencies of STD-related variables in
the 2009 CC-YRBS (11% had sex before the age of 13, 5% STD) were comparable
to 2011 CC-YRBS rates (7% and 4%, respectively) and to 2009 YRBS rates in
other states (10% Indiana and 5% Illinois, respectively; CDC, 2010).

**Alcohol and Drug Use.** Lifetime and recent AOD use was assessed using 11
YRBS items. Three items assessed subject’s frequency of alcohol use, heavy
drinking (5 or more drinks of alcohol in a row within a couple of hours), and
marijuana use in the past 30 days. Item responses for recent alcohol use ranged
from 0-30 days of the prior month, and item responses for recent marijuana use
ranged from 0-40+ times. Seven items assessed lifetime AOD use. Participants
reported lifetime use of the following substances: cocaine, inhalants, heroin,
methamphetamines, ecstasy, prescription medications without a doctor’s
prescription, marijuana, and alcohol. Item responses for drug use ranged from 0-
40+ times; lifetime marijuana and alcohol use ranged from 0-100+ times and 0-
100+ days, respectively. Participants in the 2009 YRBS-CC survey who endorsed
no use to all 11 AOD-related items were categorized as never-users; those
endorsing some use to at least one item were categorized as some-users.

**Statistical Analytic Plan**

Statistical analyses were performed using the procedures CORR, FREQ,
Distributions of variables were first examined for normality. Positively skewed
variables were given a log-transformation, and negatively skewed variables
received an arcsine transformation (e.g. Tabachnick & Fidell, 2001). Fisher’s
exact test for categorical variables and Wilcoxon Mann-Whitney rank-sum tests
for continuous variables were used to test for differences between groups. A binary logit model stratified by pair assignment tested the difference in probability of low volunteerism, driving under the influence (DUI), and unprotected sexual intercourse. A loglinear poisson regression fitted the ratio of STD incidence to years of exposure (date of first sex), with a Pearson correction for dispersion. Main effect of AOD severity group (never users vs. some users vs. substance dependent) and interaction term with subgroup (i.e., age group or gender) were tested in the logit model to maximize power available with the total sample (N=395) and preserve a family-wise error rate of p<.05.

RESULTS

Profile of Study Sample

Background and physical health characteristics of the study sample (N=585) are presented in Table 4. Participants were 16 years of age on average (SD=1.2). Approximately half (48%) were male and from a single parent household (47%). Thirty percent were African American and 9% were Hispanic. Sixty-one percent were in junior high school (grades 9-10) and 39% were in senior high school (grades 11-12). Eighteen percent of participants had a parent who did not complete high school, 44% had a parent with a high school diploma, and 37% had a parent with a four-year college degree or more. The majority of youth (74%) were within the normal BMI range for gender/age group classifications, 3% were underweight, 14% were overweight, and 9% were obese. Sixty-seven percent of participants described their health as good or very good health, 25% reported fair health status, and 8% rated their health as poor. Seventeen percent of participants indicated a history of asthma.
Initial analyses evaluated the degree to which participants selected into the study sample (N=390) were representative of non-selected participants (N=4142) from the 2009 YRBS-CC survey. Table 4 shows background and physical health characteristics of never-users and some-users, which were similar to non-selected participants in terms of age (M=15.9, F=0.8, ns), gender (47% male, x²=0.9, ns), race (32% minority, x²=0.5, ns), ethnicity (8% Hispanic, x²=0.1, ns), grade (60% in grades 9-10, x²=0.1, ns), parental education (19% did not complete high school, x²=0.2, ns), household structure (44% single parent, x²=1.7, ns), asthma history (19%, x²=1.3, ns), BMI categories (70% normal, x²=2.2, ns), and health quality of life (64% very good/good, x²=3.4, ns). As shown in Table 4, there were no significant background or physical health differences between youth with addiction, some use history, and never-users. Two significant trends showed lower rates of single-parent households among never-users (x²=2.4, p=.09) and parental high school graduates among youth with addiction (x²=2.8, p=.08).

Alcohol and Drug Consumption of Study Sample

Table 5 shows AOD consumption patterns of the study sample (N=585). By definition, never-users reported no recent or lifetime use of alcohol or drugs. In the past thirty days, the majority of some-users were abstinent from alcohol (55%), binge drinking (83%), and marijuana use (77%), with a small proportion reporting 10 or more days of drinking (6%) and marijuana use (9%). The most prevalent lifetime substances consumed by some-users were alcohol (82%), marijuana (45%), and non-prescribed controlled substances (20%). The majority of youth with addiction (62%) consumed marijuana and had at least one drink
(53%) in the prior month; the most prevalent lifetime substances were alcohol (100%), marijuana (100%), and non-prescribed controlled substances (49%). Recent and lifetime AOD use across all types of drugs were significantly higher among substance dependent youth with exception to recent alcohol use (1+ drink).

**Outcomes of Study Sample**

We initially compared youth subgroups in the prevalence of conditions related to related other-oriented regard outcomes: the proportion of sexually active youth and with an STD. One out of four (25%) of the study sample were virgins and 13% reported an STD history. The proportion of youth who were sexually active and with an STD history differed by grade level and AOD group but not gender; 9-10th graders were less likely to be sexually active (68% vs. 74%, \( \chi^2=4.2, p<.05 \)) and have an STD history (6% vs.11%, \( \chi^2=34.2, p<.01 \)) than 11-12th graders, girls were as likely to be sexually active (72% vs. 78%, ns) and have an STD history (14% vs. 10%, ns) as boys. Never-users were more likely to be virgins (54%) in comparison to some users (22%) and addicted youth (0%; \( \chi^2=153.6, p<.0001 \)). The STD rate among addicted youth (15%) and some-users (15%) was approximately twice the rate of never-users (8%; \( \chi^2=7.03, p<.01 \)).

Table 6 shows other-oriented regard outcomes of the study sample. Seventy-seven percent of the sample volunteered less than 5 hours in an average month, 55% of sexually active youth and 62% of infected youth did not use a condom at the last sexual intercourse, and 26% drove under the influence of AOD in the past month. Rates of low volunteerism were similar across grade level (75% grades 11-12 vs. 79% grades 9-10, ns) and gender (76% girls vs. 78% boys,
as were DUI rates (23% grades 11-12 vs. 20% grades 9-10, ns), and gender (20% girls vs. 24% boys, ns). Rates of unprotected sex were similar across grade level (53% grades 11-12 vs. 56% grades 9-19, ns) with a trend towards higher rates among girls (56%) than boys (44%, X²=3.6, p=.07).

Our hypothesis of greater likelihood of low volunteerism among youth with addiction was confirmed among boys but not girls; boys with addiction were more likely to report low volunteerism than boys with some (RR=1.19, p<.01) and no AOD use history (RR=1.12, p<.05). Our hypothesis of greater likelihood of unprotected sex among youth with addiction was also confirmed. Adolescents with addiction were more likely to have unprotected sex than some-users who had greater risk than never-users. This pattern was pronounced in populations with an STD: addicted youth with an STD were more likely to have unprotected sex than infected some-users, whose risk was greater than infected never-users. Youth with addiction were also more likely to drive under the influence than some-users; however, there were no significant differences in DUI risk between youth ineligible to drive (i.e. 14-15 year olds in grades 9-10) versus eligible (aged 16+ in grades 11-12).

CONCLUSIONS AND SCIENTIFIC SIGNIFICANCE

This study was the first to explore the relationship between the amount of exposure to AOD and corresponding changes in other-oriented behaviors in a large cohort of youth representative of the adolescent population attending high school in the region (52% female, 30% minority; PRCHN, 2009). The potential confounders of age, gender, minority status, and residence (i.e. zipcode), as well as characteristics associated with these variables, were addressed by the
matched-pair study design. Consistent with prior research showing lower charitable giving among SD youth in comparison to normative controls (Carter et al., 2012), volunteering at least 5 hours per month appears to have a significant, albeit small, protective effect on reducing risk of adolescent addiction. A significant, dose-response relationship between greater AOD severity and increased likelihood of low volunteerism was found for boys but not girls. Boys with addiction were more likely to report low volunteerism than boys with some and no AOD use history. Because of the zipcode pairing criteria, findings are robust across regional differences in youth volunteerism opportunities. However, socialization practices may contribute to the gender differences observed. From an early age, girls are encouraged to be generous with their time and resources whereas boys learn to oppose others in male friendships (Tannen 1994). Adherence to perceived social ideals may better disguise ego-centric behaviors affiliated with addiction for girls but not boys. This warrants future research.

In contrast, a significant, moderate, dose-response relationship was found between greater AOD severity and increased likelihood of behaviors that demonstrate lack of other regard. DUI rates were significantly higher among youth with addiction than youth with some AOD use history. Having unprotected sex was more prevalent among addicted youth in comparison to some users, whose risk was greater than never-users. Further, participants with a STD history who did not use protection at the last sexual intercourse were more likely to be AOD dependent in comparison to some users, whose risk was greater than never-users. One hypothesis, however, was not supported: the association between AOD severity and likelihood of DUI was not more pronounced among
participants ineligible to drive (i.e. aged 14-15 vs 16-18). Obtaining a driver’s license has dramatically declined as a right of passage for teenagers (Sivak & Schoettle, 2012), which could diminish difference in the AOD/DUI association across age groups. Future research is warranted to explore a greater dose-response association between DUI and AOD severity among youth aged 14-15 versus 16-18 with more DUI events than those reported in the past 30 days.

We interpret study findings through a lens of social skills deficits tied to the disease of addiction. Rather than a problem of moral character or psychopathology, alcoholics may be less sensitive to understand how their actions impact others as if hindered with aspects of autism. Recent neuroimaging genetic research shows evidence of addicts’ blunted responsivity to others (Cservenka & Nagel, 2013). Alcoholics clearly seek but struggle with social connectedness (Pagano et al., 2013), need external validation (Luhtanen et al., 2005), and are hypersensitive to perceived criticism (Pagano et al., 2010). The tension between low insight about the impact of their actions on others and not fitting in is well captured in 12-step literature. “Almost without exception, alcoholics are tortured by loneliness . . . craving attention and companionship” (AA, 1981,p.54). “He is like the farmer who came up out of his cyclone cellar to find his home ruined. To his wife he remarked, ‘Don’t see anything the matter here, Ma. Ain’t it grand the wind stopped blowing?’” (AA, 2001, p.82). Two relevant questions asked of AA members directly target the illness’s blind spot regarding other-oriented awareness: “am I willing to think of other people, of their needs, instead of myself, in order to get rid of the drink problem?” (AA, 2001, p. 214) and “how will this affect the other?” (B, 1998, p.340).
There are several limitations of this study that should be noted. First, study measures were assessed at one time point; thus, while correlated, the direction of causation between higher AOD use and lower other-oriented behavior is inconclusive. For example, it is possible that a subject with some AOD use history drank or used drugs for the first time in the past 30 days that resulted in a DUI incident. However, it is unlikely that a DUI in the past 30 days preceded development of addiction among youth admitted into treatment.

Second, findings may not generalize to adult populations or non-western societies with a more collectivist mentality. Third, as with all self-report instruments, social desirability bias may be present in YRBS survey items. This potential bias is likely to be minimal, however, given all participants completed survey items under anonymous conditions and the comparability of item responses to other YRBS state reports. The dose-response association between low other-oriented regard and AOD severity is likely to be greater than observed to the extent that minimization of socially unacceptable behavior is more pronounced among those with addiction. Fourth, only a randomized clinical trial can take into account unmeasured confounding variables. However, the matched-pair design of this study does rule out important select characteristics (age, gender, minority status, zipcode) as alternative explanations for differences between youth AOD groups, and partially adjusts for unmeasured confounders that are correlated with matched characteristics.

**Clinical Implications**

Living sober often requires daunting lifestyle changes that can be overwhelming. Simple behavioral modifications that are repeatedly practiced are
recommended to produce an enduring change in other-oriented outlook. For example, asking how their actions made the other feel as part of the amends process may increase addicts’ sensitivity to others. Approaches that cultivate alcoholics’ empathic curiosity (Halpern, 2007; Mcevoy et al., 2013) and capacity to empathically understand others without judgment (Rogers, 1975), such as AAH, may not only help sustain sobriety and increase interest in others (Pagano et al., 2013), but also improve the quality of interpersonal relationships. While empathic accuracy is a trainable skill, motivation for the alcoholic to learn how to take and appreciate another’s perspective may be fostered by drawing attention to the discrepancy between the alcoholic’s desire for interpersonal connectedness and harmful behaviors.

This research suggests that addiction is associated with behaviors that lack other regard. Alcoholics’ attendance at Al-Anon meetings, a program for those whose lives are impacted by addiction, may increase their awareness of how their actions affect others, which warrants future research.
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Assessing Youth Participation in AA-Related Helping: Validity of the Service to Others in Sobriety (SOS) Questionnaire in an Adolescent Sample

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Background and Objectives: The positive outcomes derived from participation in Alcoholics Anonymous-related helping (AAH) found among adults has spurred study of AAH among minors with addiction. AAH includes acts of good citizenship in AA; formal service positions, public outreach, and transmitting personal experience to another fellow sufferer. Addiction research with adolescents is hindered by few validated assessments of 12-step activity among minors. This study provides psychometric findings of the "Service to Others in Sobriety (SOS)" questionnaire as completed by youths.

Methods: Multi-informant data was collected prospectively from youth self-reports, clinician-rated assessments, biomarkers, and medical chart records for youth (N = 195) after residential treatment.

Results: Few youths (7%) did not participate in any AAH during treatment. Results indicated the SOS as a unidimensional scale with adequate psychometric properties, including item-total-reliability (r = .5), internal consistency (alpha = .90), and convergent validity (r = .3 to .5). Programmatic AAH activities distinguished abstinent youths in a random half-sample, replicated on the other half-sample. The SOS cut-point of 40 indicated high AAH participation.

Conclusions and Significance: The SOS appears to be a valid measure of AAH, suggesting clinical utility for enhancing treatment and identifying service opportunities salient to sobriety. (Am J Addict 2013;22:60-66)

BACKGROUND AND OBJECTIVES

The 21st century has witnessed the greatest increase in alcohol abuse, prescribed controlled substances, and use of other drugs (AOD) among our nation’s minors,1 potentiating the danger of risky sex, criminal activity, and school drop-out. The rising cost of AOD problems is estimated at $500 billion in increased criminal activity, higher health-care costs, and lost productivity.2 Efficient, cost-effective approaches for juvenile offenders are needed that alter youths’ deleterious life course trajectories while sustaining addiction recovery, developing new sober peer networks, and promoting character development.

In the United States, Alcoholics Anonymous (AA) is the most commonly sought source of help for AOD problems, and most alcoholism treatment programs encourage AA attendance.3-5 AA participation consistently is associated with improved AOD outcomes for mandated and non-mandated populations,4 which has spurred national efforts to investigate how behavioral change is mobilized and sustained in AA.6 A growing body of literature has identified AA-related helping (AAH) as an active ingredient of the 12-step program. Reviews of AAH research report modest effect size estimates of AAH on increased abstinence, reduced depression, and reduced symptoms of extreme self-preoccupation,7,8 which are not limited to individuals of a certain gender, ethnicity, problem severity, educational level, socioeconomic class, or religious orientation.9,10

Service has natural application with adolescent populations: action-oriented for youths without higher-level cognitive skills; provides social and leadership opportunities; is associated with reduced narcissistic behaviors common during adolescence and to AOD populations;11 is commonly encouraged in promoting adolescent development; and does not require parental permission, fees, or transportation. Given AAH’s applicability and association with improved outcomes, the death of AAH quantification in adolescent addiction investigations is surpris-

Received January 19, 2012; revised June 19, 2012; accepted August 10, 2012.

Address correspondence to Dr. Pagano, Division of Child Psychiatry, Department of Psychiatry, Case Western Reserve University School of Medicine, 12012 Euclid Ave, Cleveland, OH 44106. E-mail: maria.pagano@case.edu.
anyone. While there was no association between providing sponsorship and AOD use, youths who performed services (8%) were more likely to be abstinent. However, youths may not understand what constitutes performing services, or be reluctant to endorse the title of being a sponsor while engaging in activities common to sponsors. The frequency and impact of youth AAH participation on outcomes may be greater with broader measurement of AAH.

For feasibility in clinical settings, AAH instrumentation needs to be brief and easily scored, capture the myriad ways alcoholics may help fellow sufferers, list AAH activities accessible to all individuals at various stages of recovery, assess support given outside of treatment settings, and estimate the degree of AAH participation rather than completed activity. Further, measured AAH activities are more meaningful when they are shown to distinguish abstinence from relapse, and relate activity thresholds to clinical severity. The "Service to Others in Sobriety (SOS)" questionnaire was developed to assess common AAH activities including acts of good citizenship, formal service positions, public outreach, and transmitting personal experience to another fellow sufferer. The SOS has demonstrated adequate psychometric properties with treatment-seeking adults, with good internal consistency (Cronbach alpha = .82-.92), construct validity (r = .3-.6), test-retest reliability (r = .94), and feasibility. These findings suggest that the SOS may be a useful tool with adolescents.

In this study, we examined the psychometric properties of a 12-item instrument, SOS, as completed by adolescents and completed by adolescents and were enrolled in a residential treatment program in Northeast Ohio. The SAS patients approached, none were ineligible and 16 refused to participate, resulting in an enrollment sample of 195 subjects. There were no significant differences between the groups in terms of demographic profile, drug of choice, years of illicit drug use, trauma history, sexual orientation, treatment history, and treatment completion. Of the 195 youths enrolled at intake, 175 (90%) completed treatment, 10 (5%) were discharged prematurely against medical advice, 6 (4%) were discharged to a higher-level facility, and 4 (2%) were hospitalized for medical complications. Discharge interviews were unable to be scheduled for 5% of enrolled subjects: three treatment completers, three premature discharges, and four higher-level facility discharges. There were no significant differences between subjects with and without a discharge interview in terms of background characteristics or instrument validity study variables at baseline. Detailed information regarding the overall aims, research design, and baseline assessment of instrument validity study measures is explicated elsewhere.

METHODS

Procedures

Recruitment for this study was conducted from February 2007 to August 2009 at a single site in Northeast Ohio. Inclusion criteria included: (1) aged 14–18 years, (2) English speaking, (3) stable address and telephone, (4) met DSM-IV diagnosis of a substance use disorder (SUD), and (5) medically stable. Exclusion criteria included: (1) a major chronic health problem other than substance use likely to require hospitalization, (2) currently suicidal or homicidal, and (3) incarceration in the subsequent 12 months. In the week prior to their scheduled date of admission, subjects were sent a packet of information that included an invitation letter to participate in the study. Following admission, subjects were approached to participate in the study. After a complete description of the study, eligible subjects signed statements of informed consent/assent. Ninety-minute interviews were conducted within the initial 10 days of admission and repeated at discharge after 2 months of residential treatment (M = 2.2, SD = 2). Urine toxicology screens were collected prospectively each week of the 8-week treatment period by clinical staff as part of routine clinical procedures. Clinicians completed the SOS and one instrument validity measure at discharge. Clinical and research study staff were blind to instrument validity measurement scores. All procedures of this study were approved by the University Hospitals/Cleveland Medical Center Institutional Review Board for human investigation, and a Certificate of Confidentiality from NIAAA was obtained. All subjects and their parent/legal guardian voluntarily provided written informed consent/assent and were paid $25 for completed assessments.

Subjects

A total of 482 adolescents were admitted into treatment during the enrollment period of the study. Subjects were recruited from New Directions (ND), the largest adolescent residential treatment provider in Northeast Ohio. Of the 211 patients approached, none were ineligible and 16 refused to participate, resulting in an enrollment sample of 195 subjects. There were no significant differences between subjects and subjects not enrolled (N = 195) versus not enrolled (N = 287) in terms of demographic profile, drug of choice, years of illicit drug use, trauma history, sexual orientation, treatment history, and treatment completion. Of the 195 youths enrolled at intake, 175 (90%) completed treatment, 10 (5%) were discharged prematurely against medical advice, 6 (4%) were discharged to a higher-level facility, and 4 (2%) were hospitalized for medical complications. Discharge interviews were unable to be scheduled for 5% of enrolled subjects: three treatment completers, three premature discharges, and four higher-level facility discharges. There were no significant differences between subjects with and without a discharge interview in terms of background characteristics or instrument validity study variables at baseline. Detailed information regarding the overall aims, research design, and baseline assessment of instrument validity study measures is explicated elsewhere.

Measures

Background variables are first described, followed by the SOS and instrument validity study variables.

Background Variables

Background variables assessed at intake included: youth gender, race, ethnicity, age, years in school, parole/probation history, treatment history, parental marital status, parental education, and monthly household income.
AA-Related Helping

The 12-item SOS is a behavioral assessment of service participation within the 12-step program. To reflect the reality of degrees of participation as opposed to definitive yes/no activity, SOS items are rated on a 5-point Likert scale from 1 (“rarely”) to 5 (“always”) and summed for a total SOS score (range: 12-60). In addition to youth self-report of the SOS, the SOS was also completed by counselors to enable inter-informant reliability analysis with youth-report of the SOS. The majority of intra-correlations between SOS items were low to moderate (r = 0.3-0.7); one-high correlation (r = .5, p < .001) emerged between SOS items, “reached out to another alcoholic” and “said something positive to another alcoholic.”

Instrument Validity Study Variables

Instrument validity study measures included prosocial variables, narcissistic variables, and clinical variables.

Prosocial Behaviors

Prosocial behaviors were assessed with two valid subscales that have been used with adolescent populations and normative young adult populations. The 5-item “helping behaviors” subscale from the 10-item Autonomy Self-Report assessed charitable activities performed in the past year giving food or money to a homeless person, doing volunteer work for a charity, giving money to a charity, looking after a person’s home while they are away, and carrying a stranger’s belongings. Items are rated on a 6-point Likert scale from 1 (“more than once a week”) to 6 (“not at all”) and summed. Three of these 5 items have shown good psychometric properties in adolescent populations and normative young adult populations.16 Two items from the Daily Spiritual Experiences Scale (DSES)15,17,18,19,20 “I feel a selfless caring for others” and “I accept others even when they do things I think are wrong.” were rated on a 1 (“many times a day”) to 6 (“never or almost never”), reverse-scored, and summed (range = 2-12). The correlation between the two prosocial subscales was r = .2, p < .05.

Narcissistic Behaviors

At the opposite end of prosocial behaviors, narcissistic behaviors were measured with the Narcissistic Personality Inventory (NPI), a well-validated self-report of subclinical individual differences in narcissism.21-23 Three NPI subscales shown to be elevated in AOD populations were selected: exhibitionism (seven items), entitlement (six items), and vanity (three items).

Clinical Variables

Clinical outcomes included two AOD indicators (toxicology screens, AOD cravings), and psychosocial functioning. Youth tested positive for substance use if either ethanol and/or any use of opiates, cannabinoids, cocaine, or phencyclidine were detected in urine samples. Cut-off concentrations (µg/mL) for the following drugs were: THC 50, opiates 1000, and PCP 25. The Adolescent Obsessive Compulsive Drinking Scale (A-OCDS) is a valid measure of obsessive thoughts about AOD use and distress caused by these thoughts.24 With reference to the past week, 14 items are rated on a 5-item scale from 0 (“none/never”) to 5 (“always/extreme”) and summed. Psychosocial functioning was assessed with the clinician-rated Children’s Global Assessment Scale (CGAS), a global assessment of a youth’s worst functioning at home, school, and with peers in the past month.23 Scores are rated on a scale from 1 to 100 (lower scores indicating worse functioning), with anchor points that separate functioning into 10 percentile increments. A CGAS score of ≤60 was considered a “definite case,” a cut-point supported empirically by epidemiological study of pediatric psychopathology25 that separates subjects with no versus at least one close friend. Of the three clinical variables, one correlation was found between CGAS scores and positive toxicology screens (r = -0.3, p < .01).

AA Involvement

Information on AA involvement (meeting attendance, providing sponsorship, step-work) was assessed from the well-validated AA Involvement (AAI) scale.26 Subjects completed the following three AAI items with reference to the assessment period: “how many meetings did you attend?” “did you have a sponsor?” and “what steps did you complete?”

Statistical Analytic Plan

Statistical analyses were conducted with SAS version 9.2 (SAS Institute, Inc., 2008). Distributions of variables were examined for normality. Missing data for key variables at discharge ranged from 3 to 9.5%, and outcomes collected from medical charts were obtained for all subjects. Non-parametric analyses were performed for group comparisons using Fisher’s exact test for binary variables and Kruskal-Wallis chi-square test for continuous variables. To determine the SOS factor structure with theoretically correlated factors, an exploratory factor analysis (EFA) was conducted with promax-rotated matrices. Given the exploratory nature of the study, no criteria were specified for the number of factors to retain. Following Brand-Rochlen,27 the following qualifications were used for interpreting the magnitudes of factor loadings: <.2 “low,” .2-.4 “moderate,” .4-.7 “high,” and >.7 “very high.” Other SOS psychometric analyses included item analysis, inter-informant reliability (youth- vs. counselor-report of the SOS), internal consistency, convergent validity, receiver operator curve (ROC) analysis, and stepwise discriminant function analysis. For interpretation purposes, Cohen’s28 considers r = 1 “small,” r = .3 “medium,” and r = .5 “large.” Statistical significance was set at p < .05 (two-tailed).

RESULTS

Sample

We report intake characteristics of the sample, which are comparable to other studies of adolescents in residential treatment. Approximately half of the sample was male (48%)
and from a single parent household (59%), 30% were African American, and 8% were Hispanic. The average age was 16.2 years (SD = 1.1) with 10.1 years of education (SD = 1.2). Approximately half of the sample had a parent with a high school diploma (45%), and the average monthly income across all participants was $2,296 (SD = $1,944). The majority of youths entered treatment with drug dependency (99%), with comorbid alcohol dependency (60%), and had an assigned probation officer (84%). The most prevalent drug dependency types were marijuana dependence (95%) and narcotics dependency (21%). Few had received prior residential treatment (5%), and more than half of the sample had attended fewer than two meetings (median = 2.0) in the 90 days prior to admission. There were no significant differences in background characteristics between male and female subjects at baseline.

Frequency of SOS Items

Table 1 shows the frequency of endorsed responses to SOS items. AAH activities that youths engaged in the most (ie, SOS items rated “often” or “always”) were emotionally supportive acts to other alcoholics/addicts (saying something positive to another alcoholic) and the least were programmatic forms of service (taking calls or spending time with a sponsor). Very few youths (7%) did not engage in any AAH during treatment (ie, all SOS items rated “never” or “rarely”). Individual SOS items and total scores were correlated significantly with counselor-report of SOS items (Table 2). Youth AAH participation was higher generally than other programmatic activities (Table 2): approximately one in four youths (24%) had a sponsor, and 15% had completed a 4th step inventory.

Component Structure of the SOS

Results: Principal Component Analysis (PCA) with varimax rotation identified three components explaining 72% of the variance. The first rotated factor accounted for 46% of the shared variance, the second factor accounted for 27% of the shared variance, and no items loaded strongly on both factors. The second rotated factor explained 27% of the variance, the second factor accounted for 11% of the variance, and no items loaded strongly on both factors. The magnitude of factor loadings was moderate, and a one-component solution was found to be the most appropriate, inspection of residual plots, interpretability, and at least three significant variables per retained component. The one-component solution was found to be the most appropriate, inspection of residual plots, interpretability, and at least three significant variables per retained component. The one-component solution was found to be the most appropriate, inspection of residual plots, interpretability, and at least three significant variables per retained component. The one-component solution was found to be the most appropriate, inspection of residual plots, interpretability, and at least three significant variables per retained component. The one-component solution was found to be the most appropriate, inspection of residual plots, interpretability, and at least three significant variables per retained component.

Correlations between the SOS and Instrument Validity Study Variables

As shown in Table 2, the SOS was associated significantly with helping behaviors and compassion subscale scores. The SOS was associated negatively with entitlement subscale scores, but not associated with vanity or exhibitionism subscale scores. When compared to clinical and AA involvement variables, the SOS was associated significantly with fewer AOD cravings, higher psychosocial functioning, higher meeting attendance, and greater step-work.

<table>
<thead>
<tr>
<th>SOS Item</th>
<th>Item</th>
<th>Median</th>
<th>M (SD)</th>
<th>% Low</th>
<th>Factor Loadings</th>
<th>Correlations with SOS by counselor-report</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Listen to an alcoholic/addict</td>
<td>4.0</td>
<td>4.0 (1.1)</td>
<td>14</td>
<td>.6</td>
<td>.2**</td>
<td></td>
</tr>
<tr>
<td>2. Said something positive to an alcoholic/addict</td>
<td>4.0</td>
<td>3.7 (1.1)</td>
<td>15</td>
<td>.6</td>
<td>.3***</td>
<td></td>
</tr>
<tr>
<td>3. Put away chairs after a meeting</td>
<td>4.0</td>
<td>3.5 (1.2)</td>
<td>16</td>
<td>.6</td>
<td>.3**</td>
<td></td>
</tr>
<tr>
<td>4. Said hello to a new member</td>
<td>3.5</td>
<td>3.5 (1.3)</td>
<td>20</td>
<td>.7</td>
<td>.3**</td>
<td></td>
</tr>
<tr>
<td>5. Reached out to an alcoholic/addict</td>
<td>3.0</td>
<td>3.2 (1.3)</td>
<td>24</td>
<td>.7</td>
<td>.2**</td>
<td></td>
</tr>
<tr>
<td>6. Guided an alcoholic/addict through the 12-steps</td>
<td>3.0</td>
<td>3.1 (1.2)</td>
<td>28</td>
<td>.6</td>
<td>.3**</td>
<td></td>
</tr>
<tr>
<td>7. Read program literature to an alcoholic/addict</td>
<td>3.0</td>
<td>2.9 (1.2)</td>
<td>32</td>
<td>.7</td>
<td>.3**</td>
<td></td>
</tr>
<tr>
<td>8. Shared personal story with an alcoholic/addict</td>
<td>3.0</td>
<td>2.9 (1.3)</td>
<td>27</td>
<td>.7</td>
<td>.3**</td>
<td></td>
</tr>
<tr>
<td>9. Exchanged an alcoholic/addict to go to a meeting</td>
<td>3.0</td>
<td>2.8 (1.2)</td>
<td>41</td>
<td>.5</td>
<td>.2*</td>
<td></td>
</tr>
<tr>
<td>10. Donated money to AA/NA</td>
<td>2.8</td>
<td>2.7 (1.4)</td>
<td>47</td>
<td>.6</td>
<td>.2*</td>
<td></td>
</tr>
<tr>
<td>11. Held a service position in a 12-step program</td>
<td>1.0</td>
<td>1.8 (1.0)</td>
<td>76</td>
<td>.2</td>
<td>.3**</td>
<td></td>
</tr>
<tr>
<td>12. Took calls or spent time with a sponsor</td>
<td>1.0</td>
<td>1.2 (1.2)</td>
<td>95</td>
<td>.1</td>
<td>.2***</td>
<td></td>
</tr>
<tr>
<td>Total score</td>
<td>—</td>
<td>35.5 (6.4)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; ***p < .001; Items are rated as “never (1),” “rarely (2),” “sometimes (3),” “often (4),” or “always (5)” with reference to the assessment period; % Low = SOS items endorsed “never” or “rarely.” Factor loadings (intercepted). Correlations with other variables were not significant (p > .05). Test statistic qualified as at least 10 min of uninterrupted listening; Literature can be read at meetings (the promises, the steps, etc.) or directly when working with another alcoholic/addict; 12-Step programs were self-helping/supporting through members’ contributions at meetings or local service centers; Service positions at meetings include: service delegate, public relations officer (aa, paas, etc.), literature delegate; Subjects not sponsoring others at any point during the assessment period rate this item as “never.”

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TABLE 2. Correlations between the SOS and the Analysis of the SOS

<table>
<thead>
<tr>
<th>Measure</th>
<th>M (SD)</th>
<th>Correlations with the SOS</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altruism subscale: helping behaviors</td>
<td>23.9 (4.5)</td>
<td>- .3***</td>
<td>- .4, -.1</td>
</tr>
<tr>
<td>DSES subscale: compassion</td>
<td>6.4 (2.4)</td>
<td>.5***</td>
<td>- .4, -.2</td>
</tr>
<tr>
<td>NPI subscale: vanity</td>
<td>1.5 (1.0)</td>
<td>.1</td>
<td>- .1, .2</td>
</tr>
<tr>
<td>NPI subscale: exhibition</td>
<td>2.6 (1.8)</td>
<td>-.1</td>
<td>- .2, .1</td>
</tr>
<tr>
<td>NPI subscale: entitlement</td>
<td>2.1 (1.3)</td>
<td>-.2**</td>
<td>- .3, -.1</td>
</tr>
<tr>
<td>AOCDS total score</td>
<td>8.6 (5.2)</td>
<td>-.2**</td>
<td>- .4, -.2</td>
</tr>
<tr>
<td>CGAS</td>
<td>60.9 (6.0)</td>
<td>.3***</td>
<td>1.0</td>
</tr>
<tr>
<td>No. of meetings attended</td>
<td>32.7 (19.7)</td>
<td>.3***</td>
<td>1.0</td>
</tr>
<tr>
<td>No. of steps completed</td>
<td>2.6 (2.0)</td>
<td>.2**</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; ***p < .001; 1SSE: Spiritual Experiences Scale; 2SOS: Self-Report scale; 3DSES: Disease Specific Scale; 4NPI: Narcissistic Personality Inventory; 5AOCDS: Adolescent Orientation Comprehensive Drinking Scale (AODS); 6Children’s Global Assessment Scale (CGAS) summary score; 7Spearman rank-order correlation.

Stepwise Discriminant Analysis of the SOS

The sample was split randomly in half to generate two datasets with balanced toxicology group proportions relative to the population (N = 195; 48% positive). The first split half from each toxicology group was negatively and positively represented in the calibration dataset (N = 98; 48% positive); the second split half from each group represented a validation dataset (N = 97; 47% positive) that was classified using discriminant analysis functions developed in the calibration dataset. As shown in Table 3, the four SOS items assessing programmatic forms of AAH were shown to be useful in distinguishing negative and positive toxicology groups with a final Wilk’s lambda of .67 (F = 316.82, df = 6, p < .001). The cross-validation model showed a predicted misclassification error rate of 24%.

Selection of SOS Cut-Off Score

Figure 1 shows the ROC curve for the SOS against CGAS scores (N = 90; 53%). The area under the curve (AUC), a measure of discriminating ability, was .73 with a standard error of .08; this score compares favorably with the AUC data for the SOS as completed by adults (AUC = .76) and for other psychological assessments. A cut-off score of 40 or higher was found to provide the highest average sensitivity and specificity (SN = .51; SP = .66), the highest Phi coefficient (p = .5), and the highest degree of concordance (E = .5). Using this cut-off score to indicate high AAH, 27% of subjects engaged in high AAH during treatment, similar to the rate observed among adults (28%).

CONCLUSIONS AND SCIENTIFIC SIGNIFICANCE

This study is the first investigation to validate a brief adolescent self-report of AAH in one of the largest samples of substance-dependent juvenile offenders with equal gender proportions. Results from the current study indicate that the SOS possesses the requisite psychometric qualities to be useful as a brief assessment of prosocial behaviors relevant to addiction recovery. Data were derived from psychometrically strong instruments and multi-informant, utilizing youth self-reports, clinician-rated assessments, biomarkers, and medical chart review. The internal consistency of the youth administration of the SOS was excellent and every SOS item demonstrated a meaningful load on the unidimensional scale. SOS scores were corroborated by counselor-report; low to moderate inter-rater correlations may have been higher if counselors observed youths’ AAH participation at both off-and on-site meetings. Convergent validity also was established; the SOS was correlated positively with two subscales of prosocial behaviors and negatively associated with narcissistic entitlement. AAAH may be a solution to facets of narcissism, social entitlement and hypersensitivity, which are one of the problems with the social establishment shown to be associated with worse AOD outcomes. The SOS also was associated with lower AOD cravings and higher psychosocial functioning. Meeting attendance and step-work, significant predictors of long-term abstinence, also were associated with AAH activity.

This study is the first to explore the prevalence of youth AAH activity during treatment, provide a preliminary threshold for high AAH activity tied to psychosocial and interpersonal functioning, and discern which forms of AAH best distinguish youth AOD outcomes. Most youths engaged in formal AAH activities at least some of the time, and only 7% of juvenile offenders did not engage in any AAH. Youth participated more in AAH than other 12-step activities such as step-work, paralleling earlier work by Treanor et al., who noted lower participation in programmatic components of 12-step programs as compared to fellowship-oriented activities. There is evidence to support more encouragement of youth participation in programmatic AAH activities, which were better predictors of objective SUD biomarkers than general forms of help. The discriminant function correctly classified 76% of subjects, similar to the 78% correct classification rate of the AUDIT among adolescent populations. Future research is warranted to replicate the factor structure, threshold of high AAH, and best set of AAH predictors among diverse samples of adolescents at various stages of recovery.
TABLE 3. Results of stepwise discriminant analysis of SOS items

<table>
<thead>
<tr>
<th>Step</th>
<th>SOS item entered</th>
<th>Number removed</th>
<th>Partial $R^2$</th>
<th>$F$ statistic</th>
<th>Prob. $F$</th>
<th>Wilk's lambda</th>
<th>Prob. lambda</th>
<th>Avg. sq. canonical $r$</th>
<th>Prob. $&gt; \ ASCC$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shared personal story with an alcoholic/addict</td>
<td>1</td>
<td>.13</td>
<td>7.39</td>
<td>.01</td>
<td>.752</td>
<td>.009</td>
<td>.125</td>
<td>.009</td>
</tr>
<tr>
<td>2</td>
<td>Put away chairs after a meeting</td>
<td>2</td>
<td>.11</td>
<td>5.37</td>
<td>.02</td>
<td>.591</td>
<td>.005</td>
<td>.166</td>
<td>.005</td>
</tr>
<tr>
<td>3</td>
<td>Read program literature to an alcoholic/addict</td>
<td>3</td>
<td>.10</td>
<td>3.32</td>
<td>.03</td>
<td>.492</td>
<td>.006</td>
<td>.220</td>
<td>.006</td>
</tr>
<tr>
<td>4</td>
<td>Guided an alcoholic/addict through the 12 steps</td>
<td>4</td>
<td>.07</td>
<td>3.48</td>
<td>.04</td>
<td>.441</td>
<td>.007</td>
<td>.248</td>
<td>.007</td>
</tr>
<tr>
<td>5</td>
<td>Said hello to a newcomer</td>
<td>5</td>
<td>.05</td>
<td>2.53</td>
<td>.10</td>
<td>.399</td>
<td>.005</td>
<td>.236</td>
<td>.005</td>
</tr>
</tbody>
</table>

Five SOS items were found to be helpful in discriminating between positive versus negative treatment responses during treatment.

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Figure 1: ROC curve of sensitivity and specificity of the SOS items at discharge. The area under the curve (AUC) is 0.73.
Given AAH participation during treatment significantly improves the likelihood of long-term abstinence, interventions that facilitate early engagement in AAH are critical in the short window of time youths are willing to change their behavior. As a brief, prosocial behavior screening tool, an SOS total score below 40 can identify youths low in service participation, and identifies AAH activities as resources. Instrumental forms of AAH can be adopted without higher cognitive abstraction, processing, or instruction, and can be practiced at meetings to satisfy sentencing mandates for greater benefit. Facing a rising prevalence of substance-related problems, the chronic nature of SUDs, and limitations on reimbursement due to national healthcare reform, providers may find the SOS useful for assessing and monitoring levels of AAH. Encouraging such activities during and following treatment may enhance the effectiveness of formal treatment without additional cost, and facilitate more successful youth re-entry into the community.

This research was funded in part by federal grants awarded to Drs. Pagano (K01 AA101337), Kelly (R21 AA4016702), and Stout (R21 AA1016702) from the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and a John Templeton Foundation grant awarded to Dr. Pagano.

The authors would like to thank Mark D. Schneiders, PhD for his helpful suggestions and input on our analytic methods employed.

Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this document.

REFERENCES

SERVICE TO OTHERS IN SOBRIETY (SOS) QUESTIONNAIRE

With reference to the assessment period, rate each item on a scale from 1 to 5.

Please give a response of 1 (never) to any item that does not apply to you.

<table>
<thead>
<tr>
<th></th>
<th>never (1)</th>
<th>rarely (2)</th>
<th>sometimes (3)</th>
<th>often (4)</th>
<th>always (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Guide an alcoholic/addict through the 12-Steps?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Hold a service position in a 12-Step program?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Say something positive to an alcoholic/addict?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Listen to an alcoholic/addict?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Say hello to a newcomer?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Reach out to an alcoholic/addict having a hard time?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Share a personal story with an alcoholic/addict?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Read program literature to an alcoholic/addict?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Encourage an alcoholic/addict to go to a meeting?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Donate money to AA/NA?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Put away chairs after a meeting?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Took calls or spent time with a sponsee?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Itema</td>
<td>M (SD)</td>
<td>% lowf</td>
<td>factor loadingss</td>
<td>rh</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>--------</td>
<td>------------------</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>1. Listened to an alcoholicd</td>
<td>4.0 (1.1)</td>
<td>14%</td>
<td>.6</td>
<td>0.2**</td>
<td></td>
</tr>
<tr>
<td>2. Said something positive to an alcoholic</td>
<td>3.7 (1.1)</td>
<td>15%</td>
<td>.6</td>
<td>0.3**</td>
<td></td>
</tr>
<tr>
<td>3. Put away chairs after a meeting</td>
<td>3.5 (1.2)</td>
<td>16%</td>
<td>.6</td>
<td>0.3**</td>
<td></td>
</tr>
<tr>
<td>4. Said hello to a newcomer</td>
<td>3.5 (1.3)</td>
<td>20%</td>
<td>.7</td>
<td>0.3**</td>
<td></td>
</tr>
<tr>
<td>5. Reached out to alcoholic having hard time</td>
<td>3.2 (1.3)</td>
<td>24%</td>
<td>.7</td>
<td>0.2**</td>
<td></td>
</tr>
<tr>
<td>6. Guided an alcoholic through 12-Steps</td>
<td>3.1 (1.2)</td>
<td>28%</td>
<td>.6</td>
<td>0.3***</td>
<td></td>
</tr>
<tr>
<td>7. Read program literature to an alcoholice</td>
<td>2.9 (1.2)</td>
<td>32%</td>
<td>.7</td>
<td>0.3***</td>
<td></td>
</tr>
<tr>
<td>8. Shared personal story with an alcoholic</td>
<td>2.9 (1.5)</td>
<td>37%</td>
<td>.8</td>
<td>0.4***</td>
<td></td>
</tr>
<tr>
<td>9. Encourage an alcoholic to go to a meeting</td>
<td>2.8 (1.2)</td>
<td>41%</td>
<td>.5</td>
<td>0.2*</td>
<td></td>
</tr>
<tr>
<td>10. Donated money to AA</td>
<td>2.7 (1.4)</td>
<td>47%</td>
<td>.6</td>
<td>0.2*</td>
<td></td>
</tr>
<tr>
<td>11. Held a service position in 12-Step programb</td>
<td>1.8 (1.0)</td>
<td>76%</td>
<td>.2</td>
<td>0.3**</td>
<td></td>
</tr>
<tr>
<td>12. Took calls or spent time with sponsorsei</td>
<td>1.2 (0.6)</td>
<td>95%</td>
<td>.1</td>
<td>0.2**</td>
<td></td>
</tr>
<tr>
<td>Total Score</td>
<td>35.5 (8.4)</td>
<td>--</td>
<td>--</td>
<td>0.5***</td>
<td></td>
</tr>
</tbody>
</table>

NOTES: *p<0.05, **p< 0.01, ***p<0.001
aService to Others In Sobriety (SOS) items rated as “never (1)”, “rarely (2)”, “sometimes (3)”, “often (4)”, or “always (5)”
bService positions include: (at meetings) coffee maker, door greeter, chairperson; (outside meetings) service or literature delegate, public outreach coordinator.
cAA is self supporting through contributions at meetings, local service centers.
dListening qualified as at least 10 minutes of uninterrupted listening.
eLiterature can be read at meetings (i.e. promises, 12 steps) or one-to-one.
fLow = SOS items endorsed “never” or “rarely”.
gFactor loadings (unrotated).
hSpearman product-moment correlation with SOS by Counselor-Report.
iSubjects who provided no sponsorship rate this item as “never”.

Table 2. Concordant validity of the SOSa

<table>
<thead>
<tr>
<th>Measure</th>
<th>M (SD)</th>
<th>rs with SOS</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altruismb subscale:</td>
<td>23.9 (4.5)</td>
<td>-0.3***</td>
<td>(-0.4, -0.1)</td>
</tr>
<tr>
<td>DSESc subscale:</td>
<td>6.4 (2.4)</td>
<td>0.3***</td>
<td>(-0.4, -0.2)</td>
</tr>
<tr>
<td>NPId subscale: vanity</td>
<td>1.5 (1.0)</td>
<td>0.1</td>
<td>(-0.1, 0.2)</td>
</tr>
<tr>
<td>NPI subscale: exhibitionism</td>
<td>2.6 (1.8)</td>
<td>-0.1</td>
<td>(-0.2, 0.1)</td>
</tr>
<tr>
<td>NPI subscale: Entitlement</td>
<td>2.1 (1.3)</td>
<td>-0.2*</td>
<td>(-0.3, -0.1)</td>
</tr>
<tr>
<td>AOCDSe total score</td>
<td>8.6 (5.2)</td>
<td>-0.2*</td>
<td>(-0.4, -0.2)</td>
</tr>
<tr>
<td>CGASf</td>
<td>60.9 (6.0)</td>
<td>0.3***</td>
<td>(0.1, 0.4)</td>
</tr>
<tr>
<td>No. of meetings attended</td>
<td>32.7 (19.7)</td>
<td>0.3***</td>
<td>(0.1, 0.3)</td>
</tr>
<tr>
<td>No. of steps completed</td>
<td>2.6 (2.0)</td>
<td>0.2*</td>
<td>(0.1, 0.3)</td>
</tr>
</tbody>
</table>

NOTES: *p<0.05, **p<0.01, ***p<0.001

aService to Others In Sobriety (SOS)
cDaily Spiritual Experiences Scale (DSES)
dNarcissistic Personality Inventory (NPI)
eAdolescent Obsessive Compulsive Drinking Scale (AOCDS)
fChildren’s Global Assessment Scale (CGAS) Summary Score
gSpearman product-moment correlation
## Table 3. Stepwise discriminant analysis of SOS items

<table>
<thead>
<tr>
<th>Step</th>
<th>Item</th>
<th>Item</th>
<th>Partial R²</th>
<th>F statistic</th>
<th>P&gt;</th>
<th>wilks' lambda</th>
<th>P&lt;</th>
<th>avg sq.</th>
<th>P&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a</td>
<td>0.13</td>
<td>7.39</td>
<td>0.01</td>
<td>0.752</td>
<td>0.009</td>
<td>0.125</td>
<td>0.009</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>b</td>
<td>0.11</td>
<td>5.37</td>
<td>0.02</td>
<td>0.591</td>
<td>0.005</td>
<td>0.186</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>c</td>
<td>0.10</td>
<td>5.32</td>
<td>0.03</td>
<td>0.492</td>
<td>0.006</td>
<td>0.220</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>d</td>
<td>0.07</td>
<td>3.48</td>
<td>0.04</td>
<td>0.441</td>
<td>0.007</td>
<td>0.248</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>e</td>
<td>0.05</td>
<td>2.53</td>
<td>0.10</td>
<td>0.399</td>
<td>0.005</td>
<td>0.286</td>
<td>0.005</td>
<td></td>
</tr>
</tbody>
</table>

NOTES: Five SOS items were found to be helpful in discriminating between positive versus negative toxicology screens during treatment.

a. Shared personal story with an alcoholic  
b. Put away chairs after a meeting  
c. Read program literature to an alcoholic  
d. Guided an alcoholic through the 12-Steps  
e. Said hello to a newcomer
Table 4. Background and physical health characteristics of study sample

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>never user (195 (33%))</th>
<th>some user N=195 (33%)</th>
<th>sddiction N=195 (33%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (M,SD)</td>
<td>15.8 (1.3)</td>
<td>16.0 (1.3)</td>
<td>16.2 (1.1)</td>
</tr>
<tr>
<td>Male (%)</td>
<td>93 (48%)</td>
<td>93 (48%)</td>
<td>93 (48%)</td>
</tr>
<tr>
<td>Minority (%)</td>
<td>59 (30%)</td>
<td>59 (30%)</td>
<td>59 (30%)</td>
</tr>
<tr>
<td>Hispanic (%)</td>
<td>18 (9%)</td>
<td>18 (9%)</td>
<td>15 (8%)</td>
</tr>
<tr>
<td>9th -10th grade (%)</td>
<td>119 (61%)</td>
<td>119 (61%)</td>
<td>119 (61%)</td>
</tr>
<tr>
<td>11th-12th grade (%)</td>
<td>76 (39%)</td>
<td>76 (39%)</td>
<td>76 (39%)</td>
</tr>
<tr>
<td>Single parent (%)</td>
<td>80 (41%)</td>
<td>101 (52%)</td>
<td>98 (50%)</td>
</tr>
<tr>
<td>Parental &lt; GED (%)</td>
<td>32 (16%)</td>
<td>45 (23%)</td>
<td>29 (15%)</td>
</tr>
<tr>
<td>Parental GED (%)</td>
<td>77 (39%)</td>
<td>70 (36%)</td>
<td>113 (58%)</td>
</tr>
<tr>
<td>Parental BA+ (%)</td>
<td>86 (44%)</td>
<td>80 (41%)</td>
<td>53 (27%)</td>
</tr>
<tr>
<td>Underweight (%)</td>
<td>4 (2%)</td>
<td>4 (2%)</td>
<td>10 (5%)</td>
</tr>
<tr>
<td>Normal (%)</td>
<td>136 (70%)</td>
<td>147 (76%)</td>
<td>151 (77%)</td>
</tr>
<tr>
<td>Overweight (%)</td>
<td>32 (16%)</td>
<td>23 (12%)</td>
<td>24 (12%)</td>
</tr>
<tr>
<td>Obese (%)</td>
<td>23 (12%)</td>
<td>21 (11%)</td>
<td>10 (5%)</td>
</tr>
<tr>
<td>Good health (%)</td>
<td>133 (68%)</td>
<td>127 (65%)</td>
<td>133 (68%)</td>
</tr>
<tr>
<td>Fair health (%)</td>
<td>41 (21%)</td>
<td>52 (27%)</td>
<td>51 (26%)</td>
</tr>
<tr>
<td>Poor health (%)</td>
<td>1 (11%)</td>
<td>6 (8%)</td>
<td>11 (6%)</td>
</tr>
<tr>
<td>Asthma history (%)</td>
<td>37 (19%)</td>
<td>35 (18%)</td>
<td>30 (15%)</td>
</tr>
</tbody>
</table>

Notes: * p<.10; body mass index categories based on age/gender growth charts;
Table 5. Alcohol and drug consumption of study sample

<table>
<thead>
<tr>
<th></th>
<th>frequency</th>
<th>never user 195 (33%)</th>
<th>some user 195 (33%)</th>
<th>addiction 195 (33%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1+ drink (past mo)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 days</td>
<td>0 (0%)</td>
<td>108 (55%)</td>
<td>103 (53%)</td>
<td></td>
</tr>
<tr>
<td>1-9 days</td>
<td>0 (0%)</td>
<td>75 (39%)</td>
<td>80 (41%)</td>
<td></td>
</tr>
<tr>
<td>10+ days</td>
<td>12 (6%)</td>
<td>12 (6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>binge drink (past mo)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 days</td>
<td>0 (0%)</td>
<td>162 (83%)</td>
<td>115 (59%)</td>
<td></td>
</tr>
<tr>
<td>1-9 days</td>
<td>0 (0%)</td>
<td>33 (17%)</td>
<td>69 (35%)</td>
<td></td>
</tr>
<tr>
<td>10+ days</td>
<td>0 (0%)</td>
<td>12 (6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>marijuana (past mo)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>0 (0%)</td>
<td>151 (77%)</td>
<td>75 (38%)</td>
<td></td>
</tr>
<tr>
<td>1-9 times</td>
<td>0 (0%)</td>
<td>28 (14%)</td>
<td>37 (19%)</td>
<td></td>
</tr>
<tr>
<td>10+ times</td>
<td>0 (0%)</td>
<td>16 (9%)</td>
<td>83 (43%)</td>
<td></td>
</tr>
<tr>
<td><strong>1+ drink (lifetime)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 days</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>36 (19%)</td>
<td></td>
</tr>
<tr>
<td>1-19 days</td>
<td>0 (0%)</td>
<td>110 (56%)</td>
<td>36 (19%)</td>
<td></td>
</tr>
<tr>
<td>20+ days</td>
<td>0 (0%)</td>
<td>49 (25%)</td>
<td>159 (82%)</td>
<td></td>
</tr>
<tr>
<td><strong>marijuana (lifetime)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>0 (0%)</td>
<td>107 (55%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>1-19 times</td>
<td>0 (0%)</td>
<td>60 (29%)</td>
<td>8 (4%)</td>
<td></td>
</tr>
<tr>
<td>20+ times</td>
<td>0 (0%)</td>
<td>28 (14%)</td>
<td>187 (96%)</td>
<td></td>
</tr>
<tr>
<td><strong>cocaine (lifetime)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>0 (0%)</td>
<td>175 (90%)</td>
<td>112 (57%)</td>
<td></td>
</tr>
<tr>
<td>1-19 times</td>
<td>0 (0%)</td>
<td>20 (11%)</td>
<td>15 (8%)</td>
<td></td>
</tr>
<tr>
<td>20+ times</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>68 (35%)</td>
<td></td>
</tr>
<tr>
<td><strong>inhalants (lifetime)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>0 (0%)</td>
<td>171 (88%)</td>
<td>135 (69%)</td>
<td></td>
</tr>
<tr>
<td>1-19 times</td>
<td>0 (0%)</td>
<td>13 (7%)</td>
<td>34 (17%)</td>
<td></td>
</tr>
<tr>
<td>20+ times</td>
<td>0 (0%)</td>
<td>11 (6%)</td>
<td>26 (13%)</td>
<td></td>
</tr>
<tr>
<td><strong>heroin (lifetime)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>0 (0%)</td>
<td>182 (93%)</td>
<td>89 (46%)</td>
<td></td>
</tr>
<tr>
<td>1-19 times</td>
<td>0 (0%)</td>
<td>2 (1%)</td>
<td>33 (17%)</td>
<td></td>
</tr>
<tr>
<td>20+ times</td>
<td>0 (0%)</td>
<td>11 (6%)</td>
<td>73 (37%)</td>
<td></td>
</tr>
<tr>
<td><strong>methamph. (lifetime)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>0 (0%)</td>
<td>177 (91%)</td>
<td>111 (57%)</td>
<td></td>
</tr>
<tr>
<td>1-19 times</td>
<td>0 (0%)</td>
<td>7 (4%)</td>
<td>25 (13%)</td>
<td></td>
</tr>
<tr>
<td>20+ times</td>
<td>0 (0%)</td>
<td>11 (6%)</td>
<td>59 (30%)</td>
<td></td>
</tr>
<tr>
<td><strong>ecstasy (lifetime)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>0 (0%)</td>
<td>178 (91%)</td>
<td>92 (47%)</td>
<td></td>
</tr>
<tr>
<td>1-19 times</td>
<td>0 (0%)</td>
<td>17 (9%)</td>
<td>32 (16%)</td>
<td></td>
</tr>
<tr>
<td>20+ times</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>71 (36%)</td>
<td></td>
</tr>
</tbody>
</table>
Table 6. Likelihood of low other-regard

<table>
<thead>
<tr>
<th></th>
<th>never users&lt;sup&gt;a&lt;/sup&gt;</th>
<th>some users&lt;sup&gt;b&lt;/sup&gt;</th>
<th>addiction&lt;sup&gt;c&lt;/sup&gt;</th>
<th>a vs b</th>
<th>a vs c</th>
<th>b vs c</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>195 (33%)</td>
<td>195 (33%)</td>
<td>195 (33%)</td>
<td>RR</td>
<td>RR</td>
<td>RR</td>
</tr>
<tr>
<td>low volunteerism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>151 (77%)</td>
<td>140 (72%)</td>
<td>163 (84%)</td>
<td>1.06</td>
<td>1.14**</td>
<td>1.06</td>
</tr>
<tr>
<td>females</td>
<td>70 (69%)</td>
<td>64 (75%)</td>
<td>80 (86%)</td>
<td>1.06</td>
<td>1.19**</td>
<td>1.12*</td>
</tr>
<tr>
<td></td>
<td>81 (75%)</td>
<td>76 (79%)</td>
<td>83 (81%)</td>
<td>1.05</td>
<td>1.08</td>
<td>1.02</td>
</tr>
<tr>
<td>driving under influence</td>
<td>--</td>
<td>15 (8%)</td>
<td>111 (57%)</td>
<td>--</td>
<td>--</td>
<td>1.64***</td>
</tr>
<tr>
<td>grade (9-10)</td>
<td>--</td>
<td>7 (6%)</td>
<td>66 (55%)</td>
<td>--</td>
<td>--</td>
<td>1.64***</td>
</tr>
<tr>
<td>grade (11-12)</td>
<td>--</td>
<td>8 (11%)</td>
<td>45 (59%)</td>
<td>--</td>
<td>--</td>
<td>1.63***</td>
</tr>
<tr>
<td>unprotected sex*</td>
<td>34 (38%)</td>
<td>85 (56%)</td>
<td>120 (62%)</td>
<td>1.19**</td>
<td>1.26***</td>
<td>1.06</td>
</tr>
<tr>
<td>with STD</td>
<td>2 (13%)</td>
<td>18 (60%)</td>
<td>26 (90%)</td>
<td>1.59**</td>
<td>2.14***</td>
<td>1.33**</td>
</tr>
</tbody>
</table>

Notes: *p<.05, **p<.01, ***p<.0001; *149 virgins not included;
Figure 1. Receiver-operator characteristics curve of SOS versus CGAS scores


Cservenka, A., & Nagel, B.J. (2013). Differences in brain activity during affective processing and emotional cognitive control in youth with and without a family history of alcoholism. *ACER, 37*(S1), 312.


