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Alcohol treatment goal choice predicts longitudinal drinking outcomes in adolescent substance users

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Abstract

Social cognitive theory suggests that when individuals select their own goals, they work harder to achieve them as compared to clinician-imposed goals. Moreover, achieving goals during the course of treatment may increase self-efficacy, which could positively predict outcome. Research in clinical samples of adults with alcohol use disorder supports the utility of treatment goal choice in predicting longitudinal outcomes; a total abstinence (TA) goal choice has been associated with better clinical outcomes (e.g. greater percentage of days abstinent, more days to relapse to heavy drinking) compared to a controlled use (CU) goal choice. Treatment of adolescents presents unique challenges, because adolescents tend to be resistant to treatment and often enter treatment in response to external pressures (e.g. parent, school system). Data from 110 adolescents aged 14 to 18 were collected upon admission to outpatient substance use disorder treatment. A series of hierarchical linear regressions was used to test the utility of the alcohol treatment goal choice variable in predicting drinking outcomes at 6-, 12-, and 24-month follow-ups. Separate models were run to examine binge drinking days, percentage of days abstinent, and drinks per drinking day at each time point. Goal choice significantly predicted drinking outcomes at the 12-month follow-up, but not at the 6- or 24-month time points, such that TA goal choice was associated with better clinical outcomes. These findings are relevant to treatment planning, as they suggest that goal choice may have clinical utility as a predictor of alcohol use disorder clinical course in adolescents.

Keywords

Alcohol use; treatment goal; abstinence; controlled drinking

Alcohol is the most commonly used substance among adolescents. Data from the 2015 Monitoring the Future (MTF) national school-based survey suggests that 10 percent of 8th graders, 21 percent of 10th graders, and 35 percent of 12th graders have used alcohol in the past 30 days (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2016). According to MTF data, 5 percent of 8th graders, 11 percent of 10th graders, and 17 percent of 12th graders

report binge drinking in the past two weeks (Miech et al., 2016). Adolescents are not only using alcohol but some are developing dangerous drinking patterns that involve episodes of high volume alcohol consumption (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014).

Underage drinking has been associated with a number of consequences across a variety of domains. Immediate consequences include an increase in risky behavior, particularly risky sexual behavior resulting in an increased risk for unplanned pregnancies and sexually transmitted infections (Cooper & Orcutt, 1997; Cooper, Peirce, & Huselid, 1994). Underage alcohol use has also been associated with an increased risk for physical and sexual assault (Hingson, Heeren, Winter, & Wechsler, 2005). In the long term, binge drinking in high school predicts dropouts from college (Schulenberg, Patrick, White, & Rabiner, 2012), and binge drinking in 12th grade predicts alcohol use disorder (AUD) symptoms among 35-year-olds (Merline, Jager & Schulenberg, 2008; Merline, O'Malley, Schulenberg, Bachman & Johnston, 2004). Neurological research suggests that alcohol use during adolescence can substantially alter the physical and physiological development of the brain, which has been shown to continue into the early twenties (De Bellis et al., 2000; White & Swartzwelder, 2005). The severity and scope of the consequences related to underage alcohol use necessitate a concerted research effort into optimizing adolescent alcohol treatment programs.

Treatment of AUD in adolescents is fraught with challenges, many of which are similar to those found in treatment of adult AUD, but some of which are unique to adolescents. Relapse is a problem faced by both adults and adolescents in treatment. Although relapse has been operationalized differently in different treatment programs, according to one clinical sample of adolescents, relapse occurred in as many as 74 percent of adolescents, in as little as 26 days from baseline (Maisto, Pollock, Cornelius, Lynch & Martin, 2003). Additionally, adolescents are more likely than adults to enter treatment in response to external pressures (e.g. parent, school system) rather than internal motivation, which may render them less cooperative and more resistant to treatment (Battjes, Onken, & Delany, 1999). Therefore, study of ways to increase treatment effectiveness is of considerable importance.

According to Bandura's (1986) social cognitive theory, when individuals participate in setting their own goals, they are more likely to work harder to achieve them. Additionally, achieving goals during the course of treatment may increase self-efficacy, which could in turn be related to positive outcomes (Annis & Davis, 1989). Due to the illicit nature of alcohol use for those under 21 years of age, treatment of adolescent AUD is often abstinence oriented. However, assessment of treatment goal choice (i.e. individual goals for modifications or reductions in alcohol consumption) at baseline may provide information that aids treatment planning in a population that tends to be resistant to treatment. Similarly, data on goal choice during the course of treatment may be an indicator of progress (or lack thereof). Research examining the utility of goal choice in the treatment of AUD has been reported in adult populations (e.g. Hall, Havassy, & Wasserman, 1991), and has demonstrated that goal choice can add valuable information to the assessment of AUD in clinical settings (Bujarski, O'Malley, Lunny, & Ray, 2013). Recent research on the clinical

utility of goal choice in adolescent populations has demonstrated the utility of assessing commitment to goal choice, whether it be total abstinence (TA) or controlled use (CU). Kaminer, Ohannessian, McKay, and Burke (2016) developed the Adolescent Substance Abuse Goal Commitment (ASAGC) questionnaire, a clinician-rated assessment of adolescents' commitment to their goal. The measure not only demonstrated excellent psychometric properties over time, but results suggested differential associations with clinically relevant variables (e.g. confidence in ability to resist alcohol use) based on goal choice (Kaminer et al., 2016).

Literature on the clinical utility of goal choice in adults with AUD suggests that baseline differences exist between those choosing a TA goal versus a CU goal on a number of clinically relevant variables. Typically, adults in treatment for AUD more often choose TA over CU as a treatment goal (54%–82% of sample) when a choice of goal is offered (Al-Otaiba, Worden, McCrady, & Epstein, 2008; Dunn & Strain, 2013; Heather, Adamson, Raistrick, & Slegg, 2010; Hodgins, Leigh, Milne, & Gerrish, 1997; Öjehagen & Berglund, 1989; Pachman, Foy, & Van Erd, 1978). Several baseline characteristics have emerged as consistent differences between TA and CU groups; CU adults typically have less severe AUD and are less likely to have prior treatment experience (Al-Otaiba et al., 2008; Booth, Dale, & Ansari, 1984; Heather et al., 2010; Adamson & Sellman, 2001; Mowbray et al., 2013; Pachman et al., 1978). Similarly, researchers have been able to predict CU goal choice based on less severe AUD, less treatment experience, and lower motivation at baseline (Adamson & Sellman, 2001; DeMartini et al., 2014; Heather et al., 2010). Overall, research in adults suggests that differences exist at baseline between TA and CU groups in clinically significant variables (e.g. severity of AUD, motivation, stage of change) that could be useful in treatment planning and progress monitoring.

Not only do baseline differences exist between TA and CU groups in adult samples, but research has demonstrated that goal choice either at baseline or completion of treatment can predict drinking outcomes at follow-up. Hodgins and colleagues (1997) found that baseline TA goal choice was associated with fewer intoxicated days at a 12-month follow-up, while final TA goal choice was associated with fewer drinking days and more non-problem (defined as > 4 drinks/occasion) drinking days at follow-up. Similarly, studies have shown that those choosing TA reported more abstinent weeks, more weeks with no heavy drinking, had a greater proportion of participants reporting more than a 50 percent decrease in drinks per day, and took longer to relapse over the course of treatment at a 16-week follow-up (Bujarski et al., 2013; Dunn & Strain, 2013). To account for different definitions of successful outcomes based on goal choice, Al-Otaiba and colleagues (2008) developed an outcome measure based on the success of meeting the predetermined goal, defined as percent weeks meeting goal (either TA or CU). The authors found that adults who chose TA were more successful at meeting their goal at 9-month follow-up. Finally, Adamson, Heather, Morton and Raistrick (2010) found that goal choice predicted percent days abstinent (PDA) at both 3- and 12-month follow-ups. Research in adult populations suggests that goal choice, either at baseline or completion of treatment, can successfully predict drinking outcomes longitudinally, and that TA goal choice is often associated with better clinical outcomes.

In studies of goal choice that included longer-term follow-ups (e.g., greater than 12 months), the predictive power of goal choice in adult populations has produced discordant findings. Mowbray and colleagues (2013) found that goal choice significantly predicted alcohol outcomes at a 2.5-year follow-up, however another study failed to find significant predictive effects of goal choice on alcohol outcomes at 18-month follow-up (Al-Otaiba et al., 2008). The predictive utility of goal choice may depend, in part, on the length of follow-up.

Research in adults has demonstrated that goal choice may have significant clinical utility based on baseline differences between individuals presenting for AUD treatment and choosing TA versus CU goal choice, and the ability of goal choice to predict drinking outcomes. However, no such research has been reported in an adolescent population, for which goal choice could arguably be of greater clinical utility. Therefore, this study examined baseline differences between adolescents presenting for substance use disorder (SUD) treatment and choosing TA versus CU goal choice at baseline on a number of variables, including measures of AUD severity, amount of other drug use, motivation to abstain, confidence in ability to abstain, perceived difficulty abstaining, and stage of change. We hypothesized that, compared to those choosing CU, adolescents choosing TA will have more severe AUDs, be more motivated to abstain, and be in later stages of change. Additionally, this study tested goal choice as a predictor of drinking outcomes at 6-, 12-, and 24-month follow-ups. We hypothesized that the TA goal choice will be associated with better drinking outcomes (i.e. fewer drinks per drinking day [DDD], fewer binge days, greater PDA) at 6- and 12-month follow-ups. In considering the discordant findings at long-term follow-ups in the adult literature, as well as differences between adolescent and adult drinkers (e.g., adolescents less likely to seek treatment on their own, and more likely to be placed in treatment), we hypothesized that goal choice at baseline would not significantly predict alcohol outcomes at the 24-month follow-up.

Methods

Participants

Participants were recruited from seven community-based treatment sites offering intensive outpatient treatment operated by the same organization. Treatment was abstinence-oriented, and involved cognitive behavioral therapy, relapse prevention, and 12-step facilitation. Inclusion criteria included (a) being age 14 to 18 at initial assessment, (b) current enrollment in outpatient SUD treatment (c) meeting a minimum frequency of use criterion for either alcohol (lifetime use) or cannabis (at least once a month for a minimum of six months), and (d) having a primary caretaker collateral informant. The difference in the frequency of use criterion for alcohol versus cannabis was specified in order to better approximate the typical use patterns (i.e., more frequent marijuana use) of adolescents based on the nationally representative Treatment Episode Data Set (TEDS; SAMHSA, 2016). Participants were excluded if they had a history of psychosis, cognitive impairment, or severe mental illness.

Data from participants who were unable to complete the initial research assessment within two weeks of admission ($n = 12$) were excluded from analyses based on the time sensitivity of measures. For these analyses, out of the 184 participants who were enrolled in the research project, 110 adolescents were included in the analysis sample based on their

responses to the baseline goal choice measure (see measure description, below). Youth who reported a goal choice for alcohol use of either “total abstinence” ($n = 35$) or “total abstinence, but realize a slip is possible” ($n = 47$) were included in the TA goal choice group, and were compared to those who chose “controlled use” ($n = 28$) as their goal at baseline (analysis $N = 110$ out of 184 enrolled).

Procedure

Study procedures have been described elsewhere (Chung, Maisto, Cornelius, & Martin, 2004; Maisto, Martin, Pollock, Cornelius, & Chung, 2002). In brief, within three days of treatment admission, study recruiters approached adolescents for participation in a longitudinal study of SUD clinical course (Chung et al., 2004). Those adolescents who were eligible (i.e., 18 years of age) at the time of enrollment provided written informed consent. Minors (i.e., 14–17 years of age) completed informed consent procedures with a legal guardian and provided separate minor assent. Adolescents then completed a baseline research assessment followed by monthly telephone interviews over a one-year period, and a 24-month follow-up assessment. Assessments (e.g., K-SADS, TLFB) were completed by clinical assessors trained in their administration by the principal investigators. Participants were compensated for completing research assessments. The university’s Institutional Review Board approved the research protocol.

Measures

Goal choice.—The Thoughts About Abstinence Scale (Hall et al., 1991) was administered at baseline to assess adolescents’ current alcohol abstinence goals. Adolescents were instructed to choose from one of the following six goal choices: (1) total abstinence, never use again; (2) total abstinence, but realize that a slip is possible; (3) occasional use when urges are strongly felt; (4) temporary abstinence; (5) controlled use; (6) no goal to limit use right now. Of the six goal choice options, the most frequently selected alcohol treatment goal at baseline was “total abstinence, but realize a slip is possible,” representing 26% of the total enrolled sample ($n=184$), followed by “Total abstinence” (19%), “occasional use when urges are strongly felt” (15%), “controlled use” (15%), “temporary abstinence” (14%), and no goal set (7%). For these analyses, the TA group was operationalized as adolescents who endorsed either “total abstinence, never use again” or “total abstinence, but realize that a slip is possible” ($n = 82$). CU was defined as those who endorsed “controlled use” ($n = 28$). The remaining three goal choices cannot be categorized as being either TA or CU, and therefore individuals selecting these goals were excluded from the analyses.

Frequency of alcohol use.—Alcohol use was measured using the Timeline Followback (TLFB) method (Sobell & Sobell, 1995). This method uses a calendar format as a memory aid to enhance retrospective self-reporting of daily alcohol consumption in standard drink units. This instrument is widely used and has been shown to demonstrate good psychometric properties, including good test-retest reliability in adolescents (Levy et al., 2004). At baseline, participants reported alcohol use for the previous 90 days. At each follow-up session, the TLFB covered the time since the last assessment to minimize missing data. Alcohol use was considered as PDA, DDD, and number of binge drinking days. Binge

drinking was defined as five or more standard drinks on the same occasion (Substance Abuse and Mental Health Services Administration, 2014).

Other drug use.—Use of drugs in the past 6 months was assessed via self-report at baseline. Participants completed a questionnaire on which they indicated which of 12 classes of drugs they had used in the past 6 months. Classes of drugs included alcohol, cannabis, cocaine, stimulants (e.g. amphetamines), over-the-counter stimulants (e.g. caffeine pills), sedatives, over-the-counter sedatives (e.g. cough syrup to get high), opioids, hallucinogens, inhalants, tobacco, and other (e.g. ecstasy, steroids). Colloquial terminology and brand names were used when appropriate.

SUD diagnoses and symptoms.—Presence of Diagnostic and Statistical Manual (*DSM-IV*) SUD diagnoses and symptom counts at baseline were assessed by trained research staff using the SUD section of the adapted version of the Structured Clinical Interview for the *DSM* (First, Spitzer, Gibbon, & Williams, 2002). Modifications in the adapted version include the assessment of additional items developmentally relevant to adolescents (Martin, Kaczynski, Maisto, Bukstein, & Moss, 1995). This measure has been found to have good concurrent validity and high inter-rater reliability among adolescents (Martin, Pollock, Bukstein, & Lynch, 2000).

Other psychiatric diagnoses.—Current (i.e., past 6 months) presence of *DSM-IV* Axis I diagnoses other than SUD (e.g., Major Depressive Disorder, Attention Deficit/Hyperactivity Disorder, Conduct Disorder) was assessed at baseline using the adolescent form of the Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS; Clark et al., 1997; Kaufman et al., 1997). The K-SADS has demonstrated strong interrater reliability in clinical samples of adolescents (Kaufman et al., 1997) and among adolescent substance users (Clark et al., 1997).

Readiness to change drinking behavior.—A stage-of-change algorithm based on previously developed staging algorithms (Belding, Iguchi, & Lamb, 1996; DiClemente et al., 1991) was used to determine each participant's readiness to change at baseline and at each monthly follow-up. Participants responded to four questions: "Have you used alcohol in the past 30 days?" "Have you used alcohol in the past 6 months?" "In the next 6 months, do you intend to cut down on your level of alcohol use or to stop?" "In the next 30 days do you intend to cut down on your alcohol use, or to stop?" Adolescents were classified according to a previously published classification system (Belding et al., 1996), and data were coded numerically, with higher numbers indicative of more readiness (i.e., 1 = *precontemplation*, 2 = *contemplation*, 3 = *preparation*, 4 = *action*, 5 = *maintenance*). *Precontemplation* consisted of adolescents who did not plan to reduce or quit alcohol use in the next 6 months and who used alcohol in the past 30 days. *Contemplation* included those who used alcohol in the past 30 days and planned to reduce or quit alcohol use in the next 6 months but not the next 30 days. *Preparation* included adolescents who used alcohol in the past 30 days and planned to reduce their use or quit in the next 30 days. *Action* consisted of adolescents who used alcohol in the past 6 months but who were abstinent in the past 30 days. *Maintenance* included adolescents who have been abstinent from alcohol in the past 6 months. An

additional measure of readiness to change, the Readiness Ruler (Miller, 1999) assessed readiness to change on a 10-point scale, on which “1” indicates “not at all ready to change,” “4” indicates “unsure,” “6–7” indicates “ready to change,” and “10” indicates “already trying hard to make a change.”

Motivation, confidence, and difficulty to abstain from alcohol.—Single-item measures were administered at baseline to assess patients’ motivation, confidence and perceived difficulty to abstain from alcohol over the next 30 days (King, Chung, & Maisto, 2009). Adolescents were asked “Thinking about the next 30 days, how motivated are you to abstain (not use at all) from alcohol?”, “How difficult will it be for you to abstain (not use at all) from alcohol?”, and “How confident are you that you will be able to abstain for the next 30 days from alcohol?” Responses were rated on a 10-point scale ranging from 1 = “not at all” to 10 = “very motivated”, “very difficult” and “very confident”, respectively.

Data Analysis Approach

Descriptive statistics were computed to characterize sample demographics and drinking behavior. Distributions of all continuous variables were examined, and transformations were used to increase normality as appropriate. *T*-test (continuous) and chi-square (categorical) analyses were conducted to examine differences between adolescents choosing TA versus CU goal choice at baseline on the number of alcohol abuse and dependence symptoms (SCID) endorsed, amount of other drug use, and on their motivation to abstain, confidence in ability to abstain, perceived difficulty abstaining, and stage of change.

A series of separate hierarchical linear regressions was used to test our hypothesis of the predictive power of goal choice. Similar data analysis techniques of analyzing dependent variables at multiple time points have been reported in longitudinal studies to examine the effect of predictor variables on dependent variables at multiple time points (Adamson et al., 2010; Astington & Jenkins, 1999; Hogue, Dauber, & Morgenstern, 2010). In each model, the respective drinking variable at the previous time point was entered as a covariate (i.e. 6-month drinking was controlled in the model predicting 12-month drinking). This conservative approach was taken in order to account for variance in the drinking variables that may be accounted for by previous measurement of the same variable (Adamson et al., 2010; Dubow, Arnett, Smith, & Ippolito, 2001). Goal choice (TA = 0; CU = 1) was examined as a predictor of drinking outcome at 6-, 12-, and 24-month follow-ups. Age and gender (1 = female, 2 = male) were entered into the first step of each model, and each respective drinking variable at the previous time point was entered into the second step. Baseline difference variables (i.e., other drug use, number of abuse/dependence symptoms, motivation, difficulty, confidence, and stage of change) were entered as covariates in the third step of each model. Finally, goal choice was entered in the fourth step of each model. Missing data were accounted for using pairwise case deletion. SPSS statistical software was used for all analyses, and alpha was set at .05 for all statistical tests.

Attrition Analyses

Participant retention was good, with 95% of the sample ($n = 104$) providing TLFB data at the 6-month follow-up, 90% of the sample ($n = 99$) providing TLFB data at the 12-month

follow-up, and 90% of the sample ($n = 99$) providing TLFB data at the 24-month follow-up. Bivariate correlations were computed to test whether missing observations were related to demographic, alcohol use, or psychiatric diagnosis variables. Missing data was unrelated to baseline age, socioeconomic status, gender, race, psychiatric diagnosis, other drug use, motivation to abstain, confidence in ability to abstain, perceived difficulty abstaining, number of abuse/dependence symptoms, alcohol goal choice, DDD, binge days, or PDA at any of the follow-ups (p 's $> .05$).

Results

Baseline differences by goal choice

Table 1 presents participant characteristics upon entering treatment. Compared to participants in the CU group, those choosing TA were younger, reported significantly fewer alcohol abuse and dependence symptoms in the past six months ($p = .01$) and less other drug use in the past six months ($p = .01$). The TA group also reported more motivation to abstain in the coming month ($p < .001$), less anticipated difficulty abstaining ($p = .03$), and more confidence in their ability to abstain in the coming month ($p < .001$). Those in the TA group were in the later stages of change ($p < .001$), reported fewer binge days ($p < .001$), fewer DDD ($p = .003$), and a greater PDA in the past month ($p < .001$). The groups did not differ on gender, socioeconomic status, race, Readiness Ruler, or the presence of a psychiatric diagnosis (p 's $> .05$).

Goal choice as a predictor of longitudinal drinking outcomes

Multiple hierarchical regression analyses were performed to test whether baseline goal choice predicts drinking outcomes at 6-, 12-, and 24-month time points. Age and gender were entered into the first step of each model, respective drinking variable at the previous time point was entered into the second step of each model, baseline difference variables (i.e., other drug use, number of abuse/dependence symptoms, motivation, difficulty, confidence, and stage of change) were entered into the third step of each model, and goal choice was entered in the fourth step of each model. Results from the regression analyses can be found in Table 2.

Results from the regression models predicting 6-month drinking outcomes suggest that goal choice is not associated with DDD ($M = 2.83$, $SD = 4.01$), binge days ($M = 1.83$, $SD = 4.07$), or PDA ($M = 91.63\%$, $SD = 15.41\%$) at the 6-month follow-up (p 's $> .05$). Gender ($\beta = .25$, $p = .005$), other drug use ($\beta = .21$, $p = .04$) and confidence in ability to abstain ($\beta = -.27$, $p = .02$) were significant predictors of DDD in the final step of the model. Confidence in ability to abstain ($\beta = -.25$, $p = .05$) approached significance in the final step of the model predicting binge days at the 6-month follow-up. Number of alcohol abuse/dependence symptoms at baseline ($\beta = -.27$, $p = .02$) was the only significant predictor of PDA at the 6-month follow-up.

Results from the regression models predicting 12-month drinking outcomes show that goal choice significantly predicted DDD ($M = 2.54$, $SD = 4.06$, $\beta = .33$, $p = .004$), binge days ($M = 0.94$, $SD = 2.12$, $\beta = .34$, $p = .003$), and PDA ($M = 68.82\%$, $SD = 40.91\%$, $\beta = -.30$, $p = .$

01). Significant increases in R^2 (see Table 2) suggest that the addition of goal choice explained unique variance beyond that explained by other predictors. Gender ($\beta = .19, p = .03$), DDD at the 6-month time point ($\beta = .28, p = .01$), and number of alcohol abuse/dependence symptoms at baseline ($\beta = .20, p = .049$) were also significant predictors of DDD in the final step of the 12-month model. Gender ($\beta = .25, p = .004$) and 6-month binge days ($\beta = .22, p = .03$) were also significant predictors of binge days in the final step of the 12-month model. Gender ($\beta = -.30, p = .001$) was also a significant predictor of PDA in the final step of the 12-month model.

Results from the regression models predicting 24-month drinking outcomes suggest that goal choice was not associated with DDD ($M = 3.27, SD = 4.16$), binge days ($M = 1.92, SD = 4.37$), or PDA ($M = 91.55\%, SD = 14.83\%, p$'s $> .05$). DDD at the 12-month time point ($\beta = .31, p = .01$) was the only significant predictor of DDD at the 24-month time point. Binge days at the 12-month time point ($\beta = .51, p < .001$) was the only significant predictor of binge days at the 24-month time point. PDA at the 12-month time point ($\beta = .32, p = .01$) and perceived difficulty in abstaining ($\beta = -.29, p = .02$) were significant predictors of PDA in the final step of the 24-month model.

Overall, results suggest that goal choice predicts unique variance in 12-month drinking outcomes, but not at 6- and 24-month time points. Goal choice was positively associated with DDD and binge days, and negatively associated with PDA. Therefore, the CU goal choice was associated with poorer drinking outcomes (e.g., more DDD, more binge days, fewer PDA) at the 12-month time point.

Discussion

The purpose of this study was to examine differences in baseline characteristics between adolescents choosing TA versus CU as an alcohol treatment goal, as well as evaluate goal choice as an independent predictor of alcohol use treatment outcomes at 6-, 12-, and 24-month time points in an adolescent sample. Consistent with predictions, adolescents who chose TA reported more motivation to abstain, greater confidence in their ability to abstain, and a greater PDA upon initiating treatment compared to adolescents choosing a CU goal. These findings are consistent with baseline differences reported in adult populations (Adamson & Sellman, 2001; Heather et al., 2010).

In contrast to results from studies of adults (DeMartini et al., 2014), adolescents who chose TA reported experiencing fewer alcohol abuse and dependence symptoms upon entry into treatment compared to those who chose CU. This inconsistency may be due to differences in the magnitude, number, and types of negative consequences experienced by adults and adolescents. In particular, our adolescent sample, regardless of goal choice, reported relatively few alcohol abuse and dependence symptoms. Several studies have questioned the validity of using the *DSM-IV* abuse and dependence criteria with an adolescent sample, as some criteria may be infrequently endorsed by youth (e.g., withdrawal, failed attempts to quit; NIAAA, 2004). Therefore, it is possible that adolescents are experiencing alcohol-related consequences that are not encompassed in the *DSM-IV* criteria (Martin & Winters, 1998). In addition, compared to adults, adolescents have shorter histories of alcohol use, and

less time for an AUD to develop. Therefore, the clinical course of alcohol use disorder in adolescents may not be comparable in severity to that of an adult user with a history of far more chronic and heavy alcohol use.

Another explanation for the difference between adults and adolescents may involve differences in level of autonomy regarding treatment initiation. The studies of adults that were reviewed included non-mandated treatment-seeking adults. Our adolescent population was typically placed in treatment due to external factors (e.g., parents or school) which influenced the initiation of treatment. Also in contrast to adult literature, the presence/absence of a psychiatric diagnosis did not differ between goal choice groups (Heather et al., 2010) nor was presence/absence of a psychiatric diagnosis related to treatment outcomes. It is possible that use of a dichotomous psychiatric diagnosis variable may have reduced the power to detect a difference between goal choice groups and/or an effect of psychiatric diagnosis on treatment outcomes, compared to a continuous variable. Overall, however, there appear to be similarities in baseline characteristics between adolescents and adults who choose TA as a goal for their alcohol use at the beginning of treatment on several characteristics that may have clinical utility in assessing the prognosis and potential course of treatment.

This study also examined whether goal choice predicted alcohol treatment outcomes at 6-, 12-, and 24-month time points. In partial support of our hypotheses, TA goal choice was a significant predictor of alcohol outcomes at the 12-month time point, when TA goal choice was associated with better alcohol treatment outcomes (i.e., fewer DDD, fewer binge days, greater PDA) compared to those who chose CU. This finding is consistent with outcomes reported in the adult literature at 12-month (Adamson et al., 2010; Hodgins et al., 1997) follow-ups. Also in support of our hypotheses, goal choice did not significantly predict alcohol outcomes at the 24-month follow-up. Research on the predictive power of goal choice at longer follow-ups (e.g. greater than 12 months) in adult populations is inconsistent, likely due to changes in extra-treatment factors that may occur within the substantial period of time. Therefore, the nonsignificant effect of goal choice at 24 months is expected given the inconsistency in the adult literature, coupled with the tendency for instability in maintaining abstinence in adolescent populations.

Contrary to predictions, goal choice was not an independent predictor of 6-month alcohol use and related consequences outcomes. The 6-month findings may be understood in the context of the transtheoretical model of change (DiClemente et al., 1991) in an adolescent sample. Adolescents are typically mandated to enter substance use treatment (Battjes et al., 1999) and therefore may be less motivated to change upon initiating treatment, compared to adults or those who are internally motivated to initiate treatment. Exploration of motivation to change in this sample, as assessed by the Readiness Ruler (Miller, 1999) revealed that on average, adolescents indicated that they were not ready to change upon initiation of treatment. Therefore, it is possible that a substantial proportion of this sample was unwilling or unprepared to alter their substance use prior to the 6-month follow-up.

It is also possible that the predictive power of goal choice at the 12-month follow-up may reflect the influence of treatment. All treatment protocols were abstinence-oriented, and

therefore adolescents choosing TA as a goal choice were likely to find that the course of treatment better aligned with their own goals. It is possible that abstinence-oriented treatment may have had differential efficacy for adolescents choosing TA versus CU. It has been suggested in the adult literature that those entering treatment with a goal that differs from the goal of the program overall are less likely to be successful (Al-Otaiba et al., 2008). Initial resistance to treatment, as well as the tendency for abstinence rates to decline in the years following treatment (Alford, Koehler, & Leonard, 1991), suggest that some treatment effects might be most prominent at the 12-month follow-up. Therefore, the significant predictive power of goal choice at the 12-month follow-up may reflect differential treatment effects that may not have been as prominent at 6- and 24-month follow-ups. Further research utilizing standardized treatment protocols is warranted to further elucidate the possibility of differential treatment efficacy for adolescents choosing TA versus CU goal choice.

These findings have clinical implications regarding the utility of assessing an adolescent patient's pre-treatment alcohol use goal choice in treatment settings. Goal choice was associated with baseline substance use characteristics upon entry into treatment, and predicted alcohol treatment outcomes at 12-month follow-up. This information could be used to identify individuals who may benefit from interventions designed to increase their motivation, confidence, and self-efficacy, which may help them to move them forward along the continuum of motivation for behavior change (Prochaska & DiClemente, 1982). By identifying and addressing these factors at the beginning of treatment through the use of different therapeutic techniques (e.g., motivational interviewing), adolescents may begin to alter their goals to be more abstinence oriented, which predicts better alcohol consumption outcomes at 1-year.

The results of this study should be viewed in light of its limitations. First, the generalizability of the findings may be limited, as the adolescents included in this study were primarily male and Caucasian. These adolescents also identified marijuana as their primary drug of choice and endorsed other types of substance use as well. Therefore, alcohol use may not have been the focus of their treatment. Future research should examine the relationship between goal choice and treatment outcomes of other substances that are used in this population, such as marijuana. There were also substantially more adolescents who chose a TA goal as compared to CU. This may be due, in part, to the legal status of alcohol consumption by adolescents in the United States. Therefore, CU may not have been a goal that was highly supported by either parents or the treatment program, as there are legal ramifications for continued use. Finally, this study did not include assessments of contextual factors. Previous research has identified the importance of contextual factors in determining relapse following treatment, particularly socialization with pretreatment peers, the number of individuals present at a social gathering, and pressure to drink (Brown, Vik, & Creamer, 1989). Future research should examine the relationship between goal choice and contextual factors relevant to adolescents, such as post-treatment social environment, and how this relationship may impact treatment outcomes.

In conclusion, this study's findings suggest that there are baseline differences between adolescents who choose TA versus CU for an alcohol treatment goal upon initiating treatment. The results also indicate that goal choice is a significant predictor of alcohol

treatment outcomes at 12-month follow-up. Overall this study's results emphasize the importance of addressing goal choice for adolescents in substance use treatment, especially to help identify those in need of tailored interventional strategies based on heterogeneity of presentation, and support better long-term alcohol treatment outcomes.

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Table 1.

Participant Characteristics at Baseline.

	TA (N=82)		CU (N=28)		<i>t</i> (χ^2)	p
	M (%)	SD	M (%)	SD		
Gender						
Male	67%	--	60%	--	0.37	.54
Psych dx						
Present	54%	--	53%	--	0.60	.44
Race						
Caucasian	87%	--	89%	--	0.14	.71
Age	16.44	1.15	17.04	1.35	-2.80	.02
SES	40.56	13.67	41.46	9.95	-0.37	.71
# abu/dep sx	1.55	2.02	2.0	1.44	-2.55	.01
# other drugs	3.85	2.20	5.23	2.58	-2.78	.01
Motivation	8.30	2.60	4.39	2.87	7.03	<.001
Difficulty	3.08	2.70	4.61	3.29	-2.22	.03
Confidence	8.24	2.72	4.39	2.87	6.35	<.001
SOC	3.62	0.85	2.07	1.05	7.02	<.001
RR	6.72	3.47	5.73	3.22	-1.30	.20
DDD	3.02	4.64	6.05	4.16	-3.06	.003
Binge days	0.56	1.17	2.92	5.81	-6.95	<.001
PDA	77%	33%	27%	31%	7.12	<.001

Note. N=110. Psych dx includes major depressive disorder, Dysthymia, Attention Deficit Hyperactivity Disorder, generalized anxiety disorder, conduct disorder, and oppositional defiant disorder based on DSM-IV criteria. SES = socioeconomic status, measured according to Hollingshead (1975); # abuse/dep sx = number of DSM-IV alcohol abuse and dependence symptoms; # drugs used in the past 6 months, out of a max of 12; Motivation = motivation to abstain in the coming month; Difficulty = perceived difficulty in abstaining in the coming month; Confidence = confidence in ability to abstain in the coming month. SOC = stage of change. RR = Readiness Ruler (Miller, 1999). DDD = drinks per drinking day; PDA = percent days abstinent.

Table 2.

Goal Choice as a Predictor of Longitudinal Drinking Outcomes at Final Step of Hierarchical Linear Regression Models.

Outcome	Full model	Change statistics	Goal choice statistics		
	R^2	F	R^2	$B(SE)$	p
6 month					
DDD	.40	1.56	.01	1.32(1.05)	.22
Binge	.34	0.78	.01	0.09(0.10)	.38
PDA	.24	0.71	.01	-0.02(0.03)	.40
12 month					
DDD	.45	8.72**	.06	3.08(1.04)	.004
Binge	.46	9.48**	.06	0.22(0.07)	.003
PDA	.38	6.51*	.05	-0.23(0.09)	.01
24 month					
DDD	.28	0.12	.001	-0.45(1.30)	.73
Binge	.33	0.04	.000	-0.02(0.12)	.85
PDA	.20	0.03	.000	-0.01(0.03)	.87

Note. DDD = drinks per drinking day, PDA = percent days abstinent. Full model includes covariates specified in data analysis strategy. Change statistics represent changes in model with the addition of goal choice in the final step.

*
 $p < .05$

**
 $p < .01$