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Relationship Between Approach and Avoidance Inclinations to Use Alcohol and Treatment Outcomes

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Abstract

BACKGROUND—Despite growing recognition of the importance of multidimensional assessments of craving, little is known about how both approach and avoidance of alcohol inclinations change during the course of treatment, or relate to treatment outcomes. The current study examined the relationship between approach inclinations, avoidance inclinations, and treatment outcomes in individuals seeking treatment for alcohol dependence, and investigated whether changes in approach and avoidance ratings were associated with changes in drinking.

METHODS—Individuals ($n=81$) seeking treatment for alcohol dependence were randomized to receive either 12-sessions of cognitive-behavioral therapy plus healthy living skills or 12-sessions of cognitive-behavioral therapy plus affect regulation training. Participants provided pre- and post-treatment scores on various measures including drinking behaviors and approach and avoidance inclinations to use alcohol.

RESULTS—Results indicated that both approach and avoidance inclinations were uniquely and significantly associated with problem recognition, and that avoidance inclinations were uniquely related to taking steps to make a change in alcohol use at baseline. In addition, avoidance inclinations were positively associated with number of sessions attended with no association found for approach ratings. Finally, results suggested that changes observed in drinking outcomes (drinks/day and % days abstinent) were significantly associated with changes in approach, but not avoidance inclinations.

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Contributors

Paul R. Stasiewicz, Clara M. Bradizza, Scott F. Coffey, and Suzy B. Gulliver designed and wrote the protocol for the randomized clinical trial, and Gregory D. Gudleski served as project coordinator on the randomized clinical trial. Robert C. Schlauch and Paul R. Stasiewicz conceptualized the manuscript, and Robert C. Schlauch conducted all statistical analyses and wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of Interest

No conflict declared.

CONCLUSIONS—These findings highlight the importance of measuring both desire to consume and desire to avoid consuming alcohol simultaneously and suggest that avoidance inclinations are associated with treatment initiation and retention, and approach inclinations with positive treatment outcomes.

Keywords

alcohol; treatment outcomes; craving; approach; avoidance

1. Introduction

Despite the emergence of well-validated treatments, alcohol use disorders continue to be a widespread problem with an estimated 18.7 million people diagnosed in the United States (SAMSHA, 2010). Further, research suggests that 30–40% percent of those who enter treatment experience positive outcomes (i.e., abstinence or moderate drinking without problems) (Miller, Walters, & Bennett, 2001), and approximately 60 percent relapse to alcohol use within the first 3 months following treatment completion (Miller, 1996). Recently, there has been a push within the field to better understand how and why behavioral treatments work to improve alcohol outcomes with the goal of improving treatment response and long-term success rates (Longabaugh, 2007). To date, little is known about which components of cognitive-behavioral treatments are critical elements that result in changes in drinking behavior. Identification of the processes associated with improvements in drinking behavior is a critical step to understanding what components of treatment will be most effective. The purpose of the current study was to examine hypothesized processes related to changes in drinking behavior within a clinical sample of alcohol users. Specifically, we sought to examine the relationship between craving (as measured by approach and avoidance inclinations to use alcohol) and treatment outcome variables.

Craving is often viewed as a critical factor in both the development and maintenance of alcohol use disorders, and has traditionally been defined as the desire or inclination to approach or consume alcohol (e.g., Sayette, Shiffman, Tiffany, Niaura, Martin, & Shadel, 2000; Tiffany & Conklin, 2000). Indeed, significant associations have been found between craving and relapse during and following inpatient and outpatient treatment for alcohol problems (e.g., Flannery, Poole, Gallop, & Volpicelli, 2003; Gordon, Sterling, Siatkowski, Raively, Weinstein, & Hill, 2006). For example, Flannery and colleagues (2003) found that ratings on self-report craving measures assessing desires to consume alcohol predicted subsequent drinking during treatment, and that these relationships were stronger predictors of future drinking than was drinking in the previous treatment week. However, despite the regular use of the term “craving” in both research and clinical settings, agreed upon definitions are lacking (Rosenberg, 2009). Further complicating the issue are the array of methods developed to assess craving including self-report, behavioral, physiological, and neurobiological approaches (Sayette et al., 2000).

Over the past decade, advances in research on reactivity to substance-related cues, have lead some researchers to question unidimensional approaches to measuring craving. Specifically, findings indicate that cue-elicited appetitive and aversive reactions to alcohol cues (i.e., craving; e.g., Franken, De Hann, Van Der Meer, Haffmans, & Hendricks 1999; Sinha, Fuse, Aubin, & O'Malley, 2000) result from the activation of multiple response domains (i.e., approach and avoidance). Consistent with this idea, craving is better defined using a multidimensional approach that represents the “relative activation of substance-related response inclinations along the primary dimensions of approach and avoidance (Stritzke, McEvoy, Wheat, Dyer, & French, 2007).” Approach inclinations are defined as the desire to

consume the substance, whereas avoidance inclinations are defined as the desire to withdraw and refrain from consumption (Breiner, Stritzke, & Lang, 1999; McEvoy, Stritzke, French, Lang & Ketterman, 2004; Stritzke, Breiner, Curtin, & Lang, 2004). Both are presumed to develop as a function of the consequences of substance use including the reinforcing effects of psychoactive substance use, as well as the negative consequences that follow excessive use (Breiner et al., 1999). Further, approach and avoidance are proposed to be orthogonal to one another resulting in four hypothetical quadrants: predominantly approach (high approach, low avoidance), predominantly avoidant (low approach, high avoidance), ambivalence (high approach, high avoidance), and indifference (low approach, low avoidance) (Breiner et al., 1999; Stritzke et al., 2007).

Measurement of both approach and avoidance as separate dimensions of craving have numerous advantages clinically and methodologically (see Stritzke et al., 2007 for a review). For example, evaluation of both approach and avoidance over time allows for the assessment of the “evaluative craving space” (i.e., indifference, avoidance, approach, and ambivalence) as a function of both the drinking patterns and recovery status of those seeking and/or receiving treatment. Further, it has been argued that measuring “craving” or “urge to use” exclusively in terms of approach inclination without consideration of a separate, yet concurrent, avoidance inclination may misrepresent a motivational disposition that is actually a combination of both approach and avoidant motivation, thus significantly diminishing the utility of the information obtained (Breiner et al., 1999). Indeed, studies examining avoidance inclinations using both cue reactivity paradigms and self-report measures have provided considerable support for its incremental validity in predicting alcohol-related variables in both non-clinical and clinical samples (Curtin, Barnett, Colby, Rohsenow, & Monti, 2005; Klein, Stasiewicz, Koutsky, Bradizza, & Coffey, 2007; McEvoy et al., 2004; Stritzke et al., 2004; Stritzke et al., 2007). Further, avoidance inclinations are associated with taking steps to make a change in an alcohol dependent sample (Klein et al., 2007) and are predictive of relapse status (Stritzke et al., 2007), suggesting that avoidance inclinations may play a critical role in treatment outcomes. Thus, a greater understanding of how both approach and avoidance dimensions of craving change during treatment and impact treatment outcomes is likely to improve our understanding of the processes involved in successful changes in drinking behaviors.

1.1 Current Study

The primary aim of the current study was to examine the relationship between both approach and avoidance inclinations and treatment outcomes in alcohol-dependent, treatment-seeking individuals. Specifically, we sought to examine the 1) relationship between pretreatment approach and avoidance inclinations, stages of change and treatment readiness (e.g., taking steps to make a change), and treatment retention, 2) ways in which both approach and avoidance dimensions change from pre- to post-treatment, and 3) relationship between changes in approach and avoidance inclinations and drinking behavior. We predicted that:

1. Pre-treatment avoidance inclinations would be positively associated with stages of change and treatment readiness (e.g., taking steps to make a change) and treatment readiness and treatment retention (i.e., number of sessions attended), whereas pretreatment approach inclinations would be negatively associated with treatment retention.
2. Approach and avoidance inclinations would change significantly over the course of treatment (pre to post treatment), such that approach would decrease and avoidance would increase.

3. Increases in avoidance inclinations would be associated with decreases in drinking behavior following treatment.

2. Method

2.1. Participants

Participants were 81 individuals (female $n=39$) seeking outpatient treatment for alcohol-related problems with a mean age of 45.7 ($SD=11.1$). Participants were predominantly Caucasian (85.2%; 13.6% African American and 1.2% other), with 60.5% reporting at least part-time employment and a mean of 14.1 ($SD=2.1$) years of education. Participants were originally recruited for a randomized clinical trial for those characterized as negative affect drinkers (defined below). Inclusion criteria included: a) seeking outpatient alcohol treatment services, b) current diagnosis of alcohol dependence (assessed by trained interviewers using the Mini International Neuropsychiatric Interview; M.I.N.I., Sheehan et al., 1998), c) meeting criteria for a negative affect drinking profile (i.e., highest scores on the Inventory of Drug Taking Situations-- Alcohol Version [IDTS; Annis, Sklar, & Turner, 1997] unpleasant emotions or conflict with others scales), and d) living within commuting distance of the program site. Exclusion criteria included: a) acute psychosis or severe cognitive impairment, b) use of medications (i.e., disulfiram, naltrexone) that may modify alcohol use, c) made changes in past 3 months in dose or type of prescription medication that affects mood (e.g., antidepressants, anxiolytics), d) any drug use diagnosis other than for nicotine and cannabis, and e) legally mandated to attend treatment. Forty-two percent reported receiving previous outpatient treatment for alcohol problems and 15.6% reported a prior episode of inpatient treatment. Finally, at intake, participants reported 29.3% days abstinent and a mean of 6.2 ($SD=4.0$) drinks per day.

2.2. Measures

Demographic characteristics, current status information (e.g., marital status, employment) and substance abuse treatment history were obtained using a comprehensive background questionnaire administered during the initial intake appointment.

2.2.1. Approach and Avoidance of Alcohol Questionnaire (AAAQ)—The AAAQ (McEvoy et al., 2004) is a 20-item self-report measure assessing two primary dimensions of alcohol craving: approach (e.g., "I wanted to drink as soon as I had the chance") and avoidance (e.g., "Drinking did not seem such a good idea to me"). Participants are asked to report on their attitudes towards alcohol during the past week by indicating how strongly they agree with each statement on a 9-point Likert Scale (0=not at all to 8= very strongly). Although originally developed among non-dependent drinkers as a three-factor measure representing two approach subscales that differed on intensity of desire to consume alcohol (i.e., inclined/indulgent and obsessed/compelled), recent evidence in a clinical sample suggests that the items for these two factors simply represent an approach dimension (Klein et al., 2007); thus, in the current study, a single approach dimension was used in all analyses. Participants completed the AAAQ at pre- and post-treatment.

2.2.2 Mini International Neuropsychiatric Interview (M.I.N.I. Sheehan et al., 1998)—The M.I.N.I. (Sheehan et al., 1998) is a brief, structured diagnostic interview, developed to assess for current (and lifetime) DSM-IV disorders, including alcohol and other substance use. The M.I.N.I. has been found to have good convergent validity with other well-established diagnostic interviews (Sheehan et al., 1998). The M.I.N.I. was administered at the intake interview by trained interviewers.

2.2.3. Inventory of Drug Taking Situations – Alcohol Version (IDTS-A; Annis et al., 1997)—The IDTS-A (Annis et al., 1997) is a 50-item, self-report questionnaire designed to measure the frequency of drinking in a range of situations over the past year. Items are rated on a 1 (never) to 4 (almost always) Likert scale and form eight subscales: unpleasant emotions, physical discomfort, pleasant emotions, testing personal control, urges and temptations, conflict with others, social pressure to use, and pleasant times with others.

2.2.4. Short Alcohol Dependence Data Questionnaire (SADD)—The SADD (Davidson and Raistrick, 1986) is a 15-item self-report questionnaire that assesses alcohol dependence with scores greater than 20 indicative of high dependence. Participants rated each item on a 4-point Likert scale indicating their agreement with each of the statements (0=never to 3=nearly always).

2.2.5. Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES)—The SOCRATES (Miller & Tonigan, 1996) is a 19-item self-report measure designed to assess awareness of problem drinking and motivation to change drinking behavior. Items are rated on a 1 (strongly disagree) to 5 (strongly agree) Likert scale and form three subscales: problem recognition, ambivalence, and taking steps to make a change.

2.2.6. Timeline Follow-Back (TLFB)—The TLFB (Sobell & Sobell, 1992) is a calendar-based retrospective recall interview of daily alcohol use. The TLFB was used to estimate the number of standard drinks consumed each day and percent days abstinent over the 6-month period prior to the date of the initial intake assessment and a 3 month period at post-treatment.

2.3. Procedure

Participants were recruited through radio and newspaper advertisements (i.e., direct recruitment) and the Clinical Research Center (CRC). The CRC is a publicly-funded outpatient substance abuse clinic at Research Institute on Addictions serving the Western New York community. The CRC offers a variety of services for substance use disorders, including brief screening interviews, comprehensive assessments, medical evaluations, and a range of treatment services (e.g., CBT, brief alcohol interventions) for those self-referred or referred by other community agencies. Individuals calling the project phone number were screened for initial inclusion criteria and provided a description of the treatment program. For those recruited through the CRC, a centralized screening process was set up to accommodate recruitment for several clinical research studies. Participants were recruited and screened in the same manner as the radio and newspaper recruitment process. Once eligibility criteria were met, participants attended an intake appointment where informed consent was obtained and the remaining eligibility criteria (e.g., diagnosis) were assessed by trained interviewers. Participants were then scheduled for a pre-treatment interview administered as a questionnaire packet. All participants were remunerated with cash payments for completing the intake and pre-treatment interviews.

The current study was part of a larger, randomized clinical trial assessing the incremental validity of an affect regulation training for alcohol-dependent individuals with a negative affect drinking profile. Thus, following the pre-treatment interview, participants were randomly assigned to one of two treatment conditions: cognitive-behavioral therapy (CBT) for alcohol dependence plus an affect regulation training treatment enhancement ($n=42$) or CBT plus a health and lifestyles treatment enhancement (active control group; $n=39$). Both treatments were manual guided and consisted of weekly, 90-minute therapy sessions for 12 weeks. For the current study, participants from both treatment groups are pooled for

analyses due to our interest in understanding the common processes involved in changes in drinking behaviors. Further, it should be noted that there were no significant differences between the two CBT conditions on approach, avoidance, or drinking outcomes. For those entering treatment, follow-up rates at post-treatment were 77% for drinking data and 65% for approach and avoidance data.¹

2.4 Data Analytic Strategy

Prior to analysis, all variables were examined for outliers and non-normality. Upon reigning in outliers (median + or – 2 interquartile range) all distributions were acceptable. Means, standard deviations and bivariate correlations among the variables of interest are presented in Table 1. To examine hypothesis one, we conducted a series of regression analyses for readiness to change variables and treatment retention with approach and avoidance dimensions entered as predictor variables. Next, we examined changes in drinking behaviors, approach, and avoidance from pre- to post-treatment using simple repeated measures ANOVAs (hypothesis 2). Prior to conducting these analyses, we compared those individuals who provided follow-up data with those who did not complete follow-up on pretreatment severity of alcohol dependence (i.e., SADD), age, and gender; no differences were found.

Finally, to examine whether changes in approach and avoidance inclinations were associated with changes in drinking behaviors after treatment (hypothesis 3), two path analyses were conducted (MPLUS 6.0; Muthen and Muthen, 2010) using pre- and post-treatment scores on the AAAQ and TLFB. Path analysis is an extension of the regression model in which the hypothesized model is compared to the observed covariance matrix, providing a number of goodness of fit statistics. Path coefficients or parameter estimates (i.e., unstandardized and standardized estimates) are similar to partial regression coefficients that assess the strength of the relationships between variables. In the current study, parameter and fit indices were estimated using maximum likelihood (ML) estimation. Missing data was addressed using full information maximum likelihood (FIML).² Prior to examining parameter estimates, five fit indices were utilized to assess absolute fit, fit adjusting for model parsimony, and comparative or incremental fit (Kline, 2005): chi-square (χ^2), Tucker-Lewis index (TLI), comparative fit index (CFI), standardized root mean residuals (SRMR), and the root mean square error of approximation (RMSEA).

3. Results

3.1. Approach/Avoidance Inclinations and Readiness to Change/Treatment Retention

First we examined the relationships between approach and avoidance inclinations, pretreatment variables, and treatment retention (see Table 2 for summary of results). With regard to stages of change readiness, results indicated that approach inclinations were significantly related to problem recognition only ($\beta=.31, p<.01$). In contrast, avoidance ratings were uniquely and significantly related to both problem recognition ($\beta=.29, p<.05$) and taking steps to make a change ($\beta=.64, p<.001$). Further, avoidance inclinations were also positively associated with total number of sessions attended ($\beta=.23, p<.05$), whereas approach inclinations were not ($\beta=-.16, p=.16$). Taken together, these results suggest that avoidance inclinations may be an important individual difference variable associated with treatment-seeking behaviors and treatment retention.

¹Percentages differ for follow-up rates on approach/avoidance inclinations and drinking behavior due to a focus by study protocol to obtain at the very least drinking data on those who had been difficult to contact following treatment or drop-out.

²Analyses were conducted using both listwise deletion and FIML. Results across both methods for handling missing data were similar. Given the reduced power associated with listwise deletion and that FIML leads to unbiased estimations under conditions of data missing completely random and data missing at random, FIML was retained for the final analyses.

3.2. Changes in Approach, Avoidance, and Drinking Behavior

Next, we examined how approach inclinations, avoidance inclinations, and drinking behaviors changed from pre to post treatment (see Table 3). Results of the repeated measure ANOVAs indicated a significant decrease in approach inclinations following treatment [$F(1, 52)=49.64, p<.001$], and a near-significant increase in avoidance ratings [$F(1, 52)=3.82, p=.056$]. Further, results indicated significant changes in drinking behavior following treatment, such that percentage of days abstinent significantly increased [$F(1, 61)=70.69, p<.001$] and average number of drinks per day decreased [$F(1, 61)=79.35, p<.001$].

3.3. Relationship Between Changes in Approach, Avoidance Inclinations and Drinking Behaviors

Finally we examined if changes in approach and avoidance were related to changes in drinking from pre to post treatment. First, we examined the relationship between changes in approach/avoidance inclinations and changes in percent days abstinent at post-treatment. Results indicated an excellent fitting model. Specifically, the chi-square for this model was non-significant ($\chi^2(6) = 6.48, p=.37$), the standardized root mean square residual (SRMR; .06), the Tucker-Lewis (TLI=.99) and Comparative Fit (CFI=.99) indices and the root mean square error of approximation (RMSEA=.03; 90% CI=.00-.15, $p=.50$) were all well within the recommended limits. Examination of parameter estimates indicated that post-treatment approach inclinations predicted percent days abstinent at post-treatment controlling for pre-treatment scores (see Figure 1 top panel and Table 4), suggesting that as approach inclinations decreased number of days abstinent increased. No relationship was found between avoidance inclinations and percent days abstinent at post-treatment.

Next, we examined the same relationships using drinks per day as our main outcome variable. Results from these analyses also indicated an excellent-fitting model. Specifically, the non-significant chi-square ($\chi^2(6) = 6.65, p=.35$), and the fit indices: SRMR = .07, TLI = .98, CFI=.99, and the RMSEA=.04 (90% CI=.00-.15, $p=.48$) were all well within the recommended limits. Similar to our first model, the parameter estimates indicated that approach inclinations at post-treatment predicted drinks per day at post treatment after controlling for pre-treatment scores (see Figure 1 bottom panel and Table 4), suggesting that as approach inclinations decreased the average number of drinks per day also decreases. No relationship was found between avoidance inclinations and drinks per day at post-treatment.

4. Discussion

Over the past decade greater emphasis has been placed on understanding how and why cognitive-behavioral treatments for alcohol dependence work; however, little is known about the processes associated with changes in drinking. The current study sought to fill this gap in the literature by examining the relationship between the ambivalence model of craving, defined as both the inclination or desire to use alcohol and the inclination or desire to avoid using alcohol, and treatment-related variables, specifically, drinking outcomes. We explored three study aims: 1) the relationship between baseline approach and avoidance inclinations, stages of change and treatment readiness, and treatment retention, 2) the ways in which both approach and avoidance dimensions change from pre- to post-treatment, and 3) the relationship between changes in both approach and avoidance inclinations and changes in drinking behavior.

Results from the current study support the validity of measuring avoidance inclinations in addition to traditional approach inclinations when assessing craving. Specifically, we found that pre-treatment avoidance inclinations were significantly and uniquely related to both problem recognition and taking steps to make a change at baseline, as well as number of

treatment sessions attended. Such findings suggest that avoidance inclinations may be an important intrapersonal factor that predicts treatment initiation and retention. These findings are consistent with previous studies (e.g., Klein et al., 2007). It was somewhat surprising that pretreatment approach inclinations were not uniquely and negatively associated with treatment retention, particularly given the research suggesting that stronger desires to use alcohol predicts relapse during treatment and greater treatment drop-out rates (Flannery et al., 2003; Ray, Hutchison, & Bryan, 2006). However, it is possible that the absence of a relationship between approach inclinations and the number of treatment sessions attended is due to the concurrent measurement of avoidance inclinations. Indeed, simple bivariate correlations reveal that pretreatment approach inclinations are negatively associated with number of sessions attended, but that such a relationship diminishes when accounting for avoidance inclinations, highlighting the importance of measuring craving as the activation of two competing orthogonal dimensions.

In addition, the current study found that both approach and avoidance inclinations changed during the course of treatment. Specifically, large decreases were noted for approach inclinations from pre- to post-treatment, whereas minor increases were noted for avoidance inclinations. More importantly, though inconsistent with our predictions, decreases in drinking behavior (percent days abstinent and drinks per day) from pre- to post-treatment were significantly associated with changes in approach, but not avoidance inclinations. There are several possible explanations for these findings. First, it is possible that avoidance inclinations may be more important for treatment initiation rather than change in drinking behavior as the current results would suggest. However, it is also possible that, within our sample of alcohol-dependent treatment seeking individuals, most of the change in avoidance inclinations occurred prior to entering the study. Indeed, avoidance inclinations were relatively high and increased minimally from pre- to post-treatment. Thus, the lack of substantial change in avoidance inclinations during treatment may have limited our ability to detect such an association with drinking behaviors. Perhaps pre-treatment changes in drinking behaviors noted in clinical trials (e.g., Epstein, Drapkin, Yusko, Cook, & McGrady, 2005) are the result of such an increase in avoidance inclinations prior to entering treatment. That is, avoidance inclinations may temporally predict initial changes in drinking behaviors which is then followed by a decline in approach inclinations. Alternatively, it may be due to a combination of the two processes such that initial changes in avoidance inclinations results in initial changes in drinking which, in turn, initiates a reduction in approach inclinations. Treatment then accelerates changes (reduction) in approach inclinations which leads to additional and sustained changes in drinking. For example, Stritzke et al. (2007) monitored a small sample of inpatient alcohol-dependent patients following 50 days of treatment using interactive voice response, and found patterns suggesting that moderate levels of avoidance inclinations may allow patients to overcome the challenges of gradual and/or acute rises in approach inclinations following treatment. Such a pattern may also hold true during the course of treatment. Unfortunately, the design of the current study does not allow us to examine such temporal relationships. Nevertheless, our results continue to highlight the importance of these processes in changes in drinking behaviors, and a need to further explore them in future studies, particularly regarding their possible roles as mechanisms of change.

The current study findings offer several potential strategies for future research that may improve alcohol treatment outcomes. First, the results converge with principles underlying motivational interviewing techniques (Miller & Rollnick, 2002), in particular, fostering discrepancies and increasing motivation to change drinking behavior which is most likely achieved through the strengthening of avoidance inclinations. Although the current study was not designed to study the temporal relationship between the desire to avoid consuming alcohol and drinking, there is some evidence to suggest that increases in motivation to

change measured over one month using a decisional balance worksheet, a technique commonly used in motivational interviewing to foster motivation to change, predicts changes in drinking behaviors among college students at 6-months (Collins, Carey, & Otto, 2009). However, it is important to note that decisional balance techniques are designed to strengthen the decision to change by listing the pros and cons of drinking and not drinking, which may or may not correspond to one's actual desire to avoid alcohol. For example, significant decreases in drinking at one month were noted for all participants regardless of increases or decreases in motivation as measured by the decisional balance measure; an effect the authors attribute to potential assessment reactivity (Collins et al., 2009). Further, Collins and colleagues also found that the effect noted at 6-months decayed by 12-months, suggesting that current desires to avoid alcohol may be more predictive of current drinking status following treatment. Thus, desires to avoid alcohol may not be synonymous with motivation to change, but rather an important intrapersonal difference factor requiring constant monitoring that predicts successful change by forestalling lapses resulting from the extreme ups and downs in approach inclinations often experienced during treatment (Stritzke et al., 2007). Future research should explore how approach and avoidance ratings of craving are related to decisional balance measures in predicting changes in drinking, particularly if such techniques strengthen avoidance among those alcohol dependent.

Although developing avoidance inclinations is indeed considered the goal of many treatments for alcohol dependence, traditional cognitive-behavioral therapy for alcohol dependence and "change plans" often focus almost exclusively on high-risk situations and approach inclinations or desires to consume alcohol during skills training and relapse prevention. For example, functional analyses, drug refusal skills, and seemingly irrelevant decisions target desires to consume alcohol and teach people how to avoid high risk situations, but neglect to assess and strengthen the client's actual level of avoidance inclination. In other words, therapy may provide someone with the skill of saying "no" to a drink in a social situation, but the person may not strongly want to avoid drinking in that situation. Findings from the current study suggest that although approach inclinations are important, equal attention should be paid to avoidance inclinations, particularly with regard to treatment initiation and retention. Thus, greater emphasis on techniques that enhance avoidance inclinations may indirectly improve treatment outcomes due to greater treatment retention or by enhancing the ability to weather acute rises in approach inclinations over the course of treatment. Such efforts may be particularly important early in treatment, even during pre-treatment screenings. Future research should continue to explore ways to enhance and/or reinforce avoidance inclinations and examine their impact on treatment outcomes.

Overall, the results of the current study offer interesting findings for better understanding the processes associated with changes in drinking behaviors during the course of treatment. However, the current study is not without limitations. Most importantly, the current study relied heavily on correlational methods that limit the ability to draw conclusions about the predictive validity of changes in both approach and avoidance inclinations on changes in drinking behaviors. Within a path analysis framework, reliance on such methodology, particularly the inclusion of only two time points, gives rise to concerns of equivalent models, which precludes our ability to establish temporal relationships among the variables of interest. Further, the assessment of approach and avoidance inclinations is likely a dynamic process that fluctuates daily. Thus, longitudinal designs with multiple assessments, perhaps with daily ratings, should be utilized to further examine the relationships between approach inclinations, avoidance inclinations, and drinking behaviors. Finally, although somewhat mitigated by underlying aims of the current study, namely greater understanding of the processes involved in changes of drinking behavior, the generalizability of our findings may be limited due to the recruitment of negative affect drinkers for the original

clinical trial. Future research would benefit from the inclusion of a broader sample of those diagnosed with alcohol use disorders.

In summary, findings from the current study continue to support the growing body of literature highlighting the importance of assessing craving using a multidimensional approach. Exploration of the role of the ambivalence model of craving in predicting changes in drinking behaviors, including the potential to serve as a mechanism of change, provides many exciting avenues for investigators concerned with the treatment of alcohol problems.

Highlights

We examined the relationship between approach inclinations, avoidance inclinations, and treatment outcomes in individuals seeking treatment for alcohol dependence. > Pretreatment approach and avoidance inclinations were uniquely associated with problem recognition. > Pretreatment avoidance inclinations were uniquely related to taking steps to make a change in alcohol use at baseline and number of sessions attended. > Changes observed in drinking outcomes (drinks/day and % days abstinent) were significantly associated with changes in approach, but not avoidance inclinations.

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Figure 1. Summary of path model standardized estimates for percent days abstinent (top panel) and drinks per day (bottom panel). Solid lines represent significant paths ($p < .05$)

Table 1

Means, Standard Deviations, and Bivariate Correlations Among Variables of Interest

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Approach-Pre	4.9	2.0	-	.44**	-.37**	-.17	-.26*	-.42**	.25*	.34**	.21	.17	-.40**	-.26*
2. Approach-Post	2.5	2.0		-	-.14	-.32*	-.34*	-.61**	.09	.65**	-.17	.17	-.20	-.15
3. Avoidance-Pre	4.2	2.1			-	.50**	.10	.23	-.10	-.19	.18	-.05	.69**	.27*
4. Avoidance-Post	5.1	1.6				-	.05	.20	.28*	-.12	.36**	.07	.30*	.18
5. % days abstinent-Pre	29.3	27.6					-	.52**	-.57**	-.41**	.01	-.14	.13	.05
6. % days abstinent-Post	62.4	33.6						-	-.32*	-.89**	.13	-.25*	.12	.28*
7. Drinks/day-Pre	6.2	4.0							-	.37**	.33**	.13	-.11	-.13
8. Drinks/day-Post	1.9	1.9								-	-.08	.10	-.08	-.29*
9. Problem Recognition	30.5	4.1									-	.08	.10	.06
10. Ambivalence	15.8	3.6										-	.08	-.11
11. Taking Steps	30.1	7.2											-	.07
12. #Treatment Sessions	7.7	4.6												-

Note: Means on for pre-treatment scores are different from those reported in the repeated measures ANOVA analyses due to listwise deletion.

* $p < .05$,** $p < .01$

Table 2

Regression analyses examining the relationship between approach, avoidance, readiness to change, and treatment retention (semi-partial correlations).

	Approach	Avoidance
SOCRATES		
Problem Recognition	<i>.29**</i>	<i>.27*</i>
Ambivalence	.17	.03
Taking steps to make a change	-.15	<i>.59**</i>
Number of Sessions Attended	-.15	<i>.21*</i>

*
p<.05,

**
p<.01

Table 3

Summary of means (standard deviations) for repeated measure ANOVAs

	Pre-Tx	Post-Tx	<i>F</i>	Partial η^2
Craving (n=53)				
Approach Inclination	4.6 (2.0)	2.5 (2.0)	49.64**	.49
Avoidance Inclination	4.5 (2.2)	5.1 (1.6)	3.82 ^a	.07
Drinking Behavior (n=62)				
% days Abstinent	30.0 (27.5)	62.4 (33.6)	70.69**	.54
Drinks per Day	6.0 (3.9)	1.9 (1.9)	79.35**	.57

^a Difference between pre and post avoidance ratings demonstrated a significant trend, $p=.056$ *
p<.05,**
p<.01

Table 4

Summary of unstandardized estimates and standard errors for path models

	% Days Abstinent		Drinks per Drinking Day	
	Estimate	SE	Estimate	SE
Pre-Approach→Post-Approach	.44**	.12	.39**	.12
Pre-Avoidance→Post-Avoidance	.36**	.08	.35**	.08
Pre-Drinking→Post-Drinking	.45**	.12	.13*	.05
Post-Approach→Post Drinking	-7.72**	1.81	.56**	.10
Post-Avoidance→Post Drinking	1.41	2.20	-.02	.14
Pre-Approach↔Pre-Avoidance	5.52**	.50	-1.59**	.50
Pre-Approach↔Pre-Drinking	-14.20*	6.27	1.97*	.90
Pre-Avoidance↔Pre-Drinking	5.52	6.52	-.88	.94
Post-Approach↔Post-Avoidance ^a	-.77*	.36	-.84*	.40

^aCorrelation among residuals