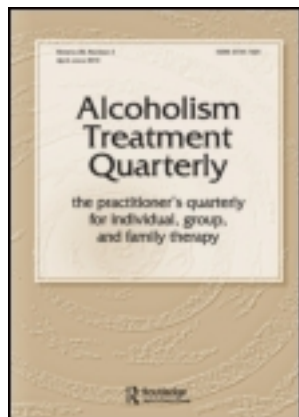


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Interpersonal Climate of 12-Step Groups Predicts Reductions in Alcohol Use

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Research has shown that increases in the size of abstinence-based social networks helps explain the association between 12-Step attendance and increased abstinence. This study investigated whether the quality of social interaction in 12-Step groups also predicts reduced substance use. Participants reported their perceptions of engagedness, avoidance, and conflict in their 12-Step groups and their substance use in four assessments. Results showed that perceptions of group engagedness, but not avoidance or conflict, decreased over time. Despite this, engagedness predicted increased 12-Step-related behavior and decreased alcohol use. Findings suggest that positive group interaction plays an important role in 12-Step affiliates' recovery efforts.

KEYWORDS 12-Step, Alcoholics Anonymous, group climate, abstinence-based social network

Twelve-step programs are the most popular community-based resource for recovery from alcohol and substance use problems in the United States (Kelly, Yeterian, & Myers, 2008). Prospective studies and meta-analytic reviews have shown that 12-Step attendance is predictive of increased alcohol abstinence (Kelly, Stout, Zywiak, & Schneider, 2006; Moos & Moos, 2006; Tonigan & Rice, 2010), and it is also becoming clear that 12-Step participation is associated with increased abstinence from illicit drugs (Carroll,

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Nich, Ball, McCance, Frankforter, & Rounsaville, 2000; Gossop, Stewart, & Marsden, 2007; Timko, DeBenedetti, & Billow, 2006; Timko & Sempel, 2004; Toumbourou, Hamilton, U'Ren, Stevens-Jones, & Storey, 2002; Weiss *et al.*, 2005; Withbrodt & Kaskutas, 2005; Worley *et al.*, 2008). Considering the strong evidence linking 12-Step involvement with reductions in alcohol and drug use, researchers are now investigating the processes and mechanisms responsible for 12-Step-related benefit (e.g., Kelly, Stout, Magill, & Tonigan, 2011; Kelly, Stout, Magill, Tonigan, Pagano, 2011; Tonigan, Rynes, Toscova, & Hagler, 2013).

To date, five studies have reported that abstinence-based social networks of 12-Step members explain, in part, the salutary effects of 12-Step attendance (Bond, Kaskutas, & Weisner, 2003; Humphreys, Mankowski, Moos, & Finney, 1999; Kaskutas, Bond & Humphreys, 2002; Kelly, Stout, Magill, & Tonigan, 2011; Laudet, Cleland, Magura, Vogel, & Knight, 2004). In general, these studies report that 12-Step attendance is associated with two parallel processes in 12-Step members' social networks: increases in the number of persons supporting abstinence and reductions in prodrinking individuals. Although there is some debate regarding the relative benefit of these two processes in accounting for abstinence, collectively they highlight the underlying importance of interpersonal relationships for 12-Step affiliates. Oddly, only three studies have gone beyond simply counting abstinent and nonabstinent individuals in the social networks of 12-Step members to assess what qualities of the abstinence-based social network might help explain the benefits of 12-Step participation. These studies investigated 12-Step members' perceptions of social interactions in 12-Step meetings and how such perceptions influenced members' 12-Step-relevant behaviors and alcohol use (Montgomery, Miller, & Tonigan, 1993; Tonigan, Ashcroft & Miller, 1995; Rice & Tonigan, 2011). Given that 12-Step meetings are an essential social component of 12-Step programs, the lack of research on social dynamics in these meetings is surprising. Indeed, Alcoholics Anonymous' (AA's) own literature states that "the entire structure of AA depends upon the participation and conscience of the individual groups, and how each of these groups conducts its affairs has a ripple effect on AA everywhere" (AA, 2005, p. 10).

Of the three studies that have directly evaluated 12-Step group social dynamics, two examined differences between 12-Step groups in the quality of their social climate and whether these differences were related to 12-Step-relevant behavior (Montgomery *et al.*, 1993; Tonigan *et al.*, 1995), and one examined whether 12-Step group social dynamics predicted later abstinence from alcohol (Rice & Tonigan, 2011). In the first study, Montgomery *et al.* (1993) compared ratings on the eight subscales of the Group Environment Scale (GES; Moos, 1986) across four AA groups. These researchers reported that members of the four AA groups rated their respective groups differently on the extent to which their groups were cohesive and aggressive. Of note, impressions of social cohesion and aggressiveness were inversely

related such that less cohesive groups were judged by members to be more aggressive. Tonigan et al. (1995) extended this work by demonstrating that impressions of AA group social interactions were associated with the extent to which the 12 Steps were discussed in AA meetings. Here, AA groups judged by members to be more supportive and cohesive discussed the 12 Steps more frequently relative to less cohesive and supportive AA groups. Only one study has evaluated whether 12-Step social group dynamics are prospectively associated with abstinence (Rice & Tonigan, 2011). This study used the GES to measure participants' perceptions of group cohesion in the 12-Step meeting they attended most frequently. Results showed that perceptions of 12-Step group cohesion in months 4 to 6 of the study significantly predicted a greater proportion of days that members were abstinent from alcohol during months 10 to 12 after statistically adjusting for AA attendance during months 7 to 9. Thus, the level of cohesion in the most frequently attended 12-Step group prospectively predicted increased abstinence from alcohol even after controlling for overall 12-Step meeting attendance. In sum, research on 12-Step group cohesiveness suggests that it is associated with increased practice of 12-Step principles and increased abstinence from alcohol.

Group psychotherapy research has also found group cohesion to be associated with significant therapeutic gains. Braaten (1989), for example, found greater therapeutic gains among members' target complaints when members perceived their group to be highly engaged and to have low levels of avoidance early in therapy. Likewise, Yalom, Houts, and Zimerberg (1967) and Budman, Soldz, Demby, and Feldstein (1989) found that impressions of group cohesion were significantly and positively associated with therapeutic gains, including psychological symptom reduction, improved day-to-day functioning, and improvements in interpersonal relationships and self-esteem. Finally, Kivlighan and Lilly (1997) found that group engagedness was significantly associated with therapeutic gains, but not in a linear fashion. Specifically, ratings of group engagedness that went from high to low to high from early to late in the course of group therapy was associated with greater therapeutic gains than other trajectories of group engagedness. A quadratic low-high-low pattern of conflict and a cubic high-low-high-low pattern of avoidance were also associated with improvements in members' target complaints.

Although general agreement across different literatures is encouraging, a number of challenges have yet to be overcome in terms of understanding 12-Step social interactions and how such processes are associated with abstinence. Foremost, the fundamental question has yet to be addressed about how, if at all, impressions of 12-Step group social interactions change over time, and how such changes are mobilized. Work by Kivlighan and Lilly (1997) suggests that this may be an important consideration. Thus far, investigations have largely treated impressions of 12-Step social interactions as

static variables, an assumption that does not square with clinical knowledge about the 12-Step affiliation process. Indeed, with one exception, investigations of 12-Step member impressions of AA group social climate have used cross-sectional designs. As a result, it is unclear whether perceived climate of AA groups predicts increased discussion and practice of the 12 Steps or whether increased 12-Step practices predict later perceptions of group climate. Finally, though it has been demonstrated that impressions of 12-Step group cohesiveness may predict increased abstinence, the behaviors accounting for this association have yet to be investigated.

The purpose of this study is to address some of these limitations to gain a better understanding of the role that 12-Step group social climate plays in predicting 12-Step-related behaviors and alcohol and drug use. We have three specific aims. First, we test how perceptions of the social interactions of 12-Step groups may change over time. Second, using a prospective lagged design, we evaluate whether changes in 12-Step group social climate over time are moderated by the severity of participants' dependence on alcohol or by the frequency with which they attend their 12-Step home group. Third, we examine whether 12-Step group climate is prospectively associated with self-reports of 12-Step-relevant behaviors and abstinence from alcohol and drugs.

METHOD

Participants

Participants were 130 adults recruited from community-based AA clubs ($n = 27$), substance abuse treatment programs ($n = 66$), and via advertisement and word of mouth ($n = 33$). Recruitment source data were missing for four participants. To ensure that our results reflected the initial mobilization and change processes of participants seeking recovery through 12-Step participation, we excluded individuals who reported having more than 16 weeks of lifetime AA exposure and individuals who reported that they successfully achieved abstinence from alcohol for 12 months or longer in the past. To be included, participants had to qualify for an alcohol abuse or dependence diagnosis as defined by the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)*; American Psychiatric Association [APA], 2000), have attended at least one AA meeting in the 90 days prior to baseline and have used alcohol in the previous three months. We excluded participants who qualified for a *DSM-IV* psychotic disorder, but did not exclude participants with current diagnoses of abuse or dependence on substances other than alcohol. This was an assessment-only study, and thus study participation did not involve receiving treatment for alcohol and drug use problems. However, we did not prohibit participants from attending formal treatment, and

research assistants provided participants with referral to professional alcohol and drug treatment when the participant requested such information or when the research assistant deemed it necessary to provide a referral. Overall, 86.7% of participants attended at least one session of formal substance abuse treatment while enrolled in this study.

On average, participants were 38.65 ($SD = 9.60$) years old, 53.8% ($n = 70$) were men, 78.5% ($n = 102$) were either single or divorced, and 21.5% ($n = 28$) were either married or cohabiting. Almost one half of participants (43.1%, $n = 56$) were Hispanic, 35.4% ($n = 46$) were non-Hispanic White, 15.4% ($n = 20$) were American Indian or Alaskan Native, 2.3% ($n = 3$) were African American or Black, and 3.8% ($n = 5$) did not specify their ethnicity. Participants had an average of 12.48 ($SD = 3.04$) years of education and most 66.9% ($n = 87$) were unemployed.

Procedures

At the beginning of each study interview, trained research assistants obtained informed consent from all participants and administered breathalyzers. If participants' blood alcohol concentration exceeded .05, research assistants ended and rescheduled the interview. The baseline assessment battery included 12 self-report questionnaires, three semistructured interviews, and urine toxicology screens for four classes of illicit drugs. These interviews took approximately 2.5 hours to complete. Participants completed follow-up interviews at 3, 6, and 9 months postbaseline. These interviews were identical to the baseline interview except that they did not include a demographic questionnaire or a Structured Clinical Interview for DSM-IV Alcohol Abuse, Alcohol Dependence, and Psychotic Disorders (SCID-I/P; First, Spitzer, Gibbon, & Williams, 2002), and thus took 1.5 hours to complete. Participants received \$50 for each completed interview. All procedures and assessments were approved by the institutional review board at the University of New Mexico (UNM Protocol #27147).

All participants completed baseline interviews in person, and research assistants strongly encouraged them to also complete their follow-up interviews in person. Follow-up interviews were completed over the telephone or at the home of the participant when necessary. Following procedures developed by the Project MATCH Research Group (1997, 1998), if participants missed an interview but were successfully interviewed at a later follow-up point then alcohol and drug use data were reconstructed for the missed interview. At 3 months, 96 participants (74%) were interviewed in person, and one participant was interviewed by telephone (.08%). Twenty-one participants reconstructed the 3-month interview at a later assessment (16%) resulting in complete alcohol and drug use data at 3 months for 118 (91%) participants. At 6 months, 95 in-person interviews (73%) and five telephone interviews were completed (4%). Fourteen participants (11%)

reconstructed 6-month data at the 9-month interview resulting in complete data on 114 (88%) of the participants at the 6-month interview. At the 9-month interview 113 (87%) participants were interviewed, 106 (82%) in person and 7 (5%) by telephone.

Measures

Form 90. The Form 90 (Miller, 1996) is a semistructured interview that includes calendars and memory prompts designed to help participants remember their day-to-day alcohol consumption. This study adapted it to also assess participants' attendance of 12-Step meetings. Research assistants conducted Form 90 interviews at each assessment point in the study to assess participants' alcohol use and their 12-Step attendance on each day in the 3 months prior to baseline and on each day between the 3-, 6-, and 9-month assessment points. Previous studies have demonstrated that the Form 90 has satisfactory reliability for measuring number of days on which participants abstained from alcohol use ($r = .79$ for outpatients and $r = .97$ for aftercare patients) and days on which they engaged in heavy alcohol use, $r = .96$ for outpatients and $r = .97$ for aftercare patients (Tonigan, Miller, & Brown, 1997).

Form 90 data were used to calculate three specific variables. We calculated proportion of days abstinent from alcohol (PDA) by dividing the number of days the participant was abstinent from alcohol in the assessment period by the total number of days in that period. Drinks per drinking day were calculated by dividing the number of drinks consumed per drinking day by the number of drinking days in a period. Finally, the proportion of 12-Step attendance days were calculated by dividing the number of days on which the participant attended at least one 12-Step meeting by the number of days in the assessment period.

iCassette Drug Screen-4 Panel Test. Urinalyses were conducted at the baseline and 9-month follow-up assessments using the iCassette Drug Screen-4 Panel Test (Instant Technologies, 2002). This panel test measures use of cocaine, marijuana, opiates, and amphetamines. In cases where participants reported no recent drug use but obtained a positive urinalysis result, research assistants assessed whether the participant was taking a prescribed medication (i.e., methadone) that may have caused a positive reading. When this was the case, the participants' self-report data was used instead of their urinalysis result as the final measure of drug use. The outcome measure of drug use in this study was a binary yes/no measure of abstinence from drugs at the 9-month follow-up that indicated whether the participant obtained a positive result on at least one of the four classes of drugs assessed in the urinalysis.

Group Climate Questionnaire-Short Form. At each measurement point, participants were asked to select one of the 12-Step groups they had attended

in the past 90 days and to rate the climate of this group using the Group Climate Questionnaire-Short Form (GCQ-S; MacKenzie, 1983). The GCQ-S is a self-report instrument designed to measure individuals' perceptions of the atmosphere of therapy groups. It contains 12 items that participants rate using 7-point Likert-type scales in which 1 = *not at all* and 7 = *extremely*. Factor analyses have shown that the GCQ-S has three underlying latent factors that represent the degree to which the rated group is (1) engaged, (2) avoidant, and (3) conflictual (MacKenzie, 1983, 1990). Further research has shown that there is high internal consistency among the items that make up each of these factors, with alpha coefficients for each factor ranging from .88 to .94 (Kivlighan & Goldfine, 1991). Thus, researchers commonly divide the GCQ-S into Engaged, Avoidant, and Conflict subscales (e.g., Kivlighan & Lilly, 1997).

This study used participants' scores on each GCQ-S subscale to measure their perceptions of the interpersonal climate of their index 12-Step group. The Engaged subscale measures how cohesive and actively participatory the group is; the Avoidant subscale measures the degree to which the group avoids discussion of group problems or conflict; and the Conflict subscale measures friction, tension, and interpersonal distance within the group (MacKenzie, 1983).

General AA Tools of Recovery questionnaire. The General AA Tools of Recovery (GAATOR) questionnaire (Montgomery, Miller, & Tonigan, 1995) was developed to measure individuals' 12-Step relevant behaviors and beliefs. It contains 24 self-report items that participants rate on a 4-point scale (1 = *definitely false*, 4 = *definitely true*). Total scores range from 24 to 96, with higher scores indicating greater engagement in 12-Step-related behaviors and belief in 12-Step principles. Studies have shown that total scores on the GAATOR have good internal consistency, with Cronbach's α s > .80 (Kelly, Myers, & Brown, 2000; Montgomery et al., 1995). Recent research has also shown that the GAATOR may be a more sensitive measure of 12-Step relevant behaviors and beliefs than other self-report questionnaires such as the Alcoholics Anonymous Inventory (Greenfield & Tonigan, 2012; Tonigan, Connors, & Miller, 1996).

Alcohol Dependence Scale. The Alcohol Dependence Scale (ADS; Horn, Skinner, Wanberg, & Foster, 1984; Skinner & Allen, 1982; Skinner & Horn, 1984) is a 25-item multiple-choice questionnaire that assesses symptoms of alcohol dependence in the past 12 months. Total possible scores on the ADS range from 0 to 47 with greater numbers indicating greater severity of alcohol dependence. The ADS manual suggests that scores from 1 to 13 reflect a low level of alcohol dependence, scores from 14 to 21 reflect an intermediate level of alcohol dependence, scores from 22 to 30 reflect a substantial level of alcohol dependence, and scores from 31 to 47 reflect severe alcohol dependence (Horn et al., 1984). Research has shown that the internal consistency of ADS scores is 0.92. In addition, comparisons of

ADS scores to self-reports of drinking frequency, duration of alcohol use disorders, and level of alcohol craving suggest that ADS scores have high concurrent and convergent validity (Doyle & Donovan, 2009; Hodgins & Lightfoot, 1989; Kivlighan, Sher, & Donovan, 1989).

RESULTS

Table 1 shows participants' alcohol and substance use and level of 12-Step participation over 12 months: from the baseline assessment that evaluated substance use in the 3 months prior to intake to the 9-month follow-up. On average, participants reported that they were abstinent on 56% ($SD = .31$) of the 90 days prior to the baseline assessment. Urine screen data indicated that 59.2% of participants were abstinent from drugs at baseline. Paired t tests comparing participants' alcohol use at baseline to their use at the 9-month follow-up point indicated that percent of abstinent days increased about 16%, $t(112) = 5.33$, $p < .0001$, and drinks per drinking day (DPDD) significantly decreased, $t(112) = 5.90$, $p < .0001$; $d = -.61$. A Fisher's exact test showed that the number of participants abstinent from alcohol at baseline ($n = 0$) did not significantly differ from the number of abstinent participants at 9 months ($n = 29$), $p = .13$. However, the number of participants abstinent from drugs at baseline ($n = 77$) was significantly less than the number of participants abstinent from drugs at 9 months ($n = 97$, $p < .001$).

At each assessment point, most participants reported that they attended at least one 12-Step meeting (98.5%, 81.5%, 81.5%, and 79.2% at baseline, 3-, 6-, and 9-month measurements respectively) and, on average, they attended 12-Step meetings on 20.4% of days ($SD = 26\%$) in the 12 months of the study. Participants' average baseline GAATOR score was 64.43 ($SD = 12.31$) and this score did not change significantly throughout the study ($b = -.29$, $SE = .44$, $p = .52$) suggesting that participants maintained a moderately high commitment to working the 12 steps during the year they participated in the study. On average, participants attended formal alcohol or substance abuse treatment on 10% ($SD = .18$) of days throughout the study.

Change Over Time in 12-Step Attendance and Perceptions of Interpersonal Group Climate

Table 1 describes the frequency of participants' 12-Step meeting attendance and their ratings of the interpersonal climate of their index 12-Step groups. To test whether these variables changed significantly over time, we conducted four unconditional multilevel growth models. Each evaluated change over time in either 12-Step attendance or the engagedness, avoidance, or conflict present in the index 12-Step groups by regressing these variables on the

TABLE 1 Sample Alcohol and Drug Use, 12-Step Attendance, and Treatment Participation: Intake through 9 Months

	Months				Confidence interval and <i>d</i> (pre-post)
	Intake	0-3	4-6	7-9	
Substance use					
% abstinent (alcohol only)	0	17.7	21.5	22.3	[0, 29]
Proportion of days abstinent from alcohol, <i>M</i> (<i>SD</i>)	0.56 (0.31)	0.72 (0.32)	0.74 (0.30)	0.72 (0.32)	0.51
Drinks per drinking day, <i>M</i> (<i>SD</i>)	14.02 (9.13)	9.67 (10.78)	8.84 (9.05)	8.60 (8.80)	-0.60
Proportion of days abstinent from drugs, <i>M</i> (<i>SD</i>)	0.27 (0.37)	0.15 (0.28)	0.13 (0.28)	0.13 (0.27)	0.43
12-Step and treatment measures					
Proportion 12-Step days, <i>M</i> (<i>SD</i>)	0.17 (0.20)	0.24 (0.31)	0.23 (0.29)	0.18 (0.24)	0.05
% attending 12-Step programs	98.5	81.5	81.5	79.2	[127, 102]
% sponsored	49.2	35.4	37.7	39.2	[63, 51]
Group Climate Questionnaire, Engaged Scale score, <i>M</i> (<i>SD</i>)	4.82 (0.89)	4.91 (0.78)	4.65 (1.03)	4.56 (0.90)	-0.29
Group Climate Questionnaire, Conflict Scale score, <i>M</i> (<i>SD</i>)	2.66 (1.09)	2.89 (1.15)	2.72 (1.04)	2.87 (1.14)	0.19
Group Climate Questionnaire, Avoidant Scale score, <i>M</i> (<i>SD</i>)	4.09 (1.04)	4.16 (0.87)	4.03 (0.93)	4.25 (0.97)	0.16
Proportion formal treatment days	0.07 (0.14)	0.12 (0.19)	0.11 (0.20)	0.09 (0.17)	0.13
% attending formal treatment	59.2	67.7	63.8	61.5	[76, 80]

Note. GAATOR = General Alcoholics Anonymous Tools of Recovery Scale.
N = 129. 95% confidence interval given for difference of the 9-month versus intake binary measures, Cohen's *d* given for difference of the 9-month versus intake continuous and proportion measures.

Level-1 predictors of intercept and time. Results showed that change over time occurred in only one variable, group engagedness, which decreased significantly from baseline to the 9-month follow up, $b = -.09$, $SE = .04$, $p = .01$. There was no change over time in frequency of 12-Step attendance ($b = .00$, $SE = .01$, $p = .75$), group avoidance ($b = .03$, $SE = .04$, $p = .39$) or group conflict ($b = .04$, $SE = .04$, $p = .33$).

Moderators of Change in Group Engagedness

We conducted two analyses to investigate whether severity of alcohol dependence or frequency of attendance of the index group moderated the decrease over time in perceived group engagedness. The first analysis was a multilevel model (MLM) that included intercept and time as Level-1 predictors, baseline score on the ADS as a Level-2 predictor and a cross-level interaction between ADS score and time. Results indicated that the interaction between baseline ADS score and time was not significantly associated with perceived engagedness of the index group, $b = -.00$, $SE = .00$, $p = .32$, indicating that change over time in perceived engagedness of the index group did not vary according to baseline severity of alcohol dependence. The second post-hoc analysis was an MLM that included intercept and time as Level-1 variables, a dichotomized indicator of frequency of index 12-Step group attendance (0 = *below median attendance rate*, 1 = *above median attendance rate*) as a time-varying Level-2 variable, and a cross-level interaction between frequency of index group attendance and time. Results showed that change over time in perceived engagedness of the index group was not moderated by frequency of attendance of the index group, $b = -.12$, $SE = .07$, $p = .10$.

Associations Between Group Climate and 12-Step-Related Behavior

We conducted three separate lagged MLMs to examine prospective associations between indicators of group climate (engagedness, avoidance, and conflict) and the degree to which participants reported completing behaviors prescribed in the 12 steps. These MLMs included total GAATOR scores at the 3-, 6-, and 9-month measurement points as the dependent variable, intercept as a Level-1 predictor, and scores on either the Engaged, Avoidance, or Conflict subscales of the GCQ as Level-2 predictors. Results from the first analysis showed that scores on the Engaged subscale predicted significant increases in GAATOR scores (e.g., self-reported completion of 12-Step-relevant behaviors), $b = 2.23$, $SE = .75$, $p < .01$. However, results from the second and third analyses showed that scores on the Conflict and Avoidance subscales were unrelated to GAATOR scores, $b = .56$, $SE = .66$, $p = .39$ and $b = 1.18$, $SE = .72$, $p = .10$, respectively.

Associations Between Interpersonal Group Climate and Alcohol and Drug Use

To test whether perceived index group climate predicted later alcohol use we conducted six separate lagged MLMs, each of which regressed either PDA or DPDD at 3-month, 6-month, and 9-month measurements on ratings of either group engagedness, conflict, or avoidance at baseline, 3-month, and 6-month measurements. In each of these analyses we entered frequency of 12-Step group attendance at baseline, 3 months, and 6 months and baseline level of alcohol use (either PDA or DPDD) as Level-2 control variables. Results of these MLMs are shown in Tables 2 and 3. Our first lagged MLM showed that index group engagedness predicted marginal increases in PDA ($b = .03$, $SE = .02$, $p = .052$) and predicted significant decreases in DPDD ($b = -1.14$, $SE = .56$, $p < .05$). However, group conflict and avoidance were not associated with either PDA ($b = .01$, $SE = .02$, $p = .65$; and $b = .01$, $SE = .02$, $p = .53$, respectively) or DPDD ($b = -.53$, $SE = .48$, $p = .27$ and $b = -.46$, $SE = .53$, $p = .39$, respectively). Without controlling for frequency of 12-Step attendance, perceived group engagedness predicted significant increases in PDA, $b = .04$, $SE = .02$, $p = .04$.

Findings from six hierarchical logistic regressions showed that all indicators of group climate at the 3- and 6-month follow-up points were unrelated to abstinence from drugs at the 9-month follow-up. In these analyses we

TABLE 2 Prospective Lagged Multilevel Analyses of Whether Interpersonal Climate of the Index 12-Step Group Predicted Proportion Days Abstinent from Alcohol at 3, 6, and 9 Months

	<i>b</i>	<i>SE b</i>
Group engagedness at baseline, 3, and 6 months predicting proportion days abstinent		
Constant	.74**	.02
Proportion of days attending 12-Step meetings at baseline, 3, and 6-months	.14*	.06
Proportion of days abstinent from alcohol at baseline	.29**	.07
Perceived group engagedness	.04†	.02
Group conflict at baseline, 3, and 6 months predicting proportion days abstinent		
Constant	.74**	.02
Proportion of days attending 12-Step meetings at baseline, 3, and 6-months	.16*	.06
Proportion of days abstinent from alcohol at baseline	.31**	.07
Perceived group conflict	.01	.02
Group avoidance at baseline, 3, and 6 months predicting proportion days abstinent		
Constant	.74**	.02
Proportion of days attending 12-Step meetings at baseline, 3, and 6-months	.16*	.06
Proportion of days abstinent from alcohol at baseline	.30**	.07
Perceived group avoidance	.01	.02

Note. † $p < .06$, * $p < .05$, ** $p \leq .001$.

TABLE 3 Prospective Lagged Multilevel Analyses of Whether Interpersonal Climate of the Index 12-Step Group Predicted Drinks per Drinking Day at 3, 6, and 9 Months

	<i>b</i>	<i>SE b</i>
Group engagedness at baseline, 3, and 6 months predicting drinks per drinking day		
Constant	9.21**	.62
Proportion of days attending 12-Step meetings at baseline, 3, and 6 months	−6.92**	1.94
Drinks per drinking day at baseline	.49**	.07
Perceived group engagedness	−1.14*	.56
Group conflict at baseline, 3, and 6 months predicting drinks per drinking day		
Constant	9.26**	.62
Proportion of days attending 12-Step meetings at baseline, 3, and 6 months	−7.57**	1.95
Drinks per drinking day at baseline	.49**	.07
Perceived group conflict	−.53	.48
Group avoidance at baseline, 3, and 6 months predicting drinks per drinking day		
Constant	9.25**	.63
Proportion of days attending 12-Step meetings at baseline, 3, and 6 months	−7.43**	1.93
Drinks per drinking day at baseline	.49**	.07
Perceived group avoidance	−.46	.53

Note. * $p < .05$, ** $p \leq .001$.

entered predictor variables in two steps; in the first we entered baseline urinalysis results and frequency of 12-Step group attendance at 3 months or 6 months as control variables, and in the second, we entered index group engagedness, conflict, and avoidance at the 3-month or 6-month measurements as predictor variables. The dependent variable in all analyses consisted of drug urinalysis results at the 9-month measurement. Results from the first two analyses showed that index group engagedness at both 3 months and 6 months were unrelated to urine drug screen results at 9 months, $b = -.12$, $SE = .30$, $p = .69$ and $b = .14$, $SE = .25$, $p = .56$, respectively. Similarly, group conflict at the 3- and 6-month follow-up points did not predict abstinence from drugs at 9 months ($b = .12$, $SE = .21$, $p = .60$ and $b = -.01$, $SE = .23$, $p = .97$, respectively) and group avoidance at the 3- and 6-month follow-up points did not predict abstinence from drugs at the 9-month measurement point, $b = -.10$, $SE = .27$, $p = .71$ and $b = -.32$, $SE = .28$, $p = .24$, respectively. In all analyses, the 12-Step attendance covariate was not associated with urine screen results (all $p \geq .59$) and in all analyses except two negative baseline urine screens significantly predicted a greater likelihood of negative urinalysis results at 9 months at $p \leq .04$. The two exceptions were, first, in the analysis of group engagedness at 6 months, where the baseline urine covariate was only marginally significant (odds ratio [OR] = 2.55, $p = .06$) and second, in the analysis of group conflict at

6 months, where urinalysis at baseline was an insignificant predictor of urine results at 9 months, $OR = 2.38, p = .09$.

DISCUSSION

The purpose of this study was to examine changes over time in 12-Step affiliates' perceptions of the interpersonal social climate of their 12-Step groups and whether ratings of group climate predicted 12-Step related behavior, alcohol use, and drug use. Results indicated that perceptions of the degree to which 12-Step groups were engaged decreased significantly over 12 months, but ratings of group avoidance and conflict did not change. Despite the decrease in perceptions of 12-Step group engagedness, these perceptions predicted increases in 12-Step-related behavior and beliefs, as well as marginal increases in PDA and significant decreases in DPDD. Group avoidance and conflict did not predict 12-Step-relevant behavior, PDA, or DPDD and all measures of group climate at 3- and 6-month follow-ups were unrelated to abstinence from drugs at the 9-month follow-up.

Findings contribute important information regarding the role that 12-Step group cohesion plays in 12-Step affiliates' abstinence from alcohol and practice of 12-Step principles. Arguably, the 12-Step group is one of the most important social groups to 12-Step affiliates. In group meetings, members are given the opportunity to share intimate personal information about their struggles with alcoholism and substance abuse, and difficulties and successes with sobriety knowing that their identity and information will be kept confidential (AA, 2005). Twelve-step programs consider the social support provided in 12-Step meetings important to maintaining abstinence. Alcoholics Anonymous' own literature claims that "through sharing . . . sober lives [can] be enriched beyond measure" (AA, 1983, p. 7) and the

ability to stay away from alcohol depends on maintaining physical, mental, and spiritual health. This can [be] achieved by going to meetings regularly and putting into practice what [is] learned there . . . it helps to stay sober if [one] help[s] other alcoholics. (AA, 1980, p. 4)

The findings from this study support these ideas, showing that increased disclosure of sensitive information and active engagement in reasoning things out (e.g., group engagedness) in 12-Step groups predicts significant decreases in drinking intensity and marginal increases in days abstinent from alcohol. These effects occurred even after analyses controlled for frequency of 12-Step group attendance suggesting that positive group process may contribute significantly to the overall effect that 12-Step group involvement has on abstinence outcomes.

Theorists and researchers have described cohesion in group therapy as the analogue to the relationship in individual therapy (Budman et al.,

1989; Kivlighan & Lilly, 1997; Yalom, 1995). Indeed, Yalom (1995) defined *group cohesion* as “the condition of members feeling warmth and comfort in the group, feeling they belong, valuing the group and feeling, in turn, that they are valued and unconditionally accepted and supported by the other members” (p. 48). To the extent that this definition is accurate, group cohesion may deserve more attention in future studies of 12-Step and group approaches to substance abuse treatment. Establishing a secure, trusting, and nonjudgmental relationship is a key component of MI (Miller & Rollnick, 2012), one of the most well-established individual treatment models for alcohol and substance use disorders (cf. Burke, Arkowitz, & Menchola, 2003; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). Having a strong rapport with one’s client is thought to help decrease the client’s resistance to change and subsequently mobilize that client’s personal and social resources to make desired changes in his or her drinking. To the degree to which group cohesion is comparable to the relationship in individual therapy, it may be possible that a change process similar to the one that is seen in MI is responsible for the gains associated with group cohesion. Future research on the mechanisms of change associated with group cohesion would help clarify these ideas.

An alternative explanation for the gains in 12-Step related behavior and abstinence associated with group cohesion may come from social learning theory. One scale included in our measure of group cohesion assessed the extent to which group members “felt what was happening was important and there was a sense of participation” (MacKenzie, 1983). Many 12-Step group discussions revolve around how members incorporate the 12 Steps into their everyday lives and how they maintain their sobriety. If these 12-Step-relevant behaviors are deemed important, the participants may try to incorporate them into their own daily behavior. Thus, 12-Step group participation may set the stage for a social learning process whereby participants adopt 12-Step related behavior and strategies for maintaining abstinence that were discussed and deemed important in the 12-Step group (cf. Bandura, 1977).

Although study findings indicated that group cohesion predicted drinking and 12-Step behavior outcomes, group avoidance and conflict had no relation to study outcomes. These results contradicted findings from the more general group therapy literature (Braaten, 1989; Kivlighan & Lilly, 1997). One reason why group conflict may not have predicted participant outcome may have had to do with restricted range in this variable. Descriptive statistics indicated that at each measurement point, mean ratings of group conflict were always lower than 3 on a 7-point scale. Thus, most participants perceived that group conflict was not a salient occurrence in their 12-Step groups. This lack of saliency may have made group conflict irrelevant to participants’ outcomes. This study design may also have made it difficult to capture the associations between group conflict, avoidance, and

outcome. A previous study of interpersonal process therapy groups showed that group conflict and avoidance changed over time in a non-linear fashion (Kivlighan & Lilly, 1997). Specifically, group conflict was found to follow a low-high-low quadratic pattern from early to late therapy sessions and group avoidance followed a high-low-high-low cubic change trajectory. The current study, though longitudinal, had four measurement points (baseline and 3, 6, and 9-month follow-ups). Thus, we did not have sufficient data for reliably modeling anything other than linear change trajectories. It is possible that if future studies gather data on group climate on a weekly basis, they may be able to detect associations between group conflict, avoidance, and participant outcome that this study was unable to reveal.

There were some limitations to the current study. First, we had no observational measure of 12-Step group climate. Rather, results reflected only participants' perceptions of their 12-Step group atmosphere. It is possible that different results would be achieved from analyses of independent ratings of group processes (cf. McLeod & Weiss, 2005). Second, we did not ask participants to report on a particular group. Instead, they simply rated the group climate of the 12-Step meeting they attended most frequently in the previous 3 months. Thus, we do not know whether each participant rated the same group at all four measurement points and we do not know whether two or more different participants may have reported on the same group. Clearly, in future research these are problems that will need to be remedied. Future research that identifies the group that participants are reporting on may help to reveal interesting information regarding correlations between different individuals' reports of the same group and how individuals' ratings of the same group change over time. A third study limitation regards one of the study's eligibility criteria. While we excluded participants who reported more than 16 weeks of lifetime AA exposure, we did not assess the amount of experience participants had in other 12-Step groups (e.g., Narcotics Anonymous, Gamblers Anonymous). Thus, it is possible that some participants may have had more 12-Step experience than others, and these more experienced 12-Step affiliates would likely have different trajectories of change in 12-Step relevant behavior, drinking, or drug use than participants who were new to the 12-Step program.

In conclusion, results suggest that cohesion in 12-Step groups predicts significant decreases in drinking intensity, increases in 12-Step relevant behavior, and marginal increases in abstinence from alcohol. These findings occurred even after controlling for frequency of 12-Step group attendance, suggesting that a high amount of variance in 12-Step affiliates' drinking reductions and 12-Step related behavior is due to the degree of cohesion in members' home groups. There was no association between either group conflict or avoidance and participants' outcomes. However, these insignificant findings may have occurred because of the limited amount of conflict occurring in sampled 12-Step groups or because the study had too few longitudinal

measures of group conflict and avoidance to detect their associations with participant outcome. Study findings suggest several fruitful areas for future research. Perhaps most compelling would be studies using humanist (Rogers, 1951) or social learning (Bandura, 1977) principles to evaluate theory-based mechanisms of change that may underlie the association between group cohesion and abstinence.

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