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Treatment Response and Non-Response in CBT and Network Support for Alcohol Disorders: Targeted Mechanisms and Common Factors

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Abstract

Aims—To determine whether mechanisms of drinking behavior-change that are targeted by specific treatments mediate the effects of Packaged Cognitive-Behavior Therapy (PCBT) and Network Support (NS) on abstinence rates over 27 months.

Design—Secondary analysis of data from two Network Support Project randomized clinical trials (1, 2), in which participants were assigned to either a case management control treatment (Control) or NS treatment in trial 1, or to PCBT or NS Treatment in trial 2.

Setting—An outpatient substance abuse treatment site at a university medical center in the USA.

Participants—A total of 249 men and 154 women (N=403) with alcohol use disorder.

Measurements—The primary outcome was membership in a treatment responder class determined by growth mixture modeling (GMM) of monthly Proportion Days Abstinent (PDA) out to 27 months. Key predictors of responder class membership included network change variables, and changes in coping scores and self-efficacy.

Findings—GMM analyses indicated that a three-class solution provided the best fit to the data: a *treatment responder* class comprising over 50% of patients, a *late relapsing* class that showed posttreatment gains followed by a return to baseline drinking (12.7% of patients), and a *non-responder* class (32% of patients). Analyses indicated that treatment effects on responder class membership were moderated by baseline drinking ($p < .001$). PCBT effects were mediated by changes in coping scores ($p < .05$). NS treatment effects were also mediated by coping change, as well as by increases in self-efficacy and in number of abstinent friends ($p < .05$).

Conclusions—Long-term success in Packaged Cognitive Behavior Therapy and Network Support treatments for alcohol use disorder appears to be mediated by both general mechanisms (developing coping skills and self-efficacy) and treatment-targeted mechanisms (developing network strategies that emphasize social support and avoiding friends who drink).

Keywords

alcohol treatment; Network Support; coping skills; treatment mechanisms; common factors; cognitive-behavior therapy; self-efficacy

Declarations of competing interest: None

Clinical trial registration details: [ClinicalTrials.gov](https://clinicaltrials.gov) Numbers NCT00845208 & NCT01129804

Introduction

Psychosocial treatments for alcohol use disorder (AUD) seek to leverage specific mechanisms of behavior change to improve patient outcomes. The best known of these approaches (3, 4) is cognitive-behavioral treatment (CBT) and its variants (relapse prevention treatment, coping skills training), based on a cognitive–social learning model of addiction (5, 6). The goal is to reduce drinking and prevent relapse by training people to use cognitive, behavioral and affective regulatory skills to cope in high risk situations (7). Conceptually, this is an appealing approach, but the evidence for coping skills training is mixed.

Few studies have found that use of coping skills mediates the relationship between treatment and outcomes, even when CBT appeared to perform well (8, 9), though there are some exceptions (e.g., 10, and perhaps 11). In addition to finding only mixed support for the impact of skills training on outcomes, several studies have found that CBT was not superior to robust alternative treatments that did not focus on development of coping skills (12, 13). This was exemplified in Project MATCH (14, 15), and was also reported by Kadden et al. (16) and Morgenstern et al. (17).

Even when use of coping skills has mediated treatment effects, there is little evidence to indicate that coping is a *unique* mechanism of treatment. Other mechanisms may be at work across treatments, such as the support and structure provided by treatment per se, reduction in affective distress (18), and particularly abstinence self-efficacy (19, 20).

Whereas CBT seeks to directly change a person's behavior, Network Support (NS) Treatment seeks to change the person's environment. It does this by teaching them how to make their close social networks more supportive of abstinence and less supportive of drinking. Greater exposure to non-drinking models may increase a person's self-efficacy for abstinence, and support the use of effective coping skills.

In our first trial of Network Support treatment, NS yielded better outcomes than a Case Management control condition (21). NS treatment appeared to work partially through effects on social networks and coping skills, but abstinence self-efficacy was also an important contributor to treatment gains. In our second trial of Network Support (2), NS yielded better posttreatment results than a CBT alternative treatment, for both proportion of days abstinent and drinking consequences, but not for abstinence, heavy drinking days, and drinks per drinking day. NS treatment effects were mediated by abstinence self-efficacy and by pre-post changes in the proportion of non-drinkers in the close social network.

Findings of equivalence are by now familiar: treatments purportedly based on different models of promoting sobriety yield surprisingly similar results (see 13). Nevertheless, some evidence has emerged that targeted mechanisms may influence outcomes (22). Also well documented is the finding that a significant proportion of patients will not have good outcomes, regardless of treatment. What is not clear is the extent to which those who respond to treatment do so because of the mechanisms targeted by that treatment, or to common aspects of treatment (e.g., patient engagement, reduction in distress) that are said

by some to account for most treatment effects (23). A prime candidate for a common mechanism of action is abstinence self-efficacy, which emerges repeatedly as a predictor of good treatment outcomes in substance use research (19). The question is: Is there value in targeting specific presumed mechanisms of action?

One way to discover what may be occurring when treatment works is by examining treatment responders versus non-responders. The purpose of the current study was to determine what processes might be operating in CBT and Network Support treatment that contribute to the success of those who respond to each of them. To do this we combined patient data from our two clinical trials of Network Support treatment (1, 2, 21), in which patients were treated with Network Support, or a control condition: packaged cognitive-behavioral treatment (PCBT), or case management. Each treatment was delivered once a week for 12 weeks, and patients were followed for an additional two years. Growth mixture models (GMM), using levels of drinking recorded every month, were run on the combined sample, yielding classes of patients characterized as treatment responders and non-responders. Subsequent mediation analyses were used to determine the extent to which treatment-related processes accounted for membership in the responder category.

We had the following hypotheses: membership in a long-term responder class would be predicted by (1) changes in the particular mechanisms targeted by treatment, and/or (2) common treatment factors, such as engagement (e.g., attendance). That is, (a) success in PCBT would be mediated by increased use of coping skills, (b) treatment response in NS would be mediated by increases in adaptive social network variables (e.g., increase in number of abstinent friends, AA attendance), and (c) response in both treatments would also be mediated by increase in one or more common factors, such as abstinence self-efficacy, that are not specific to any treatment approach.

Method

Participants

Participants were 403 (249 men, 154 women) patients treated in one of two clinical trials for alcohol use disorder, and randomized either to a case management control treatment (in the first trial), Packaged Cognitive Behavioral Treatment (in the second trial) or Network Support (in both trials). Details regarding recruitment, and inclusion and exclusion criteria can be found in the reports from each trial (1, 2). Table 1 shows baseline characteristics and treatment-related variables for patients in each of the conditions. In both trials the follow-up rate at 27 months was approximately 80%. As seen in Table 1, the only significant difference between treatments or trials was educational level, which was slightly higher in Trial 2.

Measures and Instruments

A common set of instruments was used in both treatment trials, all with demonstrated reliability. Posttreatment assessments were administered every 3 months after the completion of the treatment period in each trial, from month 3 to month 27 (2 years past the posttreatment point), for a total of 10 data collection points including the baseline. In-person

assessments were conducted at months 3, 9, 15, 21 and 27. Assessments at months 6, 12, 18, and 24 were conducted by telephone.

Dependent variable—The primary dependent variable in this study was membership in a treatment responder class determined by statistical modeling of drinking data. Drinking data were collected using the Form-90 (24), a structured interview based on the time-line follow-back method (25), assessing drinking for each of the previous 90 days. Responder class membership in this study was based on Proportion Days Abstinent (PDA) in each 30 day period, starting from the 3 months prior to intake out to 27 months, for a total of 30 data points. PDA was used because it was the most sensitive to treatment differences in the two trials of Network Support.

Baseline characteristics—Demographic data collected included: age, sex, education, employment status, marital status, and racial/ethnic identification. Several variables were used to characterize dependence severity. The proportion of heavy drinking days (PDH; five drinks for men, four for women) during the 90 days prior to intake served as a measure of baseline drinking severity. Other measures of severity included the number of alcohol treatments received, the total negative drinking consequences score from the Drinkers Inventory of Consequences (DrInC; 26), and the Ethanol Dependence Syndrome Scale score (27).

Treatment adherence—Two variables were used to assess treatment adherence: treatment attendance (number of sessions attended, out of 12), and percent of skills practice (homework) assignments completed.

Treatment-related change: Network support variables—Network support for drinking and for abstinence were measured using modified versions of the Important People and Activities instrument (IPA; 28), a structured interview in which patients identify important people in their social network, the nature of the relationship with each person, their drinking behavior (frequency and quantity), and the person's behavior with respect to the patient's drinking (supportive or nonsupportive of drinking, or of abstinence). Based on results from our two trials, three IPA subscales were used in the present study: Social Support for Drinking (drinking status of, and degree of encouragement for drinking, by persons in the network); Behavioral Support for Abstinence (proportion of people in the network who were abstinent); and Number of Abstinent Friends (nondrinking persons with whom the participant had at least weekly contact). A related network change variable was number of AA meetings attended. For each variable a pre-post change score was computed to reflect effects of treatment.

Treatment-related change: Cognitive-social learning theory mechanisms – Coping skills and self-efficacy—Self-efficacy for abstinence was assessed using the Alcohol Abstinence Self-Efficacy Scale (AASE; 29). The Coping Strategies Scale (CSS; 8), based on the Processes of Change Questionnaire (PCQ; 30), is composed of 59 possible coping skills that may be used to remain abstinent (e.g., avoiding people who drink; seeking social support). Respondents rate the frequency of using specific skills in the previous 3 months. Although retrospective assessment of skills used is likely to be inaccurate, the CSS

has been employed extensively, and has demonstrated internal reliability ($\alpha=.95$) and predictive validity in our trials (2, 21). Pre-post scores were calculated for both the AASE and the CSS variables.

Treatment-related change: Affective distress—The Brief Symptom Inventory-18 total score (BSI-18; 31) was used to measure overall distress (anxiety, depression and somatization), which has been shown to increase risk of relapse (18, 32). The 19-item Social Interaction Anxiety Scale (SIAS; 33) was used to measure social anxiety, which is particularly important to the goals of Network Support treatment. Pre-post scores were calculated for each of these variables.

Treatments

Case Management Control (Control; n=69)—The manualized case management control treatment used in our first NS trial (1) was intended to provide an active treatment condition controlling for time, attention, and assessment intensity, but to offer no training in coping skills or social network building. The therapist and participant used a checklist to identify problems that could promote drinking, thereby developing goals for treatment (e.g., seeking a better job). After goals were selected, the participant and therapist identified community resources to address them. Attendance at AA was neither encouraged nor discouraged.

Packaged Cognitive-Behavioral Treatment (PCBT; n=97)—PCBT was used as an active, manualized comparison treatment in our second NS trial. It was designed to remediate deficits in skills for coping with interpersonal and intrapersonal antecedents to drinking, and was based on manuals developed for our previous clinical research (34). Attendance at AA was neither encouraged nor discouraged.

Network Support treatment (NS; n=237)—The NS treatment was intended to help the patient change his or her social support network to be more supportive of abstinence and less supportive of drinking. AA attendance was encouraged as a way to quickly engage patients in a supportive, abstinence-oriented social network. If a patient was opposed to attending AA, another formalized social network was explored (e.g., Rational Recovery), as well as informal networks devised by the patient. Other coping skills were not explicitly taught in NS.

Data Analysis

Analyses were conducted to detect subsets, or classes, of treatment “responders” or “non-responders” for the combined sample of patients in all treatments. The determination of classes was accomplished by grouping patients according to their trajectories of PDA over time using growth mixture modeling (GMM) (35). GMM analyses were conducted using MPlus version 8 (36), using maximum likelihood estimation and robust standard errors. The procedure uses all available data and provides a widely accepted method for dealing with missing data (37).

For these models, time was measured in months. PDA in each of the 30 months (from 3 months prior to intake out to 27 months) were used as the observed indicators in the models. Models comprising from 1 to 5 trajectory classes were evaluated. With over 400 patients and 30 data points per person in this dataset we had ample power for conducting GMM (38, 39).

The decision regarding the number of classes to be retained in the GMM was based in part on the Akaike information criterion (AIC), Bayesian information criterion (BIC), Lo-Mendell-Rubin (LMR) test, the bootstrapped likelihood ratio test (BLRT), and the entropy score (40). A solution was rejected if 2 or more of the trajectories were redundant, or if 1 or more classes contained fewer than 10% of the sample (41).

The GMM method allows the regression of class membership onto predictor variables, thus illustrating the contribution of various predictors to the trajectory-based class. The resulting parameter estimates are multinomial logistic regression coefficients. In addition to the testing of treatment mechanism variables, a number of moderator variables were also tested to account for extraneous variance. Nine independent risk models were evaluated: 1) Trial effects; 2) Treatment effects (two separate variables, effects coded as PCBT v. Control and NS v. Control); 3) demographics; 4) baseline severity; 5) treatment adherence; 6) social network pre-post change; 7) cognitive and behavioral change variables; 8) affective distress pre-post change; and 9) a combined model of all significant contributing variables, plus two theoretically important ones (number of abstinent friends, BSI distress).

Each variable domain was tested separately to minimize the number of variables in a single analysis. For each model analyzed, the Treatment Non-Responders class was used as the reference class. This was done to allow a clear comparison of those who responded to treatment with those who did not.

Once a GMM solution was reached, analyses were conducted to determine what variables might mediate treatment effects on responder class membership. The mediation analyses were conducted using Hayes's PROCESS procedure in SPSS with bootstrapped (5000 samples), bias-corrected confidence intervals for the parameter estimates and standard errors (42). In these analyses the binary responder class membership (i.e., Class 1 v Class 3, or Class 2 v Class 3) was regressed onto the effect-coded treatment variables, and on all of the potential mediators in each domain together (e.g., on coping change and self-efficacy change simultaneously). Tests for collinearity indicated that no variable in a domain correlated with another at greater than $r=.38$.

Results

Trajectory-Based Classes Based on PDA Over Time

The model-fit indices for models with 1 to 5 classes are shown in Table 2. In each condition, models with quadratic growth factors tended to fit the data best. Despite better fit statistics for the 4- and 5-class models, they included one or more classes containing fewer than 10% of cases, with highly overlapping trajectories. Therefore, a 3-class solution was adopted.

The initial unconstrained 3-class model for the PDA-based trajectories is shown in Figure 1. Class 1 was referred to as “Treatment Responders” and comprised almost 55% of cases. These were individuals who, at posttreatment through the 27 month follow-up, maintained 75–90% days abstinent. Class 2 patients, comprising about 13% of patients, were referred to as “Late Relapsers.” They initially reported increases in abstinence posttreatment but returned to more frequent drinking 12 to 15 months after treatment, and had returned to baseline levels of drinking by 21 months. Class 3 patients reported a slight increase in abstinent days during treatment, but by 9 months had returned to baseline drinking. These “Non-Responders” accounted for about 32% of cases.

Predictors of Response and Non-Response: Moderators and Treatment-Related Processes

Table 3 shows the results of the series of 3-class GMM analyses in which domains of variables are treated as predictors of responder class membership. For each analysis, Class 3 (Non-Responders) is treated as the reference class. As seen in the table, there was no effect on class membership of Trial. Both treatment effect variables were significant predictors, however, such that, relative to patients in the control condition, those in PCBT or NS were more likely to be members of Class 1. There were no significant treatment effects predicting membership in Class 2.

Of the moderators tested, none of the demographic variables predicted membership in Class 1 or Class 2. Attendance was a significant predictor of Class 1 membership, but became non-significant when analyzed in combination with other variables in the combined model (Model 9). Of the dependence severity variables, proportion heavy drinking days in the 90 days prior to treatment was a significant, and negative, predictor of membership both in Class 1 and Class 2. Those with less heavy drinking were more likely to be members of the Responder or Late Relapser classes. This variable was included as a covariate in the mediation analyses that follow.

Mediators of Treatment Effects on Class Membership: Determinants of Success in PCBT and NS

Table 4 summarizes the results of the mediation analyses involving PCBT relative to the control treatment. As seen in the table, the effects of PCBT on membership in Class 1 (Responders) were not mediated by treatment adherence variables, nor by changes in network support or emotional distress. Change in coping skills, however, was a mediator of PCBT in determining membership in Class 1. To a lesser extent coping skills also mediated effects of PCBT on membership in Class 2.

Table 5 shows the results of mediation analyses involving NS treatment. Significant mediators of NS effects on class membership included increases in both self-efficacy and coping skills scores. A significant mediator of membership in Class 1 was also increase in Number of Abstinent Friends in the social network.

Discussion

This study explored moderators and mechanisms of action in two psychosocial treatments by examining drinking trajectories from three months before intake through the 27 month

follow-up. The trajectories that emerged show both strengths and weaknesses of psychosocial treatments. Encouragingly, over half of the patient sample was characterized by 80% to 90% days abstinent during the two years following treatment. This result suggests that patients continue to exercise skills acquired during or after treatment, even when treatment does not specifically train skills. This certainly seemed to be the case in our Network Support treatment (e.g., 21); use of coping skills continued to increase out to 27 months even though many of these skills were never explicitly taught. One possibility is that NS participants continued to develop network strategies that emphasized social support and avoidance of drinking friends, skills that are tapped by the CSS. The adoption of new coping skills by successful patients is predicted by social learning theory (5, 6), but seldom documented.

Despite a large proportion of patients doing well, a sizable subsample, comprising about one-third of each sample, were virtual non-responders (or minimal responders). The patterns found here resemble two of those (responders and non-responders) found by Witkiewitz & Masyn (43) in the Relapse Replication and Extension Project (RREP; 44).

In general, treatment-related success seemed to be attributable to processes that have emerged previously, particularly coping skills and self-efficacy. When all patients were considered together, membership in the Responder class was determined by less pretreatment heavy drinking, and by pre-post increase in self-efficacy and reduction in distress (see Table 3, Model 9). When mediators of PCBT and Network Support treatment effects were examined, however, the results were somewhat different.

The only significant mediator of PCBT treatment on Responder class membership was increase in use of coping skills. Given the inconsistent findings in the literature regarding the importance of coping skills, this is a noteworthy finding that may in part be a function of focusing on treatment responders versus non-responders.

In the case of Network Support, increasing (a) the number of abstinent friends, (b) self-efficacy, and (c) use of coping skills distinguished those who succeeded in treatment from those who did not. The finding that the addition of non-drinking friends contributed to a successful trajectory, but AA attendance did not, is consistent with our earlier analyses (2), indicating that non-drinking peers were important, but they did not have to be found through AA.

We found that the subsample of patients who did not respond to treatment had the highest levels of baseline drinking. Depending on the study, these heavy drinkers may account for between 8% (e.g., 43) and 33% of a treatment sample. Intervening with this subset of non-responders may require additional efforts at problem identification and treatment.

The results presented here are consistent with other findings suggesting that in any treatment patients may find their own ways to manage their drinking (8), and/or take advantage of any credible strategies offered. In Network Support treatment, for example, we found that successful patients developed social networks that were more likely to model sober behavior and less likely to reinforce drinking. However, these patients also initiated the use of coping skills that were never taught in treatment. This sort of adaptation may also occur in

contingency management treatment, in which specific skills are often not taught (the only intervention being reinforcement for not drinking), but in which successful patients nevertheless acquire skills on their own, as seen with both gambling (45) and marijuana use disorders (46).

Finally, self-efficacy also plays a role in long-term outcome, irrespective of treatment delivered. Increases in self-efficacy are central to cognitive-behavioral theory, and may also be a common mechanism of any successful treatment (47), as well as a common final pathway to improved outcome.

The present study has limitations. First, the treatments studied here were delivered on an individual basis, with extensive follow-up assessments, which is far from common in the community. Additionally, the overall sample may not be representative of the treatment-seeking community, although it is quite comparable to, for example, the Project MATCH outpatient sample (14) in terms of demographics and treatment history.

In summary, this study has identified the value of non-targeted factors in the success of psychosocial treatment, as well as making a case for direct teaching of coping skills, and engaging patients in changing their social network. The remaining challenge is to determine which specific and/or general change mechanisms should be the treatment focus for each person. This may require a highly individualized approach to treatment.

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Figure 1.

PDA trajectory-based classes plotted derived from GMM analysis. The percentages shown refer to the percentage of patients who had membership in each of the classes. Dark lines show the mean PDA values for each trajectory for each time period. Gray broken lines show the estimated trajectories based on the GMM parameter estimates.

Baseline and Treatment-Related Characteristics (with Range) of Patients in Two Trials of Network Support Treatment for Alcohol Use Disorder (N=403).

Table 1

	Trial 1				Trial 2				Treatment Effect (<i>F</i> value, or χ^2 , <i>df</i> =3)	Trial 1 v Trial 2 (<i>t</i> value)	
	Control Treatment (<i>n</i> =69)		Network Support (<i>n</i> =141)		Packaged CBT (<i>n</i> =97)		Network Support (<i>n</i> =96)				
	M or %	SD	M or %	SD	M or %	SD	M or %	SD			
Demographics											
Age (18–82)	44.41	11.08	44.94	11.51	44.96	9.76	47.06	11.16	1.06	1.47	
Gender (% Male)	62.0		56.0		70.1		61.5		4.83	0.69	
Education in Years of School (7 – 17)	13.61	2.10	13.86	2.10	14.04	2.06	14.50	1.94	2.97*	2.36*	
Employed (% Full or Part Time)	78.3		68.1		82.5		70.1		6.93	0.64	
Marital (% Married or Cohabiting)	52.2		46.8		56.7		50.0		2.33	0.23	
Race/Ethnicity (% Caucasian)	89.9		84.4		92.8		92.7		5.93	3.67	
Severity at Intake											
Proportion Heavy Days in Last 90 (0 – 1.0)	0.54	0.31	0.64	0.28	0.61	.30	0.63	.29	1.44	0.78	
Alcohol Treatments Lifetime (0–20)	.94	1.30	1.18	1.83	.94	1.59	1.10	2.46	0.27	0.91	
DrInC Total Score (0 – 150)	94.94	19.03	95.71	18.31	99.58	19.92	97.08	21.21	1.30	0.40	
Ethanol Dep Syndrome (16 – 64)	36.79	8.98	37.66	7.90	37.77	9.01	38.31	8.47	0.45	0.59	
Change in Network Variables											
Beh. Support for Abstinence (Change: –.75 – 1.00)	0.04	0.30	0.06	0.31	0.02	0.25	0.07	0.22	0.28	0.11	
Social Support for Drinking (Change: –5.3 – 4.2)	–0.23	0.90	–0.11	0.99	0.30	1.34	–0.34	1.85	4.27**	1.24	
Number Abstinent Friends (Change: –6.0 – 5.0)	0.29	1.27	0.61	1.33	0.02	1.10	0.34	1.65	1.42	0.39	
AA Meetings Past 90 Days Pre-Post (Change: –30 – 90)	2.03	6.90	9.53	18.98	3.24	10.49	7.51	14.33	4.67**	–1.68	
Coping Score Pre-Post (Change: –0.87 – 2.58)	0.28	0.47	0.53	0.53	0.71	0.56	0.69	0.52	10.39***	2.00	
Self-Efficacy Pre-Post (Change: –96 – 136)	20.54	35.19	34.27	34.24	30.53	35.51	36.96	40.08	3.35*	0.64	
Change in Affective Distress											
Social Interaction Anxiety (Change: –43 – 40)	–3.82	8.72	–4.09	11.23	–3.44	9.06	–4.07	8.26	0.40	–0.71	
BSI Distress Pre-Post (Change: –53 – 24)	–6.19	10.49	–6.82	8.12	–10.07	15.32	–7.21	10.02	1.95	–0.30	

	Trial 1						Trial 2						Trial 1 v Trial 2 (<i>t</i> value)	
	Control Treatment (n=69)			Network Support (n=141)			Packaged CBT (n=97)			Network Support (n=96)				Treatment Effect (<i>F</i> value, or χ^2 , <i>df</i> =3)
	M or %	SD		M or %	SD		M or %	SD		M or %	SD			
Treatment Adherence														
# Treatment Sessions Attended (0–12)	8.83	4.08		8.09	4.53		7.58	4.71		7.43	4.82		1.52	–1.10
Homework Completion Rate % (0–100) ^b	--	--		64.02	41.02		57.78	36.93		56.34	32.62		1.43	–1.54

^a Treatment Effect compares Case Management, PCBT, and Network Support from Trial 1 and Network Support from Trial 2.

^b Treatment Effect for Homework Completion Rate does not include Case Management. *F*-test for this variable has *df*=2.

* $p > .05$;

** $p < .01$;

*** $p < .001$

-- No values. No homework was assigned in the Case Management treatment condition.

Table 2

Fit Indices for GMM Class Solutions for Proportion Days Abstinent Over Time.

Classes	Log Likelihood	AIC	BIC	Entropy	LMR	BLRT
2	1304.596	-2515.192	-2476.377	.89	148.179 ***	1228.038 ***
3	1401.143	-2698.287	-2655.343	.91	127.703	1335.163 ***
4 [†]	1492.650	-2829.295	-2824.227	.94	302.390	1336.414 ***
5 [†]	1472.011	-2820.021	-2768.820	.93	270.687 **	1337.203 ***

Note: AIC=Akaike Information Criterion; BIC=Bayesian Information Criterion (Sample Size Adjusted); LMR=Lo-Mendell-Rubin Test; BLRT=Bootstrapped Likelihood Ratio Test.

[†] For the 4- and 5-class solutions one or more of the classes contained less than 10% of the cases.** $p < .01$;*** $p < .001$.

Table 3

Summary of GMM Analyses on Patients in Two Clinical Trials (N=403). Values are Logistic Regression Coefficients. Class 1 (54.97%) was Labeled as Responders. Class 2 (12.7%) was Labeled as Late Relapsers. Reference Class (Class 3; 32.4%) was Labeled as Non-Responders.

Model #	Class 1				Class 2			
	B	se	t	OR	B	se	t	OR
1	Trial1 v. Trial 2							
	.0153	.0278	0.55	1.16	0.467	0.360	1.29	1.595
2	Treatment (PCBT v CaseM)							
	0.436	0.206	2.12*	1.55	0.146	0.198	0.74	1.157
	Treatment (NS v CaseM)							
	0.350	0.182	1.97*	1.43	0.144	0.225	0.64	1.154
3	Age (Years)							
	-0.001	0.012	-0.11	0.999	-0.013	0.016	-0.83	0.987
	Sex (Male=1; Female=2)							
	0.298	0.258	1.16	1.348	-0.342	0.344	-0.99	0.710
	Race (White=1, Non-White=2).							
	0.470	0.423	1.11	1.600	0.268	0.519	0.52	1.307
	Education (Years)							
	-0.091	0.064	-1.42	0.913	0.005	0.076	0.06	1.005
	Marital Status (No - Yes)							
	-0.178	0.273	-0.65	0.837	0.191	0.341	0.56	1.211
	Employment Status (No - Yes)							
	-0.119	0.315	-0.38	0.888	0.085	0.376	0.23	1.088
4	Proportion Heavy Days - Baseline							
	-2.144	0.477	-4.49***	0.117	-1.789	0.608	-2.94**	0.167
	# Alcohol Treatments Lifetime							
	0.033	0.110	0.30	1.033	0.007	0.120	0.06	1.007
	DrInC Score - Baseline							
	0.009	0.008	1.24	1.009	0.012	0.010	1.23	1.012
	Ethanol Dependence Syndrome Score							
	-0.001	0.016	-0.08	0.999	-0.010	0.023	-0.44	0.999
5	Treatment Attendance							
	0.088	0.033	2.64	1.092	0.052	0.039	1.44	1.059
	Homework Completion Rate							
	0.003	0.004	0.75	1.003	0.007	0.004	1.83	1.007
6	Behavioral Support for Abstinence (Change)							
	-0.220	0.598	-0.37	0.803	-0.017	0.711	-0.03	0.983
	Social Support for Drinking (Change)							
	-0.062	0.096	-0.64	0.939	0.126	0.133	0.95	1.134

Model #	Class 1				Class 2			
	B	se	t	OR	B	se	t	OR
Number Abstinent Friends in Network (Change)	0.174	0.113	1.53	1.190	0.166	0.126	1.32	1.181
AA Meetings (Change)	0.022	0.014	1.63	1.022	0.013	0.015	0.86	1.013
7 Self-Efficacy (Change)	0.015	0.004	3.78***	1.015	0.010	0.005	1.91 [†]	1.010
Coping Skills (Change)	0.522	0.250	2.09*	1.685	0.396	0.329	1.20	1.486
8 BSI Distress (Change)	-0.056	0.017	-3.24**	0.946	-0.040	0.022	-1.84 [†]	0.961
Social Interaction Anxiety (Change)	-0.008	0.015	-0.51	0.992	-0.708	0.181	-3.91***	0.493
9 Treatment (PCBT v CaseM)	0.067	0.256	0.26	1.069	0.490	0.301	1.63	1.632
Treatment (NS v CaseM)	0.098	0.202	0.49	1.103	0.049	0.266	0.17	1.046
Proportion Heavy Days - Baseline	-2.228	0.479	-4.65***	0.108	-1.810	0.639	-2.84**	0.164
Treatment Attendance	0.005	0.033	0.16	1.005	0.006	0.039	0.15	1.006
Number Abstinent Friends in Network (Change)	0.131	0.143	0.92	1.140	0.147	0.138	1.07	1.158
Self-Efficacy (Change)	0.010	0.004	2.55*	1.01	0.007	0.006	1.19	1.007
Coping Skills (Change)	0.382	0.307	1.25	1.465	0.244	0.429	0.57	1.276
BSI Distress (Change)	-0.044	0.016	-2.75**	0.957	-0.026	0.020	-1.31	0.974

Note:

[†]
 $p < .10$;*
 $p < .05$;**
 $p < .01$;***
 $p < .001$

Table 4

Summary of Mediation Analyses, PCBT v. Case Management

Mediator Variable	Responders v. Non-Responders									
	A Path			B Path			Indirect Effect			
	B	SE		B	SE		B	SE	z	Upper CI
Treatment Adherence										
Treatment Attendance	-0.558	0.394		0.093***	0.018		-0.052	0.041	-1.27	-0.165
Homework Completion Rate	-0.818	0.347		0.012**	0.003		-0.010	0.069	-0.14	-0.560
Network Support Measures										
Behavioral Support for Abstinence (Change)	-0.014	-0.024		0.012	0.570		-0.001	0.018	-0.01	-0.161
Social Support for Drinking (Change)	0.207	0.126		-0.063	0.110		-0.013	0.025	-0.52	-0.212
Number Abstinent Friends in Network (Change)	-0.160	0.149		0.185	0.129		-0.030	0.036	-0.83	-0.140
AA Meetings (Change)	-0.256	1.247		0.022	0.013		-0.006	0.026	-0.21	-0.078
Social Learning Theory Processes										
Self-Efficacy (Change)	4.580	3.565		0.017*	0.006		0.067	0.056	1.19	-0.022
Coping Skills (Change)	0.208***	0.049		0.916**	0.301		0.190	0.079	2.43*	0.069
Emotional Distress										
BSI Distress (Change)	-1.945	1.207		-0.058**	0.018		0.113	0.097	1.16	-0.040
Social Interaction Anxiety (Change)	0.187	0.871		0.001	0.017		0.001	0.015	0.01	-0.031
Late Relapsers v. Non-Responders										
Mediator Variable	A Path			B Path			Indirect Effect			
	B	SE		B	SE		B	SE	z	Upper CI
Treatment Adherence										
Treatment Attendance	-0.898	0.523		0.116**	0.039		-0.104	0.073	-1.42	-0.302
Homework Completion Rate	-2.174	6.374		0.015**	0.006		-0.053	0.103	-0.32	-0.291
Network Support Measures										
Behavioral Support for Abstinence (Change)	-0.035	0.037		0.325	0.689		-0.011	0.047	-0.24	-0.175

Mediator Variable	Responders v. Non-Responders										
Social Support for Drinking (Change)	0.316	0.173	0.029	0.149	0.009	0.061	0.15	-0.146	0.965		
Number Abstinent Friends in Network (Change)	-0.169	0.183	0.322	0.200	-0.054	0.084	-0.65	-0.300	0.063		
AA Meetings (Change)	0.292	1.455	0.020	0.017	0.006	0.058	0.10	-0.046	0.223		
Social Learning Theory Processes											
Self-Efficacy (Change)	4.928	4.720	0.017	0.006	0.085	0.102	0.84	-1.102	1.065		
Coping Skills (Change)	0.190**	0.067	0.917*	0.408	0.174	0.121	1.45 [†]	0.017	0.483		
Emotional Distress											
BSI Distress (Change)	-1.464	1.628	-0.047*	0.023	0.068	0.091	0.64	-0.141	0.359		
Social Interaction Anxiety (Change)	1.151	1.173	-0.005	0.022	-0.006	0.042	-0.14	-0.133	0.056		

Note: A-Path: Effect of Treatment Contrast on the mediator. B-path: Effect of mediator on outcome (Class Membership). Indirect effect: Portion of the effect of Treatment on Class membership that is accounted for by the mediator variable. Treatment was coded as Case Management=-1, PCBT or Network Support were coded as +1 according to the analysis.

[†] $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$

Table 5

Summary of Mediation Analyses. Network Support v. Case Management

Mediator Variable	Responders v. Non-Responders							
	A Path			B Path			Indirect Effect	
	B	SE		B	SE	B	SE	z
Treatment Adherence								
Treatment Attendance	-0.574	0.349		0.93***	0.028	-0.054	0.041	-1.27
Homework Completion Rate	0.818	5.348		0.012	0.004	0.010	0.069	-0.14
Network Support Measures								
Behavioral Support for Abstinence (Change)	0.019	0.022		-0.065	0.571	-0.001	0.018	-0.01
Social Support for Drinking (Change)	0.173	0.113		-0.060	0.111	-0.011	0.025	-0.52
Number Abstinent Friends in Network (Change)	0.208*	0.097		0.353	0.153	0.075	0.038	1.97*
AA Meetings (Change)	3.321*	1.088		0.019	0.013	0.063	0.026	-0.21
Social Learning Theory Processes								
Self-Efficacy (Change)	7.633***	2.403		0.015***	0.005	0.113	0.057	1.98*
Coping Skills (Change)	0.141**	0.044		0.925**	0.297	0.130	0.078	2.43*
Emotional Distress								
BSI Distress (Change)	0.907	1.039		-0.059	0.018	-0.053	0.097	1.16
Social Interaction Anxiety (Change)	-0.425	0.783		0.002	0.016	-0.001	0.015	0.01
Responders v. Late Relapsers								
	A Path			B Path			Indirect Effect	
	B	SE		B	SE	B	SE	z
Treatment Adherence								
Treatment Attendance	-0.364	0.470		0.106**	0.039	-0.039	0.055	-0.71
Homework Completion Rate	2.174	6.374		0.015**	0.006	0.033	0.112	0.29
Network Support Measures								
Behavioral Support for Abstinence (Change)	0.023	0.034		0.150	0.678	0.004	0.034	0.12
Social Support for Drinking (Change)	-0.312*	0.155		0.038	0.149	0.012	0.060	0.20

Mediator Variable	Responders v. Non-Responders										
Number Abstinent Friends in Network (Change)	0.110	0.156	0.251	0.189	0.002	0.037	0.03	-0.141	0.101		
AA Meetings (Change)	2.288	1.708	0.018	0.017	0.041	0.059	0.69	-0.037	0.222		
Social Learning Theory Processes											
Self-Efficacy (Change)	8.325 [*]	4.123	0.017 ^{***}	0.006	0.143	0.090	1.59 [†]	0.016	0.119		
Coping Skills (Change)	0.146 [*]	0.060	1.002	0.408	0.147	0.089	1.65 [†]	0.026	0.397		
Emotional Distress											
BSI Distress (Change)	-2.374	1.374	-0.048 [*]	0.023	0.165	0.098	1.68	-0.005	0.377		
Social Interaction Anxiety (Change)	-1.646	1.057	0.005	0.022	-0.008	0.049	-0.18	-0.147	0.067		

Note: A-Path: Effect of Treatment Contrast on the mediator. B-path: Effect of mediator on outcome (Class Membership). Indirect effect: Portion of the effect of Treatment on Class membership that is accounted for by the mediator variable. Treatment was coded as Case Management=-1, PCBT or Network Support were coded as +1 according to the analysis.

[†] $p < .10$;

^{*} $p < .05$;

^{**} $p < .01$;

^{***} $p < .001$