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Interaction of Motivation and Social Support on Abstinence among Recovery Home Residents

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Abstract

Background and Aims—The impetus to abstain from alcohol and drugs is especially robust when individuals seek help. However, motivation to continue abstinence during ongoing recovery is less understood. The present study assessed how social support interacted with motivation to affect abstinence over an 18-month time period.

Methods—A sample of 289 residents entering residential recovery homes were recruited and followed at 6-, 12-, and 18-months. Motivation was measured as the perceived costs and benefits of abstinence. Five social influence measures were used to assess interactive effects with costs and benefits on abstinence.

Results—Perceived costs and benefits of abstinence were robust predictors of abstinence over the 18 month assessment period. Two social support factors interacted with perceived benefits to influence abstinence: 12-step involvement and number of persons in the social network.

Conclusion—Suggestions are made for recovery services to influence perceived costs, benefits, and social network characteristics.

Keywords

Motivation; Social Influences; Social Support; Sober Living House; Recovery Home

Introduction

Few concepts in the addiction literature have received more attention than motivation for change. One view of motivation is that is an intrapersonal trait, something within the individual (Miller, 2006). However, research suggests that motivation to change substance use behaviours can be altered by the social context in which it occurs (Miller, 1999; Miller et al., 1995; Moos, 2008). Anecdotally, practitioners in the substance misuse treatment field have long acknowledged that the most motivated clients are also the most successful. Research has generally supported this contention, as studies on motivation for change have been associated with improved alcohol and drug use outcomes (Adamson, Sellman, & Frampton, 2009; McKay & Weiss, 2001). However, much of the literature on motivation has centered on a single measurement of motivation rather than a multidimensional construct.

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Motivation has typically been assessed at treatment entry to predict later outcome (Korcha, Polcin, Bond, Lapp, & Galloway, 2011). Less emphasis has been devoted to assessing change in motivation over time or how motivation may function to maintain long term abstinence. However, one study of motivation as a longitudinal and multidimensional construct showed better drug and alcohol outcomes over 18 months were predicted by higher perceived benefits of sobriety, while increased costs, or negative aspects of sobriety (e.g., boredom, social anxiety, and stress), were predictive of worse outcomes (Korcha, et al., 2011). Similarly, Heather and McCambridge (Heather & McCambridge, 2013) found support for improved drinking outcomes based on level of motivation after clients completed treatment.

A strong body of work indicates that the characteristics of one's social network impacts substance use (Galea, Nandi, & Vlahov, 2004; Kaskutas, Humphreys, & Bond, 2001; Longabaugh, Wirtz, Zweben, & Stout, 1998). Several theories have been proposed to understand the influence of social networks, including Hirschi's social control of behaviour (Hirschi, 1969). Social control refers to the strong bonds with family, friends, and other interpersonal relationships that promote drug use prosocial behaviour and discourage deviant behaviour. Addiction research has traditionally examined social control as the amount of support given toward inhibiting or abstaining from alcohol and (Beattie & Longabaugh, 1999; Longabaugh, Beattie, Noel, Stout, & Malloy, 1993; Longabaugh, Wirtz, Zywiak, & O'Malley, 2010; Miller, 2006). Support from the social network that is drug and alcohol specific is more predictive of treatment outcomes than general support (Groh, Jason, Davis, Olson, & Ferrari, 2007; Polcin, Korcha, Bond & Galloway, 2010) and a social network that is supportive of recovery efforts is related to better treatment outcomes (Beattie & Longabaugh, 1999; Subbaraman & Kaskutas, 2012).

Recent studies have considered the mediational role of motivation to understand how motivation operates in the wider scope of the recovery process (Hunter-Reel, McCrady, & Hildebrandt, 2009; Hunter-Reel, McCrady, Hildebrandt, & Epstein, 2010; Small, Ounpraseuth, Curran, & Booth, 2012). Hunter-Reel and colleagues (Hunter-Reel, et al., 2009), proposed that social network members may provide motivation to resist drinking and motivation may change as a function of these relationships. This theory was supported in a later study (Hunter-Reel, et al., 2010) that demonstrated motivation as a mediator between social support and drinking outcomes for alcohol dependent women.

Purpose

The present work examined a variety of social network factors that might interact with motivation to influence abstinence over time. Our goal was to identify ways social support might buffer the destructive effects of low motivation and identify groups for whom motivation might be particularly important. This work contributes to the literature in two important ways. First, most studies on motivation and substance use outcomes have used treatment seeking populations. Motivation to abstain from alcohol and drugs for those with some recovery time has largely been ignored. Of central interest to the present study was examining factors that influence motivation to *maintain abstinence* from alcohol and drugs rather than the motivation to stop or decrease substance use. A second goal was to expand on

the operationalization of the social network to include different types of social influences. We included traditional characteristics of the social network (e.g., number of persons in the network and number of alcohol and drug users in the network) but also other forms of social influences that may impact motivation and alcohol and drug abstinence. The concept of confrontation (Polcin, 2003; Polcin, Galloway, Bond, Korcha, & Greenfield, 2009, 2010) as a measure of supportiveness is a relatively recent development in the addiction literature that updates the notion of confrontation as it is perceived by the recipient. The concept of confrontation as helpful takes on a broader perspective that specifically queries those in recovery on the comments or warnings they may have received about their drug and alcohol use from multiple sources (e.g., “bad things” may happen if they do not change their substance use or, if in recovery, make changes to maintain abstinence). Previous work has found this construct or confrontation to be generally experienced as accurate, helpful and supportive by the recipient (Polcin, et al., 2009).

Additionally, this work included affiliation with 12-step programs such as Alcoholics Anonymous (AA) (Humphreys, Kaskutas, & Weisner, 1998) as another component of social influence that might moderate the effect of motivation on outcome. We hypothesized that the relationship between motivation and abstinence would be strongest when there were high levels of alcohol and drug abstinence in the social network, more supportive confrontation, and greater affiliation with 12-step groups. However, we also wanted to explore whether these social influences might buffer destructive influences when motivation remained low over time.

Methods

Sample

Participants were recruited within the first week of entry into residential recovery homes in Northern California. Three programs were targeted. All three used a social model approach to recovery that emphasized 12-step involvement, peer support, and residence in an alcohol and drug-free living environment. However, there were some differences between the sites. The largest (n=218) consisted of 16 houses and required at least a few days of sobriety and no signs of withdrawal from substances prior to entry into the residence. Although these freestanding houses were not affiliated with any type of treatment program, nearly half of the residents reported receipt of residential or outpatient treatment in the 30 days prior to entering the house (n=106). The second location consisted of 51 residents that entered SLHs that were affiliated with an outpatient treatment program. Typically, these individuals needed to be in good standing in the outpatient program for 30 days before applying to the sober living residence. The third site was smaller site (N=20) and offered some on-site treatment services in a residential setting for a period of 30 to 60 days followed by residence in sober living homes. All study materials and protocols were approved by the Public Health Institute's internal review board (IRB).

To maximize generalization of study findings, few exclusionary criteria were implemented and refusal to participate in the study was rare. Eligibility required all participants to be at least 18 years old, have the ability to understand and read English, report no major psychiatric impairments that would interfere with their ability to provide informed consent,

and be available for follow-up interviews. A total of 323 residents were recruited from three locales. All residents were interviewed at baseline and follow-up interviews were conducted at 6, 12 and 18 months. A total of 289 residents (90%) were interviewed for at least one follow-up interview. Because the current paper targets assessment of longitudinal changes over time, residents who did not complete a follow up interview were excluded from the analysis. The sample selected was favourable for the current study because we saw significant increases in alcohol and drug abstinence over time (Polcin, et al., 2010). We could therefore assess how interactions between motivation and social support were associated with improved rates of abstinence.

Measures

Demographic characteristics—In addition to the usual demographic indicators such as gender, race, marital status, education, psychiatric symptoms, and alcohol and drug use measures, SLH information on the length of stay (LOS) and number of days living in a controlled environments in the 30 days prior to house entry are included.

Psychiatric symptoms—To assess current psychiatric severity we used the Brief Symptom Inventory (Derogatis & Melisaratos, 1983). The 53-item measure assesses severity of psychiatric symptoms on nine clinical scales as well as a Global Severity Index (GSI). Items are rated on a 5-point scale and ask about symptoms over the past 7 days. The GSI was used to assess overall psychiatric severity.

Alcohol and Drug Consequences Questionnaire (ADCQ)—The ADCQ (Cunningham, Sobell, Gavin, Sobell, & Breslin, 1997) draws upon a view of motivation that emphasizes the ‘pros’ and ‘cons’ of behaviour (e.g., Janis, 1977). The ADCQ uses the terms “perceived costs” and “perceived benefits” to describe two subscales. Perceived costs consists of 15 items and the perceived benefits subscale was inclusive of 14 items. Examples of costs include items such as “I will have difficulty relaxing,” “I will get depressed,” and “I will feel bored.” Examples of benefits include items such as “I will have a better relationship with my family,” “I will feel better about myself” and “I will be more reactive and alert.” Because this instrument was administered several times over the course of the study and included persons with no recent substance use, participants were asked to consider their substance use prior to administration of ADCQ items and pick one of two options; (1) “if I keep my sobriety” or (2) “if I stop or cut down.” Responses are measured on a 6-point Likert scale ranging from zero to five assessing level of importance for each cost and benefit item. Two scales were created by summing scores and dividing by the number of items. Alphas for our modification of these scales (i.e., assessing motivation to “keep my sobriety” as a response option) were 0.88 for costs and 0.84 for benefits (Polcin, Korcha & Bond, 2015).

Alcohol and Drug Confrontation Scale (ADCS)—The ADCS used 8 items to assess experiences of supportive confrontation from 9 sources: spouse, family, friends SLH residents, health care professionals, mental health professionals, substance use treatment professionals, co-workers, and criminal justice professionals (Polcin, et al., 2009). Assessment of each source section begins with the question, “Did (source) say bad things might happen to you if you did not make changes to address drug or alcohol problems or if

you did not make changes to maintain your sobriety?” If the response was affirmative, additional questions followed assessing the intensity of confrontation (Internal Intensity subscale) and supportiveness of confrontation (Internal Support subscale). We used the Internal Support scale as our measure of Supportive Confrontation. Examples of items on this scale included the participant’s assessments of how supportive the person(s) were of their recovery, how supportive the person(s) were overall, and how much the confronter was trying to help. Items were rated on a 5-point Likert scale and averaged for each participant. Psychometric support for this scale is derived from several studies (Polcin, et al., 2009; Polcin, Galloway, Bostrom, & Greenfield, 2007). The alpha coefficient across all sources of confrontation was 0.90 and a confirmatory factor analysis yielded a comparative fit index of 0.90. Although a two factor structure was found, only one factor, internal support, was hypothesized to be a moderator of motivation and abstinence. The scale was dichotomized at the median so that scores below 4.5 were deemed ‘lower internal support’ and those at 4.5 or higher were ‘higher internal support’.

Six-month abstinence—Was a single question which asked if any alcohol or drugs were used during the past 6 months (Gerstein, 1994). This dichotomous variable is the primary outcome measure analysed here. Abstinence was chosen because our measure of motivation specifically asked about motivation “to keep sobriety.” In addition, abstinence was the explicit goal of all of the recovery homes. For an analysis of outcomes a using a wide variety of alcohol and drug and other outcome measures see Polcin et al (2010).

Important People Instrument (IPI)—The IPI (Zywiak, Longabaugh, & Wirtz, 2002) was used to assess number of important persons in the social network, drinking in the social network and drug use in the social network. This instrument allows participants to identify up to 12 important people in his or her network with whom they have had contact in the past six months. The four most important persons from this list were identified and rated on importance on a scale from 1–6 and mean importance was averaged. Information was obtained on the type of relationship, amount of contact over the past 6 months (a 7-point Likert scale ranging from once in the past 6 months to daily), and drug and alcohol use for each member of the social network (a 5-point Likert scale including ranging from “in recovery” to “heavy user”). Our analyses used three social network measures were dichotomized at the median: 1) size of social network was defined as ‘low’ if the resident’s network was empty or consisted of 1 person, ‘high’ if 2–12 persons were reported; 2) alcohol use of the social network scale was alcohol use multiplied by the amount of contact with the resident. This scale was scored as ‘low’ if the mean scale score was 0.83 or less and ‘high’ if 0.84 or higher; 3) drug use of the social network scale was the drug use of the network members multiplied by the amount of contact with the resident. A ‘low’ score corresponded to a scale score of 0 and a ‘high’ scores indicated a scale score above 0.

Alcoholics Anonymous Affiliation Scale (AA affiliation)—This measure includes 9 items and was used to assess the strength of an individual's affiliation with 12-step groups including Alcoholics Anonymous (AA), Narcotics Anonymous (NA), or Cocaine Anonymous (CA) (Humphreys, et al., 1998). The scale includes items assessing attendance at meetings, questions about sponsorship, spirituality, and volunteering for service positions

at meetings. The measure shows strong validity and internal consistency with Cronbach's alphas of 0.85 for treatment samples and 0.84 for community samples. Because the data distribution for this variable was highly skewed we used a dichotomized measure.

Analysis Plan

The main outcome measure of 6-month abstinence was analysed using random effects logistic regression modelling for panel models, adjusted for age and gender via the 'xtlogit' Stata macro (Stata Corp., 2013). The formal model estimated was: $\text{logit}(p_{i,t}) = \alpha_i + \beta_1 A_i + \beta_2 G_i + \gamma_1 M_{i,t} + \gamma_2 Z_{i,t} + \gamma_3 M_{i,t} Z_{i,t} + \varepsilon_{i,t}$ where A_i is the baseline age, G_i the gender (females are the reference), and $M_{i,t}$ and $Z_{i,t}$ represent the motivation (i.e., costs and, separately, benefits) and social support moderator measures, respectively. The random intercept term ε_i represents the combined effect of all unmeasured subject-specific covariates that may result in systematic over or under-prediction of abstinence within individual across the three waves analysed. Such a model estimates the time averaged effect of the number of persons in the social network, alcohol and drug use in the social network, supportive confrontation, and 12-step affiliation measures as moderators of the relationship between motivation measures and 6-month abstinence. Demographic information was obtained from the baseline interview but, because a central goal of the study was to evaluate a population with at least some degree of time in recovery, only data from the 6-, 12-, and 18-month follow-ups were used in the logistic regression models and graphs.

Results

As Table 1 indicates, residents were primarily male (81.0%) and white (65.1%). Most had received a high school education or equivalent (78.5%). Approximately half of the residents had never been married with a minority that were married or living with a partner prior to moving to the SLH (10.7%). Over a quarter had served jail or prison time in the past 30 days (29.1%). Most met DSM-IV criteria for at least one substance in the past year, with about half the sample (49.8%) reporting dependence on 2 or more substances.

Length of stay (LOS) in the sober living residence was over six months on average, although differences were apparent by site. Those residents living in sober living house affiliated with the outpatient treatment program stayed an average of 254 days (sd=169.1). Shorter lengths of stay were reported for individuals in the residential treatment program 143 days (sd=133) and the freestanding SLHs (166.6 days; sd=162.). Few other demographic differences were observed between the study locales except that those affiliated with the outpatient program tended to be older (43 years; sd=9.) compared to those in the residential treatment program 36 years (sd=12.) and freestanding houses (37 years; sd=10.). Residents in the houses affiliated with outpatient treatment also had a higher percentage of African-Americans (70%) and more men (94%).

Psychiatric symptomatology as measured by the Global Severity Index on the Brief Symptom Inventory was higher than normative data on adult non-patient populations but lower than adult psychiatric outpatients (Derogatis & Melisaratos, 1983). Residents entering the residential treatment program had significantly high GSI scores at baseline (1.1; sd=0.7) than those that completed the 90 day outpatient treatment (0.7; sd=0.6).

Table 2 displays variable distributions for motivation and social support scales as well as abstinence. Residents rated the perceived benefits of sobriety much more highly than the perceived costs at every interview. Cross-sectional t-tests comparing perceived costs and perceived benefits at each time point were significant at $p < 0.001$ at every interview. Within subject repeated measurement for the perceived costs and for the perceived benefits did not differ significantly, indicating that resident ratings of these two measures of motivation remained relatively stable across the one year time span. Social influence variables (i.e., 12-step affiliation, supportive confrontation, drug use in the social network, alcohol use in the social network, and number of contacts in the network) were dichotomized due to highly skewed variable distributions across all follow up time points. Table 2 shows the percentages for the dichotomized categories at each follow-up time point. Most of these variables were consistent over the course of the study, showing only modest variation across data collection time points. The one exception was 12-step Affiliation, which showed a decline, particularly at the 18 month time point.

Table 3 displays beta coefficients for the interaction terms of the perceived benefits and the perceived costs with each of the social influence variables, predicting abstinence. First, two models were first run to examine the marginal effects of perceived benefits and the perceived costs (not tabled). One demonstrated a significant negative relationship between perceived costs and the odds of abstinence ($\beta = -0.8$; 95% CI=-1.0 to -0.6; $p < 0.001$) and a second model showed a significant positive relationship between perceived benefits and odds of abstinence ($\beta = 0.6$; 95% CI=0.4 to 0.8; $p < 0.001$). Interaction terms, entered in separate models, were then included to test whether social influence measures moderated the relationship between motivation and abstinence. None of the social influence measures moderated the relationship between perceived costs and abstinence. However, significant interactions were evident for the perceived benefits. Interactions included the number of persons in the social network ($p < .05$) and 12-step affiliation ($p < 0.05$).

The number of persons in the social network interacted with perceived benefits to influence abstinence (Figure 1). For residents with low and high numbers of social contacts, higher perceived benefits was associated with higher abstinence. However, smaller networks were associated higher abstinence than larger social networks across all levels of benefits, but especially when benefits were low. As benefits increased for the larger social network group there was a relatively larger effect on abstinence. For persons in the smaller social network group, increases in benefits resulted in more modest improvement on abstinence.

The relationship between perceived benefits and abstinence also showed differing patterns based on level of 12-step affiliation (Figure 2). Abstinence was highest among persons in the high 12-step involvement group. That finding held across all levels of perceived benefits. However, there was a stronger effect for benefits among the low 12-step involvement group. As perceived benefits increased, the log odds of abstinence increased more among those with low rather than high 12-step affiliation.

Discussion

Research assessing motivation at treatment entry has shown only modest effects on long-term outcome. Less studied is the influence of motivation to maintain abstinence over time once a person has established some time in recovery. The findings reported here and results from previous work (e.g., Korcha, et al., 2011) demonstrate that proximal measures of motivation are strong predictors of abstinence across time. The current paper adds to this literature by showing how social influences alter the impact of motivation on abstinence.

The discussion below begins with an examination of the resiliency of costs and benefits as influential factors on abstinence. The discussion then examines the two social support factors that interacted with benefits to influence abstinence: size of the social network and 12-step involvement. Implications of the findings for sober living homes and other recovery services are discussed along with identification of study limitations.

Resiliency of Perceived Costs and Benefits

Results show that the two ADCQ scales, especially the costs scale, are strong, resilient predictors of abstinence. These scales appear to be useful for predicting outcome for a range of different client groups with different characteristics. We hypothesized that a number of social influences, such as social networks with limited or no alcohol or drug use, high affiliation with 12-step programs and greater receipt of supportive confrontation would mitigate the poorer outcomes observed with higher perceived costs. Yet all of these models, irrespective of the moderator tested, were non-significant. While 12-step affiliation and the size of the social network moderated the effect of perceived benefits on abstinence, neither substance use in the social network nor supportive confrontation had moderating effects.

It is important to remember that we were testing these social factors as moderators of motivation, not their direct impact on outcome. For example, previous research with this dataset (Polcin et al, 2010) showed alcohol and drug use in the social network and 12-step affiliation were strong predictors of outcome. One potential reason for the lack of findings for supportive confrontation is that few individuals yielded low scores on the internal support scale used. There were few counterproductive experiences of confrontation and therefore limited variation of scores. A sample with more varied experiences of how confrontation was received might yield more significant results.

Social influences on abstinence that were found in previous studies (e.g., alcohol and drug use in the social network) appear to be unrelated to motivation as measured by costs and benefits. Social influences may operate independently through containment of impulses to use substances and social reinforcement for continued abstinence. For a qualitative analysis of different ways social influences within recovery homes facilitates abstinence see Polcin and Korcha (2015).

Twelve-step Involvement

The finding that high 12-step affiliation was associated with higher abstinence across all levels of perceived benefits supports our previous work (Polcin, et al, 2010). Results suggest that for those with high 12-step affiliation increases in perceived benefits adds little to

maintaining abstinence. Practical application of the finding is limited by the fact that the 12-step model of recovery is not necessarily suited to all persons in recovery (Miller, 2008; Walters, 2002) and other approaches to assist these 'non-affiliated' individuals achieve success are needed. Hoffman (Hoffmann, 2003) suggested that individuals have 12-step career types. Some move in and out of 12-step participation but do not fully commit to it while others have 'tourist careers' with 12-step programs where they attend meetings due to coercion but have little interest in continued attendance.

Even though SLHs follow a social model program of recovery that requires 12-step attendance and promotes resident affiliation with 12-step, only about half the residents reported feeling a high level of connection with a 12-step program. Nearly all residents had left the SLH by the 18-month interview and a noticeable increase in the percentage reporting lower 12-step affiliation occurred at the 12-month interview. These results indicate that 12-step affiliation is not consistent over time and that the road to recovery is not the same for all individuals.

Interestingly, those residents with lower levels of 12-step affiliation increased the odds of abstinence with increased perceived benefits. The most rewarding aspects of sobriety may act as a buffer to using drugs and alcohol for those not interested in active participation in 12-step programs. Treatment efforts aimed at increasing perceptions about the benefits of abstinence may be particularly helpful for these individuals.

Number of Persons in the Social Network

Interaction models were not significant for alcohol or drug use in the social network, but the number of persons in the network, regardless of alcohol or drug use, was a significant moderator of the relationship between benefits and abstinence. Residents with one or no members in their social network showed a trajectory of improved abstinence with increased perceived benefits. However, the increase was significantly less than that found among residents with two or more persons in their network. These larger social networks showed a stronger improvement on abstinence as benefits increased.

One potential explanation for this finding is that individuals with larger social networks might have more opportunities to use the benefits of abstinence as a prophylaxis to relapse. For example, persons with larger networks may engage in more social activities where alcohol or drug use is possible. Possessing a strong sense of why abstinence is important (i.e., the benefits) might be very helpful in avoiding or successfully managing potential relapse situations. Individuals with little or no social support in their networks will have fewer opportunities for benefits to help them avoid relapse in social situations. It was interesting that these individuals with limited social support had higher abstinence than those with higher numbers of contacts across all levels of motivation. It seems likely that some of the participants with limited social support who were achieving abstinence were successfully avoiding contact with persons who could potentially exert a destructive influence.

Given the widespread finding that social contact and social support facilitates health and well-being, recovery home service providers might consider ways to increase social support for socially isolated residents through structured recreational and social activities within the

home or facilitating involvement in outside activities. For example, individuals with little or no social support in their personal networks might need the structured social support found in 12-step meetings, even though they might not indicate fellow 12-step members as “important people” in their lives, which is how the size of the social network item is worded.

Strategies for Maximizing Motivation

Study results support the importance of addressing several issues to facilitate recovery. First, our findings suggest that the emphasis that SLHs place on 12-step involvement is warranted. Although 12-step involvement interacted with benefits to influence abstinence, higher involvement in 12-step groups was associated with higher odds of abstinence across all levels of perceived benefits. Residents identifying few important people in their lives might particularly benefit from such involvement.

Second, strategies that help individuals learn how to cope with the challenges (i.e., costs) that abstinence presents are essential. In the current study as well as in previous work (e.g., Korcha, et al., 2011), motivation as measured by the costs scale had a consistent and robust association with outcome. The absence of moderators suggests that addressing costs should be an important part of the recovery process for all persons with substance use disorders. Cognitive behavioural therapy (CBT) interventions that address ways to cope with the challenges of recovery, such as those described by Kadden et al. (1994) and Carroll (1998) seem to be warranted. These types of interventions address issues that can exacerbate substance use, such as anxiety and depression, difficulty socializing, and discomfort when experiencing urges to use. Moreover, they provide alternative ways of getting needs met that substitute for alcohol and drug use. Our results suggest that addressing the costs associated with abstinence should be conducted over the course of recovery, not limited to relatively brief periods during treatment. Although SLHs do not typically provide formal services such as CBT, modifications could be made to provide them in a group format onsite.

Our results also suggest that service providers pay attention to the experienced benefits of sobriety over time, particularly with some subgroups. Individuals with higher numbers of contacts in their social networks and lower involvement in 12-step groups were those who were most impacted by benefits. It therefore makes sense to target efforts to increase perceived benefits most among these subgroups. The same aforementioned CBT strategies can be used to help individuals recognize the benefits of sobriety and use those recognitions as a prophylaxis to alcohol and drug use.

Limitations

There are a variety of limitations that need to be considered:

1. Our study sample consisted of SLH residents in Northern California and outcomes may not generalize to other populations, although SLH residents may be more representative of a broader community context than traditional treatment seeking samples (Jason & Ferrari, 2010).

2. Concomitant with using self-report measures is the possibility of under- or over-reporting although random urine screens were implemented and agreement with self-report was high.
3. Motivation has been measured in a variety of ways other than assessing perceived costs and benefits. Other measures of motivation may show different associations with abstinence and social support.
4. It is difficult to know whether our findings continue beyond an 18-month time period.
5. There were limitations in our variable distributions. Most of our measures were highly skewed and were therefore dichotomized for analyses. This was particularly the case for the internal support scale, which was used as our measure of supportive confrontation.
6. Because we assessed “motivation to maintain sobriety” our outcome variable was abstinence. Other outcomes, such as ways that motivation impacts severity of alcohol and drug problems, could result in different findings.

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Figure 1.
Perceived benefits by number of persons in the social network at each interview.

Figure 2.
Perceived Benefits by 12-step affiliation at each interview.

Table 1

Baseline demographic characteristics of the SLH residents (N=289).

	%
Male	81.0
Marital status	
Never Married	50.9
Married or live-in relationship	10.7
Divorced/separated/widow(er)	38.5
Children under 18	46.0
Race/ethnicity	
White/Caucasian	65.1
African-American	18.7
Hispanic	8.0
Other	7.6
GED/High School Education	78.5
Other Environments in (past 30days) Jail/prison	29.1
Any inpatient or outpatient treatment	56.7
Any employment (past 30 days)	25.6
Any substance use in the 6 months prior to SLH entry	17.0
DSM-IV dependence (past 12 mos)	
None	12.9
Alcohol only	11.5
Methamphetamine only	15.3
Cocaine only	6.2
Opiate only	3.5
Marijuana only	0.8
Multiple drug dependency	49.8
	<i>x (sd)</i>
Age	37.5 (10.1)
Length of stay at SLH (# days)	181.9 (166.4)
Global Severity Index (GSI)	0.83 (0.75)

Table 2

Characteristics of the predictor variables and percent abstinent at each study interview (N=289).

	6-month	12-month	18-month
	$\bar{x}$ (sd)	$\bar{x}$ (sd)	$\bar{x}$ (sd)
<i>Costs</i>	0.9 (1.0)	0.8 (1.0)	0.8 (1.0)
<i>Benefits</i>	4.0 (1.1)	4.1 (1.1)	4.0 (1.1)
	%	%	%
<i>Percent 6-months abstinent</i>	45.5	49.1	43.1
<i># of contacts</i>			
Low (0 or 1 person)	62.0	55.3	61.1
High (2 to 12 persons)	37.6	44.7	38.9
<i>Alcohol use of network scale</i>			
Low (0 to 0.83)	51.2	50.6	51.1
High (0.84 to 10)	48.8	49.4	49.9
<i>Drug use of network scale</i>			
Low (0)	65.3	67.7	67.4
High (0.01 to 10)	34.7	32.3	32.6
<i>Supportive Confrontation</i>			
Low (0 to 4.49)	47.5	41.5	43.4
High (4.50 to 5)	52.5	58.5	56.6
<i>12-step Affiliation</i>			
Low (0 to 6)	43.8	49.2	63.9
High (6.01 to 10)	56.2	50.9	36.1

Table 3

Beta coefficients of the interaction of social influence and motivation predicting abstinence

	Interaction of social influence measure and benefits		Interaction of social influence measure and costs	
	β	95% CI	β	95% CI
# in the social network	0.5^a	0.03, 0.9	-0.01	-0.5, 0.5
Supportive Confrontation	-0.3	-0.9, 0.3	-0.02	-0.4, 0.5
12-step affiliation	-0.5^b	-1.0, -0.03	-0.01	-0.4, 0.5
Alcohol use in the network	0.4	-0.04, 0.8	0.02	-0.5, 0.5
Drug use in the network	0.2	-0.3, 0.6	0.02	-0.5, 0.5

Note: All models control for age and gender

^a $p < 0.05$; interaction illustrated in Figure 1 below^b $p < 0.05$; interaction illustrated in Figure 2 below