Full length article

How many or how much? Testing the relative influence of the number of social network risks versus the amount of time exposed to social network risks on post-treatment substance use

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ABSTRACT

Background: Having high-risk, substance-using friends is associated with young adult substance use disorder (SUD) relapse. It is unclear, however, whether it is the total *number* of high-risk friends, or the amount of *time* spent with high-risk friends that leads to relapse. Unclear also, is to what extent low-risk friends buffer risk. This study examined the influence of number of high-risk and low-risk friends, and the amount time spent with these friends on post-treatment percent days abstinent (PDA).
Method: Young adult inpatients ($N = 302$) were assessed at intake, and 3, 6, and 12 months on social network measures and PDA. Mixed models tested for effects of number of high- and low-risk friends, and time spent with these friends on PDA, and for net-risk friend effects to test whether low-risk friends offset risk.
Results: Within and across assessments, number of, and time spent with high-risk friends was negatively associated with PDA, while the inverse was true for low-risk friends. Early post-treatment, time spent with friends more strongly predicted PDA than number of friends. Participants were more deleteriously affected by time with high-risk friends the longer they were out of treatment, while contemporaneously protection conferred by low-risk friends increased. This interaction effect, however, was not observed with number of high- or low-risk friends, or number of friends net-risk.
Conclusions: Young adult SUD patients struggling to break ties with high-risk friends should be encouraged to minimize time with them. Clinicians should also encourage patients to grow their social network of low-risk friends.

1. Introduction

Clinicians working across treatment modalities often advise individuals undergoing substance use disorder (SUD) treatment to reduce or eliminate contact with high-risk others who are still engaged in substance use, and increase interactions with non-substance using/recovering others. Social-cognitive learning theory (Bandura, 1986; Maisto et al., 1999), posits that changing social networks from prosubstance use to pro-abstinence and recovery serves important functions implicit in recovery from SUD (Longabaugh et al., 1998; Longabaugh et al., 2010; Zywiak et al., 2002). These include reducing individuals' exposure to substances and related conditioned cues, facilitating the acquisition of recovery coping skills and learning of new non-substance use related recreational activities, and strengthening of abstinence self-efficacy. Thus, adaptive changes in social network composition can help mitigate both cue- and stress-related relapse risks (Brown et al., 1995; Moos, 2007, 2008; Richter et al., 1991). Research

supports this clinical lore and theory. Individuals with SUD are exposed to social forces that can strongly influence recovery outcomes (Moos, 2003), particularly as individuals leave inpatient or intensive outpatient care (Broome et al., 2002; Buckman et al., 2008). Although individuals typically self-select social network members, exposure to such social network members is thought to play a key causal role in the resolution of SUD (Brown et al., 1989; Kelly et al., 2011; Marlatt and Gordon, 1985; Stout et al., 2012).

The influence of social networks on health risks and outcomes is also known to vary across the life course. During young adulthood, peers have a particularly strong influence on substance use behaviors, and long-term treatment outcomes (Dobkin et al., 2002; Granfield and Cloud, 2001). This is in part because substance use serves a particularly strong social facilitation function for young adults, especially for those with a history of heavy involvement with alcohol and other drugs (Chung, 2013). As such, helping young adults change their social network from pro-substance use, to pro-recovery and pro-abstinence, is

an especially important clinical goal for providers who treat young people with SUD. This is typically achieved by encouraging young adults to reduce or eliminate ties to friends that are still engaging in substance use, and increase or bolster ties with individuals who are not. Young adults' ability to make these changes is ultimately predictive of their long-term SUD recovery outcomes (Kelly et al., 2014, 2013).

It is well understood that high-risk friends confer relapse risk, but it is not clear whether it is the total *number* of high-risk friends, versus the actual amount of *time* spent with high-risk friends that ultimately increases relapse risk. After all, the *number* of high-risk social network members is only a marker for risk. From a social-cognitive learning theory standpoint, the probable causal mechanism that confers risk is more likely to be the actual *amount of exposure* to, or engagement with, social network risks, since it is through actual contact that the purported effects are conferred (i.e., through modeling, offers to use substances, reinforcement of substance use). Such a distinction has theoretical and practical importance since time engaged with high- or low-risk friends may be a more sensitive indicator and potent predictor of substance use behavior than a mere sum of high-risk friends, because the focal individual will have varying degrees of interaction with these high-risk friends ranging from none to a lot in any given period. It is also not clear what role low-risk friends may play in buffering relapse risk, or whether the quantity of low-risk friends or the amount of time spent with low-risk friends differentially affects substance use outcomes. Moreover, it is unknown to what extent low-risk friends might buffer the risk conferred by high-risk friends.

To date, social network analyses have typically examined only the presence or absence of high- or low-risk individuals in the network (e.g., Stout et al., 2012; Kelly et al., 2011) and not the amount of actual exposure to them. Should it be the case that the amount of time spent with high-risk or low-risk peers is also a predictor of SUD recovery outcomes, then clinical assessment and advice could be tailored more specifically to address this specific exposure intensity risk. Furthermore, young adults often perceive their friends to be caring and supportive of their recovery, and thus are often reluctant to change their high-risk friends. In these cases, negotiating less frequent engagement with these high-risk individuals could offer a way to reduce potential substance-related harm without a wholesale network change.

In the present investigation, we examined the relative influence of the number of high- and low-risk friends, and the amount of time spent with these friends on abstinence in the year following discharge from residential treatment. Additionally, to test to what extent low-risk friends might buffer risk conferred by high-risk friends, we investigated the net effect of number of high- and low-risk friends, and net effect of time spent with high- and low-risk friends, on abstinence (i.e., by subtracting the number of, and time spent with low-risk friends from the number of, and time spent with high-risk friends, respectively). Based on existing literature, we hypothesized that greater numbers of high-risk friends would predict lower PDA, while greater numbers of low-risk friends, would predict greater PDA. We also hypothesized that greater time spent with high-risk friends would predict lower PDA, while more time spent with low-risk friends, would predict greater PDA, and that the magnitude of the relationship between friend risk type and PDA would be stronger for *time* than *number* of friends. Additionally, we hypothesized that a greater net loading toward number of, and time spent with high-risk friends would predict less PDA, while greater net loading toward number of, and time spent with low-risk friends would predict greater PDA.

2. Methods

Data acquisition methods were originally described in Kelly et al. (2010b), and Kelly et al. (2013) and are summarized here.

2.1. Procedure

The present investigation was conducted at a residential treatment facility emphasizing twelve-step facilitation, and motivational, cognitive-behavioral, and family therapy approaches. A total of 607 young adults were admitted to the residential treatment facility during the recruitment period (October 2006–March 2008). Of those approached ($n = 384$), 64 declined or withdrew participation. Following enrollment, an additional 17 participants withdrew prior to baseline assessment, and the consent for one participant was misplaced. The final sample of 302 represents 78.6% of those approached for participation details (see Kelly et al., 2013 for more details).

Research staff conducted assessments at baseline, 1, 3, 6, and 12 months post-discharge. Each assessment included an interview portion, completed either in person or by telephone, and self-administered surveys. Participants were reimbursed $30 for the baseline assessment, and $20, $30, $40, and $50 for the post-treatment assessments at 1, 3, 6 and 12 months, respectively. Post-discharge, study retention rates were 84.5% ($n = 256$) at 1-month follow-up, 81.8% ($n = 248$) at 3-month follow-up, 74.3% ($n = 225$) at 6-month follow-up, and 71.3% ($n = 216$) at 12-month follow-up. Assessment completers were compared to non-completers on demographic, clinical, and substance use variables. Relative to those with post-secondary education, those with a high school education or less were more likely to be missed at all time-points.

2.2. Measures

2.2.1. Form-90

The Form-90 (Miller and Del Boca, 1994) interview captures percentage of days abstinent (PDA) from all substances (except caffeine and nicotine) and has demonstrated good test-retest reliability and validity (Slesnick and Tonigan, 2004; Tonigan et al., 1997).

2.2.2. Leeds dependence questionnaire (LDQ)

The LDQ (Raistrick et al., 1994) is a brief measure of general substance addiction severity that is not specific to particular substances. The 10 items address frequency of symptom experience, rated from never (0) to nearly always (3) (range 0–30). The measure has high internal consistency ($\alpha = 0.93$) and good construct validity in the present sample (Kelly et al., 2010b).

2.2.3. Social support questionnaire (SSQ)

The SSQ (Sarason et al., 1983), modified to include items assessing the alcohol and drug use patterns of key significant others (Richter et al., 1991), was used to assess the network risk structure and perceived recovery support. This interview identifies up to five key social network members (i.e., close friends), as well as each member's substance use status rated as one of the following: "currently abstaining (i.e., in recovery)", "does not use", "infrequently uses", "regularly uses", "possibly abuses", or "abuses". Participants also rate how many days contact they had with each individual on average per month during the past follow-up time period.

2.3. Social support measurements

For purposes of data analysis, we classified peers as high-risk or low-risk based on their use of alcohol and other drugs. Those who the participant reported to be engaging in "regular use", "possible abuse", or "abuse" of alcohol and/or other drugs were classified as high-risk, while those who the participant reported to be engaging in "infrequent use", who "do not use", or were "currently abstaining (i.e., in recovery)" were classified as low-risk.

The number of high-risk friends, and number of low-risk friends was calculated for each participant at each assessment point. Additionally, a net-risk of number of friends index was calculated by subtracting