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The Reliability and Reciprocity of a Social Network Measure

Leonard A. Jason, PhD and Ed Stevens, PhD

Center for Community Research, DePaul University, Chicago, Illinois, USA

Abstract

There have been few efforts to systematically develop reliable and valid measures of social networks, particularly in studies dealing with individuals having substance use disorders. In the current study, individuals living in recovery homes called Oxford Houses completed a 6-item measure of social networks. The Cronbach's alpha was .85 and a confirmatory factor analysis found excellent fit statistics with all items having substantial ($> .70$) load factors. In addition, the measure was independent of age, sex, and ethnicity and significantly related to length of stay in the recovery homes and quality of life. The authors have found that this instrument works well as an ego network with adequate psychometric properties and empirical relations to other recovery variables.

Keywords

Oxford House; recovery homes; social network; substance use disorders

Recovering people with substance use disorders (SUDs) face many obstacles to maintaining abstinence (Jason, Olson, & Foli, 2008). As an example, dropout is common from detoxification and acute treatment programs, and many people who finish treatment relapse over time. This cycle is often repeated frequently, with high personal and social costs. So it has become increasingly clear that detoxification and treatment programs are insufficient to ensure abstinence from drugs and alcohol; for most people with SUDs, continued longer term support following treatment is necessary. Environmental factors are key contributors to maintaining abstinence after treatment (Vaillant, 2003). These factors include the amount and type of support one receives for abstinence.

Within the substance use literature, there have been a number of studies of social support and their relationship to abstinence (e.g., Majer, Jason, Aase, Droege, & Ferrari, 2013). Supportive, cohesive posttreatment settings are known to reduce relapse rates (Laudet Becker, & White, 2009). For example, Schaefer, Cronkite, and Hu (2011) found that each additional month spent in aftercare led to a 20% increase in the odds of continued abstinence. We also know that a minimum stay of about 6 months in such settings seems necessary to materially improve the likelihood of sustained recovery (Jason, Olson, et al., 2007). Such studies demonstrate the value of recovery support during this critical period.

CONTACT Leonard A. Jason, ljason@depaul.edu, Center for Community Research, DePaul University, 990 W. Fullerton Ave., Chicago, IL 60614.

ORCID

Leonard A. Jason, <http://orcid.org/0000-0002-9972-4425>

But in these studies, networks are often treated as a single entity representing a characteristic of an individual respondent. Such approaches do not account for the heterogeneity of an individual's social network (Stone, Jason, Light, & Stevens, 2016). In contrast, network studies have typically been based on personal network data (also called "ego networks"). Personal networks are assessed by asking an individual ("ego") to identify his or her relationships ("alters"), which can be close friends, family members, and work associates. Researchers might use inventories or name generators in interviews to map respondents' ego networks. The respondent then provides information on each person in his or her ego network. The result is a data set containing multiple ties (alters) for the same respondent (ego), with each item for each alter as a separate variable. Personal ego network methodology offers greater detail in measuring social context compared to simple summary ratings. For example, one can see the ties or connections with the friends (alters) of the person (or ego) that support drinking or abstinence.

Ego networks have been studied as treatment outcomes and how an individual's ego network might be used to predict what specific treatment is most likely to succeed. In a recent literature review, Stone et al. (2016) found that completing treatment was related to increases of the number of abstinent and treatment-related alters in one's network (Litt, Kadden, Kabela-Cormier, & Petry, 2009; Min et al., 2013; Mohr, Avena, Kenny, & Del Boca, 2001; Tracy et al., 2012). Nearly all treatment-related changes in social networks found in these studies were positive, (i.e., increases in abstinent alters and decreases in substance/alcohol use of alters; Litt et al., 2009; Min et al., 2013; Mohr et al., 2001; Zywiak et al., 2009), suggesting that treatment interventions often support positive restructuring of one's social network.

Many of these studies used a measure called the Important People and Activities Inventory (IPA; Longabaugh, Wirtz, Zywiak, & O'malley, 2010), but there is inconsistency in the way investigators have used this instrument. Many analyze individual items (e.g., number of drinking network members; Zywiak, Longabaugh, & Wirtz, 2002) and others calculate composite or summary variables for analysis (e.g., support for drinking from network members; Groh, Jason, Ferrari, & Halpert, 2011). Unfortunately, there is also disagreement among researchers as to how many and which composite factors of the IPA create the best model. The psychometric properties of this instrument are also unclear.

Recently, a new measure of social networks was used in a study by Jason, Light, Stevens, and Beers (2014) of individuals in recovery houses, and they found that involvement in recovery-related activities (Alcoholics Anonymous [AA] meeting attendance, having an AA sponsor, etc.) led to increased trust of other residents and increased the likelihood of having a "confidant" within the house, that is, a trusted friend with whom to discuss recovery-related problems and issues. These results are consistent with a mutually reinforcing feedback loop between an individual's recovery-supporting activities and the quality of his or her social relationships with other house residents. The present study examined the psychometric properties of this new social network instrument with a relatively large sample of individuals living in recovery homes. It was hypothesized that the instrument would have high internal consistency and would be related to both length of stay in the recovery homes and quality of life.

Method

Procedure

This study involved a complete longitudinal design in which consented individuals underwent an initial baseline assessment (Wave 1), which is the focus of the current study. After participants enter the study, we assess them every 4 months over a 2-year period (this study is currently in progress and at the present time, only Wave 1 data has been collected and analyzed). Each wave of assessment will be conducted by phone or in-person interview, or by written surveys sent to, completed, and returned by each individual participant. The method of assessment (interview or written survey) will be selected by the participant during the consent process and subsequently when contacted for follow-up. Any individuals entering the participating recovery home during this period will be enrolled in the study after they provide informed consent, so we can assess the complete networks of the residents of the houses for the remaining subsequent waves. We selected only Oxford House (OH) recovery homes as they are comparable across different regions, requiring residents to abide by three rules: not consume any alcohol or drugs, pay their share of rent, and maintain good behavior in their houses. There are about 2,000 OHs in the United States, making them the largest networks of self-run recovery homes, as there are no professional staff within these settings.

To recruit 42 participating Oxford House (OH) recovery homes, a national recruiting strategy was implemented through an outreach to OH stakeholders at national and state levels, and samples were collected in North Carolina, Texas, and Oregon. Research staff first called the presidents of OHs to inform them of the study and request their participation in the study. House presidents were informed at this time that they would be requested to participate in the study (answering the same surveys as other house member participants along with one additional survey specific to the house president), and to participate in the recruitment of fellow members of their OH. If the house president agreed, our staff emailed him or her a verbal script to be used in presenting the information about the study to the house members. The house president then presented the study and asked the members of each house whether they would be willing to participate. This occurred verbally between the president and house members during a regularly scheduled weekly house business meeting. After outlining the study, the house president held a secret ballot to measure member interest. The research staff contacted the house presidents after the scheduled house business meetings to learn whether the house would participate. Once house presidents indicated that all or all but one of their members would like to participate, the participants were contacted by telephone on an individual basis to obtain verbal consent and to collect the information requested on a Contact Information Sheet. Verbal consent and contact information were obtained from each participant prior to the baseline wave of interviews. After obtaining verbal consent, an information package including all of the survey measures were directly sent to the name and address or email of the consenting individual. Residents were told that they have the right to decline participation without penalty. We did not observe any coercion that might occur for recruitment by inspecting the consent form to see if any discomfort was mentioned when that form was filled out. Further, to avoid a situation where the house as a whole reached a supposed consensus even when some individuals have reservations,

individual consent was obtained online from each house member, preserving anonymity of consent among members. Participants were informed that they may still request to receive a copy of the final report of the study regardless of their houses' nonparticipation in future waves.

If assessment occurred via phone calls, then we assured confidentiality by reminding participants that their survey responses are confidential and encouraged them to be in a private area throughout the duration of the interview. Likewise, participants who elected to fill written surveys received written instructions and a reminder phone call to complete the survey in private and enclose and seal their confidential responses in the provided return envelope. Because this study included references to house members by other house members, confidentiality was an important consideration in the handling of completed surveys. For written surveys received by mail, a process was set up to maintain care, control, and custody of the data from survey completion through deidentification at the time of data entry (in REDCap) to original document safekeeping.

Measures

As part of the baseline (Wave 1), assessment for each participating individual, the interviewer began with a Demographic Survey that measures sex, age, race, and length of residency in their recovery home. The current study focused on the two measures described below.

The Social Network Instrument was developed from our previously mentioned house network pilot study (Jason et al., 2014) and was administered. It measured residents' theoretically-significant relationships within the house, comprising the house social structure. Types of relationships include friendship (how friendly, how strong, personal conversation, helping), trust (how much money you would lend), and mentoring (going to the person for advice on recovery and other important life issues; see Appendix). Each of 6 items was rated on a 5-point (0–4) scale appropriate to the relationship type (e.g., friendship goes from “close friend” to “adversary”). These measures were used to create a matrix of relationships for each participant, relationship type (i.e., with all potential ties measured). All such matrices together comprise the “multiplex social network.”

The World Health Organization Quality of Life Assessment Brief Version (The WHOQOL Group, 1998) is a 26-item instrument measuring quality of life across four domains (physical, psychological, social relationships, and environment) using 5 point Likert-type scoring. The individual subscales have demonstrated marginal to excellent reliability (α 's = .66 for the 3-item social relationship subscale, .75 for psychological, .80 for environment, and .82 for physical). The instrument exhibits strong discriminant and convergent validity (Skevington, Lotfy, & O'Connell, 2004) and has been used across a broad constellation of cultures and populations including alcoholics (da Silva Lima, Fleck, Pechansky, de Boni, & Sukop, 2005) and homeless, substance dependent individuals (Garcia-Rea & LePage, 2010). The latter study also demonstrated within-individual change on monthly to yearly time scales.

Results

There were a total of 229 participants, with an average of 5.62 network members each. Of these participants, 55% ($n = 126$) were male and 44.5% ($n = 102$) were female and .4% ($n = 1$) were other. The average age of participants was 38 ($SD = 10.82$). Neither age ($r = .06$, $p > .05$) nor sex ($r = .14$, $p > .05$) were significantly correlated with the social network measure. Regarding race, 82.1% were Caucasian, 9.2% were African American, 1.3% were American Indian, 6.5% were Latino, and Alaskan Native, and Pacific Islander were .4% ($n = 1$). The social network instrument score was not significantly related to race or ethnicity, $F(3,225) = 1.46$, $p = .23$, using the four classifications of African American, Hispanic, White non-Hispanic, and other. Figure 1 shows the distribution of mean social network scores ($n = 1,297$, $M = 2.54$, $SD = .81$). Cronbach's alpha was .85 and all items contributed positively. These items were used to create an indicator of social network for each participant.

We next performed a two-level confirmatory factor analysis, which had excellent fit statistics (Comparative Fit Index [CFI] = .967, Tucker-Lewis Index [TLI] = .949, root mean square error of approximation [RMSEA] = .062, standardized root mean square residual [SRMR] = .030) with all items having substantial ($> .70$) load factors (see Figure 2).

Finally, we created two measures of social network, one based on an individual ego network, where SN1 indicated a person's ratings of all other members, and SN2 representing a house measure of the whole network. As is evident from Figure 3, length of stay (LOS) in the recovery home and quality of life (QOL) was significantly related to each measure, suggesting that the ego network measure might serve as good proxy for a whole network measure.

Discussion

Networks are becoming more pervasive, including within physical and information (e.g., databases) and biological (e.g., neural) domains, with minimal ingredients for social networks involving people (egos and alters) and relations (ties, relations, and connections). Unfortunately, at least within the substance use area, few measures have had adequate psychometric properties, and the current study suggested that the social network measure had adequate internal reliability and was related to a number of important recovery oriented variables.

The findings that those who scored higher on the social network measure had longer stays in the recovery homes and higher quality of life have important implications. Because 50% of individuals leave recovery homes before the 6-month period of time that is predictive of good recovery outcomes (Jason, Davis, et al., 2007), we need to understand the parameters that predict premature departure. Helping residents deal with social relationships might lead to greater recovery-related learning that could lead to a greater length of stay in the recovery homes. By identifying mechanisms through social network analysis through which social environments affect health outcomes, this approach could contribute to reducing health care costs by improving the effectiveness of the residential recovery home system in the United States and also restructuring and improving other community-based recovery settings.

Network approaches have remained limited largely to studies of “personal” networks, that is, the personal friendships or other significant relationships reported by study participants. In contrast, “whole” networks do include the relationships of named individuals with each other. A personal network involves a person in a group just rating all others in the group, whereas a whole network involves a person in the group rating not only all other group members but also being rated by others. Ego networks are regularly used to study substance use disorders (Stone et al., 2016), in part because the study population normally does not share the same context. The current study does suggest that the ego network measure used was comparable to a whole network approach.

There are several limitations in the current study. Only Wave 1 data was employed, and certainly over time, it will be important to investigate the longitudinal changes that occur among the social network variables in these recovery homes, and to evaluate the stability of this social network measure over time. In addition, Item 2 probably suffers from a small amount of reverse scoring bias and switching the order of the scoring key might eliminate the minor relationships in errors, but it’s really not a large problem for this measure.

In summary, this study provides preliminary data our relatively newly developed measure had adequate internal reliability and excellent fit statistics using a confirmatory factor analysis. In addition, the measure was significantly related to length of stay in the recovery homes and quality of life. Most importantly, this instrument works well as an ego network and thus allows investigators the option of using this approach when whole network data is not possible to collect.

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Appendix. Social Network Measure

Six items focused on relationship, resources, and access which are scored on 5-point scales. The lower the score, the stronger the relationship. Currently, Item 2 must be reversed scored. Each resident answers these questions about every other member of the house.

1. How friendly are you with this person?
2. If this person asked to borrow money from you, how much would you be willing to lend them?
3. If this person needed help for a day, how likely would you be to help?
4. How often do you have a personal conversation with this person?
5. How often do you go to this person for advice on your recovery and other important life issues?
6. Overall, how strong would you rate your relationship with this person?

Figure 1.
Distribution of mean social network scores.

Figure 2.
Loadings for confirmatory factor analysis.

Figure 3. Evidence of recovery relationships & reciprocity. LOS = length of stay; QOL = Quality of Life; SN1 = person's ratings of all other members; SN2 = a house measure of the whole network.