Published in final edited form as:

Psychol Addict Behav. 2013 September ; 27(3): . doi:10.1037/a0032346.

Psychometric Properties of the Important People Instrument with College Student Drinkers

Kevin A. Hallgren, Benjamin O. Ladd, and Brenna L. Greenfield

Department of Psychology, University of New Mexico

Abstract

Alcohol use in college students is associated with a number of negative consequences, and specific characteristics of college students' social networks have been linked to hazardous or harmful alcohol use. College represents a time when social networks are changing significantly, both in terms of composition and relative influence of network members. However, the reliability and validity of one of the most common measures for assessing alcohol-specific social support, the Important People Instrument (IPI; Clifford & Longabaugh, 1991), have not been established in college student samples. The aim of the current study was to examine the psychometric properties of the IPI administered in computerized and paper-and-pencil formats within a non-treatment-seeking sample of college drinkers ($N = 197$). Test-retest reliability estimates for the overall sample indicated that all indices had acceptable reliability. While the models tested within a confirmatory factor analysis (CFA) framework exhibited mediocre fit, a three-factor model appeared to offer the best fit overall. Consistent with previous findings with treatment-seeking samples, negative consequences of drinking were positively associated with network drinking behavior, but not network support for drinking or network general support. The IPI can provide reliable and valid information about network drinking behavior, network support for drinking, and general support among college students, although there is room for improvement in the measure. Future research may improve the measurement of alcohol-specific social support by measuring additional domains of the construct or by taking more contextualized approaches.

Alcohol use in college is common, with 63% of students reporting drinking in the past month and 42% endorsing heavy episodic drinking (Substance Abuse and Mental Health Services Administration, 2011). Among students who report past-year alcohol use, 30% endorse alcohol tolerance and 15% endorse consuming alcohol in physically hazardous situations (Ehlke, Hagman, & Cohn, 2012). This level of problematic heavy episodic drinking has been steady for four decades (Schulenberg & Patrick, 2012).

The social environment has long been recognized as an important construct related to college drinking behaviors. Longitudinal studies show that young adults form social relationships with people who have similar drinking levels, and concurrently, the drinking behaviors of others affect their own drinking (Ali & Dwyer, 2010; Bullers, Cooper, & Russell, 2001; Reifman, Watson, & McCourt, 2006). For heavy drinkers, this bidirectional relationship is thought to create a social context where heavy drinking and a social environment that supports heavy drinking become mutually reinforcing, which promotes and maintains hazardous drinking.

The social network also can protect against alcohol problems. For example, college students with a larger percentage of family members in their social networks report lower levels of

drinking (Reifman et al., 2006), and lower perceived parental support may interact with personality traits like high impulsivity and sensation seeking to create a higher risk for problematic drinking (Quinn & Fromme, 2011). Considerable evidence indicates that social network characteristics are important contributors to college student alcohol use and alcohol-related problems. Much of this research has been in the social norms tradition, which focuses on perceived drinking behavior of (descriptive norms) and perceived acceptance of drinking from (injunctive norms) one's peers. These constructs consistently have been linked with individual college student drinking (Borsari & Carey, 2003), but they are limited in that they focus only on peer drinking and general perceptions of peer behavior. There may be a discrepancy in assessments of "most people" as compared to "the specific individuals in your network," and focusing solely on peer drinking, although important for this developmental stage, may overlook the influence of the larger social network, including family members, whose drinking behavior has been found to be particularly important for ethnic minority college students (Corbin, Vaughan, & Fromme, 2008) and students transitioning into college (Wood, Read, Mitchell, & Brand, 2004).

Measures that gather comprehensive data about the social network itself, such as the Important People Instrument (IPI; Clifford & Longabaugh, 1991), can help address such gaps in the literature by assessing social network drinking behaviors, drinking-related support, and the general importance of social networks. The IPI has been well-validated in adult treatment-seeking populations; however, the psychometric properties of this instrument across different populations, particularly college student drinkers, have not been well established

One study has found high test-retest reliability for the IPI among treatment-seeking adults for a single composite index representing overall network support for drinking (a construct similar to injunctive norms; Longabaugh, Wirtz, Zweben, & Stout, 1998). However, more recent factor analyses have shown that the IPI appears to capture multiple constructs. Using principal components analysis (PCA), Longabaugh, Beattie, Noel, Stout, and Malloy (1993) found support for two latent factors within the IPI: support for alcohol use and general social investment. However, also within a PCA framework, Groh et al. (2007) and Zywiak et al. (2009) identified a three-factor IPI structure as the most parsimonious model for adults in substance use treatment. These studies yielded latent constructs that represent network drinking behavior (a construct similar to descriptive norms), network general support, and network support for drinking. Using a confirmatory factor analysis (CFA) framework from the IPI in a sample of 1373 alcohol treatment-seeking adults in the COMBINE study, Longabaugh, Wirtz, Zywiak, and O'Malley (2010) found good overall fit for a model consisting of six latent factors, including the three previously identified and three other factors representing network support for treatment, contact with network, and social investment.

Several IPI indices have shown good predictive validity, although most of this research has been conducted with treatment-seeking rather than college-student samples. In treatment-seeking samples, a greater number of abstainers and recovering alcoholics in the network predicted post-treatment abstinence (Groh et al., 2007; Longabaugh et al., 2010; Zywiak et al., 2002), whereas general network support and network support for drinking have had mixed associations with post-treatment drinking outcomes (Groh et al., 2007; Longabaugh et al., 2010; Zywiak et al., 2002). In one study that used the IPI with college students, indices representing drinking frequency of network members, drinking quantity of network members, and encouragement to drink from the most important people were associated with heavier drinking within a sample of 40 college students (Orford et al., 2004). This provides initial support for the IPI's validity when used in college-student samples, but fails to assess

other psychometric properties of the IPI with college students (e.g., reliability, factor structure).

The aim of the present study was to assess the psychometric properties of the IPI in a sample of college student drinkers. Specifically, the study aimed to (a) assess the test-retest reliability of individual IPI indices in paper-and-pencil- and computer-based test formats, (b) examine the constructs that underlie the instrument by testing competing factor structures identified in previous research with alcohol dependent drinkers, and (c) assess the associations between these underlying social support constructs and individual drinking behavior and related problems.

Method

Participants

Two hundred and twenty-four participants enrolled in the present study and 197 completed both time points and were retained for analysis. Participants were undergraduate students at a large public university in the southwestern United States who were enrolled in psychology courses and received course credit for completing the study. Eligibility criteria were minimal in order to sample a broad range of individuals who represent “college drinkers,” and included being at least 18 years of age and consuming at least one alcoholic beverage within the previous six months. One hundred and eight participants (54%) were female; the average age was 21 years ($SD = 4.3$, range = 18 to 41). The sample was primarily Hispanic (44.7%) and non-Hispanic White (40.1%).

Measures

Drinking quantity—The Graduated-Frequency Measure (GF; Clark & Midanik, 1982) assessed the number of times over the past 12 months that participants drank at certain quantities (e.g., 1–2 drinks, 3–4 drinks, etc.) and provided a total index representing the estimated number of drinks consumed in the past year. GF scores indicated that participants on average drank 447.1 ($SD = 594.7$) units of alcohol in the last 12 months. Scores were square-root transformed to reduce positive skew.

Drinking-related problems—The Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler, Strong, & Read, 2005) is a reduced 24-item version of the original 48-item YAACQ. Participants provided yes/no responses to whether they had experienced 24 negative consequences of drinking in the past year. Participants reported experiencing an average of 8.4 ($SD = 5.2$) negative consequences.

Social support—The IPI (Clifford & Longabaugh, 1991) was used to assess multiple characteristics of participants’ social networks. Although originally developed as a structured face-to-face interview, the current study used computerized and paper-and-pencil versions of the instrument that were completed individually. The IPI was administered twice two to three days apart to establish test-retest reliability. Participants were randomly assigned to one of four conditions in which they completed computerized versions both times (computer-computer), a computerized version then a paper-and-pencil version (computer-paper), a paper-and-pencil version then a computerized version (paper-computer), or paper-and-pencil versions both times (paper-paper).

Analytic Plan

IPI indices and test-retest reliability—IPI indices were computed according to the most recent guidelines developed for the COMBINE study (listed in Table 1; Longabaugh et al., 2010). Test-retest reliability was assessed using two-way, single-measures absolute-

agreement intraclass correlation coefficients (ICCs; Hallgren, 2012; McGraw & Wong, 1996; Shrout & Fleiss, 1979), which offer a more conservative estimate of reliability than Pearson correlation.

Confirmatory factor analysis—CFAs (Brown, 2006) were performed to test competing conceptual models of the IPI factor structure. Several IPI indices were highly correlated and produced a non-positive definite correlation matrix, preventing model convergence. Four indices were removed due to very high correlations with other indices. These included daily support from the overall network, daily support from the most important members of the network, and average contact, which were each highly correlated with daily contact ($r = 0.92, 0.91, \text{ and } 0.76$, respectively), and daily support from valued network members, which was highly correlated with daily support from the overall network ($r = 0.87$). Additionally, indices representing the number of network members who would support or oppose participants receiving alcohol treatment contained a minimal amount of variance, with most participants identifying no network members who would support (53%, $n = 105$) or oppose treatment (54%, $n = 107$). Overall, six indices were removed, leaving 11 indices that were conceptually similar to the IPI indices used in the principal components analyses reported by Groh et al. (2007) and Longabaugh et al. (2010). Two- and three-factor CFA models were tested with each of the remaining indices allowed to load onto one of two or three *a priori* specified latent factors.

Concurrent validity—Concurrent validity was evaluated by testing for correlations of each factor from the best fitting model with measures of drinking quantity and drinking-related problems within a structural equation modeling framework. All CFA and structural equation models were fit using the R *lavaan* package (Rosseel, 2012) with maximum likelihood.

Results

Test-Retest Reliability

Table 1 displays test-retest reliability estimates for each IPI index for the overall sample and for each of the four test-format conditions. Indices retained for the CFA are presented in the top portion of Table 1, and those removed from the CFA are reported in the bottom portion. Test-retest reliability estimates for the overall sample indicated that all indices had satisfactory reliability (Cicchetti, 1994); however, some reliability estimates were poor within specific format conditions. There did not appear to be any ICCs that were consistently low across format conditions or IPI index.

Confirmatory Factor Analysis

One IPI index, total frequency of drinking in the network, produced unrealistic estimates in the CFA with a factor loading greater than 1.0 ($\beta = 1.07, SE = 0.07, 95\% \text{ CI} = 0.93 \text{ to } 1.21$) and residual error less than 0.0 ($\beta = -0.15, SE = 0.12, 95\% \text{ CI} = -0.39 \text{ to } 0.09$), resulting in an improper solution known as a Heywood case (Dillon, Kumar, & Mulani, 1987). To correct for this, guidelines provided by Dillon et al. and Van Driel (1978) were followed and models were re-estimated with negative residual error variances fixed at zero, which had little effect on the overall model fit and the remaining parameter estimates.

Modification indices, overall model fit, and correlation matrices indicated substantial strain in the model fit on IPI items that were dependent on the number of individuals in the network, including the number of network members accepting or not accepting drinking, number of daily drinkers, overall daily contact, total importance, and number of supportive people. Residual errors for these items were allowed to correlate freely with the IPI index

for total network size, justified on the basis that the correlation between these items was dependent on shared method variance based on the number of people listed on the IPI. The addition of these residual error covariances significantly improved model fit, $\chi^2(6) = 165.5$, $p < .001$.

Table 2 displays the results from the two- and three-factor CFA models, including factor loadings, residual errors, standardized latent variable covariances, and fit statistics. All latent variable variances were fixed at 1.0 to allow the latent variable covariances to be interpreted as standardized correlations.

Global fit indices (see Table 2) indicated mediocre fit based on RMSEA, CFI and SRMR estimates (Brown, 2006; Jackson, Gillaspay, & Purc-Stephenson, 2009). The three-factor model offered a slightly better fit to the data than the two-factor model based on these indices as well as the Akaike information criterion and Bayesian information criterion.

Associations with Drinking Quantity and Drinking-Related Problems

GF and B-YAACQ scores were converted to z -scores and added to the model, allowing covariances between these measures and IPI factors to be interpreted as standardized correlations. GF scores were significantly and positively associated with network drinking behavior ($r = 0.34$, $SE = 0.06$, $p < .001$) and network support for drinking ($r = 0.21$, $SE = 0.10$, $p = .03$), but not network general support ($r = -0.07$, $SE = 0.06$, $p = .27$). Drinking-related problems were significantly and positively associated with network drinking behavior ($r = .26$, $SE = 0.07$, $p < .001$), but were not associated with network support for drinking ($r = 0.01$, $SE = 0.10$, $p = .91$) or general network support ($r = -0.01$, $SE = 0.06$, $p = .85$).

Discussion

Although the IPI originally was developed to assess social support in treatment-seeking samples, it has been used in a variety of populations, including college students (Orford, 2004). Thus, the goal of this study was to assess the psychometric properties of the IPI within a sample of college drinkers. Additionally, this study examined the utility of the IPI as a measure for gathering comprehensive data on an individual's social network to supplement a body of literature that has trended towards the study of group norms.

IPI indices exhibited good to excellent reliability and were similar to those previously reported (Longabaugh et al., 1998). There were no systematic differences observed across the two formats in the current study. Thus, the IPI appears to be reliable in a young, non-treatment-seeking sample. Further, administering the IPI as a self-report instrument via paper-and-pencil or computerized questionnaires appears to be an acceptable adaptation of the IPI.

The results indicate that the IPI is reliable across modes of administration and across time. This is an important finding, as previous IPI test-retest results showed strong temporal reliability and the present study further suggests good cross-modal reliability. Of note, some individual indices were observed to have low reliability within specific modality pairings; however, some variation may be expected due to sampling fluctuation and no consistent trends were found to indicate that one mode fares more poorly than the other. Others have noted advantages of using computer-administered questionnaires instead of interviews, including reduced training and time demand for staff (Trull, 2007), increased comfort and honesty from participants (Bendtsen & Timpka, 1999; Kobak et al., 1996), and automatic data entry and error-checking. Computer-based administration of the IPI can provide an efficient method for obtaining information about clients' social networks, could be

administered in the clinic or online, and can be scored automatically to provide instant feedback.

Although not a strong fit, the three-factor model provided a somewhat better fit than the two-factor model tested. There seems to be some stability of the underlying factor structure of the IPI across different research studies; for example, encouragement for drinking vs. the actual drinking behavior of network members appear to be different constructs based on previous PCAs with treatment-seekers with alcohol dependence (Groh et al., 2007; Longabaugh et al., 2010; Zywiak et al., 2009) and based on the current study. Analyses from the current study indicated that when “support for drinking” is split into “network drinking behavior” and “network support for drinking,” network drinking behavior was found to be more strongly associated with individual drinking and drinking-related problems, while network support for drinking was less correlated with individual drinking and unrelated to drinking-related problems. General network support was uncorrelated with individual drinking and drinking-related problems. The information assessed on the IPI can provide clinically useful information regarding risk factors for college drinkers, such as the drinking behavior of one’s social network.

Because the CFA results indicated room for improved model fit, there is a need for measures that may better tap into constructs of alcohol-related social support in college students. While the IPI is considered to be a useful and comprehensive instrument for measuring alcohol-related social support, social support is a complex and dynamic construct. The underlying construct of social support may be different depending on the context in which it is measured. For the current study, the original IPI was selected (as opposed to an adapted version) in order to test the replicability of factor structures previously found in treatment-seeking samples. The current findings suggest potential value in modifying and retesting the IPI itself, particularly for factors that are less relevant to college student drinkers and had low variability in the present study. For example, “support for treatment” and “opposition for treatment” could be removed from the IPI for college student samples, or better yet, the language of these items could be modified and then tested in subsequent research. Since many college students reduce their drinking outside of formal treatment contexts, these questions could be modified to assess support for changes in drinking that may occur through any method, not just through formal treatment (e.g., “How much would this person support you reducing your drinking or stopping drinking altogether?”).

Alternatively, the way in which alcohol-related social support is measured in college populations could be reframed all together. For example, other measures of general social support may be adapted for studying alcohol-related social support along previously established dimensions such as emotional support, informational support, and instrumental support (Hogan, Linden, & Najarian, 2002; Matud, Ibáñez, Bethencourt, Marrero, & Carballeira, 2003). Items could be reframed into multiple questions by assessing the perceived likelihood of network members providing nurturance (emotional support), advice (informational support), and logistical assistance (instrumental support) if the participant were to try to reduce their drinking or stop their drinking altogether. Alternatively, it is possible that an improved factor structure may be obtained by incorporating more situation-specific information based on the contextualized nature of social environments such as cultural background, age, gender, or drinking status (e.g., Matud et al., 2003).

The current study had several limitations. First, the IPI was designed for treatment-seeking populations who may have experienced many problems related to their drinking and thus contains items that may not be salient for non-treatment seeking samples (e.g., items assessing network support for treatment). We specifically chose not to adapt these questions in order to replicate previous findings from dissimilar populations; however, the results here

indicate that network support for treatment had little variability and could be modified and validated in future research. Second, longitudinal data on drinking and drinking-related consequences were not collected. This prevented us from being able to test the predictive validity of the IPI indices, e.g., by assessing their associations with past or future drinking and drinking-related consequences, and instead only concurrent validity could be tested.

The present study also had several strengths. The psychometric properties of the IPI were tested in a novel sample. Several psychometric properties were evaluated, including test-retest reliability and construct validity. Additionally, the present study tested the reliability of the IPI via self-report rather than interview format, which is a modality in which the IPI is often used.

It is important to consider social environmental factors to understand the development of different drinking patterns. Assessing such factors requires reliable and valid measures. The study indicates that the IPI provides reliable assessment in college students and can provide useful clinical information, but there is room for improvement. Future research directed at tailoring assessment of alcohol-specific support in non-treatment-seeking populations is needed to better establish the construct of social support.

Acknowledgments

This research was funded by NIAAA grant numbers T32AA018108 and F31AA021031. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Alcohol Abuse and Alcoholism or the National Institutes of Health.

The authors would like to thank Aaron Haslam, Ericka Avery, Martin Haug, Barbara McCrady, and Kamilla Venner for their assistance with this study.

References

- Ali MM, Dwyer DS. Social network effects in alcohol consumption among adolescents. *Addictive Behaviors*. 2010; 35(4):337–342.
- Bendtsen P, Timpka T. Acceptability of computerized self-report of alcohol habits: A patient perspective. *Alcohol and Alcoholism*. 1999; 34(4):575–580.
- Borsari B, Carey KB. Descriptive and injunctive norms in college drinking: A meta-analytic integration. *Journal of Studies on Alcohol and Drugs*. 2003; 64:331–341.
- Brown, TA. *Confirmatory factor analysis for applied research*. New York: Guilford Press; 2006.
- Bullers S, Cooper ML, Russell M. Social network drinking and adult alcohol involvement: A longitudinal exploration of the direction of influence. *Addictive Behaviors*. 2001; 26(2):181–199.
- Burk WJ, Van Der Vorst H, Kerr M, Stattin H. Alcohol use and friendship dynamics: Selection and socialization in early-, middle-, and late-adolescent peer networks. *Journal of Studies on Alcohol and Drugs*. 2012; 73(1):89–98.
- CASAA Research Division. Demographic interview 2.2 (English version). University of New Mexico Center on Alcoholism, Substance Abuse, and Addiction; 1997. Retrieved April 12, 2009, from http://casaa.unm.edu/inst/Demographic%20Interview%202_2.pdf
- Cicchetti DV. Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*. 1994; 6(4):284–290.
- Clark, WB.; Midanik, LT. *Alcohol and Health Monograph No 1*. Rockville, MD: NIAAA; 1982. Alcohol use and alcohol problems among U.S. adults: Results of the 1979 survey.
- Clifford, PR.; Longabaugh, R. Adapted for use by Project MATCH for NIAAA 5R01AA06698-05 Environmental Treatment of Alcohol Abusers. Richard Longabaugh, Principal Investigator; 1991. Manual for the administration of the Important People and Activities Instrument.
- Corbin WR, Vaughan EL, Fromme K. Ethnic differences and the closing of the sex gap in alcohol use among college-bound students. *Psychology of Addictive Behaviors*. 2008; 22(2):240–248.

- Dillon WR, Kumar A, Mulani N. Offending estimates in covariance structure analysis: Comments on the causes of and solutions to Heywood cases. *Psychological Bulletin*. 1987; 101(1):126–135.
- Ehlke SJ, Hagman BT, Cohn AM. Modeling the dimensionality of DSM-IV alcohol use disorder criteria in a nationally representative sample of college students. *Substance Use and Misuse*. 2012; 47:1073–1085. [PubMed: 22515205]
- Fox. sem: Structural Equation Models (version 0.9-21) [software]. 2010. Available from <http://CRAN.R-project.org/package=sem>
- Groh DR, Olson BD, Jason LA, Davis MI, Ferrari JR. A factor analysis of the Important People Inventory. *Alcohol and Alcoholism*. 2007; 42(4):347–353. [PubMed: 17510103]
- Hallgren KA. Computing inter-rater reliability for observational data: An overview and tutorial. *Tutorials in Quantitative Methods for Psychology*. 2012; 8(1):23–34. [PubMed: 22833776]
- Ham LS, Hope DA. College students and problematic drinking: A review of the literature. *Clinical Psychology Review*. 2003; 23:719–59. [PubMed: 12971907]
- Hogan BE, Linden W, Najarian B. Social support interventions: Do they work? *Clinical Psychology Review*. 2002; 22:381–440.
- Jackson DL, Gillaspay JA, Purc-Stephenson R. Reporting practices in confirmatory factor analysis: An overview and some recommendations. *Psychological Methods*. 2009; 14(1):6–23. [PubMed: 19271845]
- Kahler CW, Strong DR, Read JP. Toward efficient and comprehensive measurement of the alcohol problems continuum in college students: the Brief Young Adult Alcohol Consequences Questionnaire. *Alcoholism: Clinical and Experimental Research*. 2005; 29(7):1180–1189.
- Kobak KA, Greist JH, Jefferson JW, Katzelnick DJ. Computer-administered clinical rating scales: A review. *Psychopharmacology*. 1996; 127(4):291–301. [PubMed: 8923563]
- Longabaugh R, Beattie M, Noel N, Stout R, Malloy P. The effect of social investment on treatment outcome. *Journal of Studies on Alcohol*. 1993; 54(4):465–478.
- Longabaugh R, Wirtz PW, Zweben A, Stout RL. Network support for drinking, Alcoholics Anonymous and long-term matching effects. *Addiction*. 1998; 93(9):1313–1333. [PubMed: 9926538]
- Longabaugh R, Wirtz PW, Zywiak WH, O'Malley SS. Network support as a prognostic indicator of drinking outcomes: The COMBINE study. *Journal of Studies on Alcohol and Drugs*. 2010; 71(6): 837–846. [PubMed: 20946740]
- MacCallum RC, Roznowski M, Necowitz LB. Model modifications in covariance structure analysis: The problem of capitalization on chance. *Psychological Bulletin*. 1992; 111(3):490–504. [PubMed: 16250105]
- MacCallum RC, Widaman KF, Zhang S, Hong S. Sample size in factor analysis. *Psychological Methods*. 1999; 4:84–99.
- Matud MP, Ibáñez I, Bethencourt JM, Marrero R, Carballeira M. Structural gender differences in perceived social support. *Personality and Individual Differences*. 2003; 35(8):1919–1929.
- McGraw KO, Wong SP. Forming inferences about some intraclass correlation coefficients. *Psychological Methods*. 1996; 1:30–46.
- Mercken L, Steglich C, Knibbe R, de Vries H. Dynamics of friendship networks and alcohol use in early and mid-adolescence. *Journal of Studies on Alcohol and Drugs*. 2012; 73(1):99–110. [PubMed: 22152667]
- Orford J, Krishnan M, Balaam M, Everitt M, Van Der Graaf K. University student drinking: The role of motivational and social factors. *Drugs: Education, Prevention & Policy*. 2004; 11(5):407–421.
- Parra GR, Krull JL, Sher KJ, Jackson KM. Frequency of heavy drinking and perceived peer alcohol involvement: Comparison of influence and selection mechanisms from a development perspective. *Addictive Behaviors*. 2007; 32(10):2211–2225. [PubMed: 17428616]
- Read RP, Kahler CW, Strong DR, Colder CR. Development and preliminary validation of the Young Adult Alcohol Consequences Questionnaire. *Journal of Studies on Alcohol*. 2006; 67(1):169–177. [PubMed: 16536141]
- Quinn PD, Fromme K. The role of person-environment interactions in increased alcohol use in the transition to college. *Addiction*. 2011; 106:1104–1113. [PubMed: 21338432]

- Rehm J, Greenfield TK, Walsh G, Xie X, Robson L, Single E. Assessment methods for alcohol consumption, prevalence of high risk drinking and harm: A sensitivity analysis. *International Journal of Epidemiology*. 1999; 28:219–24. [PubMed: 10342682]
- Reifman A, Watson WK, McCourt A. Social networks and college drinking: Probing processes of social influence and selection. *Personality and Social Psychology Bulletin*. 2006; 32(6):820–832. [PubMed: 16648206]
- Schulenberg, JE.; Patrick, ME. Historical and developmental patterns of alcohol and drug use among college students: Framing the problem. In: White, HR.; Rabiner, D., editors. *College drinking and drug use*. New York, NY: Guilford; 2011. p. 13-35.
- Shrout PE, Fleiss JL. Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*. 1979; 86(2):420–428. [PubMed: 18839484]
- Substance Abuse and Mental Health Services Administration. NSDUH Series H-41, HHS Publication No SMA 11-4658. Office of Applied Studies; 2011. Results from the 2010 National Survey on Drug Use and Health: Summary of national findings. Retrieved from <http://www.samhsa.gov/data/NSDUH/2k10NSDUH/2k10Results.htm-3.1.6>
- Trull TJ. Expanding the aperture of psychological assessment: Introduction to the special section on innovative clinical assessment technologies and methods. *Psychological Assessment*. 2007; 19(1): 1–3. [PubMed: 17371118]
- Van Driel OP. On various causes of improper solutions in maximum likelihood factor analysis. *Psychometrika*. 1978; 43(2):225–243.
- Walter SD, Eliasziw M, Donner A. Sample size and optimal designs for reliability studies. *Statistics in Medicine*. 1998; 17(1):101–110. [PubMed: 9463853]
- Wood MD, Read JP, Mitchell RE, Brand NH. Do parents still matter? Parent and peer influences on alcohol involvement among recent high school graduates. *Psychology of Addictive Behaviors*. 2004; 18:19–30. [PubMed: 15008682]
- Wothke, W. Nonpositive definite matrices in structural modeling. In: Bollen, K.; Long, S., editors. *Testing Structural Equation Models*. Newbury Park, CA: Sage; 1993.
- Zywiak WH, Longabaugh R, Wirtz PW. Decomposing the relationships between pretreatment social network characteristics and alcohol treatment outcome. *Journal of Studies on Alcohol*. 2002; 63(1):114–121. [PubMed: 11925053]
- Zywiak WH, Neighbors CJ, Martin RA, Johnson JE, Eaton CA, Rohsenow DJ. The Important People Drug and Alcohol interview: Psychometric properties, predictive validity, and implications for treatment. *Journal of Substance Abuse Treatment*. 2009; 36:321–330. [PubMed: 18835677]

Table 1

Test-retest reliability for IPI indices

IPI Index	M (SD)	Full-sample ICC (N=197)	Full-sample ICC 95% CI	Paper-Paper ICC (n=46)			Computer-Paper ICC (n=53)		
Percentage of heavy drinkers:	12.3 (14.1)	.715	(.639, .777)	.682	.673	.740	.701		
Percentage of abstainers/recovering alcoholics:	18.9 (17.7)	.790	(.726, .839)	.709	.772	.827	.768		
No. network members who drink daily:	0.36 (0.71)	.574	(.473, .661)	.414	.676	.674	.475		
Total frequency of drinking in the network:	239.2 (154.5)	.825	(.773, .866)	.711	.848	.850	.847		
No. who accept/encourage drinking:	5.64 (2.81)	.775	(.713, .826)	.753	.811	.745	.802		
No. who oppose drinking:	0.90 (1.36)	.814	(.761, .856)	.676	.925	.841	.738		
Average general support from network members:	4.57 (0.77)	.579	(.469, .670)	.684	.309	.488	.785		
No. of members with daily contact:	2.73 (1.79)	.659	(.572, .731)	.727	.354	.783	.634		
Total no. in network:	9.42 (1.34)	.851	(.807, .885)	.665	.959	.880	.812		
Total importance of network members:	46.1 (8.8)	.856	(.813, .889)	.782	.886	.853	.883		
No. of supportive network members:	7.50 (2.11)	.558	(.449, .650)	.294	.564	.478	.791		

IPI Index	M (SD)	Full-sample ICC (N=197)	Full-sample ICC 95% CI	Paper-Paper ICC (n=46)	Paper-Computer ICC (n=45)	Computer-Paper ICC (n=53)	Computer-Computer ICC (n=53)
Indices excluded from CFA							
No. who support treatment:	2.77 (3.79)	.807	(.753, .851)	.726	.898	.812	.809
No. who oppose treatment:	2.66 (3.70)	.758	(.692, .812)	.679	.797	.764	.807
Daily support:	2.45 (1.71)	.650	(.561, .724)	.659	.406	.712	.694
Daily support from valued network members:	2.40 (1.70)	.651	(.562, .725)	.674	.479	.666	.701
Average amount of contact with network:	62.6 (22.6)	.751	(.683, .806)	.801	.579	.805	.782
No. of valued members from whom support is received:	6.88 (2.17)	.595	(.483, .685)	.426	.650	.474	.776

Note: ICC = Intraclass correlation, CFA = confirmatory factor analysis, paper = paper-and-pencil format, computer = computerized format.

Table 2

Confirmatory factor analysis results.

IFI Index	Two-factor model			Three-factor model		
	Latent factor	Factor loading (SE)	Residual error (SE)	Latent factor	Factor loading (SE)	Residual error (SE)
Percentage of heavy drinkers:	Support for drinking	.504(.061)***	.743(.075)***	Network drinking	.504(.061)***	.743(.075)***
Percentage of abstainers/recovering alcoholics ^a :	Support for drinking	-.403(.066)***	.833(.084)***	Network drinking	.403(.065)***	.833(.084)***
No. network members who drink daily:	Support for drinking	.611(.056)***	.626(.063)***	Network drinking	.611(.056)***	.626(.063)***
Total frequency of drinking in the network:	Support for drinking	1 ^b	0 ^b	Network drinking	1 ^b	0 ^b
No. who accept/encourage drinking ^a :	Support for drinking	.262(.066)***	.902(.091)***	Support for drinking	.711(.142)***	.461(.182)***
No. who oppose drinking:	Support for drinking	.238(.069)**	.946(.095)***	Support for drinking	.477(.109)***	.764(.110)***
Average general support from network members:	General support	.715(.068)***	.484(.064)***	General support	.706(.068)***	.497(.065)***
No. of members with daily contact:	General support	.149(.072)***	.973(.098)***	General support	.140(.071)*	.975(.098)***
Total no. in network:	General support	.182(.087)***	.906(.090)***	General support	.189(.090)*	.924(.092)***
Total importance of network members:	General support	.639(.069)***	.587(.068)***	General support	.630(.069)***	.598(.069)***
No. of supportive network members:	General support	.986(.065)***	.023(.080)	General support	.999(.065)***	.000(.083)
Latent variable covariances						
				Standardized correlation		
Support for drinking	General support	.039(.062)				
Support for drinking	Network drinking behavior	.377(.090)***				
Network drinking behavior	General support	.034(.061)				
Fit statistics						
				Estimate		
Chi-square (df)						109.25(37)***
SRMR						.085
RMSEA						.100
CFI						.906
AIC						5480.02
BIC						5575.24

Note: Statistical significance determined by Wald test. SRMR = standardized root mean square residual, RMSEA = root mean square error of approximation, CFI = comparative fit index, AIC = Akaike information criterion, BIC = Bayesian information criterion.

* $p < .05$,
 ** $p < .01$,
 *** $p < .001$.

^a Item reverse scored.

^b Residual errors fixed to zero to correct for Heywood cases, which necessarily fixes factor loadings at 1.