2018

Loneliness in Treatment-Seeking Substance-Dependent Populations: Validation of the Social and Emotional Loneliness Scale for Adults-Short Version

Isabella Ingram
University of Wollongong, ii841@uowmail.edu.au

Peter James Kelly
University of Wollongong, pkelly@uow.edu.au

Frank P. Deane
University of Wollongong, fdeane@uow.edu.au

Amanda Baker
University of Newcastle, Amanda.Baker@newcastle.edu.au

Dayle Raftery
University of Wollongong, dkr034@uowmail.edu.au

Loneliness in Treatment-Seeking Substance-Dependent Populations: Validation of the Social and Emotional Loneliness Scale for Adults-Short Version

Abstract

Objectives: Loneliness is a distressing emotional experience that is likely to be prevalent among people accessing treatment for substance dependence problems. The first aim of the current study was to report on the validity of the Social and Emotional Loneliness Scale for Adults-Short Version (SELSA-S), a multidimensional measure of loneliness, for use in substance-dependent treatment populations. In order to further the understanding of loneliness among this population, loneliness was examined in relation to demographic, physical, and mental health variables. **Methods:** Participants were attending Australian residential substance dependence treatment services provided by two nongovernmental organizations (The Salvation Army and We Help Ourselves). Participants completed cross-sectional surveys (N = 316) consisting of measures of demographics, substance use, loneliness, and physical and mental health. **Results:** Confirmatory factor analysis revealed high factor loadings and a moderate degree of concurrent and discriminant validity and internal consistency for the SELSA-S; however, model fit indices did not meet prespecified cutoff criteria. Loneliness was deemed to be a serious problem for 69% of respondents, and 79% reported feeling lonely at least once per month. **Conclusions:** Findings of this study suggest the need for further research into the validity of the SELSA-S for use with substance-dependent populations. In addition, it may be beneficial to test a range of loneliness measures in order to determine whether other measures of loneliness may be more favorable for use across this population.

Disciplines
Education | Social and Behavioral Sciences

Loneliness in treatment-seeking substance dependent populations:

Validation of the Social and Emotional Loneliness Scale for Adults-Short version

Short Title: Loneliness and validation of the SELSA-S

Isabella Ingram[1] B.Sc, GDipProfPsy. (ingram@uow.edu.au)

Peter J. Kelly[1] Ph.D. (pkelly@uow.edu.au)

Frank P. Deane[1] Ph.D. (fdeane@uow.edu.au)

Amanda L. Baker[2] Ph.D. (amanda.baker@newcastle.edu.au)

Dayle K. Raftery[1] B.Psy(Hons), MProfPsy. (dkr034@uowmail.edu.au)

[1]Illawarra Institute for Mental Health, School of Psychology, University of Wollongong, NSW, Australia

[2]School of Medicine and Public Health, University of Newcastle, New South Wales, Australia

Author for correspondence: Isabella Ingram, School of Psychology, University of Wollongong, Wollongong, NSW, Australia, 2500. Telephone: +61 2 4221 4484, Fax: +61 2 4221 4163, Email: ingram@uow.edu.au

Abstract

Objectives: Loneliness is a distressing emotional experience that is likely to be prevalent amongst people accessing treatment for substance dependence problems. The first aim of the current study was to report on the validity of the Social and Emotional Loneliness Scale for Adults-Short version (SELSA-S), a multidimensional measure of loneliness, for use in substance dependent treatment populations. In order to further the understanding of loneliness amongst this population, loneliness was examined in relation to demographic, physical and mental health variables.

Methods: Participants were attending Australian residential substance dependence treatment services provided by two non-government organizations (The Salvation Army and We Help Ourselves). Participants completed cross-sectional surveys ($N = 316$) consisting of measures of demographics, substance use, loneliness, and physical and mental health.

Results: Confirmatory factor analysis revealed high factor loadings and a moderate degree of concurrent and discriminant validity and internal consistency for the SELSA-S, however, model fit indices did not meet pre-specified cut-off criteria. Loneliness was deemed to be a serious problem for 69% of respondents, and 79% reported feeling lonely at least once per month.

Conclusions: Findings of this study suggest the need for further research into the validity of the SELSA-S for use with substance dependent populations. Additionally, it may be benenficial to test a range of loneliness measures in order to determine if other measures of loneliness may be more favorable for use across this population.

Key Words: loneliness, substance dependence, addiction, measurement, validation

Introduction

2

Loneliness is a distressing emotional experience that arises as a result of a discrepancy between an individual's desired interpersonal relationships and their perceived relationships (Peplau & Perlman, 1982). Loneliness can be experienced as transient or chronic, and this experience can change over time (Perlman & Peplau, 1981). Loneliness has consistently been linked to poor physical health (Cacioppo et al., 2002; Christiansen, Larsen, & Lasgaard, 2016; Petitte et al., 2015; Stickley et al., 2013), poor mental health (Beutel et al., 2017), poor quality of life (Theeke et al., 2014), and increased morbidity and mortality (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). Loneliness has been likened to physical inactivity, obesity, and smoking as a leading health risk factor for mortality (Holt-Lunstad et al., 2015). About 28% of Australians identify loneliness to be a serious concern. Additionally, 36% of Australians report experiencing loneliness at least once per month (Franklin & Tranter, 2008). These rates are broadly consistent with international estimates of loneliness across other western countries. For example, in the United States, it is estimated that one in five Americans experience loneliness at any given time (Cacioppo & Patrick, 2008).

While it is unknown whether loneliness is an antecedent to, or a consequence of, substance dependence, it is likely to be an issue for people with substance dependence problems. Social relationships, and in particular positive social support and belonging, are key factors involved in recovery from substance use disorders (McCrady, 2004; Spaniol, Bellingham, & Cohen, 2003). Poor-quality relationships and social isolation are detrimental to recovery and wellbeing (Nordfjaern, Rundmo, & Hole, 2010) and are linked to loneliness (Hawkley et al., 2008; Tate, Brown, Unrod, & Ramo, 2004). Anecdotal reports concerning feelings of disconnection, isolation, and loneliness are common amongst people in recovery from addiction. In addition, mutual aid fellowships such as Alcoholics Anonymous (AA) make reference to loneliness as a shared experience amongst those in recovery (e.g. "Then he will know loneliness such as few do"; Alcoholics Anonymous World Services inc., 1976).

Similarly, treatment manuals for addiction frequently include components aimed to reduce

social isolation and alleviate loneliness (e.g. Daley & Mercer, 2002; Foote, 2011). While

literature reviews and commentaries suggest that people with substance dependence problems

are lonely (Akerlind & Hornquist, 1992; Loos, 2002), these reviews are often based on

theoretical discussions and clinical observations, and note that there is little empirical

research in this area.

The existing empirical research in this area has been difficult to interpret, as the

measurement of loneliness has been varied (Yang & Victor, 2011). The majority of empirical

research explores constructs that are similar to loneliness, such as social isolation and social

support, as opposed to loneliness directly. For example, Orzeck and Rokach (2004)

developed a measure to examine the experience of loneliness for males accessing drug

dependence treatment. Their measure examined constructs such as emotional distress and

interpersonal isolation, which were theoretically related to loneliness, yet not a direct measure

of loneliness. Research directly measuring loneliness has often used single-item measures or

has explored loneliness through descriptive methods (e.g. Yildirim, Engin, & Yildirim,

2011), while other studies have relied upon author-developed measures (e.g. Hornquist &

Akerlind, 1987; Medora & Woodward, 1991) which have rarely been validated for use with

substance dependent populations.

To improve the measurement of loneliness across substance dependent populations, a

standardized approach is required using scales that are theoretically grounded, and are

validated for use across this population. Standardized loneliness measures, such as the

University of California, Los Angeles' Loneliness Scale (UCLA; Russell, Peplau, &

Ferguson, 1978) have been commonly used across the literature to quantify loneliness.

Findings from studies that have used the UCLA have suggested that loneliness predicts

substance use (Mannes et al., 2016) and that substance dependent samples are lonelier than

4

control groups (Agman et al., 2015). However, loneliness is progressively being viewed as a multidimensional construct, which cannot be captured using single-item or unidimensional measures, such as the UCLA scale (Heinrich & Gullone, 2006; Maes, Klimstra, Van den Noortgate, & Goossens, 2014).

Weiss (1973) proposed a typology of loneliness that was comprised of two distinct types of loneliness: social and emotional loneliness. Social loneliness results from a deficiency in social relationships. Emotional loneliness is proposed to result from the lack of attachment to another person who offers emotional support. The Social and Emotional Loneliness Scale (SELSA; Ditommaso & Spinner, 1993) is a 37-item scale based on the Weiss (1973) theory of social and emotional loneliness. The scale yields three loneliness subscales; social, family and romantic and the latter two can be combined to yield an 'emotional loneliness' score. A review of different measures of loneliness concluded that, "the SELSA represents the superior instrument to assess both social and emotional loneliness dimensions" (Cramer & Barry, 1999). In order to enhance ease of use for clinical and research settings, a shorter 15-item version of the SELSA (SELSA-S) was developed and validated for use across university samples, a psychiatric sample, and armed forces personnel (DiTommaso, Brannen, & Best, 2004). A study using this measure was conducted among a sample of people accessing treatment for drug dependence in Iran (Hosseinbor, Ardekani, Bakhshani, & Bakhshani, 2014). The findings of that study provided some insight into the multidimensionality of loneliness amongst substance dependent samples, however, the SELSA-S measure is yet to be properly validated for use across substance dependent populations.

The first aim of the current study was to report on the validity of the SELSA-S for use in substance dependent treatment populations. In order to further the understanding of loneliness amongst this population, demographic, and physical and mental health variables

were examined in relation to loneliness. Based on findings across other populations, it was hypothesized that higher psychological distress (e.g. Stickley, Koyanagi, Koposov, Schwab-Stone, & Ruchkin, 2014), lower quality of life (e.g. Theeke et al., 2014), and poorer physical and mental health would be associated with higher levels of loneliness.

Methods

Participants

Participants were attending residential substance dependence treatment at The Salvation Army Recovery Services Eastern Territory Division (three residential services) and We Help Ourselves (WHOs; six residential services across Australia). Across these services, 346 participants completed the surveys between May 2017 and September 2017 (males = 69.5%, females = 30.5%, age M = 37.71, SD = 9.85). Both programs operate in the form of a modified therapeutic community (see Kelly et al., 2015; and Marceau, Berry, Lunn, Kelly, & Solowij, 2017 for further details). Participants' average length of stay in the residential services was 10 weeks (SD = 11.86) and participants reported having experienced problems with drugs and/or alcohol for an average of 18 years (SD = 9.77). Methamphetamine was identified as the primary drug of concern for 45.8% of the sample, followed by alcohol, which was identified as a primary drug of concern for 36.3% of participants. About half (55%) of participants reported using their primary substance of concern more than once per day prior to treatment entry, and 30% reported using daily. Depression (36.3%) and anxiety (22.5%) were the most commonly self-reported psychiatric diagnoses across the sample. Over two-thirds (67%) of participants reported receiving prior treatment for a mental health problem and 22% reported the presence of a chronic physical health condition. Participant demographic and substance use variables are reported in Table 1.

Insert Table 1

Procedure

Ethics approval was obtained from the Human Research Ethics Committee (HREC) at the University of Wollongong, NSW, Australia (HE2017/115). Research assistants visited the treatment services. Given that the study was cross-sectional, participants were all at different stages of their treatment stay. At each of the sites, all residents were invited to attend a meeting, where participant information sheets were administered and explained to attendees. Participants were informed that completion of the survey was anonymous and returning the survey to the researcher would indicate that the participant provided tacit consent for their responses to be used in the study. Completion of the surveys took approximately 30 minutes.

Measures

Demographic Variables: Included questions related to age, gender, ethnicity, marital status, education level, and income.

Substance Abuse: Questions pertained to the type of substances used, the length of problems with substances (number of years), and frequency of substance abuse prior to entering treatment: 1 (*once a month*), 2 (*more than once a month*), 3 (*at least once a week*), 4 (*daily*), 5 (*more than once a day*).

Mental and Physical Health Problems: Participants were asked about the presence of any mental and physical health conditions and, if present, the specific diagnosis received. The Short-Form Health Survey (version 2) (SF-12; Ware, Kosinski, & Keller, 1996) was used to determine participants' views about their physical and mental health. Quality of life was assessed using the EUROPE Health Interview Survey-Quality of Life (EUROHIS QoL-8; Schmidt, Mühlan, & Power, 2006), and psychological distress was measured using the Kessler-6 (Kessler et al., 2002). The EUROHIS QoL-8 yielded a Cronbach's alpha of .84 for the current sample, while the internal consistency of the Kessler-6 was .90.

Loneliness: The Social and Emotional Loneliness Scale for Adults – Short Version (SELSA-S; DiTommaso et al., 2004) is a 15-item scale that yields three loneliness subscales: social, family, and romantic. Items are rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Scores for each subscale range from 7 to 35, with higher scores indicating a greater level of loneliness in that given domain. Examples of items from each of the SELSA-S subscales include: 'I feel part of a group of friends' (Social subscale), 'I feel close to my family' (Family subscale), and 'I wish I had a more satisfying romantic relationship' (Romantic subscale). Internal consistency for the 15 items (Cronbach's alpha α) was calculated to be .81 for the current sample. The Social loneliness subscale was α = .80, Family loneliness was α = .83, and Romantic loneliness was α = .82. Responses on the SELSA-S were not used to report the prevalence of loneliness, as this measure provides an estimate of loneliness intensity and would not allow for comparison with figures reported across the general Australian population.

A three-item loneliness scale, based on the most widely used measure of loneliness, the Revised UCLA (Hughes, Waite, Hawkley, & Cacioppo, 2004) was used to assess the concurrent validity of the SELSA-S. This measure differs to the SELSA-S in that it provides an indication of frequency of loneliness, while the SELSA-S is indicative of intensity of loneliness. Response options for the three-item UCLA consisted of: 1 (*hardly ever*), 2 (*sometimes*), or 3 (*often*). Ratings for each item were summed to produce a total score ranging from 3 to 9, with a higher score indicating a greater frequency of loneliness. The three-item UCLA yielded an internal consistency of α = .82 for the current sample.

Franklin and Tranter (2008) reported the frequency and severity of loneliness across the Australian population using two single-item questions. In order to report the prevalence of loneliness these two items were used in the current study. The first item asked, "How often do you personally experience loneliness in your life?". Participants had the option to select

one of the following response options: 5 (*at least once a day*), 4 (*at least once a week*), 3 (*at least once a month*), 2 (*at least once a year*), or 1 (*less often/ never*). Based on the methods used by Franklin and Tranter (2008), participants who indicated feeling lonely 'at least once a month' or more frequently, were categorized as 'often feeling lonely', while responses indicating 'once a year or never' were categorized as 'not often'. The second item stated, "Loneliness has been a serious problem for me." Participants selected one of the following responses: 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), or 4 (*strongly agree*). Again, these responses were dichotomized to indicate whether participants 'agree' or 'disagree'. While responses on these items were dichotomized for the purpose of reporting prevalence statistics, the original categories for these variables were used to determine correlations with other measures of loneliness and wellbeing (presented in Table 2).

Statistical Analyses

In total, 346 surveys were collected across the residential services. A total of 30 cases in which responses on the SELSA-S items had significant missing data or inaccurate responding were removed from the dataset. The remaining 316 cases were included in the analysis. Correlational analyses were used to identify relationships between loneliness and other demographic and health variables.

To test the validity of the SELSA-S, Confirmatory Factor Analysis (CFA) was conducted using IBM SPSS Amos Version 4. Based on cut-off criteria specified by Ditommaso and Spinner (1993), a value of 0.30 for factor loadings was used to determine items that did or did not relate to a factor. Recommendations by Jackson, Gillaspy, and Purc-Stephenson (2009) were used to guide selection and reporting of model fit indices. Based on these recommendations, the model was determined to be a good fit if chi-squared and associated degrees of freedom (χ^2/df) fell between 1 and 3, Comparative Fit Index (CFI) = .90, and Root Mean Square Error of Approximation (RMSEA) < .06. Correlation analyses

were conducted to identify concurrent and discriminant validity of the SELSA-S with the

UCLA, psychological distress (K6), and quality of life (EUROHIS QoL-8). It was expected

that the SELSA-S would yield moderate-strong correlations with the three-item UCLA, and

weak-moderate correlations with the K6 and EUROHIS QoL-8.

Results

SELSA-S. Scores on the SELSA-S revealed the highest levels of loneliness were

experienced in the form of romantic loneliness ($M = 23.66$, $SD = 8.20$), followed by social

loneliness ($M = 17.84$, $SD = 6.96$), and family loneliness ($M = 14.91$, $SD = 7.46$). The

average total score on the SELSA-S was 56.42 ($SD = 15.77$). There was no significant

difference in SELSA-S scores based on gender. Length of stay was found to correlate with

scores on the Social subscale of the SELSA-S, $r(296) = -.22$, $p \leq .001$, scores on the Family

subscale, $r(296) = -.17$, $p \leq .01$, and with overall SELSA-S scores, $r(296) = -.15$, $p = .01$.

Confirmatory factor analysis. To determine the validity of the SELSA-S measure for

use with substance dependent populations a CFA was conducted. Using maximum likelihood

estimation, four models were compared, including the independence model, a one-factor

model, a two-factor model, and a three-factor model. Following the cut-off criteria outlined

above and recommended by Jackson et al. (2009), all models appeared to fit the data poorly,

with the best fit being the three factor model ($\chi^2/df = 4.33$, CFI $= .86$, TLI $= .83$, and

RMSEA $= .10$). Factor loadings were high, with all loadings exceeding the .30 cut-off criteria

(see Figure 1).

Insert Figure 1

Concurrent validity of the SELSA-S. To assess concurrent validity, the relationship

between the SELSA-S and the three-item UCLA was evaluated. Correlations revealed

positive, statistically significant relationships of mostly moderate magnitude, between scores

on the SELSA-S and scores on the three-item UCLA. Consistent with findings by DiTommaso et al. (2004) and Ditommaso and Spinner (1993), the social loneliness subscale of the SELSA-S was found to be correlated with the three-item version of the UCLA, $r(315) = .48. p < .001$, more so than the other subscales. Spearman's Rho correlations between the SELSA-S and other measures of loneliness are presented in Table 2.

Analysis of participants' level of satisfaction with their marital status and scores on the SELSA-S provided further concurrent validity (see Table 2). Level of satisfaction with ones marital status was related to scores on the Romantic subscale of the SELSA-S, $r(305) = -.23, p < .001$, but not the Family or Social loneliness scales. These findings suggest that a higher level of satisfaction with ones romantic relationship status was associated with lower scores on the romantic loneliness subscale, $F(1, 303) = 17.07, p < .001$.

Discriminant validity of the SELSA-S. Discriminant validity of the SELSA-S was demonstrated through its correlation with measures of quality of life and psychological distress. These correlations are presented in Table 2.

Insert Table 2

SELSA-S and health variables. The relationship between total scores on the SELSA-S ($M = 56.42, SD = 15.77$) and demographic and health variables are presented in Table 1. Frequency of substance use prior to entering treatment and length of time with substance use problems was not related to loneliness scores. As hypothesized, higher psychological distress, and lower quality of life was associated with higher loneliness scores on the SELSA-S (see Table 2). Similarly, higher levels of loneliness were found to be related to poorer mental health and poorer physical health (see Table 1).

Rates of loneliness. Of respondents, 79.6% (*n* = 160) reported feeling lonely at least once per month or more often, and 69% (*n* = 139) agreed with the statement "loneliness has been a serious problem for me at times." Odds ratios were calculated to compare these rates to the general Australian population, as reported by Franklin and Tranter (2008). The substance dependent population was found to be almost seven times more likely to experience loneliness on a monthly basis or more frequently, compared to the general population, *OR* = 6.82, 95% CI [4.79, 9.69]. Similarly, odds ratios revealed the substance dependent population was over five times more likely to identify loneliness as a serious concern, *OR* = 5.76, 95% CI [4.22, 7.86].

Discussion

The current study sought to report on the validity of the SELSA-S, a measure of social and emotional loneliness, for use with substance dependent populations. Findings demonstrated that the SELSA-S might be an adequate tool for use across substance dependent populations. The CFA revealed that while factor loadings were high for items, and the SELSA-S demonstrated internal consistency and moderate concurrent and discriminant validity, model fit indices suggested the SELSA-S three-factor model was not a suitable fit to the data. While the SELSA-S is suggested to be one of the best measures of social and emotional loneliness throughout the literature, the findings of this study suggest further research into its validity for use with substance dependent populations may be required. Given that the original validation of the SELSA-S was conducted by Ditommaso et al. (2004) a number of years ago, rapid advances in social media and online networking during this time may account for some of the differential findings reported in this study. For example, increased access to online networking may mean that loneliness has reduced over time.

Alternately, online social networks may not be fullfilling for people and highlight the disparity between their perceived and desired social connectedness.

Another explanation for the poor model fit found in this study is that substance dependent populations may experience loneliness differently to individuals from the general population. The pervasive nature of substance dependence disorders is likely to have far-reaching effects on social, family, and romantic relationships and the nature of these relationships may change when individuals enter into recovery from addiction. For example, Weiss (1973) proposed that different relationships offer different social provisions, or interpersonal needs, and that loneliness resulting from lacking or insufficient relationships will be different depending on these social provisions. People with a history of substance dependence may make and maintain relationships that meet their needs at the time of active substance use, however, once in recovery, the social needs of these individuals are likely to have changed, and consequently their existing interpersonal relationships no longer meet these needs. Additionally, traditional measures of loneliness used across the general population, may be unable to capture the loneliness that results from the changing lifestyles and changing interpersonal needs of this population.

Differences between the results of this study and previous studies (such as DiTommaso et al., 2004) may be accounted for by the timing of the survey distribution in the current study, in terms of how long participants had been in the treatment program. A shorter duration of stay was found to be correlated with higher loneliness scores, suggesting that individuals who had recently entered into treatment were lonelier. It is possible that treatment increases connection with others and reduces loneliness, however, this variability may also have had an effect on the factor stability of the SELSA-S. An alternate explanation for the findings of the CFA may be due to the sampling method used in the current study. The SELSA-S was distributed across treatment services and completed via a written survey.

Substance dependent populations may experience difficulty with literacy (Holtyn, DeFulio, & Silverman, 2015) and as such, the sample may have experienced difficulty interpreting and completing the SELSA-S with little assistance. The loneliness literature has called for more subjective examinations of the construct (Heinrich & Gullone, 2006; Mann et al., 2017). The findings of the current study support this call, suggesting that loneliness may be better captured and understood across this population if examined qualitatively, with less reliance on literacy levels.

Findings presented in this study indicate that substance dependent populations experience higher rates of loneliness compared with the general population. Further, loneliness appeared to be primarily experienced in the form of romantic loneliness, which is likely explained by the large proportion of the sample who indicated that they were single (59.6%) or were separated, divorced, or widowed (25.4%). Romantic loneliness did not relate to poorer quality of life or higher levels of psychological distress. This might suggest that items asking about romantic loneliness (for example item 3; "I have a romantic partner with whom I share my most intimate thoughts and feelings") were not relevant for this sample. Alternately, the lack of relationship between romantic loneliness and quality of life and distress, might suggest that romantic loneliness is a very unique experience for this population – warranting further exploration of the concept.

The current study was limited by its modest sample size and use of cross-sectional survey methods which relied upon self-reporting of loneliness. Additionally, this study was only conducted across Australian residential treatment services, which might limit the generalizability of the findings. Despite this, to the authors' knowledge, no measure of social and emotional loneliness has been validated for use across substance dependent populations, and the current study was the first that sought to do so. While the SELSA-S did not demonstrate adequate model fit indices across the current sample, the measure demonstrated

high internal consistency and a moderate degree of validity across this sample. Future research may benefit from examining the validity of the SELSA-S with this population through delivery of the measure via interview format. This would enhance engagement levels and allow for literacy difficulties to be ruled out as a possible barrier to responding.

Findings from the current study suggest that substance dependent populations are vulnerable to experiencing the detrimental effects that loneliness has on physical and mental health. The high prevalence of loneliness across this population highlights the need for further research into the ways that loneliness is experienced across this specific population. Such research will further the understanding of the experience of loneliness among people with substance dependence and assist in working towards reducing associated distress and improving wellbeing.

References

Agman, Y., Calli, S. K., Avci, S. H., Huner, S., Bilici, R., & Citak, S. (2015). Relationship between severity of dependence with loneliness and perceived social support in individuals with alcohol and substance use disorder. *Bulletin of Clinical Psychopharmacology, 25*(S80-S81).

Akerlind, I., & Hornquist, J. A. (1992). Loneliness and alcohol abuse: A review of evidences of an interplay. *Social Sciences Medicine, 34*(4), 405-414.

Alcoholics Anonymous World Services inc. (1976). *Alcoholics Anonymous Big Book Third Edition*. New York: Alcoholics Anonymous World Services inc.

Beutel, M. E., Klein, E. M., Brähler, E., Reiner, I., Jünger, C., Michal, M., . . . Tibubos, A. N. (2017). Loneliness in the general population: prevalence, determinants and relations to mental health. *BioMed Central Psychiatry, 117*(1), 97. doi:10.1186/s12888-017-1262-x

Cacioppo, J. T., Hawkley, L. C., Crawford, E., Ernst, J. M., Burleson, M. H., Kowalewski, R. B., . . . Berntson, G. G. (2002). Loneliness and health: Potential mechanisms. *Psychosomatic Medicine, 64*, 407-417.

Cacioppo, J. T., & Patrick, W. (2008). *Loneliness: Human nature and the need for social connection*. New York: WW Norton & Company.

Christiansen, J., Larsen, F. B., & Lasgaard, M. (2016). Do stress, health behavior, and sleep mediate the association between loneliness and adverse health conditions among older people? *Social Science and Medicine, 152*, 80-86. doi:10.1016/j.socscimed.2016.01.020

Cramer, K. M., & Barry, J. E. (1999). Conceptualizations and measures of loneliness: A comparison of subscales. *Personality and Individual Differences, 27*, 491-502.

Daley, D. C., & Mercer, D. (2002). *Drug Counseling for Cocaine Addiction: The Collaborative Cocaine Treatment Study Model*. Maryland, US: U.S. Department of Health and Human Services, National Institutes of Health.

DiTommaso, E., Brannen, C., & Best, L. A. (2004). Measurement and validity characteristics of the short version of the Social and Emotional Loneliness Scale for Adults. *Educational and Psychological Measurement, 64*(1), 99-119. doi:10.1177/0013164403258450

Ditommaso, E., & Spinner, B. (1993). The development and initial validation of the Social and Emotional Loneliness Scale for Adults (SELSA). *Personality and Individual Differences, 14*(1), 127-134.

Foote, J. (2011). *Group motivational intervention (GMI-20) manual: A cognitive-behavioral-motivational treatment approach*. New York: National Development and Research Institutes inc.

Franklin, A., & Tranter, B. (2008). *Loneliness in Australia*. Hobart: University of Tasmania,.

Hawkley, L. C., Hughes, M. E., Waite, L. J., Masi, C. M., Thisted, R. A., & Cacioppo, J. T. (2008). From social structural factors to perceptions of relationship quality and loneliness: the Chicago health, aging, and social relations study. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 63*(6), S375-S384.

Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: A literature review. *Clinical Psychology Review, 26*(6), 695-718. doi:10.1016/j.cpr.2006.04.002

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science, 10*(2), 227-237. doi:10.1177/1745691614568352

Holtyn, A. F., DeFulio, A., & Silverman, K. (2015). Academic skills of chronically unemployed drug-addicted adults. *Journal of Vocational Rehabilitation, 42*(1), 67-74. doi:10.3233/JVR-140724

Hornquist, J. O., & Akerlind, I. (1987). Loneliness correlates in advanced alcohol abusers. *Scandanavian Journal of Social Medicine, 15*, 225-232.

Hosseinbor, M., Ardekani, S. M. Y., Bakhshani, S., & Bakhshani, S. (2014). Emotional and social loneliness in individuals with and without substance dependence disorder. *International Journal of High Risk Behaviors & Addiction, 3*(3), e22688. doi:10.5812/ijhrba.22688

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26*(6), 655-672.

Jackson, D. L., Gillaspy, J. A., & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analysis research: An overview and some recommendations. *Psychological Medicine, 14*, 6-23.

Kelly, P. J., Baker, A. L., Deane, F. P., Callister, R., Collins, C. E., Oldmeadow, C., . . . Keane, C. A. (2015). Study protocol: A stepped wedge cluster randomised controlled trial of a healthy lifestyle intervention for people attending residential substance abuse treatment. *BioMed Central Public Health, 15*, 465. doi:10.1186/s12889-015-1729-y

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L. T., . . . Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine, 32*(959-976). doi:10.1017

Loos, M. D. (2002). The synergy of depravity and loneliness in alcoholism: A new conceptualization, an old problem. *Counseling and Values, 46*(3), 199-212.

Maes, M., Klimstra, T., Van den Noortgate, W., & Goossens, L. (2014). Factor structure and measurement invariance of a multidimensional loneliness scale: Comparisons across gender and age. *Journal of Child and Family Studies, 24*(6), 1829-1837. doi:10.1007/s10826-014-9986-4

Mann, F., Bone, J. K., Lloyd-Evans, B., Frerichs, J., Pinfold, V., Ma, R., . . . Johnson, S. (2017). A life less lonely: the state of the art in interventions to reduce loneliness in people with mental health problems. *Social Psychiatry and Psychiatric Epidemiology, 52*, 627-638. doi:10.1007/s00127-017-1392-y

Mannes, Z. L., Burrell, L. E., Bryant, V. E., Dunne, E. M., Hearn, L. E., & Whitehead, N. E. (2016). Loneliness and substance use: the influence of gender among HIV+ Black/African American adults 50+. *AIDS Care, 28*(5), 598-602. doi:10.1080/09540121.2015.1120269

Marceau, E. M., Berry, J., Lunn, J., Kelly, P. J., & Solowij, N. (2017). Cognitive remediation improves executive functions, self-regulation and quality of life in residents of a substance use disorder therapeutic community. *Drug and Alcohol Dependence, 178*, 150-158. doi:10.1016/j.drugalcdep.2017.04.023

McCrady, B. S. (2004). To have but one true friend: implications for practice of research on alcohol use disorders and social network. *Psychology of Addictive Behaviors, 18*(2), 113-121. doi:10.1037/0893-164X.18.2.113

Medora, N. P., & Woodward, J. C. (1991). Factors associated with loneliness among alcoholics in rehabilitation centers. *The Journal of Social Psychology, 131*(6), 769-779.

Nordfjaern, T., Rundmo, T., & Hole, R. (2010). Treatment and recovery as perceived by patients with substance addiction. *Journal of Psychiatric and Mental Health Nursing, 17*(1), 46-64. doi:10.1111/j.1365-2850.2009.01477.x

Orzeck, T., & Rokach, A. (2004). Men who abuse drugs and their experience of loneliness. *European Psychologist, 9*(3), 163-169. doi:10.1027/1016-9040.9.3.163

Peplau, L. A., & Perlman, D. (1982). Perspectives on Loneliness. In L. A. Peplau & D. Perlman (Eds.), *Loneliness: A sourcebook of current theory, research, and therapy* (pp. 1-20). New York: Wiley-Interscience.

Perlman, D., & Peplau, L. A. (1981). Toward a Social Psychology of Loneliness. In B. Duck & R. Gihour (Eds.), *Relationships in Disorder*. London: Academic Press.

Petitte, T., Mallow, J., Barnes, E., Petrone, A., Barr, T., & Theeke, L. (2015). A systematic review of loneliness and common chronic physical conditions in adults. *Open Psychology Journal, 8*(Suppl 2), 113-132. doi:10.2174/1874350101508010113

Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment, 42*(3), 290-294. doi:10.1207/s15327752jpa4203_11

Schmidt, S., Mühlan, H., & Power, M. (2006). The EUROHIS-QOL 8-item index: psychometric results of a cross-cultural field study. *European Journal of Public Health, 16*(4), 420–428.

Spaniol, L., Bellingham, R., & Cohen, B. (2003). *The recovery workbook: II. Connectedness*. Boston: Boston University Center for Psychiatric Rehabilitation.

Stickley, A., Koyanagi, A., Koposov, R., Schwab-Stone, M., & Ruchkin, V. (2014). Loneliness and health risk behaviours among Russian and U.S. adolescents: a cross-sectional study. *BioMed Central Public Health, 14*(366). doi:10.1186/1471-2458-14-366

Stickley, A., Koyanagi, A., Roberts, B., Richardson, E., Abbott, P., Tumanov, S., & McKee, M. (2013). Loneliness: its correlates and association with health behaviours and

outcomes in nine countries of the former Soviet Union. *PLoS ONE, 8*(7), e67978. doi:10.1371/journal.pone.0067978

Tate, S. R., Brown, S. A., Unrod, M., & Ramo, D. E. (2004). Context of relapse for substance-dependent adults with and without comorbid psychiatric disorders. *Addictive Behaviors, 29*(9), 1707-1724. doi:10.1016/j.addbeh.2004.03.037

Theeke, L., Horstman, P., Mallow, J., Lucke-Wold, N., Culp, S., Domico, J., & Barr, T. (2014). Quality of life and loneliness in stroke survivors living in Appalachia. *Journal of Neuroscience Nursing, 46*(6), E3-15. doi:10.1097/JNN.0000000000000097

Ware, J., Kosinski, M., & Keller, S. D. (1996). A 12-Item short-form health survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care, 34*(3), 220-233.

Weiss, R. S. (1973). *Loneliness: The experience of emotional and social isolation*. Cambridge, MA: MIT Press.

Yang, K., & Victor, C. (2011). Age and loneliness in 25 European nations. *Ageing and Society, 31*(8), 1368-1388. doi:10.1017/S0144686X1000139X

Yildirim, B., Engin, E., & Yildirim, S. (2011). Loneliness and effective factors in alcohol and drug dependence. *Journal of Psychiatric Nursing, 2*(1), 25-30.

Table 1

Participant demographic and health variables, and relationship with loneliness on the SELSA-S (n = 316).

Participant characteristics	% or M (SD)	r
Age	37.71 (9.85)	$r(314) = .003$, $p = .95$
Identify as being from Aboriginal or Torres Strait Islander decent	12.8%	$r(299) = .08$, $p = .16$
Gender		$r(315) = .02$, $p = .75$
Male	69.5%	
Female	30.5%	
Marital Status		$r(314) = -.02$, $p = .71$
Single	59.6%	
Married/ De facto	15%	
Separated/ Divorced/ Widowed	25.4%	
Primary Substance[1]		$r(284) = .06$, $p = .29$
Alcohol	36.3%	
Other Drugs	77.9%	
Length of substance dependence problem[2]	18.23 (9.82)	$r(305) = -.05$, $p = .41$
Frequency of substance use[3]	4.35 (.87)	$r(311) = -.08$, $p = .15$
Physical health[4]	14.57 (3.23)	$r(315) = -.16$, $p < .01$
Mental health[4]	17.83 (4.51)	$r(316) = -.32$, $p < .001$

Note. SELSA-S = Social and Emotional Loneliness Scale for Adults – Short Version.

[1]Participants had the option to select more than one primary substance of concern. [2]Length of substance dependence measured in years. [3]Frequency of substance use prior to entering into treatment. Responses ranged from 1 (*once a month*) to 5 (*more than once a day*). [4]Health assessed using the Short Form Health Survey (SF-12 version 2) where lower scores indicate greater severity of health problems.

Table 2

Correlations between the SELSA-S and other measures of loneliness and wellbeing

	1	2	3	4	5	6	7	8	9	10
1. SELSA-S Total	-									
2. SELSA-S Social	.70** (n = 316)	-								
3. SELSA-S Family	.71** (n = 316)	.38** (n = 316)	-							
4. SELSA-S Romantic	.60** (n = 316)	.16* (n = 316)	.07 (n = 316)	-						
5. UCLA[1]	.49** (n = 315)	.45** (n = 315)	.32** (n = 315)	.26** (n = 315)	-					
6. Frequency of Loneliness[2]	.38** (n = 210)	.29** (n = 201)	.22* (n = 201)	.25** (n = 201)	.67** (n = 201)	-				

7. Loneliness a Serious Concern[2]	.26**	.16	.12	.27**	.55**	.50**	-		
	(*n* = 201)	(*n* = 201)	(*n* = 201)	(*n* = 201)	(*n* = 201)	(*n* = 201)			
8. Psychological Distress[3]	.33**	.36**	.33**	.02	.54**	.49**	.32**	-	
	(*n* = 315)	(*n* = 315)	(*n* = 315)	(*n* = 315)	(*n* = 315)	(*n* = 201)	(*n* = 201)		
9. Quality of Life[4]	-.39**	-.41**	-.32**	-.08	-.50**	-.50**	-.34**	-.59**	-
	(*n* = 315)	(*n* = 315)	(*n* = 315)	(*n* = 315)	(*n* = 314)	(*n* = 201)	(*n* = 201)	(*n* = 314)	
10. Satisfaction with Marital Status	-.21**	-.08	-.09	-.25**	-.17*	-.07	-.19*	-.01	.17*	-
	(*n* = 305)	(*n* = 305)	(*n* = 305)	(*n* = 305)	(*n* = 304)	(*n* = 194)	(*n* = 194)	(*n* = 304)	(*n* = 304)

Note. SELSA-S = Social and Emotional Loneliness Scale for Adults – Short Form. [1]Three-item version of the University of California Los Angeles (UCLA) loneliness scale used. [2] Item was administered at three residential services. [3]Psychological Distress measured using the Kessler-6. [4]Quality of Life assessed using the EUROHIS QoL-8. **Significant at p < .001. *Significant at p < .01.
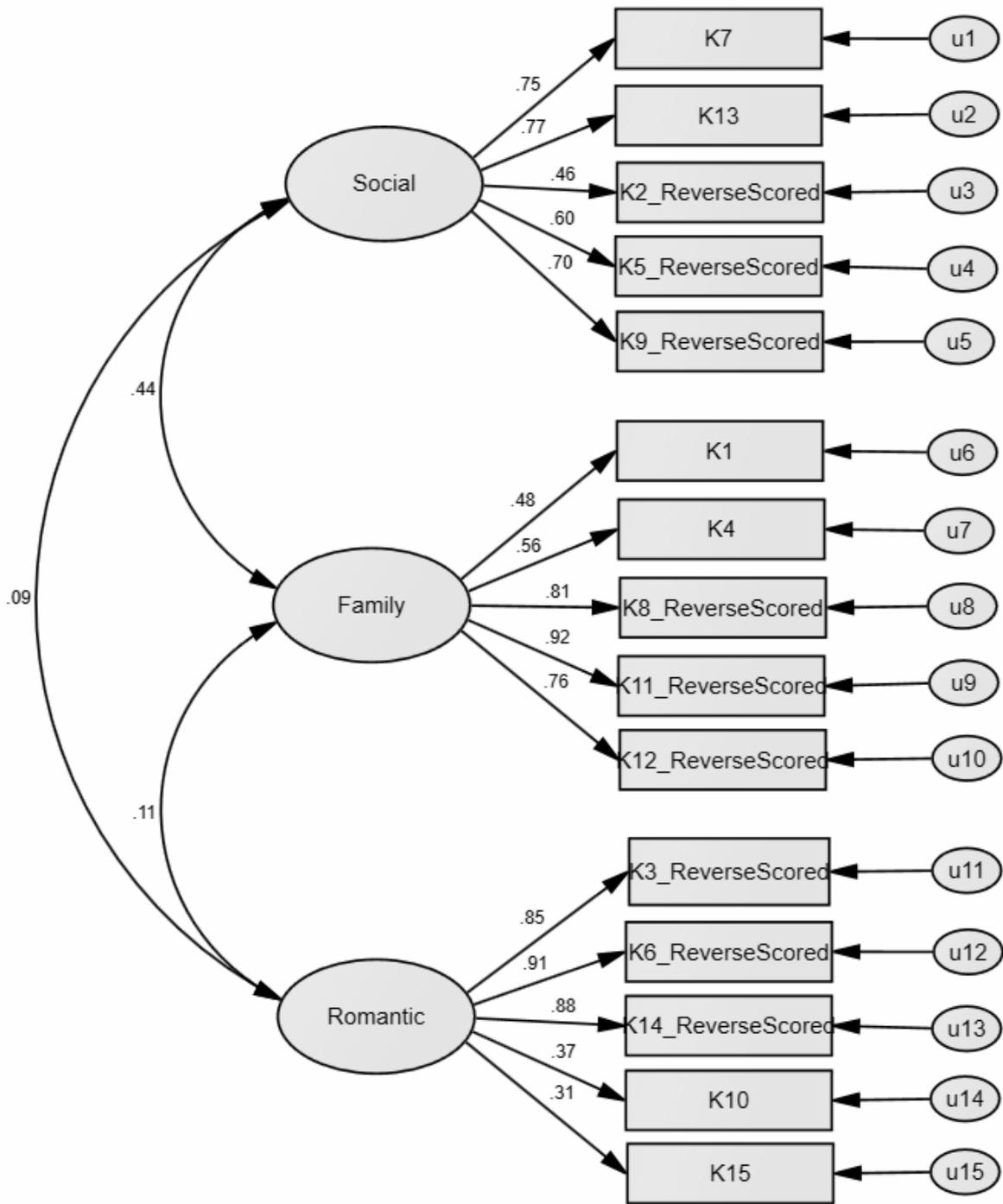
Figure 1. Three-factor model of the SELSA-S.