The de Jong Gierveld Loneliness Scale used with Norwegian club-house members: Psychometric properties and associated factors

Tore Bonsaksen 1, 2
Thea M. Opseth 3
Aud R. Misund 4
Amy Ø. Geirdal 5
Orsolya R. Fekete 6
Hege Nordli 7

1 OsloMet – Oslo Metropolitan University, Faculty of Health Sciences, Department of Occupational Therapy, Prosthetics and Orthotics, Oslo, Norway

2 VID Specialized University, Faculty of Health Studies, Sandnes, Norway

3 Fontenehuset Oslo Øst, Oslo, Norway

4 OsloMet – Oslo Metropolitan University, Faculty of Health Sciences, Department of Nursing and Health Promotion, Oslo, Norway

5 OsloMet – Oslo Metropolitan University, Faculty of Social Sciences, Department of Social Work, Child Welfare and Social Policy, Oslo, Norway

6 Western Norway University of Applied Sciences, Faculty of Health and Social Sciences, Department of Welfare and Participation, Bergen, Norway

7 Fontenehuset i Oslo, Oslo, Norway

Corresponding author:
 Tore Bonsaksen
 OsloMet – Oslo Metropolitan University
 Department of Occupational Therapy
 Prosthetics and Orthotics
 Faculty of Health Sciences
Postbox 4 St. Olavs Plass
 0130 Oslo
NORWAY

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Abstract

Background: Loneliness is considered a common experience, but persistent loneliness can set the stage for depression and in other ways jeopardize psychological well-being. Loneliness appears to be particularly frequent among persons with mental health problems, and a short, feasible, and psychometrically sound measure of loneliness can assist in addressing loneliness in mental health practice and research.

Aims: To contribute to the validation of a Norwegian version of the six-item de Jong Gierveld Loneliness Scale. We empirically investigated the factor **structure and internal consistency of the scale, and explored factors associated with the resulting scales.**

Method: Ninety-four Norwegian clubhouse members completed the loneliness scale as part of a larger member survey in 2016. Factor structure was examined with Principal Components Analysis, in conjunction with Parallel Analysis, and internal consistency was examined with Cronbach's coefficient alpha.

Results: Two factors were extracted from the data, explaining 68.2 % of the total data variance. The structure matrix showed no cross-loadings, and all items loaded substantially (0.74-0.91) on the proposed factor. Internal consistency of the items belonging to factor 1 (social loneliness) and factor 2 (emotional loneliness) was $\alpha = 0.86$ and 0.63, respectively. No variables showed a significant relationship with any of the scales.

Conclusions: The scale demonstrated the theoretically proposed two-factor structure, with good measures of internal consistency. Thus, the de Jong Gierveld Loneliness Scale appears promising for future use in psychosocial settings in Norway.

Introduction:

Loneliness is considered a basic fact of life, something that everyone experiences, to different degrees (Salimi, 2011). However, prolonged feelings of loneliness may indicate that social relationships are somehow deficient. Feelings of loneliness can evolve into suffering and may give cause to illness (Nilsson, Lindstrom, & Nåden, 2006). Loneliness and lack of support are well-documented problems for persons in need of mental health services (Wang, Mann, Lloyd-Evans, Ma, & Johnson, 2018). To investigate loneliness we need instruments that measure loneliness precisely and that are easy to use across settings. Short versions of instruments that assess individuals' subjective experience can be useful for research, mental health service delivery, and policy-making. In this study, the shortened version of de Jong Gierveld Loneliness Scale for measuring emotional and social loneliness was examined with members in a specific clubhouse in Norway to contribute to the validation of the instrument.

Loneliness is often confused with depression, poor social support and social isolation, the latter concerning the objective characteristics of a situation and referring to the absence of relationships with other people. Instead, loneliness refers to an individual's subjective evaluation of his or her social participation, social support or social isolation (de Jong Gierveld & Van Tilburg, 2010; Hawkley et al., 2008). Persistent loneliness can set the stage for depression, increase the risk of suicide, and in other ways jeopardize psychological well-being (Nolen-Hoeksema & Ahrens, 2002; Perlman & Peplau, 1984). In a study of Spanish older adults, Buz and Pérez-Arechaederra (2014) found a moderate to strong association between loneliness and depression, and similar associations were found in a population-based study of American older adults (Cacioppo, Hughes, Waite,

Hawkley, & Thisted, 2006). Nummela and co-workers (2011) found that absent or infrequent loneliness is a good predictor of better self-rated health. Adding to these findings, the Norwegian Generations and Gender Survey found that living alone, being female, having poor health and lacking a connection to ordinary work, increased the possibility of experiencing loneliness (Hansen & Slagsvold, 2016; Thorsen & Clausen, 2008).

Loneliness is considered the subjective and negative evaluation of a gap between an individual's desired and actual quality and quantity of social relationships. It is attributable to specific relational deficits, as perceived by the person, and is therefore one of the main indicators of social well-being. The concept is frequently divided into two main components: social and emotional loneliness. Social loneliness can be described as missing a broader group of contacts or wider social network (de Jong Gierveld & van Tilburg, 2006), and is characterized by feelings of aimlessness, boredom and exclusion (Dykstra & de Jong Gierveld, 2004). Emotional loneliness, on the other hand, is a feeling of missing an intimate relationship or partner (de Jong Gierveld & van Tilburg, 2006), and is characterized by feelings of desolation, anxiety and insecurity (Dykstra & de Jong Gierveld, 2004).

With a view to group comparisons, most studies have shown men to be lonelier, compared to women (Cacioppo et al., 2006; Chipuer & Pretty, 2000; de Jong Gierveld & Van Tilburg, 2010; Moore & Schultz, 1983; Tümkaya, Aybek, & Çelik, 2008; Wiseman, Guttfreund, & Lurie, 1995). However, the opposite association has also been found (Borys & Perlman, 1985; Bugay, 2007; Page & Cole, 1991), leaving the gender-loneliness association ambiguous. Using the two-dimensional loneliness construct, Dykstra and de Jong Gierveld (2004) found that men tended to be less emotionally lonely than women, but more socially lonely. Thus, it appears that gender differences in loneliness may depend on which type of loneliness is considered. Persons with higher education levels and more income have also reported lower levels of loneliness, compared to their counterparts. A positive marital relationship contributing also to a better income gave the best protection against loneliness (Hawkley et al., 2008).

Several studies have shown that older adults face an elevated risk of loneliness as they age and older adults who have lost their partner in death have shown the greatest increase in loneliness (Dykstra, van Tilburg, & de Jong Gierveld, 2005; Penning, Liu, & Chou, 2014). However, Nolen-Hoeksema and Ahrens (2002) investigated the levels of, and relationships between, loneliness and depressive symptoms in three age groups (25-35, 45-55, and 65-75 years of age), and found that the middle-aged adults were most lonely. Thus, the impact of age may depend on other variables, such as the individuals' actual social networks and partnerships. In line with this reasoning, researchers have found that people living without a partner reported higher emotional loneliness, compared to those who had a partner (de Jong Gierveld & Van Tilburg, 2010; Hansen & Slagsvold, 2016). Age may therefore obscure these and similar effects rather than constitute an independent contribution towards loneliness.

The associations between loneliness and mental health problems indicate that loneliness may be frequent among persons who have such problems (Buz & Perez-Arechaederra, 2014; Cacioppo et al., 2006; Mykletun, Knudsen, & Mathisen, 2009; Nummela et al., 2011). However, in diagnostically oriented contexts, psychiatric symptoms may be focused to an extent that loneliness in the individual's everyday life may go unnoticed. Recovery-oriented services, such as membership-based clubhouses providing work-oriented psychosocial rehabilitation, may be a relevant supplement to psychiatric treatment. The clubhouse model is a non-governmental psychosocial rehabilitation intervention for people with mental illness (Clubhouse International, 2016), which aims at adding to their members' networks and fostering positive relationships in the context of collaborative work and productive activity (Carolan, Onaga, Pernice-Duca, & Jimenez, 2011; Clubhouse International, 2016, 2017; Herman, Onaga, Pernice-Duca, Oh, & Ferguson, 2005; Raeburn, Halcomb, Walter, & Cleary, 2013). The model breaks with the medical paradigm. Instead it focuses on strengths and resources and attaches great importance to empowerment, which is evident in several elements of the model (Propst, 1997). These elements address participants as members instead of patients or users, establishing an equal working community of members and employees (McKay, Nugent, Johnsen, Eaton, & Lidz, 2016). By their active participation in the clubhouse community, the members are jointly responsible for carrying out

meaningful tasks for the community's good within the so-called "work-oriented day" (Tanaka & Davidson, 2015a, 2015b). Social support and social participation can help people recover from the disabling effects of mental illness. Thus, more specifically, participation at the clubhouse may contribute to prevent or combat feelings of loneliness among its members.

Instruments for assessing individuals' self-perceived loneliness may provide the means to evaluate and compare levels of loneliness in defined populations, and potentially to provide a baseline for targeting loneliness as a problem among individuals. Thus, having a short, feasible, and psychometrically sound measure of loneliness is important in both practice and research settings. One such instrument is the Dutch de Jong Gierveld Loneliness Scale (de Jong Gierveld & van Tilburg, 2006), which was developed in the beginning of the 1980s. This has been shown to be a reliable and well-validated instrument, and is widely used to measure loneliness in different populations (Masi, Chen, Hawkley, & Cacioppo, 2010). Originally, it consisted of 11 items, but the validity of the shortened 6-items scale has been found to parallel that of the original scale (De Jong Gierveld & Van Tilburg, 2006). Following its development, it has been translated into several European languages (de Jong Gierveld & Van Tilburg, 2010; Scharf & de Jong Gierveld, 2008), including Norwegian. However, we are unaware of previous studies where the scale has been used within a defined psychosocial context, like the clubhouse for persons with mental illness. Moreover, instruments need to be psychometrically tested prior to their implementation in a new context or population (Kielhofner, 2006; Wild et al., 2005). Assuming that the scale may be an applicable tool for assessing loneliness among Norwegian clubhouse members, preliminary validation procedures and investigating factors associated with the scales are warranted.

Study aim
The main aim of the study was to contribute to the validation of a Norwegian version of the de Jong Gierveld Loneliness Scale, which was done by empirically investigating its factor structure and internal consistency. In addition, we explored factors associated with the resulting scales.

Methods
Design and data collection
The study had a cross-sectional design. All data came from self-report questionnaires filled out by members of one specific clubhouse in Norway. Clubhouse staff and members collected the data in collaboration during the winter of 2016.
Sample

All clubhouse members were eligible participants in the study, and there were no exclusion criteria. At the time the data were collected, there were 151 active members of the clubhouse, of which 94 (62.3 %) opted to participate. Sample characteristics is displayed in Table 1.

Measurement
The annually employed member survey contains a range of questions. Sections of the member survey concern sociodemographic characteristics, duration of membership and use of the clubhouse, sources of income, work and education, perceived impact from using the clubhouse, a user satisfaction scale, and a loneliness scale. This study focuses on the loneliness scale.

The Loneliness Scale
The Loneliness Scale (de Jong Gierveld & van Tilburg, 2006) consists of six statements, all of which rated from 0 (totally disagree) to 4 (totally agree). It was designed to measure two different aspects of loneliness, "emotional loneliness" and "social loneliness". A previous factor-analytic study found that the six statements loaded on two different factors, and that they therefore should be treated as constituting two different scales reflecting the two different aspects of loneliness (de Jong Gierveld & van Tilburg, 2006). The items loaded

uniformly on their proposed scales with no cross-loadings. Internal consistency ranged between 0.67 and 0.74, and between 0.70 and 0.73, for the emotional loneliness and social loneliness scales, respectively. However, using a one-factor solution to measure overall loneliness may also be appropriate, depending on the level of conceptual nuance required. Higher sum score of all scale items would indicate higher overall loneliness, and internal consistency of the overall scale ranged between 0.70 and 0.76.

Prior to commencing the member survey in 2016, Author #5 of this article translated the Loneliness Scale from English to Norwegian. A group of clubhouse members served as a review panel and agreed with the final translated version, and this version was subsequently included in the member survey. The translated scale was back-translated into English and returned to the developer for scrutiny. It was found that the back-translated version was conceptually identical to the English version of the scale.

Data analysis

When assessing latent factors in the Loneliness Scale items, an exploratory Principal Components Analysis (PCA) was performed. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (Kaiser, 1974) and Bartlett's Test of Sphericity (Bartlett, 1954) were used to assess whether factor analysis was appropriate. KMO values should exceed 0.60 (Cerny & Kaiser, 1977; Kaiser, 1974), and Bartlett's test should reach statistical significance, indicating that the correlations were significantly different from zero. As we expected the items to be intrinsically correlated, we used the Direct Oblimin rotation method. Factor extraction was determined by inspecting the scree-plots, and by assessing the Eigenvalue (λ) estimates and the data variance explained by the factors. Factors with $\lambda > 1$ and/or factors explaining more than 10 % the variables' variance proportions were retained. In addition, we employed the stricter Parallel Analysis (Horn, 1965) as a means to ascertain that the number of extracted factors was not overestimated (Zwick & Velicer, 1986). The Parallel Analysis proposes that factors should be retained only if the actual λ exceeds the randomly generated λ of the corresponding factor in a random dataset, using the same number of variables and respondents.

Statistical measures reported from the PCA include communalities, indicating the variance proportion of each variable explained by the factors together, and factor loadings – estimates of the impact from a given variable on each factor. Factor loadings from the structure matrix were inspected in order to obtain a clearer view of the pattern, and loadings > 0.40 were considered high. Internal consistency was examined with Cronbach's α and inter-item correlations. Cronbach's α coefficients exceeding 0.70, and/or mean inter-item correlations exceeding 0.20, were considered satisfactory.

Descriptive statistics were used to describe the sample. Frequencies and percentages were used on categorical variables, whereas means and standard deviations were used on continuous variables (scale scores). To assess factors associated with the scale scores, with performed a series of regression analyses. First, univariate regression analyses were performed, using the two derived loneliness scales as outcomes in two subsequent analyses. Each of the independent variables were entered separately: age group, gender, education level, work status, work experience, and use of the clubhouse. Then, the multivariate regression analysis entered all of the independent variables together. The purpose of these analyses was to assess how each of the variables were associated with the outcome measures, while adjusting for the impact of the other variables. The regression models also estimated the variance proportions accounted for by the included independent variables. The level of significance was set at $p < 0.05$, and effect sizes were reported as standardized beta coefficients (β). Coefficients larger than 0.30 were considered of medium size (Cohen, 1992). The data were analyzed using SPSS for Windows version 24 (IBM Corporation, 2016).

Ethics

The clubhouse staff informed all members of the clubhouse about the survey. Responding to the survey was voluntary, the survey questionnaires were collected anonymously, and completing and returning the questionnaires implied informed consent to participate. As the collected data was anonymous and not related to health or illness, formal ethical approval was not required.

Results

Sample characteristics

Table 1 displays the characteristics of the study sample. The participants' age was equally distributed across the five categories, and there was a balance between men and women. One out of five participants had a job, full-time or part-time. Levels of loneliness appeared to be low.

Table 1- Sociodemographic characteristics of the participants (n = 94)

	n	*%*
Age group	94	100
21-30 years	11	11.7
31-40 years	25	26.6
41-50 years	25	26.6
51-60 years	23	24.5
61 years and above	10	10.7
Gender	94	100
Men	45	47.9
Women	47	50.0
Transperson	2	2.1
Education (highest completed level)	93	98.9
Elementary school or high school	58	62.4
College or university (BSc level or higher)	35	37.2
Work and income	94	100
In paid work	19	20.2
Time-limited disability pension	36	38.3
Disability pension	41	43.6

Work experience	87	92.6
5 years or less	30	34.5
6 years or more	57	65.5
Use of the clubhouse	89	94.7
4-5 times per week	17	18.1
1-3 times per week	48	51.1
About every other week	3	3.2
Less frequently than every other week	21	22.3
Loneliness	90	95.7
	M	*SD*
Emotional loneliness	2.00	1.06
Social loneliness	1.52	1.33

Note. On variables with some missing responses (i.e., *n*

< 94), the valid percent is reported.

Factor structure

As the first step in the PCA, we found that the KMO value was 0.72, and Bartlett's test of sphericity was statistically significant ($p < 0.001$). The items' communalities ranged between 0.55 (item 1) and 0.82 (item 6). Two factors with Eigenvalues > 1 were extracted: Factor 1, $\lambda = 2.54$, explaining 42.3 % of the data variance, and Factor 2: $\lambda = 1.56$, explaining 25.9 % of the data variance, adding up to 68.2 % of the total variance explained by the two factors together. The structure matrix showed no cross-loadings, and all items loaded substantially on the proposed factor, with loadings ranging between 0.74 (item 1) and 0.91 (item 6).

When controlling the factor extraction with the Parallel Analysis, we found a randomly generated $\lambda = 1.18$ for Factor 2, which was lower than the actual λ found for the second extracted factor in the PCA. Thus, the Parallel Analysis confirmed the extraction of two factors. However, in light of the theory suggesting that a total sum score may also be used, we conducted a second PCA using a confirmatory approach where we specified that only one factor should be extracted. This analysis yielded commonalities ranging between 0.13 (item 3) and 0.70 (items 5 and 6). The factor loadings were above the > 0.40 threshold value, excepting item 3, which had a factor loading of 0.36.

Internal consistency of scales

The internal consistency of the three items belonging to factor 1 (items 4, 5 and 6) were Cronbach's $\alpha = 0.86$, mean inter-item correlation = 0.67. For the items belonging to Factor 2 (items 1, 2 and 3), internal consistency was Cronbach's $\alpha = 0.63$, mean inter-item correlation = 0.37. Using the one-factor solution, the internal consistency of all items together was Cronbach's $\alpha = 0.71$, mean inter-item correlation = 0.29. Deleting item 3 from the total scale would slightly increase the internal consistency (Cronbach's $\alpha = 0.72$). Otherwise, deleting

any of the items from any of the scales would lead to lower internal consistency between items. The results from the PCA, both one-factor and two-factor structure, are displayed in Table 2.

Table 2 *Sociodemographic characteristics of the participants*

	Item	Factor 1	Factor 2	Communalities	Item #	Factor 1	Communalities
6	People I can trust	**0.91**	0.14	0.82	6	**0.84**	0.70
4	People to lean on	**0.88**	0.11	0.78	4	**0.80**	0.64
5	Close relation-ships	**0.86**	0.26	0.75	5	**0.84**	0.70
2	Sense of empti-ness	0.18	**0.78**	0.60	2	**0.44**	0.20
3	Feeling rejected	0.09	**0.76**	0.59	3	**0.36**	0.13
1	Miss people around me	0.16	**0.74**	0.55	1	**0.41**	0.17
	Eigenvalue (λ)	2.54	1.56			2.54	
	Cronbach's α	0.86	0.63			0.71	
	Mean inter-item correlation	0.67	0.37			0.29	
	Explained vari-ance	42.3 %	25.9 %			42.3 %	
	Total explained variance	68.2 %				42.3 %	

Note. Two-factor structure derived from explorative PCA using the Direct Oblimin rotation method with Kaiser normalization. One-factor structure derived from confirmative PCA with the fixed extraction of one factor only. Factor loadings are from the structure matrix.

Factors associated with loneliness

Table 3 shows the results from the regression analyses, displaying the factors associated with loneliness. None of the independent variables were associated with emotional loneliness in any of the analyses. The multivariate model was not statistically significant and explained 5.7 % of the variance proportions of emotional loneliness.

Similarly, none of the independent variables were significantly associated with social loneliness in any of the analyses. The multivariate model was not statistically significant and explained 9.6 % of the outcome variance proportions.

Table 3 - Univariate and multivariate regression analysis showing associations between the study variables and loneliness (n = 92)

	Emotional loneliness		Social loneliness	
Independent variables	Univariate	Multivariate	Univariate	Multivariate
Age group	-0.04	-0.12	0.07	-0.02
Gender	-0.09	-0.07	-0.11	-0.16
Education	-0.17	-0.17	0.13	0.12
Work status	-0.13	-0.13	0.13	0.14
Work experience	0.02	0.14	0.17	0.16
Use of the clubhouse	-0.04	0.12	-0.07	-0.06
Explained variance	**5.7 %**		**9.6 %**	

Note. Table content is standardized beta weights (β), indicating the strength of associations with the dependent variables.

Discussion

The aim of the study was to contribute to the validation of a Norwegian version of the de Jong Gierveld Loneliness Scale, and to assess factors associated with the scales derived from the instrument. As expected from the underpinning theory and available international studies of the scales' properties (de Jong Gierveld & Tesch-Romer, 2012; de Jong Gierveld & van Tilburg, 2006, 2010; Scharf & de Jong Gierveld, 2008), the instrument had a clear 2-factor structure and the scale items had good internal consistency. Thus, this study' replication of the factor structure is a contribution that speaks to the conceptual validity and reliability of the scale when used in a Norwegian population in need of mental health services. This may be of particular importance in view of loneliness being a frequent problem in this group that may result from, but also add to, their mental health problems (Buz & Perez-Arechaederra, 2014; Cacioppo et al., 2006; Mykletun et al., 2009; Nummela et al., 2011; Wang et al., 2018). Its importance may also be related to the need for short and easy-to-use scales when addressing the needs of persons mental health problems, who may have difficulty with focus and attention and therefore with completing longer and more complex scales (Beidas et al., 2015). Being able to measure two important dimensions of loneliness validly with six items only may prove to be a useful addition to the array of measures used in mental health care and psychosocial practice in Norway.

In the subsequent regression analyses, we were unable to detect significant associations between any of the employed characteristics and the two loneliness scales. This indicates that basic sociodemographic characteristics, like age, gender, education and work status as employed in the analyses, are not indicative of loneliness in this group. Similarly, use of the clubhouse (frequently or less frequently) was not associated with loneliness. In view of previous studies with the same sample, this was somewhat more surprising. Use of the clubhouse has previously been shown to be related to lower levels of loneliness among members (Chang et al., 2014), but also to higher satisfaction with the clubhouse (Ritter, Fekete, Nordli, & Bonsaksen, 2018) and to more favorable

perceived outcomes from participating at the clubhouse (Ritter, Fekete, Nordli, & Bonsaksen, 2018). However, we did not assess variables like having a spouse or partner, nor did we assess the level of psychological or symptomatic distress among the participants. As shown from previous research (de Jong Gierveld & Van Tilburg, 2010; Hansen & Slagsvold, 2016; Hawkley et al., 2008; Wang et al., 2018), these seem to be factors consistently associated with loneliness.

Future studies might assess these and other variables when seeking to establish associations with loneliness among clubhouse members. In a longer time perspective, longitudinal studies may assess whether and how loneliness might be amenable to change over time, and whether aspects of the clubhouse experience can affect the course of loneliness.

Study limitations

The study is limited by using a small convenience sample, where the clubhouse members had all been recruited from one clubhouse only. Importantly, we did not have access to information concerning the participants' diagnosis or illness severity, psychosocial functioning, or relationship status, and we believe this played a part in our inability to detect statistically significant covariates to loneliness. Also, we used a cross-sectional study design, where data was collected only from one point in time.

Conclusion

This study found that the Norwegian version of the 6-items de Jong Gierveld Loneliness Scale had the expected two-factor structure and good internal consistency when used in the psychosocial clubhouse context. We were, however, unable to find significant associations between the loneliness scales and the employed independent variables. Future studies may use the loneliness scales in larger and more varied samples when investigating covariates to loneliness. Longitudinal study designs are needed to assess changes in loneliness over time, and possibly to address predictors of such change. Such studies might have a considerable impact on the mental health practice.

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