INLAND NORWAY
UNIVERSITY
OF APPLIED SCIENCES

Faculty of Social and Health Sciences

BRAGE

The Social Provisions Scale – psychometric properties of the SPS-10 among participants in nature-based services

Abstract

Purpose: This article analyses the psychometric properties of the Social Provisions Scale 10- items version. *Methods:* The Social Provisions Scale was analysed by means of the polytomous Rasch model, applied to data on 93 young adults (16-30 years) out of school or work, participating in different nature-based services, due to mental or drug-related problems. *Results:* The psychometric analysis concludes that the original scale has difficulties related to targeting and construct validity. In order to improve the psychometric properties, the scale was modified to include eight items measuring functional support. The modification was based on theoretical and statistical considerations. *Conclusion:* After modifications the scale showed not only satisfying psychometric properties, but it also clarified uncertainties regarding construct validity of the measure. However, further analysis on larger samples are required.

Keywords: Young adults, Rasch, Social Provisions Scale, Social support, Nature-based services

Introduction

Social relations and social support are psychosocial factors of importance for health and well-being of individuals [1-3]. According to numerous studies, there is a positive effect of social support and social participation on mental health, coping and quality of life [4-7]. Therefore, social support may serve as an important source of protection, alleviating negative consequences of stress. Contrary low social support may be considered a risk factor for mental health problems [8]. Nine out of ten people in Norway report good social support and having at least one close friend [8]. Lower social support is reported among elderly and people with mental health problems. Therefore, increasing levels of social support can potentially, lead to improved mental health [8]. Also the relation between social support and physical and physiological health is well documented [9]. Social support is found to be important for a variety of rehabilitation outcomes [10] and for different patient groups within the rehabilitation context [11-13].

Different conceptions and definitions to describe social support and social relations exist. Cobb [1] describes social support as the individuals' experience of being surrounded with love and care, to be respected and valued, and to have a social network with mutual commitments. Across the different conceptions and definitions of social support one main division is found, namely between functional and structural social support. Functional support refers to what other people may contribute with for a person, both practically and emotionally, while structural support refers to how connected a person feels within a social network [2,14-16]. In research, a wide range of scales attempting to measure social support and social provisions can be identified [17], including rehabilitation research [18]. The Social provisions scale (SPS) [3] is one of the most frequently used scales on social support. The purpose of SPS is to measure a person's perceived social support. The scale is based on Weiss`s theory of social provisions, and is further developed by Cutrona and Russell [3]. Social provisions is

defined by Weiss [19] as different functions that may be obtained from relationships with others. These social functions or social provisions are referred to as different dimensions of social support. The idea of the SPS is therefore to measure a person's social provisions related to these different dimensions of social support [3]. The original SPS had six dimensions and Weiss [19] describes that all six provisions are needed for a person to feel adequate social support, but that some can be more important in different circumstances; for instance during stressful life events, or in different stages of life like childhood or in old ages. The six dimensions are; Attachment, Social integration, Reassurance of worth, Sense of reliable alliance, Guidance and Opportunity for nurturance. The SPS has also been constructed using a total score of social provisions [3,20-24].

Many different versions of the SPS are used with different number of items and dimensions [3,22,25,26]. The 24- and 16-item versions are most frequently used [3,25]. A 10-item version of the scale also exists [21], but this version is still uncommon compared to the use of the 24- and 16- item versions. The results from studies using a factor analytical classical test theory approach indicate good validity and reliability of all these three versions of the SPS [3,21,25]. However, there have been mixed conclusions about the dimensions as well as the appropriateness of response categories for the 24-items version [26,27].

The polytomous Rasch model can be used in analysis of the psychometric properties of scales intended to measure one single construct [28]. By analysing the SPS by means of the polytomous Rasch model more specific information is provided compared to factor analytical studies (classical test theory)[29]. The Rasch analysis gives the opportunity for more comprehensive analysis of how the items work together, how each individual item works, and if the items work differently for different sub-groups of respondents. The Rasch model is a good tool for development of new scales and revising existing scales [30]. Using Rasch analysis, it may be possible to increase the knowledge about the psychometric properties of

the scale; confirming or disconfirming, and complementing what previous studies have concluded.

The total SPS score from the 24- and 16-items versions has been used in numerous studies [3,20,22-24]. However, the use of the total SPS score for the 10-item version is still uncommon compared to the use of other versions [21]. In addition, there has been no analysis of the psychometric properties of the Norwegian 10-item version of the scale. The SPS-10 is a useful assessment tool for examining social support among people in rehabilitation. As earlier described, people with mental health problems report lower degrees of social support, than the general population. It is therefore important to test the psychometric properties of social support scales when applied to groups with possibly lower perceived social support.

The purpose of this study is to examine the psychometric properties of the total SPS10-item version (SPS-10) by means of the Polytomous Rasch Model, applied to Norwegian data on young adults at risk of marginalization participating in nature-based services.

Materials and methods

Data material and data collection

This analysis is based on data collected among participants in nature-based services in Norway. The participants in this study are aged 16-30, and are out of school or work due to mental or drug related problems. A long-term goal for the nature-based services is to promote return to work or school, and prevent marginalization. Social support is an important factor and may serve as one of the theoretical underpinnings in nature-based services [31-34].

The data were collected from April 2013 to June 2015. Service managers carried out the data collection after detailed instructions. Individuals agreeing to participation completed the questionnaire and returned it by mail free of postage. Due to reading or writing

difficulties, some participants were allowed to complete the questionnaire in the form of a structured interview, instead of in written form. Four participants chose to answer in a structured interview, and the first author conducted all interviews. Participants in the study come from 16 out of 19 counties, and all of the larger regions in Norway are represented.

Because the number of participants in nature-based services in Norway varies over time, it is hard to estimate the actual size of the population. However, based on phone calls with the service leaders during the data collection, the population of this study approximates 150-200 persons. In total, 93 persons participated in this study, but 91 persons responded to all or some of the SPS items and are therefore included in the analysis.

A somewhat larger proportion of the participants were females (56%) compared to males (44%). The largest proportion of respondents are aged 21-25 (47.2%) while smaller proportions are 20 years or younger (30.3%) or older than 25 (22.5%). About 31 percent of the respondents had participated in the service for 3 months or less, but 40 percent 4-11 months, while 28 percent had participated for more than 12 months at the time of data collection. About 77 percent of the participants report that their participation in nature-based services are related to mental health problems, while 11 percent report drug related problems being a contributing cause of participation.

The Norwegian Regional Ethics Committee for Southeast Norway (2012/372) approved this study.

The Social Provisions Scale (SPS)

The SPS-10 consists of 10 items representing five of Weiss [19] six dimensions of social support. The dimension 'Opportunity for nurturance' is not included [21]. Each dimension is represented by two questions, with response format: Strongly agree (4), agree (3), disagree

(2), and strongly disagree (1). This paper focuses on the total SPS-10 and its psychometric properties. The total SPS-10 score is formed by the summation of raw scores where a high score indicates high degree of social provisions [3].

Factor analytical approaches have reported good validity and reliability for the total score of this version of the scale [21]. For instance, the Cronbach's alpha for the total scale is reported to be 0.880 when applied to a general population in Canada [21].

The SPS was translated to Norwegian following standards for translation of scales, from English to Norwegian and back to English again [35]. The Norwegian 24- and 16-items versions of the scale are used in several other Norwegian studies [24,25,36]. Good psychometric properties (using a factor analytical approach and Principal Component Analysis) (PCA) of the Norwegian 16-items version are reported [25,37].

Data analysis - The Rasch model

Thresholds and targeting (distribution)

In situations with inconsistent use of response categories, the problem with disordered thresholds may occur. A threshold is the location between two response categories, and specifies the point at which the probability of choosing one out of two response categories is the same. Disordered thresholds implies that the empirical order of response categories is different from the intended order. Disordered thresholds may also occur if there are too many response categories, or the labelling of the options is confusing. Problems with disordered thresholds may be identified statistically and graphically [30,38]. Disordered thresholds is one of the areas the analysis of the SPS is focusing on.

Targeting indicates how well the instrument captures the group of respondents and shows where the respondents are located relative to item thresholds. Targeting may be examined statistically as well as graphically. Some persons can have extreme values, meaning

that they are located far away from the other person location scores and thresholds [38]. Targeting may be important because it helps to assess how well the SPS captures social provisions of the specific population.

Item fit

There is no single test that can tell us how well our data fit the Rasch model, and multiple tests are therefore carried out. Formal statistical tests of fit (e.g. Chi-Squared) as well as their graphical representations (e.g. Item Characteristic Curves (ICC)) are carried out. In addition to chi-squared statistics, mean-square values, with the expected value of 1, for individual items as well as for overall fit was calculated. The test of fit analysis provide information on how well the individual items work in accordance with other items, but also where potential problems are located [30]. For the analysis of the SPS, item fit analysis is helpful in order to find out how well the scale works as a total score measure of social support, or if some of the items do not fit with other items. Due to Chi Squared statistic being sensitive to sample size, a complementing test of fit using two-way Analysis of Variance (ANOVA) was conducted. As the conclusions from the test of fit using ANOVA did not differ from Chi Squared test of fit, the ANOVA analyses is not reported in this study.

Rasch analysis gives the opportunity for both general and finer level investigation of the instrument. One of the general tests that can tell us something about how well the instrument works is the Person Separation Index (PSI) [39], equivalent to the Test reliability of person separation, also called The reliability of case estimates [40]. This is a reliability indicium, (analogous to Cronbach's Alpha [41]). A high PSI-value means high reliability (consistency) and that in turn means that the instrument is able to separate the individuals well [30].

The criteria of invariance of measurement is a central requirement of the Rasch model and means that an instrument should work in the same way for all persons [30,42].

Differential item functioning

If persons interpret and perceive an item differently due to other factors than actual perceived social support, (e.g. gender or age) that item does not work invariantly across classifications of persons. Differential Item Functioning (DIF) is present when responses from persons in the same class-interval are influenced by person factors like for example gender or age, and not solely by perceived social support [42,43]. DIF is analysed using ANOVA. The ANOVA is conducted by using standardized residuals resulting from comparisons between expected and observed values for subgroups of individuals [43]. DIF can be analysed statistically as well as graphically, ideally in combination. In this study, the DIF-analysis implied an evaluation of, for instance, if the SPS scale works in a similar way for males and females and for different age groups.

Multidimensionality and response dependency

The Rasch model presumes that items are independent of each other and that correlations between the items are part of the latent trait. If this assumption is not met, it can reflect either multidimensionality or response dependence [42,44]. Response dependency is present if the responses to one item is dependent on the response on another item. If the scale reflects more than one latent trait, multidimensionality is present. Scales with different sub-dimensions also intended to measure one global factor is a potential source of multidimensionality [30]. Because the SPS can be used both as a global measure and as a measure with different dimensions, analyses of unidimensionality may be of particular interest. Thus, it is possible to rule out whether the scale is appropriate as a global single measure, or shows multidimensionality related to the predefined dimensions. Occurrence of response dependence

may be examined using residual correlations in combination with Principal Component Analysis (PCA). High residual correlations > 0,30 can indicate response dependency between two items [45]. PCA is used to examine patterns in grouping of items. Items can be divided into different subsets related to the patterns found in the PCA. Further, it is possible to compare the person locations generated from each of these subsets, and test these using t-tests. If more than 5 percent of the t-test comparisons are significant this can indicate either multidimensionality or response dependence [30]. Response dependence tends to increase the reliability while multidimensionality seems to decrease the reliability [44].

All psychometric analyses were conducted using the RUMM2030 software [46].

Results

The general analysis of the 10-item scale shows good reliability according to person separation index (PSI) of 0.745. This indicates that the scale works fairly well in separating the respondents along the latent trait. Figure 1 shows the distribution of individuals relative to the item-threshold distribution. The distribution indicates that there is a dislocation between individuals and item-thresholds. The individuals are represented by the bars in the top, while the item-thresholds are represented with the bars underneath. The bars to the right in the figure represent individuals with high degree of perceived social provisions, and item thresholds reflecting high degree of perceived social provisions. On the left hand side individuals and item thresholds representing lower degrees of perceived social provisions are found. From figure 1 it can be concluded that there is lack of items reflecting higher degrees of perceived social provisions, while there is much more information about individuals experiencing poor social provisions. The mean location of 1.808 reflecting that most persons experience high provisions of social support, relative to item thresholds, can also be observed in figure 1.

figure 1 in about here

Using Rasch analysis, it is possible to detect respondents with extreme response patterns (i.e. extremely positive or negative). In this analysis, 12% (11 persons) of the respondents are extremes. All the extremes are characterized by responses extremely positive on the items, reporting very high degrees of social provisions. These persons with extreme response patterns are located in the higher end (at about 4.5 logits) to the right in figure 1. Separate analysis of the extremes did not indicate them to be considerably different compared to other participants in terms of background or in key variables. Therefore, we decided not to exclude the extremes from further analysis.

Frequencies

Table 1 shows that many of the respondents have a tendency to respond into the categories "Strongly agree" and "Agree", implying that they report a high degree of social provisions, confirming the patterns observed in figure 1. For instance, in item 7 (There are people I can depend on to help me if I really need it), 66 out of 91 (72.5 percent) of the respondents responded into the "Strongly agree" category. This skewed distribution in terms of response patterns may be one source contributing to mistargeting.

table 1 in about here

Thresholds

Six of the items in the scale show problems related to item threshold disordering, as seen in table 2, where the reversed thresholds are bolded. This indicates that the response categories

do not work as intended. Problems with both targeting and threshold disordering can be related.

table 2 in about here

One reason for the occurrence of disordered thresholds may be due to too few respondents replying into the two first response categories, which was also the case in this particular study (see table 1). Because threshold disordering is a severe problem, the categories 'Strongly disagree' and 'Disagree' were collapsed for all items. After rescoring the items, the PSI value is 0.755, which is slightly higher than before collapsing the response categories. The distribution is less skewed after collapsing categories. Related to threshold ordering, only one item (no. 5: I feel a strong emotional bond with at least one other person) now show disordered thresholds.

Item fit

According to the statistical test of fit conducted, there are four items showing misfit to the model having significant probability values < 0.05 (table 3). Consequently, item 1, 6, 7 and 9 have the highest chi-square values. This can also be confirmed by mean square values much higher than the expected value of 1.

However, when the sample is small the graphical presentations related to fit is particularly important, as the statistical power is low, i.e. it may be hard to detect misfit using statistical techniques. Figure 2 shows the ICC curves for item 3 (I have relationships where my competence and skills are recognized) and for item 1 (I feel part of a group of people who share my attitudes and beliefs). The grey line shows the expected curve according to the Rasch Model. If all the dots (mean locations) are on the expected line, that would indicate no

discrepancy between model and data. As can be seen, the dots in the ICC curve for item 3 are close to the expected curve, indicating that the item fits the model well. The probability value is also larger than on the items showing misfit to the model, and with a mean square value of 1 (shown in Table 3). When the observations are far away from the expected curve, we expect lower probability values from the chi square test, and with larger means square values.

The four items showing misfit to the model have issues as illustrated by the ICC curve for item 1 (figure 2), indicating that individuals with low degree of social support score higher than expected and those with higher degree of social support score lower than expected. This illustrates that this particular item discriminates less than expected by the model.

It was not possible to observe any severe DIF-effects across gender or age groups, for any of the items.

table 3 in about here

figure 2 in about here

Multidimensionality

The principal component analysis (PCA) of the item residuals indicates that the items are clustering in different sets. The person location values from each item subset were compared and the differences were assessed with independent samples t-tests. The items clustered together in sets of six and four items, this grouping also is accordant with a theoretical grouping of the items, based on the dimensions described and found in earlier studies of the scale [3,19]. The six items clustered together belong to the three dimensions, 'Attachment', 'Guidance' and 'Sense of reliable alliance'. The four other items clustering together belong to the dimensions 'Social integration' and 'Reassurance of worth' [3,25,26]. However, the proportions of significant t-test did not exceed the critical value of 5%, implying that the

13

person locations in the two subsets are not significantly different from each other, which further leads to the interpretation that the items do not belong to different dimensions [47].

Response dependency

The analysis of residual correlations shows that none of the residuals have correlations > 0.30. This indicates that it is not likely that there are severe violations of the requirements in terms of response dependency.

Scale improvements

Two items were removed in steps in accordance with results from the statistical tests of fit and their graphical representations (ICC-curves). The first item that was removed was item 1 (I feel part of a group of people who share my attitudes and beliefs). This item is from the predefined dimension of 'Social integration' [3], and was the item showing most misfit to the model (table 3). After removing the item, and re-analysing the scale, the results for all of the items changed. From the nine items now remaining, item 2 (There are people who enjoy the same social activities I do), was the item showing most misfit to the model. This item also belongs to the predefined dimension 'Social integration'. Therefore, due to both theoretical and statistical considerations this item was also removed. This resulted in a new scale consisting of 8 items. As seen in table 4 no items now show misfit to the model after this procedure and none of the items have disordered item thresholds. The PSI value is 0.692 and the mean value 1.589, showing that targeting was improved due to item reduction.

No DIF is present for age or gender. There are no signs of violation of the requirement of local independence.

Based on theoretical considerations the modified scale can be described as measuring perceived functional support, while the items removed measure the feeling of social integration with others (structural support).

table 4 in about here

Discussion

The purpose of this study was to investigate the psychometric properties of the total SPS-10 using the polytomous Rasch model. The psychometric analysis reveals that there are room for improvements of the scale. Thus, this study contributes with important findings about the psychometric properties of the SPS-10, a version of the SPS that is less frequently used than other versions (i.e.16-items and 24-items).

One of the main psychometric shortcomings found in this study relates to targeting. This problem reflects that there is a dislocation between persons and item thresholds implying that the measure lacks items reflecting higher degrees of perceived social support. However, the population of this study is characterized by persons likely to face lower degrees of social support compared to general populations [8].

Therefore, from a psychometric perspective, it may be challenging to apply measures intended for various populations, on samples of population groups with specific characteristics. For this specific study group, targeting may be improved by the inclusion of items of sufficient difficulty, reflecting higher degrees of social provisions. The findings regarding targeting have, to our knowledge, not been addressed in any previous studies of the SPS. However, Mancini and Blieszner [26] recognized potential challenges when using the SPS in different populations. They discussed further if people in different stages of life (i.e. old people, young people) have different ways to perceive social provisions, and if this again

can affect the psychometric properties of the scale when used in different populations. This needs to be further examined by looking at targeting when the SPS is applied to different populations. Thus, this study contributes by revealing difficulties of targeting when the SPS-10 is applied to populations of younger adults in risk of marginalization, with mental and/or drug related problems.

The problem with targeting may also be related to item threshold disordering. Due to the dislocation between item thresholds and persons, there are locations along the latent trait at which very few persons are located, this may be a source of empirical item threshold disordering. Using a somewhat larger sample (376), Perera [27] found similar item threshold ordering difficulties analysing the 24-item version of SPS, using an exploratory structural equation modelling (ESEM) framework, also reaching the conclusion that the same response categories had to be collapsed. Perera [27] also reported no DIF-effects across gender. In the light of the work of Perera, the findings from this particular study, therefore, is reasonable.

The analysis of multidimensionality in the SPS showed a grouping of the items in two different sets. As earlier described, this grouping is accordant with the dimensions found in earlier studies, with respectively three and two dimensions represented in each group. Mancini and Blieszner [26] found the same division of the pre-defined dimensions as in this present study. Based on their results from confirmatory factor analysis of the SPS-24, they combined the items from the dimensions 'Attachment', 'Guidance', and 'Sense of reliable alliance' into a composite subscale named Intimacy. This is the same dimensions as found grouping together in the first set in the PCA in this study. The other dimensions they found were in their analysis clearly identified as separate dimensions. However, in this study it was concluded that the items do not belong to different dimensions.

In this particular study, modifications were made in order to improve the scale. This included recoding of response categories and removing items. As previously mentioned, the

two items removed both belong to the predefined dimension 'Social integration'. This dimension is described as: having a social network who shares similar interests and concerns, someone to feel companionship with and that you can share social events and happenings with [3,19]. Earlier research have described social integration as structural support in contrast to functional support. Structural support is then suggested to describe the degree to which a person feel connected within a social network of family, friends, membership in a club or organizations. Functional support on the other hand refers to specific functions that members in a social network can provide (direct helping). For example, emotional, instrumental (tangible), informational and companionship (belonging) support [2,14-16]. The remaining eight items after item reduction reflect this kind of functional support. This strengthens the modified scale by showing that the items remaining all measure perceived functional social support, while the items removed measure social integration, the person's own feeling of fellowship with other people (structural support). When two items are removed, the scale has different qualities than the original scale, and the present modified scale is more stringent, focusing more on one single concept.

These theoretical considerations, together with the statistical tests indicated that removing two of the items were appropriate. After re-coding of response categories and removing these two items, the scale showed satisfying psychometric properties also according to the statistical test of fit. The argument that the scale now is more stringent, with less "noise", may be the reason why the item fit is better, when the two items are removed. Item deletion should not solely be based on statistical criteria for item fit. Consequences for targeting and content validity of the instrument need to be taken into account.

It is well known that reliability indices are dependent upon the number of items included, also in this particular case the item reduction implied a slight PSI value decrease [39,48].

It is likely that because this modified scale is working better than the original scale in this population of young adults with mental and/or drug related problems, it may also work better in a more general population. This is related to the fact that previous research has shown that people with mental health problems report lower social support than the general population [8]. Considering that the present scale lacks items reflecting higher degrees of social support in this particular group, it may be hypothesized that this property would be even more pronounced when applied to a general population. Despite that the majority of the respondents in this study are reporting their mental health condition being the major cause for participation in the nature-based service, they report rather high degrees of social support. Maybe this can imply that participating in nature-based services can lead to increased perceived social support for the participants. Even if the respondents were told to think about their life in general, not only the time they were at the nature-based service when replying the SPS, it is still likely that the fact that they probably replied at the nature-based service have influenced them.

The data collection in this study had many challenges with a population that was difficult to grasp and therefore it was difficult to get respondents. At the same time, it is a strength that similar patterns and results are found in this study as in earlier studies of both the SPS-16 and -24 items versions [26,27,36].

Given the relatively small sample used in this study, some reflections on this may be in place. Even though it may be difficult to provide a smallest number of participants required for conducting Rasch analysis, as this is dependent upon a wide range of circumstances, there has been a debate addressing this issue. For instance, Linacre [49] suggested that the sample size should be based on the number required to provide narrow enough confidence intervals around the item location parameters. Thus, a sample of about 100 may be required for a 95 % confidence that the item location estimates would be stable within 0.5 logits, and a sample

of about 50 for the item location estimates to be stable within 1.0 logit. Referring to Chen, et al. [50] samples of the order of 100 and >250 have more in common than samples <50 in this respect. Using a sample approximating 100, we need to be aware of potential challenges when conducting Rasch analysis. However, a sample of that order is considered to work for the purpose of this study, which may also be partly confirmed by the power of test of fit of 0.745.

To our knowledge, no Rasch analysis have been conducted of the SPS-10 before. The results suggest a modification of the scale that is likely to have value when the scale is applied to similar and more general populations.

Social support is important for a variety of rehabilitation outcomes, and this makes it important to have good measures of social support. Good measures can be used to assess the social support needs and strengths of participants in rehabilitation [18], and be important in research seeking more knowledge about the role of social support in different forms of rehabilitation. This study contributes with a psychometric analysis of the SPS, intended to measure perceived social support, and suitable for use in rehabilitation research and practice. A short scale makes it easy to apply and still the scale covers important dimensions of functional social support. There may be limitations of the scale when applied to other populations than the one used in this study, and specific caution related to validity of the scale should then be taken.

Declaration of interests

The authors report no conflicts of interest.

REFERENCES

[1] Cobb S. Social support as a moderator of life stress. Psychosomatic medicine 1976;38:300-14.

[2] Cohen S, Wills TA. Stress, social support and the buffering hypothesis. Psychological bulletin 1985;98:310-57.

[3] Cutrona CE, Russell D. The provisions of social relationships and Adaption to Stress. In: Jones H, Pearlman D, editors. Advances in personal relationships. A research annual 1. Greenwich,CT: Jai Press Inc.; 1987. p 37-67.

[4] Wang RAH, Davis OS, Wootton RE, Mottershaw A, Haworth CM. Social support and mental health in late adolescence are correlated for genetic, as well as environmental, reasons. Scientific Reports 2017;7.

[5] Rueger SY, Malecki CK, Pyun Y, Aycock C, Coyle S. A meta-analytic review of the association between perceived social support and depression in childhood and adolescence. Psychological Bulletin 2016;142:1017-67.

[6] Caron J. Predictors of quality of life in economically disadvantaged populations in Montreal. Social Indicators Research 2012;107:411-27.

[7] Milner A, Krnjacki L, Butterworth P, LaMontagne AD. The role of social support in protecting mental health when employed and unemployed: A longitudinal fixed-effects analysis using 12 annual waves of the HILDA cohort. Social Science & Medicine 2016;153:20-6.

[8] Nes RB, Clench-Aas J. Psykisk helse i Norge. Tilstandsrapport med internasjonale sammenligninger [Mental health in Norway.State of the art with international comparisons]. Oslo: Folkehelseinstituttet; 2011.

[9] Berkman LF. The role of social relations in health promotion. Psychosomatic medicine 1995;57:245-54.

[10] Chronister J, Chou CC, Frain M, da Silva Cardoso E. The relationship between social support and rehabilitation related outcomes: A meta-analysis. Journal of Rehabilitation 2008;74:16.

[11] McKillop AB, Carroll LJ, Jones CA, Battié MC. The relation of social support and depression in patients with chronic low back pain. Disability and Rehabilitation 2017;39:1482-8.

[12] Ravenek MJ, Schneider MA. Social support for physical activity and perceptions of control in early Parkinson's disease. Disability and Rehabilitation 2009;31:1925-36.

[13] Pjanic I, Messerli-Bürgy N, Bachmann MS, Siegenthaler F, Hoffmann-Richter U, Znoj H. Predictors of depressed mood 12 months after injury. Contribution of self-efficacy and social support. Disability and Rehabilitation 2014;36:1258-63.

[14] Uchino BN. Social Support and Physical Health. New Haven, UNITED STATES: Yale University Press; 2004.

[15] Wills TA, Shinar O. Measuring percieved and recieved social support. In: Underwood LG, Cohen S, Gottlieb BH, editors. Social Support Measurement and Intervention. Cary, UNITED STATES: Oxford University Press; 2000. p 86-135.

[16] Wills TA. Support and Interpersonal Relationships. In: Clark MS, editor. Prosocial Behavior. London: Sage Publications; 1991. p 265-89.

[17] Heitzmann CA, Kaplan RM. Assessment of methods for measuring social support. Health psychology 1988;7:75-109.

[18] Chronister JA, Johnson EK, Berven NL. Measuring social support in rehabilitation. Disability and Rehabilitation 2006;28:75-84.

[19] Weiss RS. The provisions of social relationships. In: Rubin Z, editor. Doing unto others: joining, molding, conforming, helping, loving. Englewood Cliffs, N.J.: Prentice-Hall; 1974. p 17-26.

[20] Cutrona CE, Russell D, Rose J, Lawton MP. Social Support and Adaptation to Stress by the Elderly. Psychology and Aging 1986;1:47-54.

[21] Caron J. [A validation of the Social Provisions Scale: the SPS-10 items]. Santé mentale au Québec 2013;38:297-318.

[22] Caron J, Tempier R, Mercier C, Leouffre P. Components of Social Support and Quality of Life in Severely Mentally Ill, Low Income Individuals and a General Population Group. Community Mental Health Journal 1998;34:459-75.

[23] Dale B, Sævareid HI, Kirkevold M, Söderhamn O. Older home nursing patients' perception of social provisions and received care. Scandinavian Journal of Caring Sciences 2010;24:523-32.

[24] Langeland E, Wahl AK. The impact of social support on mental health service users' sense of coherence: A longitudinal panel survey. International Journal of Nursing Studies 2009;46:830-7.

[25] Bondevik M. Loneliness among the oldest old, a comparison between residents living in nursing homes and residents living in the community. International Journal of Aging & Human Development 1996;43:181-98.

[26] Mancini JA, Blieszner R. Social provisions in adulthood: concept and measurement in close relationships. Journal of gerontology 1992;47:14-20.

[27] Perera HN. Construct Validity of the Social Provisions Scale. Assessment 2016;23:720-33.

[28] Andrich D. A rating formulation for ordered response categories. Psychometrika 1978;43:561-73.

[29] Unick GJ, Stone S. State of Modern Measurement Approaches in Social Work Research Literature. Social Work Research 2010;34:94-101.

[30] Hagquist C, Bruce M, Gustavsson JP. Using the Rasch model in nursing research: An introduction and illustrative example. International Journal of Nursing Studies 2009;46:380-93.

[31] Ellingsen-Dalskau LH, Berget B, Pedersen I, Tellnes G, Ihlebæk C. Understanding how prevocational training on care farms can lead to functioning, motivation and well-being. Disability and Rehabilitation 2016;38:2504-13.

[32] Pedersen I, Ihlebæk C, Kirkevold M. Important elements in farm animal-assisted interventions for persons with clinical depression: a qualitative interview study. Disability and Rehabilitation 2012;34:1526-34.

[33] Steigen AM, Kogstad R, Hummelvoll JK. Green Care services in the Nordic countries: an integrative literature review. European Journal of Social Work 2015:1-24.

[34] Cutcliffe JR, Travale R. Unearthing the Theoretical Underpinnings of "Green Care" in Mental Health and Substance Misuse Care: Theoretical Underpinnings and Contemporary Clinical Examples. Issues Ment Health Nurs 2016;37:137-47.

[35] Chapman DW, Carter JF. Translation procedures for the cross cultural use of measurement instruments. Educational Evaluation and Policy Analysis 1979;1:71-6.

[36] Bondevik M. The oldest old, ADL, social network, and loneliness. Western Journal of Nursing Research 1998;20:325-44.

[37] Drageset J, Kirkevold M, Espehaug B. Loneliness and social support among nursing home residents without cognitive impairment: A questionnaire survey. International Journal of Nursing Studies 2011;48:611-9.

[38] Pallant JF, Tennant A. An introduction to the Rasch measurement model: An example using the Hospital Anxiety and Depression Scale (HADS). British Journal of Clinical Psychology 2007;46:1-18.

[39] Andrich D. An Index of Person Separation in Latent Trait Theory, the Traditional KR-20 Index, and the Guttman Scale Response Pattern. Education Research and Perspectives 1982;9:95-104.

[40] Wright BD, Masters GN. Rating Scale Analysis. Chicago: MESA Press; 1982.

[41] Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrica 1951;16:297-334.

[42] Tennant A, Conaghan PG. The Rasch measurement model in rheumatology: What is it and why use it? When should it be applied, and what should one look for in a Rasch paper? Arthritis Care & Research 2007;57:1358-62.

[43] Hagquist C, Andrich D. Is the Sense of Coherence-instrument applicable on adolescents? A latent trait analysis using Rasch-modelling. Personality and Individual Differences 2004;36:955-68.

[44] Marais I, Andrich D. Formalizing dimension and response violations of local independence. Journal of applied measurement 2008;9:200-15.

[45] Andrich D, Humphry SM, Marais I. Quantifying Local, Response Dependence Between Two Polytomous Items Using the Rasch Model. Applied Psychological Measurement 2012;36:309-24.

[46] Andrich D, Sheridan B, Luo G. RUMM2030: A windows program for the Rasch unidimensional measurement model [Computer software]. Perth, WA, Australia: RUMM Laboratory; 2013.

[47] Smith EV. Detecting and evaluating the impact of multidimensionality using item fit statistics and principal component analysis of residuals. Journal of Applied Measurement 2002;3:205-31.

[48] Traub RE, Rowley GL. Understanding Reliability. Instructional Topics in Educational Measurement 1991:37-45.

[49] Linacre JM. Sample size and item calibration stability. Rasch measurement transactions 1994;7:328.

[50] Chen W-H, Lenderking W, Jin Y, Wyrwich KW, Gelhorn H, Revicki DA. Is Rasch model analysis applicable in small sample size pilot studies for assessing item characteristics? An example using PROMIS pain behavior item bank data. Quality of Life Research 2014;23:485-93.

Table 2: Disordered thresholds are bolded.

Table 3: *Fit Residual values >±2.5, p values <0.05.

Table 1. Proportions (n) in different response categories.

Item	Dimension	Response category			
		1.Strongly disagree	2.Disagree	1.Agree	4.Strongly agree
1. I feel part of a group of people who share my attitudes and beliefs	'Social integration'	8.0 (7)	18.2 (16)	51.1 (45)	22.7 (20)
2.There are people who enjoy the same social activities I do	'Social integration'	3.3 (3)	5.5 (5)	37.4 (34)	53.8 (49)
3.I have relationships where my competence and skills are recognized	'Reassurance of worth'	4.4 (4)	15.4 (14)	31.9 (29)	48.4 (44)
4.I have close relationships that provide me with a sense of emotional security and well-being	'Attachment'	1.1 (1)	5.6 (5)	28.9 (26)	64.4 (58)
5. I feel a strong emotional bond with at least one other person	'Attachment'	5.5 (5)	11.0 (10)	17.6 (16)	65.9 (60)
6. There are people who admire my talents and abilities	'Reassurance of worth'	2.2 (2)	9.9 (9)	31.9 (29)	56.0 (51)
7. There are people I can depend on to help me if I really need it	'Sense of reliable alliance'	1.1 (1)	3.3 (3)	23.1 (21)	72.5 (66)
8. There is someone I could talk to about important decisions in my life	'Guidance'	9.9 (9)	4.4 (4)	19.8 (18)	65.9 (60)
9.There is a trustworthy person I could turn to for advice if I were having problems	'Guidance'	4.4 (4)	4.4 (4)	18.9 (17)	72.2 (65)
10. There are people I can count on in an emergency	'Sense of reliable alliance'	7 (7.7)	7 (7.7)	18.7 (17)	65.9 (60)

Table 2. Threshold locations for Social Provisions scale-10

Item	Thresholds			
	Location	1	2	3
1. I feel part of a group of people who share my attitudes and beliefs	**1,141768**	**-1,099567**	**-1,175634**	**2,275201**
2.There are people who enjoy the same social activities I do	**0,059481**	**-0,15404**	**-1,185256**	**1,339297**
3.I have relationships where my competence and skills are recognized	0,264035	-1,304499	-0,163726	1,468225
4.I have close relationships that provide me with a sense of emotional security and well-being	-0,995523	-1,667965	-0,251691	1,919655
5. I feel a strong emotional bond with at least one other person	0,071842	-0,449227	0,181072	0,268155
6. There are people who admire my talents and abilities	-0,187676	-1,292786	-0,403745	1,696531
7. There are people I can depend on to help me if I really need it	**-0,623229**	**0,046615**	**-1,074908**	**1,028293**
8. There is someone I could talk to about important decisions in my life	**0,299889**	**0,860906**	**-1,140592**	**0,279686**
9.There is a trustworthy person I could turn to for advice if I were having problems	**-0,217904**	**0,170154**	**-0,703019**	**0,532866**
10. There are people I can count on in an emergency	**0,187317**	**0,243807**	**-0,546602**	**0,302795**

Table 3. Social Provisions scale -10, item fit and location

Item	Location	FitResid	ChiSq	Prob	Mean-square fit
1. I feel part of a group of people who share my attitudes and beliefs	1,515	**3,232**	13,553	**0,001141***	6.8
2.There are people who enjoy the same social activities I do	-0,066	1,598	5,878	0,052926	2.9
3.I have relationships where my competence and skills are recognized	0,597	-0,652	2,006	0,366829	1.0
4.I have close relationships that provide me with a sense of emotional security and well-being	-0,609	-1,512	4,759	0,092598	2.4
5. I feel a strong emotional bond with at least one other person	0,091	1,287	3,538	0,17049	1.8
6. There are people who admire my talents and abilities	0,055	-2,324	8,17	**0,016828***	4.0
7. There are people I can depend on to help me if I really need it	-0,967	-1,302	6,976	**0,030564***	3.5
8. There is someone I could talk to about important decisions in my life	-0,058	-1,38	3,305	0,191573	1.7
9.There is a trustworthy person I could turn to for advice if I were having problems	-0,531	-0,958	6,308	**0,042686***	3.1
10. There are people I can count on in an emergency	-0,026	-0,015	2,126	0,345341	1.0

Table 4. Item fit for the improved scale, SPS-8 items

| Item	Location	Thresh.1	Thresh.2	ChiSq	Prob	Mean square fit
3.I have relationships where my competence and skills are recognized	0,882	-0,011596	1,775875	4,313	0,115708	2.2
4.I have close relationships that provide me with a sense of emotional security and well-being	-0,485	-1,86844	0,8987	2,310	0,315019	1.2
5. I feel a strong emotional bond with at least one other person	0,281	0,265441	0,296434	3,089	0,213465	1.5
6. There are people who admire my talents and abilities	0,295	-0,955504	1,545968	4,023	0,133810	2.0
7. There are people I can depend on to help me if I really need it	-0,845	-1,931454	0,24143	1,045	0,592889	0.5
8. There is someone I could talk to about important decisions in my life	0,146	-0,251938	0,543588	1,518	0,468143	0.8
9.There is a trustworthy person I could turn to for advice if I were having problems	-0,431	-1,104526	0,242784	4,225	0,120921	2.1
10. There are people I can count on in an emergency	0,157	-0,134306	0,447544	0,799	0,670504	0.4
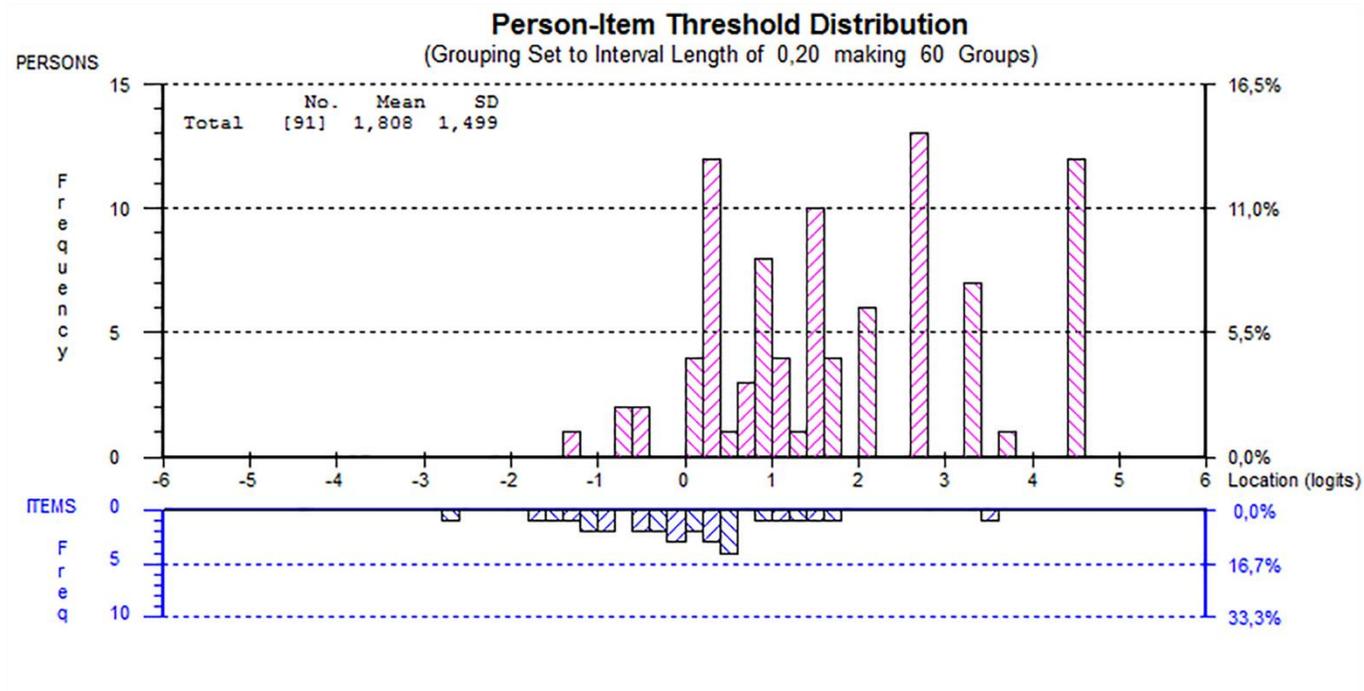
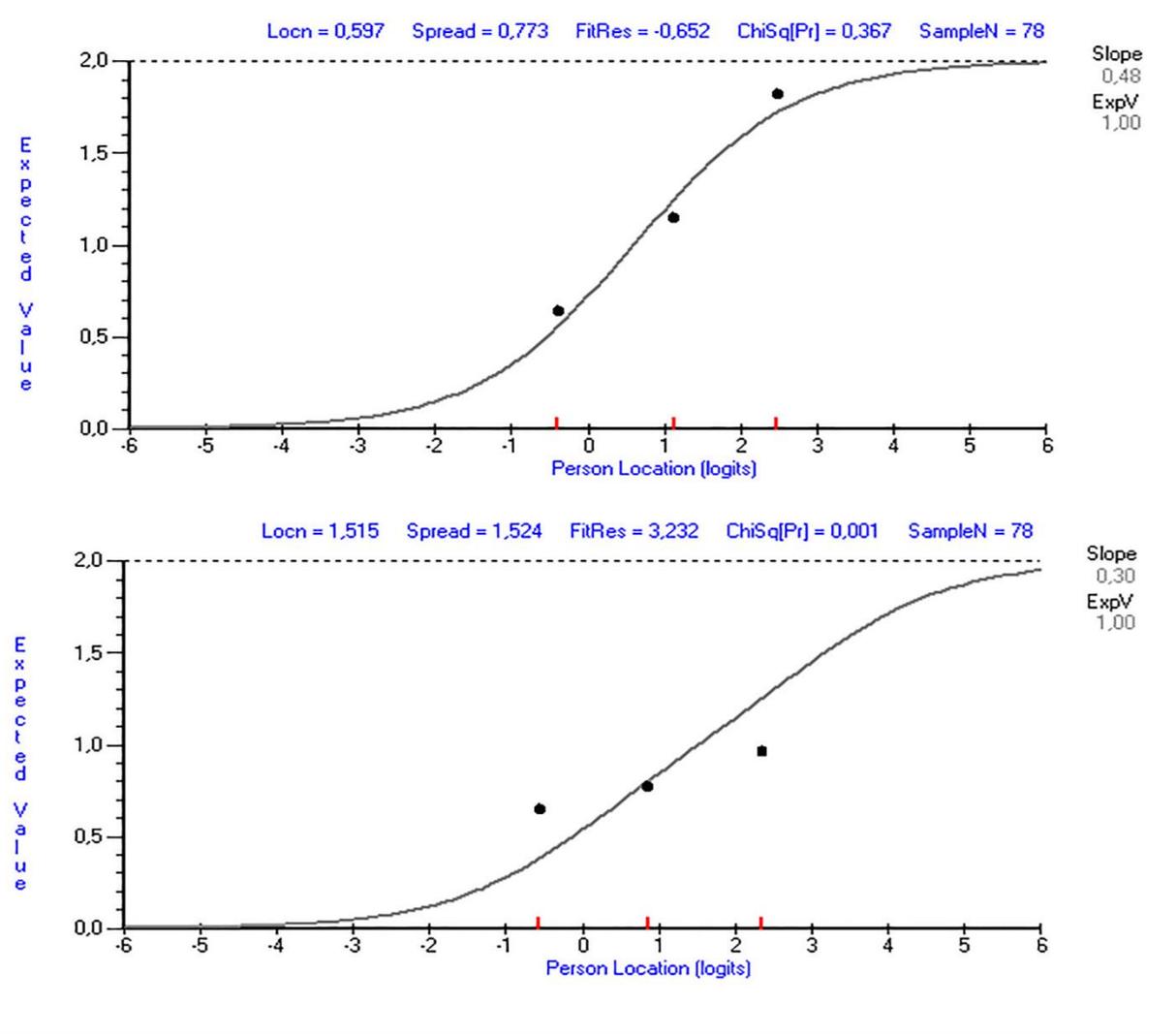Figure 1: Distribution of individuals relative to the item-threshold distribution.

Figure 2: Item Characteristic Curves (ICC) for item 3 and item 1 demonstrating graphical presentations of item-fit.