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# Measuring Social Support in People with Mental Illness: A Quantitative Analysis of the Social Network Map

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#### ABSTRACT

An instrument is needed for quantitatively evaluating changes in social support in people with mental illness, but no gold standard is available. The Social Network Map is a structured interview for assessing social support that is used in individual care settings, yet provides overwhelming output (16-128 data points per assessment). A method comprising two factors (quality and quantity of the social network) was developed. The psychometric properties were judged to be sufficient. This study shows that data from the Social Network Map can be analysed at the group level, yet further research on the psychometric properties is needed.

#### Introduction

Social support is a universal need for all people and is generally associated with quality of life and general mental and physical health (Helgeson, 2003; Holt-Lunstad et al., 2015; Uchino, 2006; Valtorta et al., 2016). This is also true for people with a mental illness, who frequently report that they lack social support (Almquist et al., 2016; Buchanan, 1995; Becker et al., 1997; Browne & Courtney, 2005; Killaspy et al, 2013). Improving social support is, therefore, often an explicit goal in the treatment of people with a mental illness (Degnan et al., 2018), although too much support can also be harmful (Melrose et al., 2015).

Social support is more than the quantity of social contacts (a social network) (Berkman et al., 2014; O'Reilly, 1988; Tracy & Whittaker, 2015). Within social support, there are several dimensions, influencing factors and moderators that can be distinguished (Bruhn, 1991; Chronister et al., 2006). Additionally, there is an important distinction between received support and perceived support (Melrose et al., 2015; Uchino et al., 2012). Whereas social networks have been the realm of social scientists for decades, measuring (change in) social support in relation to health outcomes is often done by applied sciences such as clinical psychology, health services research and nursing research (Heitzmann & Kaplan, 1988; Knoll et al., 2019; Uchino et al., 2012). In these studies on measuring social support in relation to health outcomes, focus is usually on providing clinically usable information and the studies are usually based on a specific theoretical framework (Ducharme et al., 1994).

An ongoing issue in the field of measuring social support is the lack of consensus on the definition and operationalisation of social support (Bruhn, 1991; Knoll et al., 2019; Langford et al., 1997; Martire & Helgeson, 2017). Questionnaires or measuring instruments for social support can be multi-dimensional (extending to several different aspects of social support, often in a defined construct) or can measure a single aspect of social support only (Bruhn, 1991; Chronister et al., 2006). There is no questionnaire that is viewed as the golden standard in the scientific or clinical community (Berkman et al., 2014; Heitzmann & Kaplan, 1988). Lacking a clear definition and operationalisation, the best model for measuring social support should be one that (1) describes the different aspects of social support, like emotional support, instrumental support, appraisal and informational support and (2) collects valuable data for scientific analysis to improve knowledge on the topic of social support (Berkman et al., 2014; Winemiller et al., 1993).

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Some questionnaires measuring social support are not suitable for specific populations, since these questionnaires differ from each other in subtle but important ways, for example measuring only certain aspects of social support or lacking measurement of network size or structure (Bruhn, 1991; Gottlieb & Bergen, 2010). The issue of validating a questionnaire for a specific population is particularly important since a considerable amount of questionnaires measuring social support is only validated in small groups of college students. This is troublesome since the applicability of these questionnaires to heterogeneous middle-aged and older adults is not without doubt (Berkman et al., 2014). When measuring social support in people with severe mental illness, validation for this specific population may be challenging, yet validation for a specific disability population is essential when measuring social support (Chronister et al., 2006).

To the best of our knowledge, there has only been one psychometric evaluation of a questionnaire or measuring instrument for use in people with severe mental illness. This study by Rogers et al. (2004) evaluated the 'Interpersonal Support Evaluation Checklist' (ISEL) for use in people with severe mental illness. However, this study was aimed predominantly at the nature and dimensions of social support of people with severe mental illness and only provided limited psychometric evaluation. Thus, there is no gold standard for quantitatively measuring social support in people with a mental illness (Anderson et al., 2015). An instrument is, therefore, needed for measuring social support in people with mental illness (Webber & Fendt-Newlin, 2017). Based on the issues discussed, an instrument for measuring social support in people with severe mental illness should meet four criteria: (1) be descriptive by nature instead of based on a specific theoretical framework, (2) provide clinically usable information, (3) be based on a rigid theoretical framework and (4) be validated for use with people with severe mental illness.

One instrument that adheres to these criteria is the Social Network Map (SNM). The SNM is a qualitative, semi-structured interview that Tracy and Whittaker (1990) developed for assessing social support in individual care. The SNM is mainly used to identify areas in which the social support of individual service users could be improved. In contrast to self-report questionnaires, administration of the SNM requires both the healthcare professional and the service user to be actively involved. The SNM is being used clinically with several kinds of disorders, for example, with people with a mental illness (Pinto, 2006), people with an addictive disorder (Tracy & Johnson, 2007; Tracy & Martin, 2007), people with mental retardation (Hulbert-Williams et al., 2011; Robertson et al., 2001; Robertson et al., 2007), and with children in foster care (Blakeslee, 2015; McMahon & Curtin, 2012).

A downside to the SNM is that there has been done little psychometric or other quantitative research, except for one brief report on its reliability (Tracy & Whittaker, 1990) and descriptive statistics on its characteristics in another study (Tracy & Abell, 1994). As a result of the paucity of psychometric assessment of the SNM, different researchers have used different methods for analysing results obtained with the SNM in research, and the full potential of the SNM has not always been realised. Some researchers have performed only an analysis of individual items (Berkman et al., 2014; Tracy & Whittaker, 1990), which has yielded inconclusive results. Other researchers have analysed only portions of their data sets (Quirk & Rickwood, 2015; Robertson et al., 2007). Still other researchers have analysed adapted versions of the SNM (Emerson et al., 2001; Hulbert-Williams et al., 2011; Tracy & Martin, 2007), which makes comparison across studies difficult.

In order to be able to adequately evaluate social support, a method for quantitatively analysing social support is needed. Considering that the SNM is valued for its clinical use, it is a suitable candidate for which such a method for quantitatively analysing social support could be developed. In order to be able to utilise the SNM more fully in research, we aimed to (1) develop a method for quantitatively analysing the SNM and (2) gain insight into the reliability and validity of this newly developed method.

## Materials and methods

# Design

Using a quantitative analysis of data from a longitudinal cohort study, we evaluated the methodology for using the SNM. Additional data were collected from (1) a large, longitudinal controlled trial, and (2) a small test-retest study. Analysis and reporting were in accordance with the STROBE guidelines (von Elm et al., 2007). Severe mental illness was defined as having a mental health disorder and both (a) having needed professional mental healthcare for at least 2 years and (b) having received a GAF score of 50 or less (Parabiaghi et al., 2006).

# Instrument

The SNM was originally developed in the late 1980s for assessing social support in families who were at risk of outof-home placements and is a structured assessment comprised of two parts. In the first part, the people who are supposed to have provided social support are examined using a diagram that displays eight areas of life, namely household, other family, work/school, clubs/organisations/church, friends, neighbours, and formal services. Thus, the first part of the questionnaire leads to eight general items, which each are a count of the number of social contacts in an area of life.

In the second part, the participant is first asked which of these people is the most supportive and is then asked to answer eight questions about the relationship that he or she has with this person. Examples of the questions are: "How much emotional support does this person provide?"; "How much practical support does this person provide?"; "How close are you to this person?"; and "How often do you see this person?" These questions are repeated until all persons in the social network (up to a maximum or 15) have been rated. These eight questions have different scoring, mostly using 3-point or 5-point Likert scales. In general, higher scores on these items indicate greater social support. These differences in scoring of the individual items will be addressed further in the section on the development of a method for quantitative analysis. Both parts of the questionnaire together result in 16 to 128 data points from each administration of the SNM, dependent of the number of social contacts.

#### Data collection

The data analysed in this study came from three samples. Both Samples A and Sample B had two assessments each

| Table 1. Participant characteristics.   |              |              |              |  |
|---|--------------|--------------|--------------|--|
|   | Sample A     | Sample B     | Sample C     |  |
| Number of participants                  | 286          | 96           | 25           |  |
| Number (percentage) of females          | 199 (70%)    | 68 (71%)     | 13 (53%)     |  |
| Mean age in years (Standard Deviation)  | 38.4 (11.40) | 40.9 (13.47) | 38.9 (13.49) |  |
| Number of Social Network Maps completed | 536          | 173          | 50           |  |

that were separated by one year. These data were used for the main analyses. Sample C included two assessments that were administered from 1 to 2 weeks apart. The data from this sample were used for assessing test-retest reliability. See Table 1 for a summary of the characteristics of the three samples.

Sample A (N = 283) came from a multicentre, naturalistic cohort study of people in the Netherlands with a mental illness (Koekkoek et al., 2016). Sample B (N = 96) was taken from a cost-effectiveness study of interpersonal community psychiatric treatment for people with a long-term nonpsychotic mental illness (van Veen et al., 2015). Sample C (N = 25) was tested to assess test-retest reliability. Participants receiving primary mental healthcare from a local primary mental healthcare service were assessed twice with a 1–2-week interval. Trained research assistants conducted the administration of the SNM, either in person at the health-care facility or by telephone.

#### Developing a method for quantitative analysis

The development of the method for quantitative analysis was divided into three stages (see Figure 1). First, the separate variables were modified to be more suitable for statistical analysis. Second, a factor analysis was performed in order to reduce the number of variables to a manageable number of scale scores. Third, a method was developed that would allow the variables within the different categories to be added together to form scale scores.

Stage One involved evaluating and adapting the separate variables so that they would be suitable for statistical analysis, for example on distribution of the labels (see Table 2). The normality of the distribution of scores was confirmed by inspecting each of the histograms (Howitt & Cramer, 2005).

The aim of Stage Two was to reduce the large number of variables to a manageable number of scores. To achieve this goal, an exploratory factor analysis was performed using principal component analysis without rotation (Gorsuch, 2014). The number of factors that would be accepted was determined by using the criterion *eigenvalue* > 1 and which was then confirmed by inspecting the scree plot (Gorsuch, 2014). Items with a factor loading of < 0.6 on a factor were excluded.

In Stage Three, total factor scores were developed. The main difficulty that needed to be resolved was the large differences among the factor variables in the range of answers. They varied from two (which occurred for multiple variables) to 90 (the largest number of contacts in the sample). In order to make the variables comparable with one another, *z*-scores were calculated, and the mean for each of the scores was then calculated (Howitt & Cramer, 2005). In order to

facilitate interpretability of the results, total factor scores were also calculated for the different subgroups of participants.

#### **Reliability and validity**

All reference scores were as proposed by Terwee et al. (2007). Cronbach's alpha was calculated for evaluating internal consistency (considering 0.70-0.95 adequate). Intraclass correlation coefficient (ICC) was used to assess reliability (two-way random effects model); considering larger than 0.70 adequate.

As discussed in the Introduction, there is no gold standard for measuring social support, thus there is no comparison to evaluate criterion validity. When evaluation construct validity, we hypothesised that both factor scores that we proposed for the SNM can vary independently of each other, which was tested using Pearson correlations.

In order to evaluate the responsiveness of the SNM, the effect sizes (Cohen's d) were calculated for both factor scales. In order to evaluate the divergent validity of the SNM, scores were calculated for different groups defined according to four variables: gender, marital status, living arrangements, and employment status.

#### **Ethical considerations**

The original studies underwent formal ethical review by an institutional review board. All participants in all of the studies gave written informed consent prior to their participation in the study. Additionally, all procedures contributing to this work comply with the ethical standards of the Helsinki declaration of 1975, as revised in 2013.

#### Results

From Sample A and Sample B, 382 participants completed 709 SNMs. The mean interval between the assessments was 311.1 days (SD = 66.2). In Sample C, 25 participants completed 50 assessments, which were used to evaluate test-retest reliability. The mean interval between these assessments was 10.4 days (SD = 3.23). See Table 1 for additional details about the participants' characteristics. Administration of the SNM required between 20 and 30 minutes; the time required for the second administration was somewhat less than for the first. All variables were normally distributed.

#### **Factor analysis**

When we used the criterion of *eigenvalue* > 1 to evaluate the results of the factor analysis, a two-factor solution was



Figure 1. Development of a method for quantitative analysis.

obvious. This solution was confirmed when we inspected the scree plot in which there was a clear break after two factors. The factor loadings (see Table 3) indicated that the item *direction of support* had a value of < 0.6 on both of the factors, so it was discarded. All of the other items clearly fell into one or the other of the two factors. They loaded >0.8 on one factor and < 0.3 on the other factor. Inspection of the content of the items indicated a clear distinction between the two factors. Factor One loads on items related to the quality of the social network (e.g., the different types of support; the closeness of the support), and Factor Two includes two items related to the quantity of the social network (the network size and the number of areas of life in which the support occurred). These two factors, therefore, corresponded to the scales that we included in the quantitative analysis of the SNM.

#### Scores for the sample

Following the factor analysis, the *z*-scores were calculated from the mean and standard deviation of the total sample. On average, the participants' situation improved during the

Table 2. Items on the Social Network Map and corresponding data preparation.

| #  | ltem   | Data collected  | Data preparation  | Range after preparation                 | Remarks   |
|----|--|---|---|---|---|
| 1  | Concrete support   | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Mean calculated for all<br>persons named in<br>social network   | 1-3                                     |   |
| 2  | Emotional support  | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Mean calculated for all<br>persons named in<br>social network   | 1-3                                     |   |
| 3  | Information/advice   | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Mean calculated for all<br>persons named in<br>social network   | 1-3                                     |   |
| 4  | Critical   | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Not used due to lack<br>of clarity  | ltem not used due to<br>lack of clarity | Removed because the research<br>assistants indicated that most<br>participants did not<br>understand it; some<br>participants thought that<br>critical was positive, whereas<br>others though that it<br>was negative   |
| 5  | Closeness  | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Mean calculated for all<br>persons named in<br>social network   | 1-3                                     | ,   |
| 6  | Direction of help  | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Mean calculated for all<br>persons named in<br>social network   | 1-2                                     | Response options changed from<br>support primarily from<br>participant to person in social<br>network (1), support primarily<br>from person in social network<br>to participant (2), and support<br>in both ways (3), to (1) support<br>in one direction and (2) support<br>was both ways |
| 7  | How often seen   | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Scores changed from<br>0,1, 2, 3, 4 to 0, 1, 2,<br>4, 6. Mean calculated<br>for all persons<br>named in<br>social network | 0-6                                     | Response options changed from<br>never, a few times a year,<br>monthly, weekly, daily coded<br>as 0, 1, 2, 3, 4 to 0, 1, 2, 4, 6<br>to reflect the intensity of the<br>contact more accurately  |
| 8  | How long known   | Information was collected for<br>the most supportive<br>persons in the social<br>network up to a maximum<br>of 15 | Mean calculated for all<br>persons named in<br>social network   | 1-5                                     |   |
| 9  | Number of persons in<br>social network                     | Once at the beginning of<br>the interview   | None  | Continuous                              |   |
| 10 | Number of areas of life<br>in which support<br>was present | Once at the beginning of the interview  | Total for all areas of life<br>in which at least one<br>person was<br>considered as<br>providing support                  | 0-8                                     |   |

course of the study, possibly because of the treatment that they received. Because only the baseline assessment (of the two assessments included in this study) was used to create the summary table for the different subgroups, most of the scores were below the mean score, and most were, therefore, negative (because they were derived from z-scores). Instructions for calculating the factor scores for individual patients in everyday practice based on the reference group for this study are provided in the Appendix.

#### Reliability and validity

To further evaluate the internal consistency of the SNM, Cronbach's alpha was calculated for both of the scales. Cronbach's alpha for the first scale (quality of the social network) was 0.961, and for the second scale (quantity of the social network), it was 0.694. Thus, Cronbach's alpha for both scales was slightly outside the desired range (Terwee et al., 2007).

Test-retest reliability for the quality of the social network scale had an ICC of 0.821 (n = 25); the quantity of the social network scale had an ICC of 0.735 (n = 25). Both of these scales were well above the cut-off score of 0.70, which means that the test-retest reliability of the SNM was adequate (Terwee et al., 2007).

The two assessments of Sample A and Sample B were analysed in order to evaluate responsiveness. The time between the two assessments was 311.1 days (SD = 66.2).

Table 3. Principle component matrix with factor loadings.

|                            | Factor 1 | Factor 2 |
|----------------------------|----------|----------|
| Emotional support          | 0.937    | -0.063   |
| Information/advice/support | 0.935    | -0.079   |
| Closeness                  | 0.934    | -0.042   |
| Concrete support           | 0.911    | -0.064   |
| How often seen             | 0.889    | -0.167   |
| How long known             | 0.869    | -0.007   |
| Network size               | 0.177    | 0.848    |
| Number of areas of life    | 0.214    | 0.813    |
| Direction of support       | 0.176    | 0.341    |

The effect size for the quality of the social network was 0.792 (n = 317); the effect size for the quantity of the social network was 0.311 (n = 317). When construct validity was evaluated, it was assumed that the two factor scales could vary independently of each other. This was because a social network can be large and of high quality, small and of high quality, large and of low quality, small and of low quality, or somewhere between these extremes. The assumption that both factor scales would vary independently of each other was confirmed by a Pearson correlation showing that the relationship between the two scales was 0.154 (p < .001, n = 709).

The scores of the different subgroups of participants are presented in Table 4; they were calculated to allow us to assess divergent validity. With regard to the first assessment, female participants reported better social support than male participants, both on the quality and on the quantity of their social network. This difference, however, was not statistically significant. Married participants on average reported better social support than participants who were not married, again both on the quality and on the quantity of their social network. This difference, however, was significant only on the quality of the social network.

Regarding participants' living arrangement, it is striking that participants who were living with relatives reported the lowest quality of social support, followed by participants who were living alone. On average, participants who were living with others (regardless of the relationship that the participant had with the other people) was associated with a higher quality of social support, and living with children was in particular was associated with better quality of the social network. Results for the number of people in the social network (i.e., the quantity of the social network) visa-vis the living situation was comparable to the results for the quality of the social network, with the exception of people who were living in a care facility. These results, however, were significant only for the quantity of the social network.

With regard to the results for participants' employment status, two groups stand out. They were participants who were gainfully employed and students; these two groups reported the highest quality of social support in comparison to the other groups, all of whom reported the poorest quality of social support, even though they had comparable scores on the other measures. There was one exception to this general conclusion. The scores of participants who were in voluntary work were intermediate between the other groups. The quantity of participants' social support in relationship to their employment status was comparable to the quality of their social support, although their scores on the quantity of the social support were more variable. Because the scores of the different groups varied considerably and were in accordance with the hypothesised differences, their divergent validity can be considered adequate. The differences that were observed were, however, significant only for the quantity of the social network.

## Discussion

The initial aim of the present study was to develop a method for quantitatively analysing the SNM. This aim was achieved by recoding the data, performing a factor analysis, converting scores to z-scores, and calculating means for the two factors that were obtained from the factor analysis. The two factor scales were (1) the quality of the social network and (2) the quantity of the social network. Other studies (Davidson et al., 2006; Fiorillo & Sabatini, 2011; Platt et al., 2014; Wu et al., 2011) have also divided social support into quality and quantity. A second aim of the study was to evaluate the reliability and validity of the SNM. Internal consistency, test-retest reliability, and construct validity were judged to be sufficient. Responsiveness was acceptable for both the quality and the quantity of the social network. For the quantity of the social network, however, the effect size was smaller. This could mean that the quantity of the social network scale is less sensitive to change, but it could also mean that it was more difficult to change the quantity of the social network within the period of 12 months between the two assessments. The latter possibility seems plausible, in that it takes time for a social network to be expanded (Killaspy et al., 2014).

One factor, *direction of support*, did not meet the criterium of a factor loading of 0.70 on either of both factors (0.176 and 0.341). This could be caused by the nature of the variable, as it is treated as a dichotomous variable. This small range of the variable causes limited variability and thus possibly an unreliable factor. Another explanation could off course be that whether a person in the social support system is mostly providing care, mostly receiving care or both is not related to either quality or quantity of the social support system. This item should receive additional attention when further researching the quantitative properties of the SNM.

The SNM can already be deemed suitable for working qualitatively with individual service users. In this study, however, we developed a method for quantitatively analysing results from the SNM at the group level. This method reduces the number of variables required but without modifying the SNM or discarding a portion of the data. Now that a method for analysing at the group level has been developed, the results from SNMs can be used for scientific research. With the two scales that were proposed in this paper, the SNM can be used, for example, as an outcome measure in randomised controlled trials. Being able to reliably measure social support in a standardised way will enable researchers to approach their studies from a social perspective in addition to the medical and psychological

Table 4. Divergent validity based on baseline z-scores and differences between the subgroups.

|  | Quality of the social network at baseline: mean (Standard deviation) <sup>a</sup> | p    | Quantity of the social network at baseline: mean (Standard deviation) <sup>a</sup> | p      | N   |
|--|---|------|--|--------|-----|
| Total                                      | -0.424 (0.994)  |      | 0.117 (0.754)  |        | 326 |
| Gender                                     |   |      |  |        |     |
| Male                                       | -0.498 (1.003)  | 0.88 | 0.021(0.817)   | 0.76   | 104 |
| Female                                     | -0.375 (0.990)  |      | 0.161 (0.935)  |        | 222 |
| Martial status                             |   |      |  |        |     |
| Married / registered partnership           | -0.303 (0.903)  | 0.04 | 0.383 (0.948)  | 0.67   | 93  |
| Not married                                | -0.462 (1.028)  |      | 0.012 (0.861)  |        | 232 |
| Living arrangements                        |   |      |  |        |     |
| Living alone                               | -0.535 (1.051)  | 0.61 | -0.148 (0.785)   | < 0.00 | 119 |
| Living with children                       | -0.014 (1.067)  |      | 0.574 (1.023)  |        | 4   |
| Living with significant other              | -0.442 (0.943)  |      | 0.254 (1.005)  |        | 57  |
| Living with significant other and children | -0.269 (0.887)  |      | 0.266 (0.843)  |        | 93  |
| Living with parents                        | -0.322 (1.002)  |      | 0.018 (0.900)  |        | 26  |
| Living with relatives                      | -0.860 (1.292)  |      | -0.209 (1.008)   |        | 4   |
| Living with others (e.g., group home)      | -0.419 (1.080)  |      | 0.435 (0.984)  |        | 20  |
| Living in care facility                    | -0.344 (1.926)  |      | -1.165 (0.179)   |        | 3   |
| Work status                                |   |      |  |        |     |
| Paid work                                  | -0.182 (0.823)  | 0.50 | 0.480 (0.901)  | < 0.00 | 93  |
| Volunteer work                             | -0.381 (0.957)  |      | 0.058 (1.010)  |        | 34  |
| Sheltered working environment              | -0.560 (1.454)  |      | -0.253 (0.893)   |        | 3   |
| Unemployed                                 | -0.693 (1.069)  |      | -0.286 (0.576)   |        | 28  |
| Student                                    | -0.152 (0.996)  |      | 0.367 (0.813)  |        | 34  |
| Stay at home parent                        | -0.535 (0.911)  |      | 0.090 (0.895)  |        | 17  |
| Other                                      | -0.606 (1.040)  |      | -0.126 (0.754)   |        | 18  |
| Total                                      | -0.414 (0.994)  |      | 0.117 (0.754)  |        | 326 |

Z-scores are relative to the mean of the population and are negative when below the mean. Because the situation of the participants improved during the study, most scores in this table are below the mean and thus negative.

perspectives. The fact that z-scores are used for analysis at the group level will make interpretation at face value more difficult, but this is less of a problem when the scores are being used in scientific research than when they are used in the treatment of individuals.

Although this study aimed to develop a method for analysing the SNM at the group level, the results of the study also have implications for using the SNM with individuals. At present, when the SNM is used in daily practice with individual service users, the main purpose of doing so is to identify the strengths and weaknesses of the individuals' social support system in order to help them improve the social support that they receive [12]. Having the ability to monitor progress while executing an intervention for improving individuals' support system is difficult because of the large amount of information that the SNM yields (between 16 and 128 data points). However, using the two scales from the SNM that were proposed in this paper would provide both the healthcare professional and the service user with concrete and easily comprehensible information about the individual's social support system. Nevertheless, when it is used in daily practice, a quantitative analysis of the SNM should be computerised so that the scores from the SNM are automatically provided to the healthcare professional. This is because calculating the scores by hand is complex and time consuming. An additional advantage of generating the two scales from the SNM via an automated system is that doing so would make it easy to compare individual service users with a reference group, for example service users with a similar diagnosis.

A strong feature of the present study was the large number of participants who were included in the analyses. This provided sufficient statistical power to be confident in the results from the statistical analyses that were performed. A second strength of the study is the thoroughness with which the data collection was executed. For example, trained research assistants administered the SNM using a standardised method of administration. This resulted in less variability between the different assessments than what otherwise might have occurred. At the same time, we should acknowledge that a weakness of the study was the complexity of the statistical procedure for quantitatively analysing the SNM. A simpler method of analysis (e.g., not requiring the use of z-scores) would be easier to perform and would also allow interpretation of the results of the analysis to be more intuitive.

This study demonstrated that the data from the SNM can be condensed into two scales—namely, the quality of the social support network and the quantity of the social support network—which can be analysed at the group level. Internal consistency, test-retest reliability, and construct validity of this procedure for analysing the SNM were all judged to be sufficient. Sensitivity of the measures to change was judged to be good for the quality of the social support network, and it was satisfactory for the extent of the social support network. Nevertheless, further research on the psychometric properties of the SNM and the two scales that were proposed in this paper will be necessary.

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#### **Disclosure statement**

No potential conflict of interest was reported by the author(s).

### Availability of data and materials

If researchers are interested in applying the data from the MATCH cohort study, the principal researcher (Dr. B. Koekkoek) can be contacted.

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#### Appendix

*Note:* In order to calculate scores for individual service users in everyday practice that are based on the reference group in this study, mean and standard deviations are needed for all of the individual variables. In turn, *z*-scores are calculated. The formula for calculating a *z*-score is  $z = \frac{x-\mu}{\sigma}$ , where  $\mu$  is the mean of the sample and  $\sigma$  is the standard deviation of the sample. The data required for these calculations can be found the table below.

Table A1. Data for calculating scores for individual service users in everyday practice (N = 709).

| ltem # | I                    | tem                      | Mean (standard deviation) |
|--------|----------------------|--------------------------|---------------------------|
| 1      | Concrete support     |                          | 1.906 (0.610)             |
| 2      | Emotional support    |                          | 2.028 (0.621)             |
| 3      | Information/advice   |                          | 1.988 (0.609)             |
| 4      | Critical             |                          | 1.864 (0.421)             |
| 5      | Closeness            |                          | 2.010 (0.604)             |
| 6      | Direction of help    |                          | 1.654 (0.211)             |
| 7      | How often seen       |                          | 2.467 (0.726)             |
| 8      | How long known       |                          | 2.257 (0.634)             |
| 9      | Number of persons in | n social network         | 13.702 (11.347)           |
| 10     | Number of areas of I | ife with support present | 4.380 (1.415)             |

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