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Title:

Conceptual framework for social connectedness in mental disorders: systematic review and narrative synthesis

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Abstract

Background

Adults with mental disorders are at high risk of loneliness. Loneliness has been implicated in a wide variety of physical and mental health problems. Social connectedness interventions are one means to tackle loneliness but have shown mixed effectiveness. This study aims to: (1) identify existing measures of social connectedness and (2) develop a conceptual framework of social connectedness to inform future measurement and the development of new interventions.

Methods

A systematic review of studies from six bibliographic databases was conducted. Studies were included if a quantitative measure of social connectedness was used amongst samples of adults with a mental disorder. Two analyses were conducted: a best evidence synthesis of measurement properties for identified measures and a narrative synthesis of items from these measures.

Results

Twenty-eight papers were included, employing 22 different measures. Measurement properties were of poor or unknown quality. Data synthesis identified a five-dimension conceptual framework of social connectedness: Closeness, Identity and common bond, Valued relationships, Involvement and Cared for and accepted (giving the acronym CIVIC).

Limitations

The majority of studies were conducted in high-income countries. It was not possible to validate the conceptual framework using the identified psychometric data.

Conclusions

This new five-dimension framework of social connectedness in mental disorders provides the theoretical foundation for developing new measures and interventions for social connectedness.

Keywords

social connectedness; conceptual framework; measures; mental disorders

1. Introduction

Loneliness is a state of negative affectivity resulting from the perception of unmet social needs. It is conceived of as a subjective experience, distinct from the objective state of social isolation as determined by the quantity and frequency of one's social contacts (Peplau and Perlman, 1982). Loneliness is highly prevalent amongst adults experiencing mental disorders (Michalska da Rocha et al., 2017; Stickley and Koyanagi, 2016), particularly in cases of depression (Peerenboom et al., 2015; Santini et al., 2015; Teo et al., 2018) and when more than one disorder is present (Meltzer et al., 2013). Loneliness is a risk factor for a variety of physical and mental health problems. Longitudinal studies have found that loneliness is a unique predictor of depressive symptomology (Cacioppo et al., 2010; Cacioppo et al., 2006b; Heikkinen and Kauppinen, 2004; Holvast et al., 2015; Qualter et al., 2010; Santini et al., 2016; Segrin, 1999; Wei et al., 2005). It is also prospectively associated with symptoms of anxiety (Cacioppo et al., 2006a; Lim et al., 2016) and paranoia (Lamster et al., 2017; Lim et al., 2016). For adults with pre-existing major depressive disorder, loneliness is independently associated with a poorer prognosis (Holvast et al., 2015; Jeuring et al., 2018; van Beljouw et al., 2010; van den Brink et al., 2018). Furthermore, loneliness is a risk factor for adverse physical health outcomes such as coronary heart disease and stroke (Hare Duke, 2017; Petitte et al., 2015). Meta-analyses suggest that those who feel lonely have between 22-26% increased likelihood of all-cause mortality (Holt-Lunstad et al., 2010; Rico-Uribe et al., 2018).

Interventions to address loneliness in adults with mental disorders are at an early stage of development (Mann et al., 2017; Masi et al., 2011). A variety of different psychosocial interventions have been used including supported socialisation (Lloyd-Evans et al., 2017; Sheridan et al., 2015), peer support (Simpson et al., 2014) and cognitive behavioural therapy (Conoley and Garber, 1985; Sorenson, 2003; Williams et al., 2004a). Though where it has been measured, loneliness is often a secondary outcome of clinical trials and none of these models have a robust evidence base. New, theoretically-based interventions for adults with mental disorders have been called for (Mann et al., 2017; Priebe, 2016). This review focusses on increasing 'social connectedness' as a potential means of tackling loneliness. In this review a working definition of social connectedness was used to scaffold the review as follows: 'a subjective psychological bond that people feel in relation to individuals and groups of others'. This definition was drawn from recent literature (Haslam et al., 2015). It is sufficiently broad to avoid making too many a priori assumptions about the nature of social connectedness whilst also restricting the scope of the review to *social relationships*, and as both a *subjective* and an *individual-level* phenomenon. As one of the objectives of this review is to inform interventions to tackle loneliness, these parameters are appropriate given the common understanding of loneliness as relating to social needs and 'perceived social isolation' (Mann et al., 2017).

There has been limited conceptual work to inform the development of new interventions targeting social connectedness as defined here. Recent reviews have instead taken a broader approach to develop frameworks which integrate the terminology and conceptualisations of diverse social-relational concepts across both objective and subjective domains (e.g. Valtorta et al., 2016; Wang et al., 2017). Whilst such broad frameworks can support the synthesis of existing empirical studies they do not focus on identifying the subjective dimensions of social-relational concepts. This review synthesises empirical operationalisations of social connectedness across different disciplines in order to develop a comprehensive conceptual framework.

The aims of this review were: (1) to identify the range of measures used to measure social connectedness amongst adults with mental disorders and (2) to develop a conceptual framework for social connectedness as operationalised by the included measures.

2. Methods

A systematic review was conducted according to a structured protocol which followed PRISMA-P guidance (Moher et al., 2015). The protocol was registered on the PROSPERO database (reference: CRD42017078116).

2.1 Inclusion criteria

The following inclusion criteria were applied: study used a quantitative measure of social connectedness (full or subscale; not restricted to psychometric studies); participants were both (a) aged 18-65 and (b) had a mental disorder (DSM-V or ICD-10 classifications); and published in English. During a pilot test of the review it was found that a number of studies used samples where only a small minority of participants met conditions (a) and (b). Therefore the original protocol was altered to specify that at least 50% of the study sample needed to meet these conditions.

2.2 Search strategy

A three step search strategy was used. First, an initial limited search of MEDLINE and CINAHL was undertaken using the terms "social connectedness" AND "mental health", followed by analysis of the text words contained in the titles and abstracts, and of the index terms used to describe these articles. Second, six databases were searched from inception to September 2017: MEDLINE, CINAHL, PsychInfo and Sociological Abstracts with unpublished studies searched through EThOS and ProQuest Dissertations and Theses. Keywords used for social connectedness included "social connectedness" OR companionship OR relatedness OR "sense of belonging" OR "social belonging" OR "group membership" OR "group identi*" OR "social identi*". For reasons of feasibility and in order to focus the review on measures of subjective, individual-level perceptions of relationships socio-relational terms were not used if they referred to concepts which are objective (e.g. social networks, social integration, social inclusion), feature multiple non-social domains (e.g. social inclusion/exclusion), ecological-level (e.g. some versions of social capital) or refer to resources provided within relationships (e.g. social capital, social support). Terms for mental health disorder included "mental illness" OR "mental disorders" OR psychos* OR obsessive-compulsive OR "obsessive compulsive" OR “affective disorder” OR anxiety or depress* OR panic OR phobi*. Terms were also used to exclude qualitative studies. The third step involved screening the reference lists of included studies for additional studies.

2.3 Study selection

Titles and abstracts were screened for assessment against the inclusion criteria (LHD). Due to limited resources for the review, a second independent reviewer (KM) screened a random subsample of 100 articles. Studies meeting the inclusion criteria were retrieved in full and were assessed in detail against the inclusion criteria by two independent reviewers (KM and LHD). Full-text studies that did

not meet the inclusion criteria were excluded and reasons for exclusion were noted. Any disagreements between the two reviewers were resolved through discussion.

2.4 Data extraction and quality appraisal

One reviewer (LHD) extracted data and quality assessed all retrieved papers. A random subsample (10% of the total) was assessed by a second reviewer (KM). The following data was extracted: (1) identification of the study: author, title, citation, publication type, country; (2) characteristics of the study: purpose/objectives of the study, design, sample size; (3) measurement properties; (4) individual question items of social connectedness measures. The second reviewer checked the first reviewer's extraction unblinded. Quality was determined using the Consensus-based Standards for the selection of health status Measurement Measures (COSMIN) checklist (Terwee et al., 2012). In accordance with COSMIN, nine measurement properties were assessed. These were (1) internal consistency: defined as the degree of inter-relatedness of items within a measure. (2) Reliability: including test-retest reliability (consistency over time), inter-rater reliability (consistency between different individuals on the same occasion), and intra-rater reliability (consistency between the same individuals on different occasions). (3) Measurement error: the systematic and random error of an individual's score that is not attributed to true changes in the construct to be measured. (4) Content validity: whether the content is an adequate reflection of the construct to be measured. (5) Structural validity: the degree to which measurement scores adequately reflect the dimensionality of the construct to be measured. (6) Hypotheses testing: the degree to which the scores of a measure are consistent with hypotheses. (7) Cross-cultural validity: the degree to which the performance of the items on a translated or culturally adapted measure are an adequate reflection of the performance of the items of the original version. (8) Criterion validity: degree to which the scores of a measure are an adequate reflection of a 'gold standard'. (9) Responsiveness: the ability of a measure to detect change over time (Mokkink et al., 2010).

2.5 Data synthesis

Two separate analyses were conducted. To address the first aim of the review, identifying the range of social connectedness measures available, the included measures were tabulated and summarised descriptively along with their psychometric properties. As there is currently no empirical method to statistically synthesise psychometric results, a best evidence synthesis approach was undertaken as proposed by the Cochrane Back Review Group (Furlan et al., 2009). Best evidence synthesis here refers to the possible overall rating for a measurement property ('positive', 'indeterminate', or 'negative'), accompanied by a level of evidence (strong, moderate, limited, conflicting, unknown). The criteria for synthesising evidence are adapted from (Terwee et al., 2007) and summarised in Table 1.

Insert Table 1 here.

To address the second aim of the review the conceptual framework was developed using a modified narrative synthesis approach (Popay et al., 2006). This involved three stages. The first stage used a thematic synthesis of the items from all included measures (Thomas and Harden, 2008; Thomas et al., 2012). A two-step process was used for this synthesis. First, the individual items from all measures were pooled. Common themes across the remaining items were identified using inductive thematic analysis by two independent researchers (KM and LHD). Items were excluded if they referenced social connectedness directly (e.g. 'I feel connected to those around me') as such items are not amenable to thematic analysis. Potential themes and sub-themes were discussed and iteratively refined to produce a coding framework. This framework served as the basis for a

preliminary conceptual framework identifying dimensions social connectedness. The second stage of the narrative synthesis used vote counting to explore relationships in the data. Vote counting here refers to a simple count of the dimensions per item/measure. The empirically established dimensions of included measures were also compared against the thematic synthesis. The third stage of the narrative synthesis involved determining the robustness of the synthesis. This was evaluated through a sensitivity analysis of studies rated of good content validity, as well as the independent thematic synthesis by two review authors (KM and LHD).

3. Results

Figure 1 shows a PRISMA flow diagram of the article selection process. A total of 27 papers were retrieved with one article featuring two studies, resulting in a total of 28 studies and 21 different measures. Table 2 describes the 28 included studies. Most studies were conducted in high-income countries, primarily in the USA (n=17) or Australia (n=8). There was a spread of outpatient (n=14) and community (n=11) samples with two inpatient studies and one study conducted with a combined inpatient/outpatient sample. Samples included people with a wide range of common and severe mental disorders. Single-disorder samples were found for depression[1, 5, 9, 21, 26, 27] and substance misuse[7, 28]. All other studies used samples featuring multiple different diagnostic groups.

Insert Fig. 1 here

Insert Table 2 here.

3.1 Measures of social connectedness

Of the 21 measures, 13 were full scales and eight were subscales of larger measures. The names of the 21 measures spanned six related terms: social connectedness, social support, social identity, belonging, group memberships and neighbourhood integration. The number of items in each measure ranged from two to 20. Five measures had a mix of both positively phrased items (social connectedness) as well as negatively phrased (social disconnectedness), whilst 16 measures had exclusively positive items. The COSMIN quality assessment of these measures is shown in Table 3.

Insert Table 3 here

Most of the measures (n=18) had been used in only one study and had limited evidence for their measurement properties. None of the measures had data relating to all nine COSMIN measurement properties and none assessed the properties of measurement error or of cross-cultural validity. In 14 of the 21 measures, information was available for only one or two properties. The most commonly assessed property (in 15 out of 21 measures) was internal consistency. This property was in most cases rated as unknown.

Across most measures (n=15), content validity was rated as poor. Six measures were rated as having good content validity. The SOBI-P was developed as a 'mental health concept' (Hagerty and Patusky, 1995), partly from case studies of psychiatric nurses and items were developed by clinicians. The SCS-R was developed from psychoanalytical theory (Kohut, 1984) and items developed by counsellors. The items from the SI-depression and SI-therapy measures were developed by clinical academics and specifically adapted for use in clinical samples (depressed/therapy group). The INQ-TB was developed in accordance with the interpersonal theory of suicide (Joiner, 2005) and was validated in a clinical sample. Finally, the SIM-7 was developed by clinicians and validated in a clinical

sample. The authors of these six measures had also made some assessment of their relevance and comprehensiveness.

The measure with the strongest psychometric properties was the INQ-TB, rated as moderate or strong for internal consistency, structural validity and criterion validity as well as being assessed as being of good content validity. This measure has been used by different research groups, with four different studies included in this review.

3.2 Preliminary synthesis: conceptual framework of social connectedness

Six items referred to social connectedness directly and were not used in the analysis. Synthesis of the remaining items from all measures (n=138 items) identified five dimensions describing the experience of social connectedness. These were labelled *Closeness*, *Identity and common bond*, *Valued relationships, Involvement* and *Cared for and accepted*, giving the acronym CIVIC. The CIVIC dimensions are summarised in Table 4.

Insert Table 4 here.

It was also found that the five CIVIC dimensions were rated in two ways, in relation either to specific or non-specific relationships. Items assessing social connectedness within specific relationships referred to feelings of connection to specific individuals or groups. Other items asked non-specific, decontextualized questions about a person's perceptions about relationships or social experiences in general without reference to particular interpersonal relationships. Examples of specific relationship types included particular individuals, defined groups (e.g. 'therapy group') or undefined networks (e.g. 'friendship network'). Non-specific relationship types included undefined geographical groups (e.g. 'neighbours' or 'community') as well as 'others' in general.

3.3 Relationships in the data
3.3.1 Vote counting

Table 5 shows the five dimensions of the CIVIC framework, specific and non-specific ratings and the frequency of each of these across the 21 included measures. Each row in the table shows the number of items (and item-total percentage) of each measure which relates to each of the five dimensions. The number of dimensions per measure were as follows: one dimension (n=1), two dimensions (n=6), three dimensions (n=9), four dimensions (n=4), five dimensions (n=1). The majority of measures therefore demonstrated at least two of the five dimensions, and two-thirds (67%) demonstrated three or more dimensions. The single measure which operationalised only one dimension was the two-item GI-any group measure which assessed *Identity and common bond*. Across all measures the number of dimensions increased with the number of items. Those measures assessing two dimensions had between two and four items, three dimensions (4-18 items), four dimensions (7-16 items) and five dimensions (one measure: 11 items). The single measure incorporating all five dimensions of the CIVIC framework was the SI-Therapy measure. Across all measures the most commonly assessed dimension was *Identity and Common Bond* (n=21 measures), followed by *Closeness* (n=12), *Involvement* and *Cared for and Accepted* (both n=10) and finally *Valued Relationships* (n=9). Of the 21 measures, nine (43%) contained items referring to both Specific and Non-Specific Relationships whilst 12 (57%) measures referred only to Specific-only items.

Insert Table 5 here.

3.3.2 Comparing the conceptual framework with factor analysis results from included studies

Four of the 21 measures, all subscales of larger measures, had been empirically evaluated on their dimensionality (see Table 5). One measure, the INQ-TB, was evaluated using confirmatory factor analysis. The other three measures, the SOBI-P, EASE-BR and EASE-BDA were each analysed by the scale developers using principal components analysis.

In the vote counting analysis these four measures showed between two and four dimensions as follows: two (EASE-BR), three (EASE-BDA) and four (INQ-TB; SOBI-P). By contrast, the results from factor analysis of all four measures identified only a single factor or component. Data for goodness-of-fit was provided only for the INQ-TB for which absolute and incremental fit indices suggested that a single factor was at best only marginally adequate in reproducing the underlying structure of their data (Hu and Bentler, 1999). The developers conducted exploratory analysis of the full INQ scale in a non-clinical sample (data not included here). They reported a four-factor solution as showing the best fit (compared to 1-, 2- and 3-factor models) though they did not examine this model further given the low number of indicators per factor and because it was not theoretically predicted. Similarly, the developers of the SOBI-P found Using PCA procedures, Hagerty and Patusky (Hagerty and Patusky, 1995) examined 1, 2, 3 and 5 component solutions for the SOBI measure on the basis of Scree test results. A 2-factor solution ('Psychological' and 'Antecedents' subscales, the former being included in this review) was selected on the basis of 'component significance, eigenvalues and conceptual clarity'. The other solutions were not presented or discussed.

Insert Table 6 here.

3.4 Sensitivity analysis

The robustness of the preliminary synthesis was assessed through a sensitivity analysis of those measures rated as having good content validity. Six of the 21 measures met all COSMIN criteria for good content validity: INQ-TB, SCS-R, SI-Depression, SI-Therapy, SIM-7 and SOBI-P. When reanalyzing the items of these six measures (n=70) the same five dimensions described in the CIVIC framework were found. Likewise, the relative distribution of items per dimension was very similar in these measures as to that seen in the full set. This similarity in distribution may be expected given that the six high quality measures together totaled 70 items, comprising over half of the 138 items in the full set of measures. Compared to the full analysis the number of dimensions assessed per measure was higher in the six measures included in the sensitivity analysis (two dimensions, n=1; three dimensions, n=1; four, n=3; five, n=1). The relative frequency of each dimension changed slightly with *Cared for and accepted* becoming the second most common across measures and consisting of the second highest number of items. By contrast, this was one of the less frequent dimensions in the full analysis. In assessing the distribution of items rating either specific or non-specific social connectedness, similar numbers of items were found for each (specific=30; non-specific=40). Four of the six measures featured items referring to both types of connectedness, which is slightly more than in the full set, where nine of the 21 measures (43%) assessed both. Overall, there were no marked differences between the sensitivity and main analysis. A table showing the distribution of items across CIVIC dimensions for these six measures can be found in Appendix 1.

4. Discussion

4.1 Main findings

The aims of this review were to identity measures of social connectedness which had been used in a clinical population and to develop a conceptual framework of social connectedness. Five dimensions of social connectedness were identified in this review and appeared in measures of both higher and

lower content validity. Social connectedness can be understood as the psychological bond people can feel within specific relationships as well as to other people in general. This bond is characterised by five dimensions described as feelings of closeness, shared identities, valuing the relationship, feeling socially involved as well as cared for and accepted.

The five-dimension CIVIC framework did not match the results of factor analysis for four of the included measures. These results therefore offered no validation of the framework. However, goodness-of-fit indices were either missing or suggested weak support for the model being tested. One of the most appropriate strategies for assessing the unknown dimensionality of measures is exploratory factor analysis though none of the studies used this procedure. The discrepancy between the preliminary synthesis of this review and the measurement models of these studies may also partly be due to other design factors, with these measures having fewer items per dimension than is typically recommended for exploratory analysis and most of the studies using small sample sizes (Costello and Osborne, 2005). The evidence for the latent structure of included measures is therefore quite weak and does not provide suitable empirical data to compare against the conceptual framework of social connectedness suggested by the present analysis.

Although this is a novel framework, it corresponds to some existing empirical work highlighting the inter-relationship between the five dimensions. For example, small to moderate associations have been found between perceived acceptance and social support (Brock et al., 1998), social identity support with closeness (Weisz and Wood, 2005) and between closeness and social support (Chow and Buhrmester, 2011; Feng and MacGeorge, 2006; Reis and Franks, 1994; Reis and Shaver, 1988; Salazar, 2015). Such findings suggest that these are distinct, though related dimensions of social relationships. Importantly, there may be interactions between these different dimensions of social connectedness which have a bearing upon different health outcomes. For instance, some recent studies suggest that received social support is associated with beneficial outcomes only when there is a shared social identity between participants for indices such as stress (Branscombe et al., 1999; Frisch et al., 2014; Haslam et al., 2005), cognitive health (Haslam et al., 2016b) and general well-being (Crabtree et al., 2010).

The dual rating of social connectedness within specific and non-specific relationships also fits with theories of interpersonal relationships arguing that individual differences in interpersonal behaviours and perceptions can be analysed at both levels (Kenny, 1994; Reis et al., 2002; Wang et al., 2017; Zayas et al., 2002). For instance, 'attachment style' has been found to show significant variation at both general and relationship-specific levels (Fraley et al., 2011; Fraley et al., 2015; Overall et al., 2003) with general and specific attachment showing differential associations with various psychological and social outcomes (Cozzarelli et al., 2000; Klohnen et al., 2005).

4.2 Social connectedness, loneliness and other socio-relational concepts

This review has conceptually positioned social connectedness as a potential antidote to loneliness. Although the exact relationship between loneliness and social connectedness is not entirely clear there are strong conceptual and empirical links between the two concepts. Theoretical work on loneliness suggests that the experience stems from unmet social needs, which are conceived of in subjective terms (Peplau and Perlman, 1982; Weiss, 1973). Strong associations are also found between measures of loneliness and social connectedness in clinical and non-clinical populations across different countries (Chen and Chung, 2007; Hagerty and Patusky, 1995; Lee et al., 2001; Satici et al., 2016). Social connectedness may therefore be an appropriate target for interventions aiming to reduce loneliness.

The term social connectedness is used across multiple disciplines including nursing (Phillips-Salimi et al., 2012), psychiatry (Ware et al., 2007), psychology (Haslam et al., 2015) and sociology (Cornwell et al., 2008) amongst others. Whilst the term has been in use for a number of decades (see e.g. Lee and Robbins, 1995) no clear consensus for its definition or conceptualisation has emerged. Social connectedness is also used interchangeably with other terms such as 'belonging', 'social support' and 'social integration'. The limitation in using such terms interchangeably is that different socio-relational dimensions may bear differential associations with health outcomes (see e.g. Holt-Lunstad et al., 2010; Reis and Franks, 1994).

Previous reviews have addressed the conceptualisation and measurement of specific socio-relational concepts as they apply within the context of mental health. These more established concepts include social integration (Baumgartner and Susser, 2013; Ware et al., 2007), social inclusion (Baumgartner and Burns, 2013; Boardman, 2011), social capital (Almedom and Glandon, 2008; McKenzie et al., 2002) and social support (Brugha, 1995; House et al., 1988; Turner and Brown, 2009; Turner et al., 1983). To the authors' knowledge this is the first review of social connectedness specifically.

Other recent reviews have attempted to synthesise the various concepts and measures of social relationships which have been used across health research (e.g. Valtorta et al., 2016; Wang et al., 2017). These reviews took a broader focus than the one reported here, aiming to integrate all of the various social-relational terms used in the literature as well as covering both the objective and subjective domains. Whilst such overarching reviews can be successful in bringing more clarity to the wider literature they do not examine specific concepts such as social connectedness in detail. In particular, previous reviews have typically described the subjective domain of relationships using generic terms and definitions such as 'network quality', 'network support' or 'social support'. We would argue that more comprehensive frameworks may be required in order to delineate the multiple subjective dimensions of social relationships. For instance, recent research suggests that other subjective dimensions such as social identity (Cruwys et al., 2014b; Haslam et al., 2018) and social acceptance (DeWall and Bushman, 2011) may play an important role in physical and mental health outcomes. The conceptual framework developed in this review attempts to map out each of these subjective dimensions.

4.2 Limitations

The majority of studies included in this review were from high-income countries and none of the measures had been assessed for cross-cultural validity. The results of this review may therefore not generalise across different socio-economic or cultural contexts.

The potential breadth and complexity of the construct of social connectedness also necessitated using a working definition to scaffold the review. This is likely to have limited the resulting framework in several ways. For instance, social connectedness at the group or community level (e.g. group or social cohesion) may demonstrate different dimensions to those described by the CIVIC framework at the individual level. Focusing on the individual-level also ignores important contextual dimensions such as the social norms for relationships and social interaction which are likely to influence people's perceptions.

Further limitations include the fact that it was not possible to validate the five-dimension CIVIC framework using the available empirical data identified in this review. The CIVIC framework is based upon a systematic empirical synthesis, not a narrative conceptual review and thus there may be other search terms relevant to social connectedness which were not used in this review.

4.3 Research implications

The measure with the strongest psychometric properties was the Thwarted Belongingness subscale of the Interpersonal Needs Questionnaire, which assessed four of the five CIVIC dimensions in non-specific relationships. As such, this can be recommended as a general purpose measure for assessing social connectedness amongst adults with mental disorders. However, all existing measures assess social connectedness as a unidimensional construct and do not measure all five CIVIC dimensions explicitly. Thus there may also be scope for the development of new multidimensional measures of social connectedness.

In this review it was possible to synthesise the sub-dimensions of various constructs such as social support (ISEL-B), social inclusion (SI-NI), belonging (SOBI-P) and social identity (SIM-7), which makes the divergent validity of these specific measures unclear. This raises challenges for research into social connectedness as conceptual ambiguity limits the ability to synthesise data from related measures (see e.g. Hatcher and Stubbersfield, 2013). Moreover it is not clear which of the multiple factors of social connectedness should be focused on to improve outcomes in mental disorders (Cruwys et al., 2014b; Mann et al., 2017). As an example, whilst reviews suggest that social interventions are effective in the treatment of depression there are mixed findings as to whether increases in 'social support' mediate these effects (Nagy and Moore, 2017). Psychometric evaluation of the structure and relationship between social connectedness measures and those of related constructs will be needed to support the future evaluation of social interventions.

Many of the measures included in this review combined items of both specific and non-specific social connectedness into a single measure. The measurement of social connectedness may require distinguishing between these two rating levels depending on the level of analysis required for a given research question. For instance, measures of specific social connectedness may be most relevant in assessing the subjective dimensions of particular social networks. Meanwhile, non-specific social connectedness may bear the strongest empirical association with other generalised experiences such as loneliness.

One important question which follows from this review is whether the framework developed here is universal or applies only to certain populations. Notably, it is not clear whether it applies to non-English speaking populations, older adults and children/adolescents or to people without mental disorders. Although typically theorised to be a universal phenomenon (Baumeister and Leary, 1995) it is possible that social connectedness amongst adults with mental disorders may differ slightly from that of other groups as a result of contextual factors such as stigma. Cross-cultural qualitative studies and those with healthy populations of different ages would be required to assess this.

4.4 Clinical implications

The development of new interventions to reduce levels of loneliness amongst patients may use the CIVIC framework for guidance. The framework indicates that social connectedness consists of multiple, overlapping dimensions and therefore interventions may need to feature multiple different components. Existing studies to tackle loneliness amongst adults living with mental disorders have found mixed results (Mann et al., 2017). Interventions may prove to be less effective if they address only one dimension of social connectedness (e.g. solely targeting social support or social participation). Complex interventions targeting multiple dimensions of social connectedness may demonstrate greater effectiveness. The CIVIC framework can be used to identify possible components to be included in such an intervention (e.g. enabling safe, non-judgmental social spaces such as peer support or facilitated groups, assessment of valued social identities, goal setting).

The CIVIC framework may also inform clinical assessment and management of mental disorders directly. For example, whilst psychosocial assessment is recommended for depression (NICE, 2018), the CIVIC framework identifies the interpersonal areas to assess specifically in relation to social connectedness. Interventions should be informed by the specific dimensions identified as problematic; for difficulties in the area of *Identity and Common Bond*, social identity interventions (e.g. Haslam et al., 2016b) should be considered, whereas for difficulties in *Involvement*, behavioural activation (Veale, 2018) may be indicated.

4.4 Conclusion

To our knowledge this review is the first attempt to systematically conceptualise social connectedness. In order to incorporate different perspectives on a complex phenomenon this review included measures used in different academic disciplines. A five-dimension conceptual framework was developed which may inform future measurement and clinical interventions. Despite the complexity of the construct, the consistency of the identified dimensions of connectedness across measures and within the sensitivity analysis suggests that findings of this review are relatively robust.

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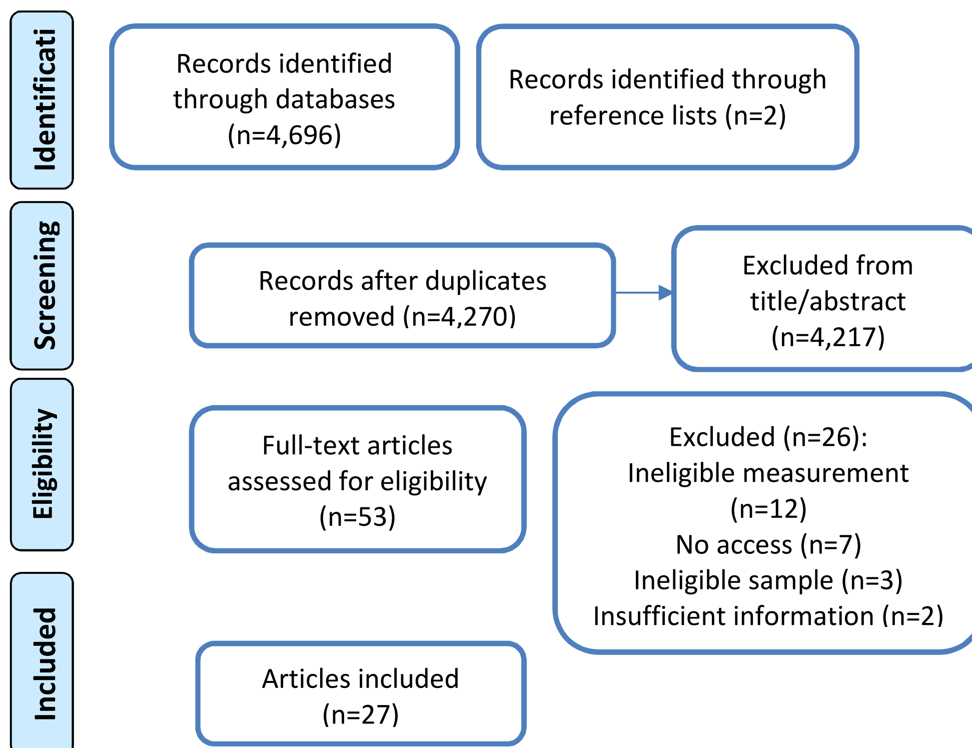

***Fig. 1**. Article screening and selection.*

Table 1

Levels of evidence for the rating of the measurement property.

Level	Rating	Definition
Strong	+++ or ---	Consistent findings in studies of good methodological quality OR in one study of excellent methodological quality
Moderate	++ or --	Consistent findings in studies of fair methodological quality OR in one study of good methodological quality
Limited	+or -	One study of fair methodological quality
Conflicting	±	Conflicting findings
Unknown	?	Studies of poor methodological quality

Table 2

Data extracted from studies included in this review (n=28).

No.	Author (year), Country	n	Setting	Social connectedness measure/subscale	Diagnosis
1	Choenarom et al. (2005), USA	51	Outpatient	Sense of Belonging Measure/Psychological subscale (**SOBI-P**; Hagerty and Patusky, 1995)	Depression
2	Cotton and Butselaar (2013), Australia	108	Community	Social Connectedness Scale-Revised (**SCS-R**; Lee et al., 2001)	Mental health service users, unknown diagnoses
3	Cruwys et al. (2014a), Australia	52	Community	Social identification with community group (**SI-community**; adapted from Doosje et al., 1995)	Unspecified, formal diagnosis (51.9% of sample: 'mostly depression or psychotic disorder'). Healthy, non-diagnosed participants (48% of sample)
4		92	Outpatient	Social identification with therapy group (**SI-therapy**; adapted from Hinkle et al., 1989; Leach et al., 2008; Luhtanen and Crocker, 1992)	Depression; anxiety
5	Cruwys and Gunaseelan (2016), Australia; India;	250	Community	Social identification with people with depression (**SI-depression**; author developed measure)	Depression

	USA				
6	Cruwys et al. (2016), Australia	69	Community	Social identity mapping-7 items (**SIM-7**; author developed measure)	Depression; anxiety
7	Dingle et al. (2015), Australia	132	Community	1. Social identification with therapeutic community (**SI-therapeutic community**; adapted from Doosje et al., 1995) 2. Social identification with substance using peers (**SI-substance users**; adapted from Doosje et al., 1995)	Substance misuse
8	Forrest et al. (2016),USA	98	Inpatient	Interpersonal Needs Questionnaire/Thwarted belongingness subscale (**INQ-TB**; Van Orden et al., 2012)	Anorexia; binge eating disorder; other specified feeding or eating disorder; unspecified feeding or eating disorder
9	Hagerty and Patusky (Hagerty and Patusky, 1995), USA	31	Inpatient and outpatient	**SOBI-P**	Depression
10	Hames et al. (2015), USA	415	Outpatient	**INQ-TB**	Depressive disorders; alcohol use disorders; generalised anxiety disorder; cannabis dependence; social phobia; borderline personality disorder
11	Haslam et al. (2016a), Australia	56	Community	1. Four Item measure of Social Identification (**FISI**; Postmes et al., 2013) 2. Multiple Group Memberships Scale (**MGM**; Haslam et al., 2008)	Depression; anxiety
12	Lemieux et al. (2015), USA	125	Outpatient	Mental Health Statistics Improvement Program/Perception of social connectedness subscale (**MHSIP-SC**; Ganju, 1999)	Major depression; thought disorder; bipolar disorder; schizophrenia; schizoaffective disorder; other (ADHD, psychosis); mood disorder, not otherwise specified)
13	Lloyd et al. (2008), Australia	26	Community	Social Inclusion Scale/Neighbourhood integration subscale (**SI-NI**; Lloyd et al., 2008)	Bipolar disorder; schizophrenia; schizoaffective disorder; major depression with psychosis; delusional disorder; dissociative identity; major depression; generalised anxiety disorder with panic
14	Norman et al. (2013), Canada	84	Outpatient	Interpersonal Support Evaluation List/Belonging subscale (**ISEL-B**; Cohen and Hoberman, 1983)	Schizophrenia; schizoaffective disorder; schizophreniform, substance induced; psychosis not specified; delusional disorder; affective psychosis

15	Matto et al. (2006), USA	103	Outpatient	1. Ecological Assessment of Drug Misuse Experiences/ Belonging-recovery subscale (**EAD-BR**; author developed measure) 2. /Belonging-drugs/alcohol subscale (**EAD-BDA**: author developed measure)	Substance misuse
16	Mawson et al. (2015), Australia	20	Inpatient	1. Social identity map-2 items (**SIM-2**; adapted from Best et al., 2014) 2. Exeter Identity Transition Scales/Social identification with groups (**GI-any group**; adapted from Haslam et al., 2008)	Drug or alcohol misuse disorder
17	van Orden et al. (2012), USA	397	Outpatient	**INQ-TB**	DSM Axis I mental disorders, not specified
18	Rüsch (2006), Germany; Switzerland	90	Outpatient	Social identification with people with mental illness (**SI-mental illness**; adapted from Jetten et al., 2001)	Social phobia; borderline personality disorder
19	Rüsch et al. (2009), USA	85	Outpatient	**SI-mental illness**	Mental health service users, multiple diagnoses (not specified)
20	Rüsch et al. (2009), USA	85	Outpatient	**SI-mental illness**	Schizophrenia; schizoaffective disorder; bipolar I and II, recurrent unipolar major depressive disorder
21	Sargent et al. (2002), USA	200	Community	**SOBI-P**	Depression
22	Silva et al. (2015), USA	997	Outpatient	**INQ-TB**	Multiple diagnoses (not specified)
23	Sohn et al. (2014), USA	7029	Outpatient	**MHSIP-SC**	Mental health service users, unknown diagnoses
24	Watson et al. (2007), USA	71	Outpatient	Group identification with mental health service users (**GI-service users**; adapted from Jetten et al., 1996)	Multiple diagnoses (not specified): ‘serious mental illness (e.g. bipolar, schizophrenia or MDD)’
25	Wieland et al. (2007), USA	58	Outpatient	**SOBI-P**	Schizophrenia; schizoaffective disorder
26	Williams et al. (2002), USA	200	Community	**SOBI-P**	Depression
27	Williams et al.	244	Community	**SOBI-P**	Depression (66% of sample: ‘at risk’ of depression [Beck

	(2004b), USA				Depression Inventory II > 18] AND Perceived Stress Scale > 30). Healthy participants (34% of sample 'not at risk' of depression)
28	Wong and Longshore (2008), USA	114	Community	Multigroup Ethnic Identity Measure/Belonging subscale (**MEIM-B**; Phinney, 1992)	Substance abuse

Table 3

Best evidence synthesis of measurement properties for all measures (n=21).

Measure	Studies (n)	Content validity	Internal consistency	Reliability	Structural validity	Criterion validity	Hypothesis testing	Responsive -ness
INQ-TB	4	+	+++		++	++		
SOBI-P	6	+	++		-		+	
MHSIP-SC	2	-						
ISEL-B	1	-						
SI-therapeutic community	1	-	?	+				
SI-substance users	1	-						
SI-depression	1	+	?					
MEIM-B	1	-	?					
SI-community	1	-	?					
SI-therapy	1	+	?					
FISI	1	-	?					
MGM	1	-	?					
SCS-R	1	+						
EAD-BR	1	-	?		-			
EAD-BDA	1	-	?		-			
SI-mental illness	1	-	?					
SI-NI	1	-	?	?				
GI-service users	1	-	?					

GI-any group	1	-						
SIM-7 items	1	+	?					?
SIM-2 items	1	-						

Table 4

Definitions and examples of the CIVIC conceptual framework.

Dimensions	Definition	Example items
Closeness	The degree of mutual dependence between two people	'There are people I feel close to in this clubhouse or social group'[20]; 'These days, I am close to other people'[1]
Identity and common bond	Believing one shares important characteristics with other people or members of a group	'I feel similar to the average person with depression'[3]; 'How representative are you of the group as a whole?'[23]
Valued relationships	Valuing and/or positively appraising an existing dyadic or group relationship	'I'm glad to be a member of the therapeutic community group'[10]; 'I am happy that I am a member of the group I belong to'[13]
Involvement	One's perceived level of involvement and social engagement with others. This includes two sub-dimensions: (a) *Group/network involvement*: feeling engaged with on-going group activities. (b) *Companionship*: the perceived availability of social contacts for engaging in shared activities.	'I feel left out of things'[4]; 'I'm involved in the activities of lots of different groups'[11]
Cared for and accepted	Feeling that one is cared for. This includes two sub-dimensions: (a) *Social acceptance*, the perception of being an accepted member of a particular group or community and that one's contributions towards social activities are seen as valuable. (b) *Social support*: that others care for one's wellbeing and would be willing to provide support if necessary.	'I generally feel that people accept me'[4]; 'I am a worthy member of this group'[9]

Table 5

Distribution of items per dimension and relationship types across all measures (n=21).

Scale or sub-scale	Items (n)	Dimension, items n (%)					Specific and Non-Specific Relationships, items n (%)	
		Closeness	***Identity and Common Bond***	***Valued Relationships***	***Involvement***	***Cared for and Accepted***	***Specific***	***Non-Specific***
EAD-BR	5		1 (20%)		1 (20%)	3 (60%)	4 (80%)	1 (20%)
EAD-BDA	4		1 (25%)		1 (25%)	2 (50%)	2 (50%)	2 (50%)
FISI	4		2 (50%)	2 (50%)			4 (100%)	
GI-service users	4	2 (50%)	2 (50%)				4 (100%)	
GI-any group	2		2 (100%)				2 (100%)	
INQ-TB	7[a]	1 (14%)	1 (14%)		1 (11%)	4 (44%)	2 (29%)	5 (71%)
ISEL-B	10	4 (40%)	1 (10%)		4 (40%)	1 (10%)	10 (100%)	
MEAM-B	7	1 (14%)	3 (43%)	3 (43%)			1 (14%)	6 (86%)
MGM	4	2 (50%)	1 (25%)		1 (25%)		4 (100%)	
MHSIP-SC	4	2 (50%)	1 (25%)			1 (25%)	3 (75%)	1 (25%)
SCS-R	16[b]	3 (19%)	7 (44%)		3 (19%)	3 (19%)	5 (31%)	11 (69%)
SI-therapeutic community	4	1 (25%)	2 (50%)	1 (25%)			4 (100%)	
SI-substance users	2		1 (50%)	1 (50%)			2 (100%)	
SI-depression	11		9 (82%)	2 (36%)			1 (9%)	10 (91%)
SI-community	4	1 (25%)	2 (50%)	1 (25%)			4 (100%)	
SI-therapy	11	1 (9%)	1 (9%)	6 (55%)	2 (18%)	1 (9%)	11 (100%)	
SI-mental illness	5	2 (40%)	3 (60%)				2 (40%)	3 (60%)
SIM-7	7		1 (14%)	2 (29%)	3 (29%)	1 (14%)	7 (100%)	
SIM-2	2		1 (50%)	1 (50%)			2 (100%)	
SI-NI	7	1 (14%)	1 (14%)		2 (29%)	3 (43%)	7 (100%)	
SOBI-P	18		10 (56%)		2 (11%)	6 (33%)	4 (22%)	14 (78%)
Total	**138**	**21 (15%)**	**53 (38%)**	**19 (14%)**	**20 (15%)**	**25 (18%)**	**85 (62%)**	**53 (38%)**

a=omits two items from the measure (direct referent to social connectedness: uncategorisable); b=omits four direct items.

Table 6

Factor structure of measures (n=4).

Measure	Method	Hypothesis	Results
EASE	Principal Components Analysis (PCA)	n/a	Two component model. Component one (*EASE-BR*). Loadings: 0.543-0.898. Fit: n/a. Component two (*EASE-BDA*) Loadings: 0.474-0.819. Fit: n/a
INQ-TB	Confirmatory Factor Analysis	One factor: 'belonging'	One factor model. Loadings: 0.514-0.877. Fit: RMSEA (0.075), SRMR (0.060), CFI (0.915), TLI (0.898)
SOBI-P	PCA	Two components: 'valued involvement' and 'identity (fit)'	One component model. Loadings: 0.48-0.85. Fit: n/a

CFI=Comparative Fit Index; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual; TLI=Tucker Lewis Index

Appendix 1 Specific and non-specific ratings across the CIVIC dimensions for measures of good content validity (n=6).

Items from measures	**Closeness**		**Identity and common bond**		**Valued relationships**		**Involvement**		**Cared for and accepted**	
	S	**N-S**	**S**	**N-S**	**S**	**N-S**	**S**	**N-S**	**S**	**N-S**
I often wonder if there is any place on earth where I really fit in.[1]				X						
I am just not sure if I fit in with my friends.[1]			X							
I would describe myself as a misfit in most social situations.[1]				X						
I generally feel that people accept me.[1]										X
I feel like a piece of a jig-saw puzzle that doesn't fit into the puzzle.[1]				X						
I would like to make a difference to people or things around me, but I don't feel that what I have to offer is valued.[1]										X
I feel like an outsider in most situations.[1]				X						
I am troubled by feeling like I have no place in this world.[1]				X						
I could disappear for days and it wouldn't matter to my family.[1]									X	
In general, I don't feel a part of the mainstream of society.[1]				X						
I feel like I observe life rather than participate in it.[1]								X		
If I died tomorrow, very few people would come to my funeral.[1]										X
I feel like a square peg trying to fit into a round hole.[1]				X						
I don't feel that there is any place where I really fit in this world.[1]				X						
I am uncomfortable that my background and experiences are so different from those who are usually around me.[1]				X						
I could not see or call my friends for days and it wouldn't matter to them.[1]									X	
I feel left out of things.[1]								X		
I am not valued by or important to my friends.[1]									X	
These days, other people care about me.[2]										X
These days, I feel like I belong.[2a]										
These days, I rarely interact with people who care about me (reverse).[2]									X	
These days, I am fortunate to have many caring and supportive friends.[2]									X	
These days, I feel disconnected from other people (reverse).[2a]										
These days, I often feel like an outsider at social gatherings (reverse).[2]				X						
These days, I feel that there are people I can turn to in times of need.[2]										X

These days, I am close to other people.[2]		X								
These days, I have at least one satisfying interaction every day.[2]								X		
I feel a bond with other people who have depression[3]				X						
Being part of a group of people who have depression gives me a good feeling[3]					X					
The fact that I have depression is an important part of my identity[3]				X						
I am similar to the average person who has depression[3]				X						
People who have depression have a lot in common with each other[3]				X						
People who have depression are very similar to each other[3]				X						
I feel solidarity with other people who have depression[3]				X						
I feel committed to people with depression[3]						X				
Being someone who is depressed is an important part of how I see myself[3]				X						
I have a lot in common with the average person who has depression[3]				X						
I often think about the fact that I am a person with depression[3]				X						
I feel distant from people.[4]		X								
I don't feel related to most people.[4]				X						
I feel like an outsider.[4]				X						
I see myself as a loner.[4]								X		
I feel disconnected from the world around me.[4a]										
I don't feel I participate with anyone or any group.[4]							X			
I feel close to people.[4]		X								
Even around people I know, I don't feel that I really belong.[4a]										
I am able to relate to my peers.[4]				X						
I am able to connect with other people.[4a]										
I feel understood by the people I know.[4]									X	
I see people as friendly and approachable.[4]										X
I fit in well in new situations.[4]				X						
I catch myself losing a sense of connectedness with society.[4a]										
I have little sense of togetherness with my peers.[4]				X						
My friends feel like family.[4]	X									
I find myself actively involved in people's lives.[4]							X			
Even among my friends, there is no sense of brother/sisterhood.[4]			X							

I am in tune with the world.[4]				X						
I feel comfortable in the presence of strangers.[4]										X
I am glad I belong to this group.[5]					X					
I feel strong ties to this group.[5]	X									
I identify with this group.[5]			X							
I feel held back by this group.[5]					X					
I think this group works well together.[5]					X					
I see myself as an important part of this group.[5]							X			
I do not consider this group to be important.[5]					X					
I am a worthy member of this group.[5]									X	
I am a cooperative participant in this group.[5]								X		
In general, I'm glad to be a member of this group.[5]					X					
I feel good about this group.[5]					X					
List all the groups you belong to.[6]							X			
How important is each group to you?[6]					X					
How positive do you feel about being a member of each group? [6]					X					
How compatible are each of the groups you're a member of?[6]							X			
How representative are you of the group as a whole?[6]			X							
How much support you get from members of each group?[6]									X	
In a typical month, how many days would you engage in activities related to each group?[6]							X			

S=specific rating of social connectedness; N-S=Non-specific rating; 1=item from *SOBI-P* measure; 2=*INQ-TB*; 3=*SI-Depression*; 4=*SCS-R*; 5=*SI-Therapy*; 6=*SIM-7*; a=direct reference to social connectedness, not categorisable.