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Are there reliable and valid measures of anxiety for people with psychosis? A systematic review of psychometric properties

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Abstract

Purpose

Current models of psychosis posit a developmental and maintaining role for anxiety, supported by robust empirical evidence. Given the central role for anxiety in psychosis, valid and reliable assessment is necessary. This systematic review is the first to critically appraise measures of anxiety applied to psychosis samples.

Methods

Web of Science, MEDLINE, PsycInfo, EMBASE and CINAHL were systematically searched for studies evaluating psychometric properties of instruments measuring anxiety in samples with non-affective psychosis diagnoses. Psychometric properties were extracted and rated according to established criteria. The CONsensus-based Standards for the selection of health Measurement Instruments (COSMIN) checklist was used to assess the methodological quality of studies.

Results

Of 4344 records identified, 11 studies were identified as eligible for inclusion, by two independent raters with high reliability. Reported psychometric properties for 17 different instruments ranged from unacceptable to excellent. The Scale of Anxiety Evaluation in Schizophrenia was assessed most extensively, and demonstrated consistently good psychometric properties. The Beck Anxiety Index, Depression Anxiety Stress Scale, DSM based Generalised Anxiety Disorder Symptoms Severity Scale, Liebowitz Social Anxiety Scale, Obsessive Compulsive Inventory,

Psychological Stress Index, Perseverative Thinking Questionnaire and Yale-Brown Obsessive Compulsive Scale demonstrated adequate reliability and/or validity on the limited properties reported. Methodological quality was largely poor according to the requirements of the COSMIN checklist.

Conclusions

The instruments listed are recommended as at least adequate for the assessment of anxiety in psychosis on the basis of these preliminary data. Further validation of existing instruments designed to measure anxiety in people with psychosis is strongly recommended.

Key words: reliability, validity, psychometric, measurement, scales, psychosis, schizophrenia, anxiety

Practitioner points

- Anxiety has a developmental and maintaining role in psychosis, therefore we should routinely screen for symptoms of anxiety when working with people with psychosis spectrum disorders.
- Studies included in this review reported reliable and valid measures of anxiety for people with psychosis; however, the methodological quality of most studies was poor.
- We recommend the BAI, DASS or SAES for general screening, and the DGSS, LSAS, OCI, PSI, PTQ and Y-BOCS to assess symptoms associated with specific anxiety disorders and anxiety related processes.

Introduction

Anxiety has been conceptualised as a precursor to, a core symptom of and a consequence of psychosis (Birchwood, 2003). These pathways are outlined in cognitive-behavioural models (Freeman & Garety, 2003; Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001; Morrison, 2001) and supported by robust evidence for a developmental and maintaining role for anxiety (Delespaul & van Os, 2002; Freeman et al., 2014; Freeman & Garety, 2003; Freeman et al., 2005; Freeman et al., 2013; Klippel et al., 2017; Startup, Freeman, & Garety, 2007). Given the central role for anxiety in psychosis, valid and reliable assessment is necessary in order to develop our understanding of anxiety-related processes and evaluate interventions in this population. Therefore, this systematic review will examine whether measures of anxiety are valid and reliable when used with people with psychosis.

The definition of anxiety for the purposes of this review is “a complex cognitive, affective, physiological and behavioural response system (i.e. threat mode) that is activated when anticipated events or circumstances are deemed to be highly aversive because they are perceived to be unpredictable, uncontrollable events that could potentially threaten the vital interests of the individual” (Clark & Beck, 2011). Anxiety disorders are therefore characterised by threat beliefs, which are maintained by processes including safety-seeking behaviours, threat-focused attention, intrusive imagery, memory processes and threat-biased reasoning (Clark, 1999). Thus, it is important to consider the cognitive, affective and physiological components of anxiety, together with related cognitive and behavioural processes, to fully understand the formation and maintenance of anxiety in psychosis.

Anxiety is commonly reported by people with psychosis, with 38.3% meeting formal diagnostic criteria for at least one anxiety disorder (Achim et al., 2011). Increased rates of subclinical anxiety are also found in this population, for example 45% of people with a diagnosis of schizophrenia report panic attacks (Goodwin, Lyons, & McNally, 2002). Elevated anxiety has been associated with a number of adverse outcomes in people with psychotic disorders including lower quality of life (Braga, Mendlowicz, Marrocos, & Figueira, 2005), poorer social functioning (Blanchard, Mueser, & Bellack, 1998), higher risk of suicide (Taiminen et al., 2001), poor pharmacological management of psychosis (Nyhuis, Faries, Ascher-Svanum, Stauffer, & Kinon, 2010), greater severity of positive symptoms (Hartley, Barrowclough, & Haddock, 2013) and a higher risk of relapse (Bayle, Krebs, Epelbaum, Levy, & Hardy, 2001).

Anxiety is therefore highly prevalent, plays a key role in psychotic symptoms and is associated with adverse outcomes. Effectively addressing anxiety during assessment and treatment of psychosis requires robust self-report and clinician-rated measures. To date, there has been no systematic review of research evaluating the psychometric properties of anxiety measures in psychosis. This review therefore sought to meet this need.

We employed the terminology and definitions of psychometric properties developed and published by a Delphi study conducted by the COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN) research group (Mokkink et al., 2010b). Reliability is defined as the extent to which repeated measurement under varying conditions produces the same score, including measures of internal consistency (degree of interrelatedness among items), test–retest reliability (consistency of scores obtained at different times), inter-rater reliability (consistency of

scores obtained by different raters) and measurement error (error in the score that is not attributed to actual changes in the construct to be measured). Validity, the degree to which the instrument measures the construct it aims to measure, incorporates content validity (degree to which the instrument adequately reflects the construct to be measured), structural validity (degree to which scores on an instrument reflect the dimensionality of the construct to be measured), testing hypotheses (degree to which scores on the instrument are consistent with hypothesised relationships with other instruments, including convergent and divergent validity), cross-cultural validity (degree to which items on a translated or adapted measure correspond to performance of original items) and criterion validity (degree to which scores correspond with a gold standard measure). Responsiveness, the ability to detect change in the construct over time, is also included.

This paper therefore aims to systematically identify and review measures of anxiety, used with people with psychosis, in relation to robustly operationalized criteria for health-related measures. It is anticipated the review will provide a useful summary of the psychometric properties of available instruments and highlight areas for future research.

Method

Search strategy

A systematic search of the following databases was undertaken from inception of the database to 23 March 2018: Web of Science, MEDLINE, PsycInfo, EMBASE and CINAHL. Grey literature was not included, which would have been challenging to identify fully for a topic such as this, and in line with the methodology of systematic reviews with a similar focus (Lako et al., 2012). The search terms were:

Schizophreni* OR schizoaffective OR psychosis OR psychotic OR paranoia *AND* Anxiety OR worry OR fear OR distress *AND* Instrument OR scale OR questionnaire OR interview OR measur* OR index OR test OR checklist OR tool OR outcome OR assess* *AND* Psychometric OR reliability OR validity OR validation OR reproducibility. The selection process began with removing duplicates and then searching titles and abstracts. The full text of remaining studies was reviewed. A second reviewer independently rated eligibility for inclusion at this stage and this indicated near perfect agreement (Cohens kappa=.88; 98.98% agreement). The very few remaining disagreements were resolved by discussing the rationale behind each rater's decisions and reaching a consensus. The reference lists of studies selected for inclusion were scanned for relevant studies and these were added. All steps were carried out by a doctoral student (the lead author) in the context of completing a doctoral thesis.

Eligibility criteria

Inclusion criteria were: studies assessing psychometric properties of instruments measuring anxiety (uni-dimensional or multi-dimensional) in people with diagnoses of non-affective psychosis; studies reporting at least one aspect of reliability or validity; studies reporting assessment of psychometric properties as a main aim of their study; availability of a validated English translation of the instrument; publication in English language and full text article available in a peer-reviewed journal. Exclusion criteria were: studies employing single items to assess anxiety; studies describing diagnostic instruments; samples including participants under the age of 18 years old; case studies, personal accounts, unpublished dissertations or reviews.

Data extraction

Psychometric properties were extracted from studies in line with recommendations specified in the COSMIN guidelines (Mokkink et al., 2010a, 2010b).

Other extracted information included study country, language, sample diagnoses, setting, age, gender and sampling methods, and instrument-related factors such as construct measured, administration mode (clinician-rated or self-report), duration of administration, number of items and subscales, scale range and scoring method. All data were extracted by the lead author.

Assessment of psychometric data

The strength of each psychometric property was described according to standard conventions as follows. Cronbach's alpha was described as: >.9, excellent; >.8, good; >.7, acceptable; >.6, questionable; >.5, poor; <.5, unacceptable (George, 2003). Inter-rater and test-retest reliability were described as: .81 – 1, almost perfect; .61 - .8, substantial; .41 - .6, moderate; .21 - .4, fair; .0 - .2, slight; <.0, poor (Landis & Koch, 1977). Correlations were described as: >.5, large; >.3, moderate; >.1, small (Cohen, 1988).

Quality assessment

Study methodological quality was assessed using COSMIN criteria (Mokkink et al., 2010a), providing a thorough evaluation of the design uninfluenced by the strength of the property reported. The rating of strength of the psychometric property was then combined with basic methodological requirements to give an overall summary score, according to Terwee et al. (2007).

1. Methodological quality rating (COSMIN checklist). The COSMIN checklist (Mokkink et al., 2010a) was administered to assess the methodological quality of included studies.

The checklist consists of 119 items, grouped in twelve boxes, assessing standards expected for design requirements and statistical analyses. Nine of the boxes refer to psychometric properties (e.g. internal; consistency, reliability, measurement error) with additional boxes for requirements relating to interpretability, generalisability and standards for studies that applied Item Response Theory (IRT). Items are rated as excellent, good, fair or poor (Terwee et al., 2012). Item ratings relating to each psychometric property are then pooled to produce an overall score for each box using the ‘worst score counts’ method (Terwee et al., 2012). A second reviewer independently assessed 25% of papers to check inter-rater reliability and this indicated substantial agreement (Cohens kappa=.68; 90.63% agreement). Kappa was calculated for overall ratings of each psychometric property for each instrument reported in the sub-sample of papers.

2. Rating of overall quality of psychometric property (Terwee criteria). Each property was rated as positive, negative or indeterminate, according to Terwee et al. (2007). This rating reflects the level of evidence for each property incorporating the strength of the property but also assessing basic aspects of methodology. It should be noted that although the magnitude of a psychometric statistic may be strong, if certain methodological requirements are not met the overall rating will decrease. For example, an indeterminate rating would be given to an internal consistency statistic if the study has ‘no factor analysis OR doubtful design or method’ regardless of the strength of the property.

Results

The database search yielded 4338 records and manual searches of reference lists at the full text stage identified six additional records (see Figure 1 for search summary). Duplicates were removed before screening titles and abstracts. Full text articles were retrieved for 198 studies and assessed for eligibility. At this stage, 187 articles were excluded. The most common reasons for exclusion were: samples not including non-affective psychosis or only reporting mixed samples; studies that did not measure anxiety, for example studies validating quality of life questionnaires; and studies not reporting a main aim to assess psychometric properties or not reporting psychometric properties at all. Studies reporting on the structural validity of the Positive and Negative Syndrome Scale (PANSS) were excluded as this has been reviewed previously (Lehoux, Gobeil, Lefèbvre, Maziade, & Roy, 2009; Wallwork, Fortgang, Hashimoto, Weinberger, & Dickinson, 2012). Overall 11 studies were eligible for inclusion in the review, and they are summarised in Table 1 (Allan & Martin, 2009; Cernis et al., 2016; de Haan et al., 2005; Huppert, Smith, & Apfeldorf, 2002; Llorca et al., 2014; Park et al., 2016; Romm et al., 2011; Seedat, Fritelli, Oosthuizen, Emsley, & Stein, 2007; Steer, Kumar, & Pinninti, 2003; Tso, Grove, & Taylor, 2012; Wang et al., 2016). Most studies recruited participants with a diagnosis of schizophrenia in an outpatient setting. Diagnosis of psychosis was confirmed by researchers in at least four of the studies and in a further four studies it was unclear whether the diagnostic data was confirmed or obtained from existing clinical records. Three studies reported diagnosis information from clinical records. Samples tended to have a mean age between 35 and 45 years old and all but two included a larger proportion of males than females. Approximately half of the studies were conducted in English, with other languages including French, Korean and Chinese and the majority of studies were carried out in America and

Northern Europe. Most studies administered just one anxiety measure to participants. Four of the studies assessed three or more psychometric properties while three studies assessed just one property. The characteristics of the 17 instruments reviewed are detailed in Table 2.

Assessment of psychometric properties

The reliability and validity data reported by the eligible studies are summarised in Table 3.

Reliability

Internal consistency. Internal consistency ranged from .46 for the Hospital Anxiety and Depression Scale (HADS)(Seedat et al., 2007) to .97 for the Liebowitz Social Anxiety Scale- self report version (LSAS-SR)(Romm et al., 2011), although note that alpha levels above .95 are outside the acceptable range as this suggests that some items are redundant (Terwee et al., 2007).

Inter-rater reliability. Inter-rater reliability was reported on 2 occasions and ranged from .78 for the Y-BOCS (de Haan et al., 2005) to .82 for the SAES (Llorca et al., 2014).

Test-retest reliability. Test-retest reliability ranged from .58 for the Penn State Worry Questionnaire (PSWQ)(Huppert et al., 2002) to .77 for the Psychological Stress Index (PSI-18) and Depression Anxiety Stress Scale (DASS)(Huppert et al., 2002; Tso et al., 2012).

Validity.

Content validity. A single study evaluated content validity as part of the development of the Scale of Anxiety Evaluation in Schizophrenia (SAES)(Llorca et al., 2014).

Structural validity. Three studies assessed structural validity, reporting that the factor structure of both the LSAS and Perseverative Thinking Questionnaire (PTQ) was similar to findings with other clinical samples (Cernis et al., 2016; Romm et al., 2011), and a third study reported unidimensionality of the SCL-90-R (Park et al., 2016).

Hypothesis testing. Convergent validity was reported for 11 instruments, evaluated against other measures of anxiety including: semi-structured diagnostic interview schedules (ADIS-IV, MINI); single items assessing anxiety (PANSS); entire instruments (HAM-A, STAI, DGSS) or anxiety subscales (HADS). Correlations ranged from small to large, with the highest value reported for the correlation between the SAES and the HAM-A.

Divergent validity was assessed for five instruments, mostly against the HADS depression scale, with a single study opting for the PANSS depression item. The smallest correlations (indicating good divergent validity) were reported for the HADS anxiety scale and the DGSS (correlated with the HADS depression scale).

Hypothesised relationships between the constructs of perseverative thinking, paranoia and worry were assessed in one study (Cernis et al., 2016).

Other psychometric properties. None of the studies reported measurement error, cross-cultural validity, criterion validity or responsiveness. There was no mention of a gold standard measure of anxiety in psychosis therefore any comparisons

were classed as convergent rather than criterion validity (which COSMIN label hypothesis testing).

Quality assessment

Table 4 presents the ratings of methodological quality according to the COSMIN checklist and ratings of quality of the psychometric property according to the Terwee criteria for each psychometric property for each instrument. No selected article was completely excluded for poor methodological quality.

1. Methodological quality (COSMIN checklist). The recommended ‘worst score counts’ method resulted in ratings of mostly poor quality with some aspects receiving a rating of fair. The most common limitations were failure to perform factor analyses when assessing internal consistency and failure to adequately describe comparator instruments, including psychometric properties, for convergent or divergent validity. Very few studies reported the percentage of missing data or how missing data were handled although this did not warrant a poor rating as it was not operationalised as a major methodological flaw in the checklist.

2. Overall quality of psychometric property (Terwee criteria). As outlined in the method, a summary score was calculated by combining basic methodological requirements with the strength of the property. As shown in Table 4 some aspects of the studies received positive ratings (20.4% of ratings), with three studies obtaining a positive rating for more than one psychometric property (Cernis et al., 2016; Llorca et al., 2014; Romm et al., 2011), but 77.6% were rated as indeterminate. Only one study received a negative rating and this was specific to the hypotheses testing aspect of a study evaluating the Y-BOCS (de Haan et al., 2005).

The high number of indeterminate ratings was largely due to studies reporting internal consistency failing to check unidimensionality of the scale, studies performing hypothesis testing and not reporting specific a priori hypotheses, and reports of reliability that either did not use the ICC or kappa statistic or that used a design deemed inadequate, for example employing an excessive time interval between ratings.

Discussion

This systematic review of anxiety measures in non-affective psychosis identified 11 studies evaluating the psychometric properties of 17 different instruments. This is the first time these data have been summarised and therefore is anticipated to represent a useful resource for clinicians and researchers.

The studies report a range of psychometric properties, although the available evidence is yet to provide a comprehensive and consistent picture of the psychometric profiles of the instruments. As such, the data are not robust enough to make strong recommendations; however, if we exclude instruments falling below a cut-off point (rated at least acceptable, substantial or moderate for internal consistency, test re-test/ inter-rater reliability and validity, respectively), we consider the following instruments to have acceptable psychometric properties: the BAI, DASS, DGSS, LSAS, OCI, PSI, PTQ, SAES and Y-BOCS. The SAES is highlighted as the instrument evaluated on the most psychometric properties (five), and demonstrating consistently good results.

A striking finding of this review was that the evaluated instruments performed poorly against standardised quality assessment criteria (Mokkink et al., 2010a), and no single measure of anxiety can be assessed as demonstrating strong psychometric properties *and* adequate methodological quality for people with psychosis. However,

the Terwee and COSMIN criteria are rather conservative, and this stringency could lead to the unfair rejection of adequate instruments. To give an example, many studies failed to carry out a factor analysis in conjunction with an assessment of internal consistency, thereby receiving lower ratings for failing to check unidimensionality of the measure. However, factor analyses are unlikely to be appropriate or useful given that three of the studies reviewed had sample sizes below $N=100$ and the remaining seven studies were between $N=100-166$. Without this item, ratings for internal consistency would have ranged from fair to excellent with none of the studies warranting a poor rating. Hypotheses testing is another area in which the COSMIN criteria seems overly stringent as instruments are marked down if a priori hypotheses are not explicitly specified; however, implicit hypotheses may have seemed so obvious that stating the expected direction of the predicted effect was unnecessary. Clinicians and researchers should take methodological quality assessment into account while also applying pragmatic considerations when selecting an instrument. It is a potential limitation of this review that only 25% of COSMIN checklist ratings were rated in parallel with an independent reviewer, although the reliability achieved for these ratings was good. It is also a limitation that the review did not explicitly follow PRISMA standards or publish a protocol.

A more general limitation of the review is the broad inclusion criteria employed, such that instruments assessing anxiety-related processes or specific anxiety subtypes as well as both self-report and clinician-rated were included. These studies are not necessarily comparable. Some instruments assess the archetypal construct of anxiety, including physiological and cognitive components with items such as “numbness or tingling” (BAI) or “I feel tense or wound up” (HADS); whereas, others excluded the physiological symptoms and focus on the emotional experience. For example, the STAI

includes items such as “I feel calm...I feel secure”. Yet others focus on anxiety in a particular situation. The ASI measures anxiety experienced when noticing physical symptoms of anxiety, such as “I feel scared when I become short of breath”. The LSAS and SIAS include items assessing distress and avoidance, an anxiety related behaviour, for various social situations. In addition, some instruments assess the impact or consequence of anxiety, as well as severity, such as the SAES and YBOCS. The PTQ has the narrowest focus as this assesses rumination, a particular cognitive process associated with the construct of anxiety. Anxiety is a complex cognitive, affective, physiological and behavioural response system and it is therefore important to carefully consider which components or subtypes intended to be assessed when selecting an appropriate instrument. Overall, this wide variation in the scope of each measure means that the assessment can be tailored to the needs and demands of the research or clinical setting, although it makes it more difficult to make direct comparisons.

In a similar vein, some models conceptualise worry as a distinct construct, separate from broader conceptualisations of anxiety and this may suggest that the instruments assessing components of worry (e.g. DGSS, PSWQ, PTQ) could be reviewed separately. Nonetheless, worry is also seen as a cognitive subcomponent of anxiety and was therefore included (Wells & Matthews, 2014). This approach was chosen as a first step to compiling all relevant research and, perhaps more importantly, because these measures are representative of current practice. Also, reflecting the common division between child and adult services in clinical practice, and a common cut off for researchers, we excluded studies including people under the age of 18. This is a limitation as this younger group also experience psychosis and anxiety and access services in relation to these experiences.

It is notable that very few studies in the current review describe a measure of anxiety designed specifically for use within a population with psychosis (only the Psychological Stress Index and Scale of Anxiety Evaluation in Schizophrenia) while all other studies applied existing anxiety instruments to this population. Although this is a common and acceptable practice, it is important that psychometric evidence is evaluated within a representative population (Terwee et al., 2007) because there are some specific issues that may compromise the reliability and validity of existing anxiety measures when used with people with psychosis. Firstly, symptoms that emerge secondary to antipsychotic medication, for example extrapyramidal symptoms, may be mistaken for cognitive, affective or physiological symptoms of anxiety (Seedat et al., 2007). This will be more relevant for measures that focus more on physiological indicators, such as the BAI. Secondly, there is phenomenological overlap between anxiety symptoms, and the positive and negative symptoms of psychosis (Achim, Sutliff, & Roy, 2015; Berman et al., 1998). Better conceptual clarity regarding how anxiety symptoms and anxiety processes relate to other common symptoms in psychosis is needed in order to ascertain what is being captured by instruments. Thirdly, higher anxiety sensitivity in psychosis populations may possibly lead to heightened awareness and therefore increased reporting of anxiety symptoms, however the difference between the psychosis and non-psychosis groups on measures of anxiety sensitivity in one study has been found to be not statistically significant (Huppert et al., 2002).

The main implication of this review for clinicians is that many measures of anxiety exist and demonstrate acceptable psychometric properties within a population with psychosis. The list of instruments recommended as adequate in this review provide a shortlist from which to determine which instrument is best suited to the intended task,

taking into account applicability to the particular research or clinical setting. For example, is the aim to screen for anxiety or to assess a specific anxiety disorder? Would it be helpful to include ratings of frequency and intensity of experiences or to take into account the impact of anxiety? How long can the person completing the measure tolerate and would they prefer clinician or self-rated versions? Is there a version of the measure in the relevant language? We therefore hope that this review provides information to assist clinicians and researchers to select the optimum instrument for their particular intended purpose, taking into account practical considerations (see Table 2) as well as psychometric properties (see Table 3). Yet, the methodological quality of studies included in this review were rated as poor using the formal criteria and this may challenge the robustness of the psychometric results. Therefore, further studies aiming to validate existing measures of anxiety within a sample of people with psychosis are required (Braga, Petrides, & Figueira, 2004). Researchers are encouraged to use resources published by the COSMIN group when specifically designing development or evaluation studies to avoid common pitfalls, such as those listed in the results section here, and improve methodological quality. Researchers are also encouraged to explore a broader range of psychometric properties as the current review did not find any studies investigating measurement error, cross-cultural validity, criterion validity or responsiveness.

Another key area for future research would be exploration of the experience of using the measure, including perspectives of clinicians and people experiencing psychosis. This will further broaden the information available to help clinicians and researchers select an appropriate measure.

In conclusion, on the basis of this first published review of the psychometric properties of anxiety measures in psychosis we make tentative recommendations. The

BAI, DASS, DGSS, LSAS, OCI, PSI, PTQ, SAES and Y-BOCS demonstrated adequate psychometric properties on the limited properties reported. The SAES was assessed most extensively, and demonstrated consistently good psychometric properties. Of note, the methodological quality of these studies was predominantly rated as poor; however, this is in the context of the relatively conservative COSMIN criteria. Further validation of existing instruments is strongly recommended. The COSMIN criteria provide a useful framework to guide the design of future studies.

Figure 1. Consort diagram for study selection

Table 1
Overview of articles reviewed

Study	Country (language)	N	Mean age (SD) (range)	Gender (% male)	Diagnoses	Setting	Sampling method	Anxiety measure(s)	Psycho- metric variable assessed
Allan & Martin (2009)	UK (English)	100	40.7 (11.43) 19-65	74.00	schizophrenia	71% Community, 13% day centre, 16% IP	Convenience /consecutive (unclear)	HADS (anxiety subscale)	IC
Cernis, et al. (2016)	UK (English)	142	41.5 (11.4)	57.74	73.24% schizophrenia, 7.74% schizoaffective, 6.33% delusional disorder, 12.68% psychosis NOS	OP	Unclear	PTQ	IC; SV; HT
De Haan, et al. (2005)	Netherlands (not stated)	135	21.7 (3.1)	76.30	82.96% schizophrenia, 9.63% schizophreniform, 7.4% schizoaffective	‘Intensive treatment programme’	Consecutive	Y BOCS	IC; IR
Huppert, et al. (2002)	USA (English)	33	36.63 (9.28) 19-52	57.57	75.75% schizophrenia, 24.24% schizoaffective	OP	Convenience	ASI; DASS (anxiety subscale); OCI; PWSQ; SIAS; SPS	IC; TR; HT
Llorca, et al. (2014)	France (French)	147	36.9 (10.7)	70.80	schizophrenia or schizoaffective	27.9% IP, 8.8% OP, 63.3% partial hospitalisation	Consecutive	SAES	IC; IR; CV; HT

Park, et al. (2016)	South Korean (Korean)	369	36.77, 25.84-47.70	44.70	schizophrenia	16.5% IP, 83.5% OP	Unclear	SCL-90-R (anxiety subscale)	SV
Romm, et al. (2011)	Norway (not stated)	144	26.3 (8.4)	64	51% schizophrenia, 8% schizophreniform, 9% schizoaffective, 6% affective psychosis, 26% psychosis NOS	‘Treatment centre’	Consecutive	LSAS-SR	IC; SV
Seedat, et al. (2007)	South Africa (Afrikaans and English)	70	35.8 (11.2) 18-59	54.3	schizophrenia	IP	Self-selecting	Ham-A; HADS (anxiety subscale); STAI; DGSS	IC; HT
Steer, et al. (2003)	USA (English)	110	44.4 (16.8)	50	29% schizophrenia, 48% schizoaffective, 23% delusional disorder	OP	Consecutive	BAI	IC
Tso, et al. (2012)	USA (English)	37	42 (10)	54.05	72.97% schizophrenia, 27% schizoaffective	OP	Self-selecting	PSI; STAI (state)	IC; TR; HT
Wang, et al. (2016)	China (Chinese)	166	42.75 (9.64)	52.40	schizophrenia	OP	Unclear	DASS (anxiety subscale)	IC; HT

Abbreviations: IP: inpatient; OP: Outpatient; OC: Obsessive compulsive symptoms; ASI-R: Anxiety Sensitivity Index; BAI: Beck Anxiety Index; DASS: Depression Anxiety Stress Scale; DGSS: DSM based GAD Symptom Severity Scale; HADS: Hospital Anxiety and Depression Scale; Ham-A: Hamilton Anxiety Rating Scale; LSAS: Liebowitz Social Anxiety Scale; OCI: Obsessive Compulsive Inventory; PSI: Psychological Stress Index; PSWQ: Penn State Worry Questionnaire; PTQ, Perseverative Thinking Questionnaire; SAES: Scale of Anxiety

Evaluation in Schizophrenia; SIAS: Social Interaction Anxiety Scale; SCL-90-R: Symptom-Checklist-90-Revised; SPS: Social Phobia Scale; STAI: State Trait Anxiety Inventory; Y-BOCS: Yale-Brown Obsessive Compulsive Scale; IC: Internal consistency; TR: Test-retest reliability; IR: Inter-rater reliability; HT: Hypothesis testing (inc convergent/divergent validity); CV: Content validity; SV: Structural validity

Table 2

Overview of anxiety measures

Anxiety measure	Construct	Administrati on mode	Duration (minute)	Structure	Scale (range)	Scoring	Score/item assessed in review
Anxiety Sensitivity Index (ASI-R)(Reiss, Peterson, Gursky, & McNally, 1986)	Fear of anxiety-related sensations	Self-rated	<5	36 items with 6 subscales	0-4 (5)	Sum all items	Total score
Beck Anxiety Index (BAI)(Beck, Epstein, Brown, & Steer, 1988)	Physiological and cognitive symptoms of anxiety	Self-rated	5-10	21 items	0-3 (4)	Sum all items	Total score
Depression Anxiety Stress Scale (DASS)(Lovibond & Lovibond, 1995)	Symptoms of depression, anxiety and stress	Self-rated	5-10	Three subscales of 14 items (Depression, Anxiety, Stress)	0-3 (4)	Sum items for each subscale separately	Anxiety subscale
DSM based GAD Symptom Severity Scale (DGSS)(Stein, 2005)	DSM-IV GAD symptoms	Clinician rated	-	8 items rated for frequency and intensity	0-4 (5)	Sum all items	Total score
Hospital Anxiety and Depression Scale (HADS)(Zigmond & Snaith, 1983)	Anxiety and depression	Self-rated	2-5	14 items; anxiety and depression subscales	0-3 (4)	Sum all items (some reverse scored) for total score. Sum items for anxiety and depression subscale separately	Anxiety subscale
Hamilton Anxiety Rating Scale (Ham-A)(Hamilton, 1959)	Psychic and somatic anxiety symptoms	Clinician rated	10-15	14 items	0-4 (5)	Sum all items	Total score
Liebowitz Social Anxiety Scale (LSAS)(Baker, Heinrichs, Kim, & Hofmann, 2002; Liebowitz, 1987)	Fear/anxiety and avoidance of social situations	Clinician and self-rated version available	20-30	24 items divided into subscales of social and performance	0-3 (4)	Sum items for fear/anxiety or avoidance. Sum all items for total	Total score
Obsessive Compulsive Inventory (OCI)(Foa, Kozak, Salkovskis, Coles, & Amir, 1998)	Symptoms of OCD	Self-rated	15	42 items rated for frequency and distress with 7 subscales	0-4 (5)	Sum all items	Total score

Perseverative Thinking Questionnaire (PTQ)(Ehring et al., 2011)	Repetitive negative thinking	Self-rated	-	15 items	0-4 (5)	Sum all items	Total score
Psychological Stress Index (PSI)(Tso et al., 2012)	Psychological stress in psychosis	Self-rated	-	18 items (9 item version available)	0-4 (5)	Mean score of sum of items (some reverse scored)	Total score
Penn State Worry Questionnaire (PSWQ)(Meyer, Miller, Metzger, & Borkovec, 1990)	Worry	Self-rated	5	16 items	1-5 (5)	Sum all items (some reverse scored)	Total score
Scale of Anxiety Evaluation in Schizophrenia (SAES)(Llorca et al., 2014)	Symptoms of anxiety	Clinician rated	-	22 items rated for frequency, intensity and interference with functioning	1-5 (5)	Sum all items	Total score
Social Interaction Anxiety Scale (SIAS)(Mattick & Clarke, 1998)	Fear of social interaction	Self-rated	10	20 items	0-4 (5)	Sum all items	Total score
Social Phobia Scale (SPS)(Mattick & Clarke, 1998)	Fear of scrutiny during routine activities	Self-rated	10	20 items	0-4 (5)	Sum all items	Total score
State Trait Anxiety Inventory (STAI)(Spielberger, 1983)	State and trait anxiety	Self-rated	20	Two 20-item scales	1-4 (4)	Sum all items (some reverse scored)	Total score
Symptom-Checklist-90-Revised (SCL-90-R)(Derogatis, 1983)	Anxiety	Self-rated	15	Nine symptom dimensions of 10 items each (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism)	0-4 (5)	Mean score of sum of items. T-scores available for normative data	Anxiety subscale
Yale-Brown Obsessive Compulsive Scale (YBOCS)(Goodman et al., 1989)	Symptoms of OCD	Clinician rated	45	60+ symptom checklist and 10 item severity scale; subscales for	0-4 (5)	Sum all severity items	Total score

obsessions and
compulsions

Abbreviations: DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; PTSD: Post traumatic stress disorder; GAD: Generalised anxiety disorder; OCD: Obsessive compulsive disorder

Table 3

Psychometric properties reported by studies

Anxiety measure	Study	Reliability			Validity	
		IC	IR	TR (interval)		
ASI-R	(Huppert et al., 2002)	.94 Excellent	-	.70 (3 months) Substantial	Convergent validity	Small correlations with ADIS-IV observer ratings of Panic Disorder symptoms, $r=.18$, ns, and with PANSS anxiety item, $r=.27$, ns.
BAI	(Steer et al., 2003)	.92 Excellent	-	-	-	
DASS	(Huppert et al., 2002)	.91 Excellent	-	.77 (3 months) Substantial	Convergent validity	Moderate correlation with the ADIS-IV ratings of panic disorder, $r=.41$, $p<.05$, and large correlation with PANSS anxiety item, $r=.64$, $p<.01$.
	(Wang et al., 2016)	.78 Acceptable	-	-	-	
DGSS	(Seedat et al., 2007)	.85 Good	-	-	Convergent validity	Large correlations with HADS anxiety subscale, $r=.54$, $p<.01$, the STAI, $r=.53$, $p<.01$, and the Ham-A, $r=.53$, $p<.01$.
					Divergent validity	Small correlation with HADS depression subscale, $r=.12$, $p>.01$.
HADS	(Allan & Martin, 2009)	.90 Good	-	-	-	
	(Seedat et al., 2007)	.46 Unacceptable	-	-	Convergent validity	Excellent agreement with MINI, kappa=.09. Large correlations with STAI, $r=.53$, $p<.01$, and DGSS, $r=.54$, $p<.01$. Moderate correlation with Ham-A, $r=.39$, $p<.01$.
					Divergent validity	Small correlation with HADS depression subscale, $r=.12$, $p>.01$.
Ham-A	(Seedat et al., 2007)	.76 Acceptable	-	-	Convergent validity	Fair agreement with MINI, kappa=.25, Large correlation with DGSS, $r=.53$, $p<.01$. Moderate correlations with HADS anxiety subscale, $r=.39$, $p<.01$, and STAI, $r=.39$, $p<.01$.

					Divergent validity	Small correlation with HADS depression subscale, $r = .16, p > .01$.
LSAS-SR	(Romm et al., 2011)	.97 Excellent	-	-	Structural validity	Factor analysis revealed three factors (public performance, social interaction, observation by others) accounted for 56% of variance and correspond to factors identified in other patient populations. Authors note main difference is that 'eating and drinking in public' factor does not appear as a separate factor in patients with psychotic disorders.
OCI	(Huppert et al., 2002)	.95 Excellent		.74 (3 months) Substantial	-	
PSI	(Tso et al., 2012)	.88 (PSI-18) Good	-	.77 (PSI-18) (4-8 weeks) Substantial	Convergent validity	Large correlations with STAI for PSI-18, $r = .64, p < .001$, and PSI-9, $r = .52, p < .001$.
		.86 (PSI-9) Good		.66 (PSI-9) (4-8 weeks) Substantial		
PSWQ	(Huppert et al., 2002)	.89 Good	-	.58 (3 months) Moderate	Convergent validity	Moderate correlations with ADIS-IV rating for GAD, $r = .44, p < .01$, and PANSS anxiety item, $r = .33, ns$.
PTQ	(Cernis et al., 2016)	.92 Excellent	-	-	Structural validity	Confirmatory factor analysis indicated good fit of data to Ehrling's factor structure of one higher order factor and three lower order factors ($\chi^2 = 332.40, df = 87, CFI = 0.96$).
					Hypothesis testing	Moderate correlation with PSWQ, $r = 0.50, p < .001$ and small correlation with the GPTS Part B, $r = 0.299, p < .001$.
SAES	(Llorca et al., 2014)	.89 Good	.82 Almost perfect	-	Content validity	Items were assessed by experts in psychosis, anxiety and psychometric assessment, using the Delphi method, to comment on 'pertinence, reliability and limitations.'

					Convergent validity	Large correlations with Ham-A, $r=.791, p<.001$ and PANSS anxiety item, $r=.69, p<.001$
					Divergent validity	Small to moderate correlations with PANSS depression item, $r=.23$ to $.4$ for the three factors of the SAES.
SCL-90-R	(Park et al., 2016)	-	-	-	Structural validity	Principal component analysis of anxiety subscale conducted. 54% of raw variance explained by measures. Indicates unidimensional scale according to Linacre (2001)
SIAS	(Huppert et al., 2002)	.95 Excellent	-	.65 (3 months) Substantial	Convergent validity	Moderate correlation with ADIS-IV rating for social phobia, $r=.40, p<.05$, and small correlation with PANSS anxiety item, $r=.24, ns$.
SPS	(Huppert et al., 2002)	.94 Excellent	-	.63 (3 months) Substantial	Convergent validity	Moderate correlation with ADIS-IV rating for social phobia, $r=.42, p<.05$ and a small correlation with PANSS anxiety item, $r=.29, ns$.
STAI	(Seedat et al., 2007)	.62 Questionable	-	-	Convergent validity	Slight agreement with MINI, $\kappa=.15$. Large correlations with HADS anxiety subscale, $r=.53, p<.01$, and DGSS, $r=.53, p<.01$. Moderate correlation with Ham-A, $r=.39, p<.01$.
					Divergent validity	Small correlation with HADS depression subscale, $r=.16, p>.01$.
	(Tso et al., 2012)	.92 (state) Excellent	-	.63 (state) (4-8 weeks) Substantial	-	
Y-BOCS	(de Haan et al., 2005)	.79 Acceptable	.78 Substantial	-	-	

Abbreviations: IC: Internal consistency; TR: Test-retest reliability; IR: Inter-rater reliability; ADIS-IV: Anxiety Disorders Interview Schedule for DSM-IV (Brown, DiNardo, & Barlow, 1994); MINI: Mini International Neuropsychiatric Interview (Sheehan et al., 1998);

Table 4

Quality ratings for psychometric properties for each measure of anxiety

Anxiety measure and article citation	Methodological quality of study (COSMIN checklist)					Quality of psychometric property (Terwee criteria)				
	Internal consistency	Reliability	Content validity	Structural validity	Hypotheses -testing	Internal consistency	Reliability	Content validity	Structural validity	Hypotheses -testing
Anxiety Sensitivity Index (ASI-R)										
Huppert, et al. (2002)	Poor	Poor	-	-	Poor	?	?	0	0	?
Beck Anxiety Index (BAI)										
Steer, et al. (2003)	Poor	-	-	-	-	?	0	0	0	0
Depression Anxiety Stress Scale (DASS)										
Huppert, et al. (2002)	Poor	Poor	-	-	Poor	?	?	0	0	?
Wang, et al. (2016)	Fair	-	-	-	Fair	?	0	0	0	?
DSM based GAD Symptom Severity Scale (DGSS)										
Seedat, et al. (2007)	Poor	-	-	-	Poor	?	0	0	0	?
Hospital Anxiety and Depression Scale (HADS)										
Allan & Martin (2009)	Fair	-	-	-	-	+	0	0	0	0
Seedat, et al. (2007)	Poor	-	-	-	Poor	?	0	0	0	?
Hamilton Anxiety Rating Scale (Ham-A)										
Seedat, et al. (2007)	Poor	-	-	-	Poor	?	0	0	0	?
Liebowitz Social Anxiety Scale (LSAS)										
Romm, et al. (2011)	Fair	-	-	Fair	Fair	?	0	0	+	+
Obsessive Compulsive Inventory (OCI)										
Huppert, et al. (2002)	Poor	Poor	-	-	Poor	?	?	0	0	?
Psychological Stress Index (PSI)										
Tso, et al. (2012)	Poor	Fair	-	-	Fair	?	?	0	0	+
Penn State Worry Questionnaire (PSWQ)										
Huppert, et al. (2002)	Poor	Poor	-	-	Poor	?	?	0	0	?
Perseverative Thinking Questionnaire (PTQ)										
Cernis, et al. (2016)	Fair	-	-	Fair	Poor	+	0	0	+	+
Scale of Anxiety Evaluation in Schizophrenia (SAES)										
Llorca, et al. (2014)	Fair	Poor	Poor	-	Poor	?	+	+	0	?
Social Interaction Anxiety Scale (SIAS)										
Huppert, et al. (2002)	Poor	Poor	-	-	Poor	?	?	0	0	?

Social Phobia Scale (SPS)										
Huppert, et al. (2002)	Poor	Poor	-	-	Poor	?	?	0	0	?
State Trait Anxiety Inventory (STAI)										
Seedat, et al. (2007)	Poor	-	-	-	Poor	?	0	0	0	?
Tso, et al. (2012)	Poor	Fair	-	-	-	?	?	0	0	0
Symptom-Checklist-90-Revised (SCL-90-R)										
Park, et al. (2016)	-	-	-	-	Fair	0	0	0	0	?
Yale-Brown Obsessive Compulsive Scale (Y BOCS)										
de Haan, et al. (2005)	Poor	Fair	-	-	Fair	?	+	0	0	-

Note: COSMIN checklist: - indicates property not reported; Terwee Quality Criteria: + = positive rating; ? = indeterminate rating; - = negative rating; 0 = not reported

References

- Achim, A. M., Maziade, M., Raymond, É., Olivier, D., Mérette, C., & Roy, M.-A. (2011). How prevalent are anxiety disorders in schizophrenia? A meta-analysis and critical review on a significant association. *Schizophrenia Bulletin*, 37(4), 811-821.
- Achim, A. M., Sutliff, S., & Roy, M.-A. (2015). Treating comorbid anxiety disorders in patients with schizophrenia: a new pathway. *Psychiatric Times*, 32(1), 29-29.
- Allan, R., & Martin, C. R. (2009). Can the Hospital Anxiety and Depression Scale be used in patients with schizophrenia? *Journal of Evaluation in Clinical Practice*, 15(1), 134-141. doi: 10.1111/j.1365-2753.2008.00968.x
- Baker, S. L., Heinrichs, N., Kim, H.-J., & Hofmann, S. G. (2002). The Liebowitz social anxiety scale as a self-report instrument: a preliminary psychometric analysis. *Behaviour Research and Therapy*, 40(6), 701-715.
- Bayle, F., Krebs, M., Epelbaum, C., Levy, D., & Hardy, P. (2001). Clinical features of panic attacks in schizophrenia. *European Psychiatry*, 16(6), 349-353.
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: psychometric properties. *Journal of Consulting and Clinical Psychology*, 56(6), 893.
- Berman, I., Merson, A., Viegner, B., Losonczy, M. F., Pappas, D., & Green, A. I. (1998). Obsessions and compulsions as a distinct cluster of symptoms in schizophrenia: a neuropsychological study. *The Journal of nervous and mental disease*, 186(3), 150-156.
- Birchwood, M. (2003). Pathways to emotional dysfunction in first-episode psychosis. *The British Journal of Psychiatry*, 182(5), 373-375.
- Blanchard, J. J., Mueser, K. T., & Bellack, A. S. (1998). Anhedonia, positive and negative affect, and social functioning in schizophrenia. *Schizophrenia Bulletin*, 24(3), 413-424.
- Braga, R. J., Mendlowicz, M. V., Marrocos, R. P., & Figueira, I. L. (2005). Anxiety disorders in outpatients with schizophrenia: prevalence and impact on the subjective quality of life. *Journal of Psychiatric Research*, 39(4), 409-414.
- Braga, R. J., Petrides, G., & Figueira, I. (2004). Anxiety disorders in schizophrenia. *Comprehensive Psychiatry*, 45(6), 460-468.
- Brown, T., DiNardo, P., & Barlow, D. H. (1994). Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV). San Antonio, Texas: Psychological Corporation: Graywind Publications.
- Cernis, E., Dunn, G., Startup, H., Kingdon, D., Wingham, G., Evans, N., . . . Freeman, D. (2016). The Perseverative Thinking Questionnaire in Patients with Persecutory Delusions. *Behavioural and Cognitive Psychotherapy*, 44(4), 472-481. doi: 10.1017/s1352465815000533
- Clark, D. (1999). Anxiety disorders: Why they persist and how to treat them. *Behaviour Research and Therapy*, 37, S5-S27.
- Clark, D., & Beck, A. T. (2011). *Cognitive therapy of anxiety disorders: Science and practice*: Guilford Press.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. 2nd edn. Hillsdale, New Jersey: L: Erlbaum.

- de Haan, L., Hoogeboom, B., Beuk, N., Wouters, L., Dingemans, P., & Linszen, D. H. (2005). Reliability and validity of the Yale-Brown Obsessive-Compulsive Scale in schizophrenia patients. *Psychopharmacology Bulletin*, 39(1), 25-30.
- Delespaul, P., & van Os, J. (2002). Determinants of occurrence and recovery from hallucinations in daily life. *Social Psychiatry and Psychiatric Epidemiology*, 37(3), 97-104.
- Derogatis, L. R. (1983). SCL-90-R revised manual. *Baltimore: Johns Hopkins University School of Medicine*.
- Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schönfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy and Experimental Psychiatry*, 42(2), 225-232.
- Foa, E. B., Kozak, M. J., Salkovskis, P. M., Coles, M. E., & Amir, N. (1998). The validation of a new obsessive-compulsive disorder scale: The Obsessive-Compulsive Inventory. *Psychological Assessment*, 10(3), 206.
- Freeman, D., Emsley, R., Dunn, G., Fowler, D., Bebbington, P., Kuipers, E., . . . Garety, P. (2014). The stress of the street for patients with persecutory delusions: a test of the symptomatic and psychological effects of going outside into a busy urban area. *Schizophrenia Bulletin*, sbu173.
- Freeman, D., & Garety, P. A. (2003). Connecting neurosis and psychosis: the direct influence of emotion on delusions and hallucinations. *Behaviour Research and Therapy*, 41(8), 923-947.
- Freeman, D., Garety, P. A., Bebbington, P., Slater, M., Kuipers, E., Fowler, D., . . . Dunn, G. (2005). The psychology of persecutory ideation II: a virtual reality experimental study. *The Journal of nervous and mental disease*, 193(5), 309-315.
- Freeman, D., Startup, H., Dunn, G., Cernis, E., Wingham, G., Pugh, K., . . . Kingdon, D. (2013). The interaction of affective with psychotic processes: A test of the effects of worrying on working memory, jumping to conclusions, and anomalies of experience in patients with persecutory delusions. *Journal of Psychiatric Research*, 47(12), 1837-1842. doi: 10.1016/j.jpsychires.2013.06.016
- Garety, P. A., Kuipers, E., Fowler, D., Freeman, D., & Bebbington, P. (2001). A cognitive model of the positive symptoms of psychosis. *Psychological Medicine*, 31(2), 189-196.
- George, D. (2003). *SPSS for windows step by step: A simple study guide and reference*, 17.0 update, 10/e: Pearson Education India.
- Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., . . . Charney, D. S. (1989). The Yale-Brown obsessive compulsive scale: I. Development, use, and reliability. *Archives of General Psychiatry*, 46(11), 1006-1011.
- Goodwin, R., Lyons, J. S., & McNally, R. J. (2002). Panic attacks in schizophrenia. *Schizophrenia Research*, 58(2-3), 213-220. doi: 10.1016/s0920-9964(01)00373-5
- Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, 32(1), 50-55.
- Hartley, S., Barrowclough, C., & Haddock, G. (2013). Anxiety and depression in psychosis: a systematic review of associations with positive psychotic symptoms. *Acta Psychiatrica Scandinavica*, 128(5), 327-346. doi: 10.1111/acps.12080

- Huppert, J. D., Smith, T. E., & Apfeldorf, W. J. (2002). Use of self-report measures of anxiety and depression in outpatients with schizophrenia: Reliability and validity. *Journal of Psychopathology and Behavioral Assessment*, 24(4), 275-283. doi: 10.1023/a:1020783101092
- Klippel, A., Viechtbauer, W., Reininghaus, U., Wigman, J., van Borkulo, C., Myin-Germeys, I., & Wichers, M. (2017). The Cascade of Stress: A Network Approach to Explore Differential Dynamics in Populations Varying in Risk for Psychosis. *Schizophrenia Bulletin*.
- Lako, I. M., Bruggeman, R., Knegtering, H., Wiersma, D., Schoevers, R. A., Slooff, C. J., & Taxis, K. (2012). A systematic review of instruments to measure depressive symptoms in patients with schizophrenia. *Journal of affective disorders*, 140(1), 38-47.
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *biometrics*, 159-174.
- Lehoux, C., Gobeil, M.-H., Lefèbvre, A.-A., Maziade, M., & Roy, M.-A. (2009). The Five-Factor Structure of the PANSS: A Critical Review of its Consistency Across Studies. *Clinical Schizophrenia & Related Psychoses*, 3(2), 103-110. doi: doi:10.3371/CSRP.3.2.5
- Liebowitz, M. (1987). Social phobia. *Modern problems of pharmacopsychiatry*, 22, 141.
- Llorca, P. M., Lancon, C., Blanc, O., de Chazeron, I., Samalin, L., Caci, H., . . . Bayle, F. J. (2014). A composite scale applied to evaluate anxiety in schizophrenic patients (SAES). *European Archives of Psychiatry and Clinical Neuroscience*, 264(2), 171-178. doi: 10.1007/s00406-013-0416-1
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, 33(3), 335-343.
- Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, 36(4), 455-470.
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State worry questionnaire. *Behaviour Research and Therapy*, 28(6), 487-495.
- Mokkink, L. B., Terwee, C. B., Patrick, D. L., Alonso, J., Stratford, P. W., Knol, D. L., . . . de Vet, H. C. (2010a). The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. *Quality of Life Research*, 19(4), 539-549.
- Mokkink, L. B., Terwee, C. B., Patrick, D. L., Alonso, J., Stratford, P. W., Knol, D. L., . . . de Vet, H. C. (2010b). The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *Journal of Clinical Epidemiology*, 63(7), 737-745.
- Montgomery, S. A., & Asberg, M. (1979). A new depression scale designed to be sensitive to change. *The British Journal of Psychiatry*, 134(4), 382-389.
- Morosini, P., Magliano, L., Brambilla, L., Ugolini, S., & Pioli, R. (2000). Development, reliability and acceptability of a new version of the DSM-IV Social and Occupational Functioning Assessment Scale (SOFAS) to assess routine social functioning. *Acta Psychiatrica Scandinavica*, 101(4), 323-329.

- Morrison, A. P. (2001). The interpretation of intrusions in psychosis: an integrative cognitive approach to hallucinations and delusions. *Behavioural and Cognitive Psychotherapy*, 29(03), 257-276.
- Nyhuis, A. W., Faries, D. E., Ascher-Svanum, H., Stauffer, V. L., & Kinon, B. J. (2010). Predictors of switching antipsychotic medications in the treatment of schizophrenia. *Bmc Psychiatry*, 10(1), 1-11. doi: 10.1186/1471-244x-10-75
- Park, I. J., Chung Jung, D., Suk-Hyun Hwang, S., Yeon Jung, H., Yoon, J. S., Kim, C. E., . . . Sik Kim, Y. (2016). Longitudinal relationship between Personal and Social Performance (PSP) and anxiety symptoms in schizophrenia. *Journal of Affective Disorders*, 190, 12-18.
- Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behaviour Research and Therapy*, 24(1), 1-8.
- Romm, K., Rossberg, J., Berg, A., Hansen, C., Andreassen, O., & Melle, I. (2011). Assessment of social anxiety in first episode psychosis using the Liebowitz Social Anxiety Scale as a self-report measure. *European Psychiatry*, 26(2), 115-121.
- Seedat, S., Fritelli, V., Oosthuizen, P., Emsley, R. A., & Stein, D. J. (2007). Measuring anxiety in patients with schizophrenia. *Journal of Nervous & Mental Disease*, 195(4), 320-324.
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., . . . Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (MINI): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry*.
- Spielberger, C. D. (1983). Manual for the State-Trait Anxiety Inventory STAI (Form Y)("Self-Evaluation Questionnaire").
- Startup, H., Freeman, D., & Garety, P. A. (2007). Persecutory delusions and catastrophic worry in psychosis: developing the understanding of delusion distress and persistence. *Behaviour Research and Therapy*, 45(3), 523-537.
- Steer, R. A., Kumar, G., & Pinninti, N. R. (2003). Severity and internal consistency of self-reported anxiety in psychotic outpatients. *Psychological Reports*, 93(3), 1233-1238. doi: 10.2466/pr0.93.8.1233-1238
- Stein, D. J. (2005). Generalized anxiety disorder: rethinking diagnosis and rating. *Cns Spectrums*, 10(12), 930.
- Taiminen, T., Huttunen, J., Heila, H., Henriksson, M., Isometsa, E., Kahkonen, J., . . . Helenius, H. (2001). The Schizophrenia Suicide Risk Scale (SSRS): development and initial validation. *Schizophrenia Research*, 47(2-3), 199-213. doi: 10.1016/s0920-9964(00)00126-2
- Terwee, C. B., Bot, S. D., de Boer, M. R., van der Windt, D. A., Knol, D. L., Dekker, J., . . . de Vet, H. C. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology*, 60(1), 34-42.
- Terwee, C. B., Mokkink, L. B., Knol, D. L., Ostelo, R. W., Bouter, L. M., & de Vet, H. C. (2012). Rating the methodological quality in systematic reviews of studies on measurement properties: a scoring system for the COSMIN checklist. *Quality of Life Research*, 21(4), 651-657.
- Tso, I. F., Grove, T. B., & Taylor, S. F. (2012). Self-assessment of psychological stress in schizophrenia: Preliminary evidence of reliability and validity. *Psychiatry Research*, 195(1-2), 39-44. doi: 10.1016/j.psychres.2011.07.009

- Wallwork, R., Fortgang, R., Hashimoto, R., Weinberger, D., & Dickinson, D. (2012). Searching for a consensus five-factor model of the Positive and Negative Syndrome Scale for schizophrenia. *Schizophrenia Research*, 137(1), 246-250.
- Wang, K., Shi, H.-S., Geng, F.-L., Zou, L.-Q., Tan, S.-P., Wang, Y., . . . Chan, R. C. K. (2016). Cross-cultural validation of the Depression Anxiety Stress Scale-21 in China. *Psychological Assessment*, 28(5), e88-e100. doi: 10.1037/pas0000207
- Wells, A., & Matthews, G. (2014). *Attention and emotion (Classic edition): A clinical perspective*. Psychology Press.
- Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, 67(6), 361-370.