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Assessing delusional ideation: A narrative review of self-report instruments

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Abstract

According to recent models of recovery in psychosis, the patients' perspectives about their own difficulties, symptoms and goals (health-related and in other areas) are of major importance in intervention. Self-report measures have been increasingly studied and several authors have pointed out their validity, reliability and clinical utility in people with psychotic-disorders. The present study

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sought to review and critically analyse the available self-report instruments for assessing delusions. Four instruments met the inclusion criteria: Characteristics of Delusions Rating Scale; Beliefs Rating Scale; Peters Delusions Inventory; and Conviction of Delusional Beliefs Scale. All scales assess delusions in a multidimensional perspective and present adequate psychometric properties, although with high variability within studies. Refining the psychometric studies of the existing instruments (mainly confirmatory factor analysis, reliability and diagnostic accuracy analyses) and developing new instruments focused on coping are future areas of research interest.

Keywords: assessment; delusions; psychosis; self-report measures

Avaliação da ideação delirante: Uma revisão narrativa dos instrumentos de autorresposta

Resumo

As perspetivas dos pacientes acerca das suas próprias dificuldades, sintomas e objetivos (relacionados com a sua saúde e outras áreas) são de extrema importância para as intervenções, principalmente tendo em conta modelos recentes baseados na recuperação (no original *recovery*) das perturbações psicóticas. Cada vez mais os instrumentos de autorresposta têm sido estudados, sendo que vários autores têm defendido a sua validade, fiabilidade e utilidade clínica para pessoas com o diagnóstico de uma perturbação psicótica. Este estudo teve como objetivo rever e analisar de forma crítica os instrumentos de autorresposta existentes para a avaliação da ideação delirante. Quatro instrumentos preencheram os critérios de inclusão: a escala de características dos delírios (*Characteristics of Delusions Rating Scale*), a escala de avaliação das crenças (*Beliefs Rating Scale*), o inventário de delírios de Peters (*Peters Delusions Inventory*) e a escala de convicção nas ideias delirantes (*Conviction of Delusional Beliefs Scale*). Todas as escalas avaliam as ideias delirantes de uma perspetiva multidimensional e todas apresentam propriedades psicométricas adequadas. No entanto elevada variablidade foi encontrada entre os estudos. O refinar dos estudos psicométricos destes instrumentos (principalmente o investimento em análises de estrutura factorial, fiabilidade e acuidade diagnóstica) e o desenvolvimento de novos instrumentos focados no *coping* com os delírios são áreas de investigação de interesse para o futuro.

Palavras-chave: avaliação; delírios; psicose; instrumentos de autorresposta

INTRODUCTION

Delusional beliefs are core symptoms in psychotic disorders and can be conceptualized as fixed and rigid cognitive representations that are not amenable to change despite clear or reasonable conflicting evidence (APA, 2013). It has long been argued that delusions should be assessed multi-dimensionally, laying particular emphasis on distress and content of beliefs (Lincoln, 2007). Nevertheless, different authors have suggested different dimensions to assess in delusional activity, such as conviction, extension, bizarreness, disorganization, pressure, affective response, deviant behaviour resulting from delusions (grouped into delusional involvement and delusional construct; Kendler, Glazer, & Morgenstern, 1983), distress, belief strength, obtrusiveness, concern (Garety & Hemsley, 1987), belief-certainty, self-monitoring, and emotional commitment (Harrow et al., 2004), among others.

The most common method to assess delusions is through clinical interviews of psychotic symptoms. The most psychometrically sound and widely used interviews specifically designed to evaluate psychotic symptoms are the Positive and Negative Symptom Scale (PANSS; Kay, Fiszbein, & Opler, 1987) and the Psychotic Symptom Rating Scales (PSYRATS; Haddock, McCarron, Tarrier, & Faragher, 1999). Both assess the presence of delusions, with PANSS evaluating delusions' severity and PSYRATS assessing several dimensions of the delusional experience, namely preoccupation, duration, conviction, frequency and intensity of distress, and life disruption. A classical and very useful scale is the Dimensions of Delusional Experience (Kendler et al., 1983) that was developed to assess five dimensions of delusional experience (conviction, extension, bizarreness, disorganization and pressure). Other examples of relevant interviews are the Signs and Symptoms of Psychotic Illness rating scale (SSPI; Liddle, Ngan, Duffield, Kho, & Warren, 2002), the Brown Assessment of Beliefs (BABS; Eisen et al., 1998), both intending to assess conviction and insight on beliefs in a range of possible diagnoses. Nevertheless, comprehensive assessment of specific aspects (e.g., relationship with symptom, coping with symptom's strategies) is often difficult. In this regard, Wessely and collaborators (1993) developed the Maudsley Assessment of Delusions Schedule (MADS) which includes a very useful section on behavioural reactions to the nuclear belief.

Although clinical interviews are extremely useful in clinical and research settings, they are usually time consuming and not well suited for the general population and/or populations with subclinical symptoms. Self-report instruments are increasingly popular, in clinical and research settings, considering its advantages in terms of their practicality (i.e. time, administration issues). Additionally, self-report allows the researcher to gain access to the respondents' perceptions. This acknowledgement of the persons' view of their difficulties, goals (health-related and in other areas)

and life-orientation has been highly valued in more recent recovery-based models of psychosis. These types of models postulate autonomy, independence and empowerment with consumers participating in all decisions (Frese, Knight, & Saks, 2009).

Although self-report measures may have some disadvantages in assessing psychotic symptoms or assessing other symptoms in populations with psychosis (e.g., due to possible cognitive deficits, lack of awareness and/or insight, shame-related difficulties, social desirability – for a review see Bell, Fiszdon, Richardson, Lysaker, & Bryson, 2007) some studies have been emerging defending the use of self-report in this context. Regarding insight, it has been found that patients with schizophrenia are able to accurately report symptoms and personality characteristics and a distinction has been made between awareness of symptoms and awareness of illness (Bell et al., 2007), thus emphasizing the potential validity of self-report measures for this population. Rabinowitz et al. (2008) also found results supporting the reliability and validity of patient reports, specifically for symptom severity, with a significant linear trend emerging between the clinician and patient-rated measures (differences between the clinician's and patient's ratings attributed to poor insight). In a study comparing a self-report measure (BASIS-R) and a clinician-rated method (the Brief Psychiatric Rating Scale), Niv, Cohen, Mintz, Ventura, and Young (2007) found good concurrent validity and the self-report measure was found to identify moderate and severe psychosis. The authors argued the validity of using self-report assessment of psychotic symptoms, highlighting its advantages of practicality (easier to administer, interpret and score) and reliability. Considering the delusions assessment, Bell et al. (2007) also state that although self-report do not allow to perform diagnosis, such instruments may have utility in assessing specific information on delusions (e.g., distress, preoccupation) and comparing clinical and non-clinical populations.

Specifically, for delusions' assessment, Lincoln, Ziegler, Lüllmann, Müller, and Rief (2010) found good agreement ratings between self (using several multidimensional questionnaires) and observer-rated assessment of delusions, the latter being an indicator of the reliability of patient information (although lack of insight may cause reduced reliability). The concordance of patient and clinician ratings did not vary according to symptom severity, duration of the disorder or patient status (in or outpatient).

Considering the growing body of research on psychosis assessment, reviews have been emerging on assessment instruments and methods for psychotic symptoms. In 2010, Ratcliff, Farhall, and Shawyer identified and explored ten scales measuring different aspects of auditory hallucinations and divided them into four categories: multidimensional assessment, coping strategies, rating of beliefs and acceptance or mindfulness scales. Killian et al. (2015) analysed ten instruments for assessing negative symptoms that included blunted affect, the focus of the review, considering instrument type, characteristics, administration and psychometric properties.

Another review, performed by Lako and collaborators (2012) focused on associated depressive symptoms in people with schizophrenia: six instruments met the criteria and were analysed regarding several psychometric properties, symptom dimensions, type of rater (self-report or clinician-rated), training needed, duration and other characteristics. With the aim of shedding light into the 'simple delusional syndrome' and specifically to describe and analyse the 'Simple Delusional Syndrome Scale' (SDSS), Forgácová (2008) briefly reviewed the characteristics of three widely known rating scales: the Dimensions of Delusional Experience Scale (Kendler et al., 1983), the Belief Rating Scale (Jones & Watson, 1997) and the Brown Assessment of Beliefs Scale (Eisen et al., 1998), additionally to describing the SDSS. The authors also reviewed the importance of rating scales for clinical practice and evaluation of treatment efficacy. Notwithstanding the relevance of this review, considering the growing body of research over recent years, an updated review is in need in the field. Moreover, the aim of the cited review was not to provide a detailed analysis of the most relevant instruments in delusion assessment and several relevant and useful instruments were not described. Therefore, the aim of the present study was to provide an updated narrative review of existing valid and reliable self-report instruments for assessing several aspects of the delusional activity. We focused specifically on self-report measures considering the importance being given to the self-assessment of experiences in psychosocial interventions for psychosis. The patient's perspective has been highly valued in recent research (e.g., Ashcroft, Barrow, Lee, & MacKinnon, 2012; Gumley & Macbeth, 2014) and self-report measures have been widely used in clinical trials either for assessing symptoms or therapeutic processes (for a review of clinical studies see Wykes, Steel, Everitt, & Tarrier, 2008).

METHOD

Search strategy

To identify relevant studies, two leading electronic databases were searched, namely MEDLINE/PUBMED and b-on. Google scholar was also searched; references from relevant articles and prior reviews were also analysed. Articles published in English language from the first available date until April 2016 were considered. Key words included a combination of two groups of terms: a) Assessment-related terms, which included key words as 'assessment', 'evaluation', 'validation', 'psychometric',

'instrument', 'measure', 'questionnaire', 'scale'; b) Delusion-related terms, including words as 'delusion', 'delusional ideation', 'belief'. In a first phase (screening) we examined titles and abstracts to select pertinent articles, then articles seemingly to have the eligibility criteria (see below) were retrieved and fully analysed.

Eligibility criteria

Our inclusion criteria included: a) self-report instruments; b) developed for assessing delusions in clinical populations; c) with at least one parameter regarding psychometric properties made available. Instruments based on clinician assessment or clinical interviews were excluded and self-report instruments developed only to assess overvalued beliefs in non-clinical populations (and therefore with no clinical application to people with psychosis) were also not subject of analysis. Instruments limited to assess specific types of delusions (e.g., persecutory delusions) were also excluded. Instruments without any psychometric study, although used in other (cross-sectional, treatment) studies, were not considered.

Analytic strategy

In the present review we analysed the specific aims of each instrument as well as their practical aspects, such as issues regarding administration, instructions, number of items, response scale. In terms of psychometric properties each instrument was evaluated regarding its reliability and validity. Reliability was assessed based on reported internal consistency with values above .70 being considered acceptable (Kline, 1999) and test-retest correlation when reported, with higher values indicating higher temporal stability. Validity comprised analysis of convergent and divergent validity. Magnitude of correlations was interpreted according to Cohen (1988). Whenever provided factor structure was analysed based on exploratory or confirmatory adjustment data.

RESULTS

Four instruments met the inclusion criteria. The psychometric properties available for each scale are presented in Table 1 and the description of each instrument's aims, instructions and response scale is presented below.

Characteristics of Delusions Rating Scale (CDRS; Garety & Hemsley, 1987). The CDRS comprises eleven belief characteristics, namely conviction, preoccupation, interference (influence on behaviour), resistance (disliking the experience), dismissibility (from the mind), absurdity, self-evidentness, reassurance seeking (from others), worry, unhappiness (caused by belief), and pervasiveness (inability to attend other thoughts). The participant is asked to rate each belief characteristic using a visual analogue scale (with each end-point described) which is then converted into a 10-point scale.

Beliefs Rating Scale (BRS; Jones & Watson, 1997). In the BRS the participants are instructed to rate in twelve diagrams representing the belief characteristics, the degree to which each characteristic represents their experience (1 to 5 – with higher scores meaning higher levels of endorsement). The twelve characteristics include conviction, influence on behaviour, influence on cognition, truthfulness, importance (to the participant), frequency, acceptability (to others), use of imagination required, speed of formation, perceptual evidence, focused thought, and evoked affective content.

Peters Delusions Inventory (PDI; Peters, Joseph, & Garety, 1999). Although initially developed to assess delusions in non-clinical populations, the PDI has been used and has direct applicability to people with psychosis. The PDI has a 40-item (original) and a 21-item version. The original version was developed from the Present State Examination (Wing et al., 1974) and included eight categories (5 items each): delusions of control; misinterpretations, misidentification, and delusions of reference; delusions of persecution; expansive delusions; delusions concerning various types of influence and primary delusions; other delusions; simple delusions based on guilt, depersonalization, hypochondriasis; thought reading, insertion, echo, broadcast. Additionally to the 'yes' or 'no' answer, when the participant gives a positive answer he is asked to rate the experience in a 5-point Likert scale for distress, preoccupation and conviction. The 21-item version was based on the highest loading items after a principal component analysis of the 40-item version.

Conviction of Delusional Beliefs Scale (CDBS; Combs et al., 2006). The CDBS is a specific measure to assess conviction in delusions and comprises nine items reflecting emotional, cognitive and behavioural aspects of conviction. The participant is instructed to rate each item in a Likert scale ranging from 1 (not at all/never) to 5 (all the time/always) and the CDBS items are summed to obtain a total score, with higher scores reflecting greater belief conviction. An important advantage for the specific population is that the CDBS items and instructions are written at a 5th grade reading level.

Table 1
Overview of the Psychometric Properties of the Reviewed Instruments

Instrument	Reference and Sample	Reliability	Validity			Dimensional structure
			Convergent	Divergent	Diagnostic accuracy	
Characteristics of Delusions Rating Scale*	Garety & Hemsley, 1987 N=55; with delusions regardless of diagnosis	**Temporal Stability:** n/a **Internal consistency:** n/a	Cluster analysis. Group membership (high, moderate and low scores on characteristics): Associations with both psychiatrist diagnosed 'clinical depression' and self-rated depression (WDI) were found. Associations between characteristics are presented (relative independence of most of the variables).			**EFA:** PCA with VR: 4 components (distress, belief strength, obtrusiveness and concern) (100% of variance explained) **CFA:** n/a
Beliefs Rating Scale	Jones & Watson, 1997 N=20 (paranoid schizophrenia); N=20 (Anorexia); N=20 (controls)	It is stated that pilot studies confirmed reliability and temporal stability, although values are not reported	The scale differentiated the delusion in schizophrenia from the overvalued idea in anorexia for seven of the 12 belief variables. Significant differences were also found between delusions and normal religious beliefs.			**EFA:** n/a **CFA:** n/a
Peters Delusions Inventory	Original study: Peters, Joseph, & Garety, 1999 (40-item) N=20 (inpatients with psychosis); N=272 (non-clinical sample)	**Temporal Stability:** r=.82; p<.05 (non-clinical) **Internal consistency:** alpha=.88 (non-clinical)	Percentages of common variance between 33% and 58% with measures of schizotypy (STA), aberrant beliefs (MgI) and delusions (DSSI) – non-clinical	n/a	All scales and ratings were significantly higher in the clinical group.	**EFA:** For 36 items (items with very low or very high rates of endorsement were eliminated). PCA with VR: 11 components (religiosity, persecution, grandiosity, paranormal beliefs, thoughts disturbances, suspiciousness, paranoid ideation, negative self, 'catastrophic ideation and thought broadcast', 'ideas of reference and influence') (59.1% variance explained) **CFA:** n/a

Jung et al., 2008 (40-item, Korean version) N=310 (non-clinical); N=60 (inpatients with psychosis)	**Temporal Stability:** *r*=.67(-non-clinical) **Internal consistency:** alpha=.92 (non-clinical)	Significant moderate correlations with STA and psychosis proneness	n/a	Higher endorsement and ratings in clinical group.	**EFA:** PCA with VR: 10 components (somatic concern, grandiose ideas, religious or superstitious ideas, passivity experiences, persecutory ideas, thought disturbances, 'jealousy and suspiciousness', paranormal beliefs, olfactory hallucination, idea of guilt) (57% variance explained) **CFA:** n/a
Verdoux et al., 1998 (21-item, French version) N=444 (non-clinical)	**Temporal Stability:** n/a **Internal consistency:** n/a	n/a	n/a	n/a	**EFA:** PCA with VR: 7 components (persecution, thought disturbances, grandiosity, religiosity, paranormal beliefs, reference guilt and apocalypse) (55.3% variance explained) **CFA:** n/a
Peters, Joseph, Day, & Garety, 2004 (21-item) N=33 (patients with delusions); N=444 (non-clinical)	**Temporal Stability:** *r*=.78-.81 **Internal consistency:** alpha=.82 (non-clinical) and alpha=.90 (clinical)	Strong correlations with DSSI	No correlations with extroversion, introvertive anhedonia andcognitive disorganization (O-LIFE)	Higher alpha in the clinical sample. All ratings higher in the clinical group.	**EFA:** PCA with a forced 1-component solution (100% variance explained)
López-Ilundain, Perez-Nievas & Otero, 2006 (21-item; Spanish version) N=365 (non-clinical)	**Temporal Stability:** n/a **Internal consistency:** alpha=.75	n/a	n/a	n/a	**EFA:** PCA with VR: 7 components (influence, depressive, paranoid, grandiosity, referential, magic thinking and religiousness) (53.7% variance explained) **CFA:** n/a

Lincoln, 2007 (21-item; German version reporting results from Lincoln, Keller, & Rief, 2009 – validation study published in German) N=53 (schizophrenia); N=359 (non-clinical)	**Temporal Stability:** n/a **Internal consistency:** alpha=.89 (clinical); alpha=.85 (non-clinical)	Strong correlation with the SPQ	n/a	n/a	**EFA:** n/a **CFA:** n/a
Preti et al., 2007 (21-item; Italian version) N=81 (mental disorder with psychotic features); N=210 (non-clinical sample)	**Temporal Stability:** n/a **Internal consistency:** n/a	n/a	n/a	The clinical group scored significantly higher on PDI. In males, the PDI scores were statistically different across general groups (control, psychosis, organic illness, anxiety) but not between psychotic diagnoses. Cut-off>8 provides the best combination of sensitivity (0.74), and specificity (0.79) (AUC, 0.815). Predictive positive value = 57%; Negative predictive value = 88%	**EFA:** n/a **CFA:** n/a
Jones & Fernyhough, 2007 (21-item) N=493 (non-clinical)	**Temporal Stability:** n/a **Internal consistency:** alpha=.77; factor alphas ranging from .55 to .80	n/a	n/a	n/a	**EFA**: Principal axis factoring with oblique rotation for the three factor structure hypothesized (34.1% variance explained; loadings from .32 to 96) **CFA:** n/a

Fonseca-Pedrero, Paino, Santarén-Rosell, Lemos-Giráldez & Muñiz, 2012 (21-item, Spanish version) N=660 (non-clinical)	**Temporal Stability:** n/a **Internal consistency:** alpha=.91	Statistically significant correlations (small to moderate) with trait and state anxiety (STAI) and negative affect (PANAS)			**EFA:** n/a Principal Unweighted least squares with Promin rotation: unifactorial structure (RMSR=0.097; goodness-of fit index=0.93) **CFA:** n/a
Kao, Wang, Lu, Cheng, & Liu, 2012 (21-item; Taiwanese version) N=154 (affecrive and non-affective psychosis); N=99 (non-clinical)	**Temporal Stability:** .81 (total) to .87 (6 months) **Internal consistency:** alpha=.90 (schizophrenia); alpha=.94 (affective psychosis); alpha=.94 (non-clinical)	Statistically significant correlations (small to moderate) with BPRS	n/a	Endorsement higher in clinical group. PDI able to discriminate between clinical and non-clinical. Cut-off>5 provides the best combination of sensitivity (0.81), and specificity (0.61) (AUC = 0.752)	**EFA:** PCA with VR: 10 components (62.48% variance explained) **CFA:** n/a
Prochwicz & Gaweda, 2015 (21-item, Polish version) N=421 (non-clinical)	**Temporal Stability:** n/a **Internal consistency:** Total: alpha=.85; Guttman's split-half reliability=0.84; Subscales: alphas ranged from 0.85 to 0.87 and Guttman's split-half reliability from .83 to .85	n/a	n/a	n/a	**EFA:** Principal axis factor analysis with oblimin rotation: 14 components (58.68% variance explained) **CFA:** n/a

Conviction of Delusional Beliefs Scale	Combs, Adams, Michael, Penn, Basso & Gouvier, 2006 N=50; schizophrenia, schizoaffective disorder or delusional disorder	**Temporal Stability:** r=.81; p<.05 (1 week), r=.83; p<.05 (2 weeks), r=.77; p<.05 (4 weeks) and r=.70; p<.05 (6 weeks) **Internal consistency:** alpha=.80	Moderate to strong correlations with conviction items (BABS and CDS), % of conviction rating scale and BPRS thought disorder scale	Weak correlations with other dimensions of the BABS and BPRS anergia; negative correlations with BPRS affect and disorganization, insight scale and Zung depression scale	n/a	**EFA:** PCA: unidimensional structure **CFA:** n/a

Note: EFA=Exploratory Factor Analysis; CFA= Confirmatory factor analysis; PCA= Principal Components Analysis; VR=Varimax Rotation; n/a: not available; BABS= Brown Assessment of Beliefs Scale; BPRS= Brief Psychiatric Rating Scale; CDS=Characteristics of Delusions Scale; DSSI= Delusions Symptom-State Inventory; MgI= Magical Ideation Scale; O-LIFE= Oxford-Liverpool Inventory of Feelings and Experiences; PANAS=Positive and Negative Affect Schedule; SPQ=e Schizotypal Personality Questionnaire; STA= Schizotypal Personality Scale; STAI=State-Trait Anxiety Inventory; WDI= Wakefield Depression Inventory.* Psychometric data also available for the CDRS (German version) as an expert rating scale from Gentner et al. (2010).

In summary, all four instruments represent delusions as dimensional constructs, two scales focus on belief characteristics (CDRS and BRS), one scale assesses different types of delusions regarding its presence and associated characteristics (PDI) and one scale specifically focuses on different aspects of the 'conviction' characteristic (CDBS).

Other relevant instruments not included in the review

Several instruments were excluded from the review for different reasons. Considering that persecutory delusions are the most common type of delusions (APA, 2013) several instruments have specifically focused on paranoid and persecutory delusions. Although this specificity was not the aim of this review it is important to acknowledge the theoretical, clinical and psychometric relevance of some specific instruments. The majority of the available instruments focus on assessing the paranoid ideas' presence, frequency, conviction and associated distress. Nevertheless, there are also scales aimed at assessing the beliefs the participant has about their paranoid thoughts and also the cognitive, emotional, physical and behavioural coping responses elicited by them. Other measures were excluded from the review because they were developed to assess delusion-like experiences in the clinical population and therefore lack applicability in clinical settings. One scale, that aims to assess willingness to experience delusions and acceptance of the delusional experience, fulfilled all criteria but was excluded from the review due to its current unpublished status. These relevant scales are cited in Table 2 along with the reasons for exclusion.

Table 2
Relevant Excluded Instruments and Reasons for Exclusion

Instrument	Reference	Reason for exclusion
Paranoia Scale	Fenigstein, A. & Vanable. P.A. (1992). Paranoia and self-consciousness. *Journal of Personality and Social Psychology, 62*(1), 129-38. doi: 10.1037/0022-3514.62.1.129	
Referential Thinking Scale	Lenzenweger, M.F., Bennett, M.E., & Lilenfeld, L.R. (1997). The Referential Thinking Scale as a measure of schizotypy: Scale development and initial construct validation. *Psychological Assessment, 9*, 452–463. doi: 10.1037/1040-3590.9.4.452	
Paranoia Checklist	Freeman, D., Dunn, G., Garety, P.A., Bebbington, P., Slater, M., Kuipers, E., Fowler, D., Green, C., Jordan, J., Ray, K., 2005a. The psychology of persecutory ideation I: a questionnaire survey. *Journal of Nervous and Mental Disease, 193*, 302–308.	
The Beliefs about Paranoia Scale	Morrison, A.P., Gumley, A.I., Ashcroft, K., Manousos, I.R., White, R., Gillan, K., Wells, A., & Kingdon, D. (2011). Metacognition and persecutory delusions: tests of a metacognitive model in a clinical population and comparisons with non-patients. *British Journal of Clinical Psychology, 50*(3), 223-233. doi: 10.1348/014466510X511141	Specifically assess paranoid/ persecutory/referential thoughts
Persecutory Ideation Questionnaire	McKay, R., Langdon, R., & Coltheart, M. (2006). The Persecutory Ideation Questionnaire. *Journal of Nervous and Mental Disease, 194*, 628-631. doi: 10.1097/01.nmd.0000231441.48007.a5	
Green et al Paranoid Thoughts Scales	Green, C.E., Freeman, D., Kuipers, E., Bebbington, P., Fowler, D., Dunn, G., & Garety, P.A. (2008). Measuring ideas of persecution and social reference: the Green et al. Paranoid Thought Scales (GPTS). *Psychological Medicine, 38*(1), 101-11. doi: 10.1017/S0033291707001638	
Reactions to Paranoid Thoughts Scale	Lincoln, T.M., Reumann, R., & Moritz, S. (2010). Is there a functional way of responding to paranoid intrusions? Development of the Reactions to Paranoid Thoughts Scale. *Cognitive Neuropsychiatry, 15*(4), 377-96. doi: 10.1080/13546800903378211.	
Cardiff Beliefs Questionnaire	Pechey, R. & Halligan, P. (2011). The prevalence of delusion-like beliefs relative to sociocultural beliefs in the general population. *Psychopathology, 44*(2), 106-15. doi: 10.1159/000319788.	
Delusions-Symptoms-States Inventory	Bedford, A., & Deary, I. J. (1999). The Delusions-Symptoms-States Inventory (DSSI): Construction, applications and structural analyses. *Personality and Individual Differences, 26*(3), 397-424.	Includes other symptoms; not specific for delusions
Willingness and Acceptance of Delusions Scale	Martins, M.J., Carvalho, C., Castilho, P., Pereira, A.T., Vagos, P., Carvalho, D., Bajouco, M., Madeira, N., Nogueira, V., & Macedo, A. (2016). Assessing Psychological Flexibility in Psychosis: Development and initial validation of the Willingness and Acceptance of Delusions Scale. Manuscript submitted for publication.	Non-published. Submitted for publication. All other criteria are met and preliminary psychometric data is available from Martins et al (2015).

DISCUSSION

Self-report measures for delusions have been shown to be not only clinically useful but also reliable (Lincoln et al., 2010). The present study sought to identify and review clinically significant and psychometrically studied instruments for assessing delusional activity in clinical population. Four self-report measures met the inclusion criteria and were analysed. All four instruments considered the delusional activity as a multidimensional phenomenon and try to assess one (conviction in the CDBS) or more (the others) dimensions and characteristics of delusions. The perspective of considering delusions as a multidimensional construct has been advocated by several authors (e.g., Garety & Hemsley, 1997) and assessment of positive symptoms has gradually included different aspects and dimensions of delusional activity (Steel et al., 2007). The assessment of dimensions such as distress, conviction or influence on behaviour is particularly useful in evaluating efficacy of psychosocial interventions for psychosis, since one of the aims of these interventions is promoting well-being, minimal impact of symptoms and functioning additionally to symptom reduction and relapse prevention (Wykes et al., 2008).

Within the scales measuring more than one dimension of delusions (CDRS, BRS and PDI) the conviction people have regarding the delusion is always assessed and the CBDS assesses conviction thoroughly in its different components. The delusion conviction seems to be an important dimension to assess and has been an intervention target in psychological therapies for psychosis, with lower levels of conviction being found as a predictor of outcome (overall symptom reduction) for brief CBT in patients with delusions (Brabban, Tai, & Turkington, 2009). Studies delivering Acceptance and Commitment Therapy for psychosis have also found an important role of 'symptom believability' (conviction in psychotic symptoms such as delusions and hallucinations), namely as a mediator of the effect of the treatment condition on the reduction of rehospitalisation at the four month follow-up (Bach, Gaudiano, Hayes, & Herbert, 2013).

Other aspect the three multidimensional scales have in common is the inclusion of items assessing emotional and behavioural responses to the delusional activity, such as distress, preoccupation, worry, influence on behaviour and cognition, unhappiness; coping responses are also assessed although they seem not to be a major aim (CDRS: reassurance seeking). The coping skills for dealing with symptoms, specifically delusions, seem to be an area of important investment in terms of assessment measures. Psychosocial interventions for psychosis usually focus on coping strategies and this can be an important outcome in assessing efficacy of such interventions. There are clinician rated instruments for assessing coping strategies in regard to delusions, such as the Heidelberg Coping Scales for Delusions (Rückl

et al., 2012) that assesses the five-factor model of coping (resource-oriented, medical care, distraction, cognitive coping and depressive coping). Specific self-report measures for coping with delusions, such as the Reactions to Paranoid Thoughts Scale (specifically for paranoia), may be useful in clinical and research settings. To our knowledge, it seems that literature lacks a general delusion scale (without focusing on specific content) assessing coping with delusional thoughts.

The CDRS and BRS also assess characteristics inherent in delusions, such as characteristics concerning content (e.g., absurdity, use of imagination), belief formation process (e.g., speed of formation) and evidence-related content (e.g., truthfulness, acceptability to others, perceptual evidence). Only one instrument – PDI – offers the possibility to assess different delusion types (regarding delusion content) in a present/absence format prior to characteristics evaluation, which can have advantages in differentiating the characteristics of different delusions in different clinical presentations. In patients presenting more than one delusion this scale can be useful in the assessment of delusional content.

Psychometrically we can observe major dissimilarities; while for the majority of instruments only one psychometric study was found, for the PDI several studies in different populations (clinical and non-clinical) were available. The PDI is also the only instrument with psychometric data for a short version (21-item); nevertheless the other three instruments are very brief and practical and therefore a shorter version was unnecessary (nine to twelve items). Brief instruments have several advantages in research and clinical practice, particularly in people with psychotic disorders that may have cognitive deficits and/or attentional difficulties and for whom amotivation, avolition and other negative symptoms may be a problem.

Although there are several different studies analysing the PDI psychometric characteristics we can observe a great variety of results: exploratory factor analyses vary from ten to eleven components in the 40-item version; and for the 21-item version were found unifactorial solutions (two studies) and solutions with three, seven (two studies), ten and fourteen components. It is also important to highlight that the two studies that find a 7-component structure did not found the same item combination and did not standardize the naming of the variables. Additionally, the clinical populations were mostly used for reliability and criterion validity/diagnostic accuracy and no factor structure studies were performed for the responses of participants with psychosis alone (one study used a mixed sample). PDI reliability varied between .67 and .87 in terms of temporal stability and between .75 and .92 concerning internal consistency which indicate adequate properties. Significant associations were found with measures of schizotypy, aberrant beliefs, delusions, psychosis proneness, anxiety, negative affect, and psychiatric symptoms; and scores in clinical populations were found to be higher than in controls when compared.

No reliability assessment is presented for the CDRS, this being a major limitation of the study. Criterion validity was studied through cluster analysis but correlations with other measures of delusions are also absent. Authors report associations with self-reported depressive symptoms and clinical depression (clinician-rated). An exploratory factor analysis found four components. The study of the BRS is mostly a group comparison study differentiating delusions of patients with schizophrenia, overvalued beliefs (anorexia patients) and normal religious beliefs (controls). Adequate reliability is stated but no values are reported. No factorial structure study was performed. The CDBS study is robust: authors report temporal stability across four assessment times (ranging from .70 to .83 across a 6-week period) and good internal consistency. Convergent and discriminant validity are reported. Significant, moderate to strong, associations were found with other self-report items of delusion conviction and with a measure of thought disorder. Exploratory factor analysis suggested a unidimensional structure.

Although not approached in the present review, and similarly to other symptoms of psychosis, such as voices (Shawyer et al., 2012), recent research has been focusing in assessing not only frequency, impact or conviction of delusions but also contextual aspects such as acceptance-based variables. The Willingness and Acceptance for Delusions Scale (WADS) is a recovery-inspired and contextual CBT-based instrument for assessing the relationship people have with their delusional thoughts. More than assessing delusions' characteristics, the WADS focuses on participants' ability (or inability) to perceive delusions as thoughts (not necessarily linked to reality), to be aware of thoughts emerging without reaction or judgment and to attain goals and pursue valued life directions independent of delusions. Preliminary psychometric properties have shown the instrument's validity and reliability (Martins et al., 2015). Nevertheless, this is the only scale to our knowledge focusing on relationship with delusions, an important concept in recent developments in interventions for psychosis (e.g., Acceptance and Commitment Therapy, Compassion-focused Therapy, Mindfulness-based interventions).

Although the present review is a valid contribution to the literature, some limitations need to be taken into account. This is a narrative review that followed rigorous search and selection procedures. Nevertheless, systematic review methods were not used. Thus, there is a possibility that relevant instruments, published in less popular journals and databases, might not have been found. Also, meta-analytic procedures could be useful particularly in instruments with more than one psychometric study (PDI). Concerning the broader application in clinical practice and research settings the main aim of this study was to review instruments that assess delusions regardless of the specific-types. Future reviews focusing in specific types might be useful particularly considering the proliferation of instruments for paranoia and persecutory delusions.

CONCLUSION

The present study provides a narrative and critical review of self-report instruments to assess delusions. Instruments evaluating different aspects and characteristics of delusions were presented and gaps in the literature were found. Overall the identified instruments present adequate psychometric properties and seem useful in assessing delusions in clinical and non-clinical populations. Improvement in future studies can be achieved both in refining the psychometric studies of the existing instruments (mainly confirmatory factor studies but also more sophisticated reliability and diagnostic accuracy analyses) and in developing new instruments focused on coping and relationship people establish with their delusions.

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