

Scales to measure dimensions of hallucinations and delusions: the psychotic symptom rating scales (PSYRATS)

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ABSTRACT

Background. Scales to measure the severity of different dimensions of auditory hallucinations and delusions are few. Biochemical and psychological treatments target dimensions of symptoms and valid and reliable measures are necessary to measure these.

Method. The inter-rater reliability and validity of the Psychotic Symptom Rating Scales (PSYRATS: auditory hallucination subscale and delusions subscale), which measure several dimensions of auditory hallucinations and delusions were examined in this study.

Results. The two scales were found to have excellent inter-rater reliability. Their validity as compared with the KGV scale (Krawiecka *et al.* 1977) was explored.

Conclusions. It is concluded that the PSYRATS are useful assessment instruments and can complement existing measures.

INTRODUCTION

The development of assessment tools to measure the presence and severity of hallucinations and delusions has, until recently, been largely for diagnostic purposes, hence these symptoms have usually been classified in terms of their presence or absence, using instruments such as the Present State Examination (Wing *et al.* 1974). This type of assessment is driven by the degree of information that is necessary to prescribe treatment. For example, pharmacological treatment for psychosis is driven by the classificatory system, which groups psychotic symptoms into discrete syndromes or diagnoses such as schizophrenia. Treatment is then usually directed towards treatment of the syndrome using the appropriate anti-psychotic medication. As a

result, assessment has striven to guide diagnosis, so that, instruments have been developed that increase the reliability and validity of the diagnostic system, in order that treatment, and research relating to the diagnosis, could be more efficient. Other assessments have been developed that specifically assess symptom severity and can monitor broad treatment outcomes. These usually assess the severity of symptoms on a unidimensional scale, which encompasses a number of different dimensions of a target symptom. Examples of these are the Psychiatric Assessment scale (KGV; Krawiecka *et al.* 1977) and the Positive and Negative Syndrome Scale (PANSS; Kay *et al.* 1989). Little attention has been paid to the multi-dimensional nature of psychotic symptoms in relation to measuring outcome from treatment, although with the advent of cognitive-behavioural treatments for psychosis a greater emphasis has been placed on symptom dimensions both in terms of treatment targets and measures of outcome. As a result, although instruments such as the PSE have proved

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invaluable to improving reliability in diagnosis, and instruments such as the PANSS have proved essential to assess global outcome, they were not primarily designed to elicit information on, and measure the severity of, different dimensions of a particular symptom. As a result, these types of assessments are poorly equipped to monitor changes in the severity of symptoms over time and to collect information as to how symptom dimensions co-vary as a result of treatment. This limitation is not just important in relation to evaluating outcome from psychological treatments. A better understanding of how symptom dimensions change as a result of biochemical treatment would be invaluable for assessing outcome and for tailoring medication to the particular needs of individual patients.

There have been a number of investigators who have investigated the multiple dimensions of hallucinations and delusions, although these studies, which have generally utilized structured assessments and interviews, have mainly been used to explore the phenomenological nature of the psychotic symptoms rather than as outcome tools (e.g. Chadwick & Birchwood, 1994; Carter *et al.* 1995; Oulis *et al.* 1995; Miller, 1996; Nayani & David, 1996; Leudar *et al.* 1997). With regard to hallucinations, Miller (1996) developed a semi-structured interview that evaluated outcome from in-patient psychiatric treatment on 12 hallucinatory dimensions. The interview took 45–60 min to administer and covered psychotic symptom dimensions such as frequency, duration, behavioural concomitants, reality and predictability. Miller reported that good inter-rater reliability could be obtained when using the instrument although no other psychometric investigations were carried out. Similarly, Carter *et al.* (1995) developed a 365 item semi-structured interview (the Mental Health Research Institute Unusual Perceptions Schedule; MUPS), which was also designed to assess subjects' experience of auditory hallucinations. Good inter-rater reliability was demonstrated when used to assess 30 psychotic in-patients. Like Miller's (1996) interview, the items rated covered physical characteristics such as frequency, duration and form and also covered wider concerns relating to psychosis such as cognitive processes associated with the symptoms and psychosocial issues. The Beliefs

about Voices questionnaire developed by Chadwick & Birchwood (1995) also examines hallucinations in the context of wider concerns by assessing the beliefs that patients hold about them. Four dimensions of beliefs about voices are examined from a self-report questionnaire (benevolence, malevolence, engagement and resistance). The scale and its four subscales showed good re-test reliability and validity as assessed using confirmatory factor analysis and independent criteria.

Similar instruments have been developed to assess the characteristics of delusions (Kendler *et al.* 1983; Harrow *et al.* 1988; Buchanan *et al.* 1993). For example, the Maudsley Assessment of Delusions Schedule (MADS; Buchanan *et al.* 1993) is an observer rated research instrument which assesses eight dimensions of delusional experience (e.g. conviction, preoccupation, systematization, etc.) and has been shown to have good inter-rater reliability. Self-report scales have also been used to assess dimensions of delusional beliefs (Garety & Hemsley, 1987; Jones & Watson, 1997). Garety & Hemsley (1987) used a visual analogue scale method of assessing dimensions of delusions whereas Jones & Watson (1997) used a self-report questionnaire, which was designed to assess religious beliefs, paranoid beliefs, schizophrenic beliefs and anorexic beliefs. Subjects were asked to rate several beliefs on 12 characteristics (e.g. conviction, frequency, perceptual evidence). No psychometric investigations of its properties were made.

More idiosyncratic measures which have been used to measure dimensions of auditory hallucinations and delusions include the Personal Questionnaire Rapid Scaling Technique (Mulhall, 1976) and diaries, which are often used to report other cognitive phenomena, such as negative automatic thoughts (Hawton *et al.* 1989). Chadwick & Lowe (1994) reported the use of PQRST to assess three belief dimensions: conviction that the belief was true, preoccupation with belief and anxiety when preoccupied and found that the PQRST were sensitive to changes which occurred as a result of treatment. Haddock *et al.* (1996) used the PQRST to monitor changes in four dimensions of auditory hallucinations; amount of time spent hallucinating, distress, disruption and the amount

to which patients believed that their voices were thoughts. The technique was sensitive to changes in symptom dimensions over time.

Although these types of instruments are widely used in clinical practice with psychotic patients there has been little investigation of the reliability and validity of such scales and of the constructs which they are attempting to measure. This is also true with regard to many of the instruments used to assess phenomenology of symptoms described above. Nevertheless, a standardized approach to the assessment and monitoring of symptom dimensions is essential to yield precise information reflecting dimensional change coinciding with any type of treatment outcome. Adequate symptoms measures may also provide a means of examining the relative importance of dimensions of symptoms and the specificity of treatment components with particular dimensions. Thus, it follows that scales assessing dimensions of hallucinations and delusions are essential for exploring psychological processes that might underlie the expression of these symptoms. This paper evaluates two scales which have been developed to measure the severity of a number of different dimensions of auditory hallucinations and delusions (the PSYRATS).

The PSYRATS consist of two scales designed to rate auditory hallucinations and delusions respectively (see Appendix 1). The auditory hallucinations subscale (AH) is an 11 item scale. The development of the scale was based on the need for an adequate measure of dimensions of hallucinations which was both comprehensive and easy to administer. The item pool for the scale taps general symptom indices of frequency, duration, severity and intensity of distress and also symptom specific dimensions of controllability, loudness, location, negative content, degree of negative content, beliefs about origin of voices and disruption. A five-point ordinal scale is used to rate symptom scores (0–4). The items were chosen following a large number of interviews with hallucinating patients using semi-structured interviews which indicated that a number of dimensions appeared to be unrelated and from psychological intervention work with psychotic patients (see Haddock *et al.* 1998).

The delusions subscale (DS) is a six-item scale which assesses dimensions of delusions. The scale items were derived from the literature of

phenomenological studies with delusions and from psychological intervention work with psychotic patients (see Tarrier *et al.* 1998). The items are rated on a five-point ordinal scale (0–4). The items include preoccupation, distress, duration, conviction, intensity of distress and disruption.

Aims of the study

The aims of this study were: (1) to assess the inter-rater reliability of both scales; (2) to explore the validity of both scales with the KGV; and (3) to examine potential dimensional inter-relationships.

METHOD

Subjects

Seventy-one patients were recruited to the study, 48 males (68%), and 23 females (32%). All patients met DSM-III-R criteria for schizophrenia; schizophrenia; paranoid type and schizoaffective disorder (American Psychiatric Association, 1987). Fifty-two patients (73%) had a diagnosis of schizophrenia and 19 had a diagnosis of schizoaffective disorder (27%). Their mean age was 36·6 years (s.d. = 10·9) years and mean duration of illness was 157 months (s.d. = 114 months). Forty-two patients had both auditory hallucinations and delusions, 14 had hallucinations only and 15 had delusions only. All patients were receiving neuroleptic medication. All patients were fully informed about the nature of the study and reassured that taking part would not influence any treatment as usual.

Patients were recruited by two routes: (1) 30 patients were selected from the caseload of trainees on the Thorn Initiative training programme at the University of Manchester; (2) 41 patients were recruited via consultant psychiatrists, clinical psychologists and community psychiatric nurses in the Manchester area.

From this cohort of 71 patients, six were selected to be interviewed on video in order to assess the inter-rater reliability of both scales. All six were male, three of the six were inpatients and three were out-patients. All of these patients had experienced auditory hallucinations and/or delusions for at least 10 years. The

duration of interviews ranged from approximately 20 to 60 min.

Materials

Patients were assessed using the modified version of the KGV. The modified KGV is a 14-item scale which assesses affective, positive and negative symptoms (anxiety, depression, elevated mood, suicidality, hallucinations, delusions, psychomotor retardation, incoherence of speech, blunted affect, poverty of speech, abnormal movements and cooperation). Patients were also assessed using the PSYRATS (the AH or DS being administered where symptoms were present).

Procedure

The 71 patients were assessed using the KGV and PSYRATS scales by either the second author (J. McC.) (41 patients) or mental health nurses (30 patients) who were engaged in the Thorn Initiative training programme at the University of Manchester. The second author and the mental health nurses were experienced in working with patients who had a severe mental illness. They had all undergone skills based training in assessment using a modified version of the Psychiatric Assessment Scale (KGV; Krawiecka *et al.* 1977; modified by Lancashire, 1994). This training consisted of approximately 12 h structured teaching and comprised standardized rating of taped sessions and role play. The trainees had demonstrated good inter-rater reliability using the modified version of the KGV ($w = 0.813$; Lancashire *et al.* 1996). The trainees also received systematic training in the administration and scoring of the PSYRATS.

The inter-rater reliability of the PSYRATS was determined from the videotaped interviews of the six patients carried out by the second author. Six of these patients were experiencing auditory hallucinations and five reported delusions. Six mental health professionals who had a range of experience working with psychotic patients carried out ratings for the purposes of inter-rater reliability. This group comprised four clinical psychologists, one psychiatrist and a senior mental health researcher with a background in social work. Raters received written guidelines in the use of the PSYRATS (available from the first author, G.H.) and were trained to

elicit hallucinations and delusions using the KGV and to rate these using the PSYRATS. Each rater independently rated all six patients from the videotaped recordings. When a patient experienced more than one belief or voice, ratings were based on the patient's view of the overall severity of the specific symptoms.

Statistical analysis

Inter-rater reliability

Unbiased estimates of inter-reliability were obtained by the method of analysis of variance (Winer, 1971) using the rating of each video session by the six independent raters; this produces a statistic equivalent to the intra-class correlation coefficient (Bartko & Carpenter, 1976; Dunn, 1989). Differences between the raters were also examined using single factor repeated measures analysis of variance.

Validity

The relationships between the (ordered categorical) item scores within the rating scales were examined using the Spearman correlation coefficient; the same statistic was used to examine the relationships between scales both in terms of the individual scale items and the sub/total scores. The factor structure of the scales was evaluated by principal components (factor) analysis with a single varimax rotation; eigenvalues in excess of one were permitted in the construction of factors. As this was an exploratory analysis no specific predictions regarding the factors were made prior to the analysis being carried out.

RESULTS

Inter-rater-reliability

The reliability coefficients for the AH, based on six raters each rating the same six patient interviews, were uniformly very high (see Table 1). Acceptable reliability is a clinical as much as a statistical judgement (Bland & Altman, 1986; Dunn, 1989); coefficients in the range of 0.61 to 0.80 are accepted as indicating substantial agreement, while coefficients greater than 0.80 are considered to be (almost) perfect (Dunn, 1989). Nine of the 11 AH items produced unbiased estimates of reliability in excess of 0.90; the remaining two items returned coefficient estimates of 0.788 (disruption) and

Table 1. AHRS and DRS: intra-class correlations across six raters

Item	R6*	Differences between raters		
		(df)	F	P
Dimensions of AHRS				
Frequency	0.986	(5, 30)	1.60	0.196
Duration	0.982	(5, 30)	1.14	0.362
Location	0.949	(5, 30)	4.09	0.007
Loudness	1.000	(5, 30)	0.00	1.000
Beliefs re-origin	0.989	(5, 30)	1.60	0.196
Amount of negative content	0.974	(5, 30)	1.20	0.336
Degree of negative content	0.989	(5, 30)	1.42	0.248
Amount of distress	1.000	(5, 30)	0.00	1.000
Intensity of distress	0.995	(5, 30)	1.56	0.207
Disruption	0.788	(5, 30)	2.32	0.070
Control	0.795	(5, 30)	1.64	0.184
Dimensions of DRS				
Preoccupation	0.992	(4, 25)	0.84	0.841
Duration	0.994	(4, 25)	0.52	0.760
Conviction	1.000	(4, 25)	0.00	1.000
Amount of distress	0.999	(4, 25)	1.00	0.443
Intensity of distress	0.990	(4, 25)	0.76	0.587
Disruption	0.884	(4, 25)	4.53	0.012

* Unbiased estimate of reliability (intra-class correlation) across six raters.

0.795 (control), which are both within acceptable limits. No disagreements between raters exceeded one scale point on the control item. For the disruption item, complete agreement occurred for 26 out of the 36 score comparisons, but two occurrences were noted where two raters differed by ≥ 2 scale points; furthermore, the disagreements were not entirely at random, one rater tending to score lower than the others ($P = 0.070$). A similar consistent difference between raters was observed for the location item ($P = 0.007$).

The inter-rater reliability estimates for the DS were also very high, with coefficients in excess of 0.9 for five of the six items. The only exception was the disruption item, but its coefficient of reliability was still within the 'almost perfect' range (0.884); as with the equivalent item on the AH, one rater tended to score consistently differently from the others ($P = 0.012$).

Validity

The median scores (with their ranges) for the individual items on the PSYRATS and KGV are shown in Table 2. For the modified KGV scale, the following scores were also derived; total composite score (T-KGV), total hallucinations/delusions score (KGV-PS), total

affective symptoms score (KGV-A; which included anxiety, depression, suicidality and elevated mood), total negative symptoms (KGV-N) and total disorganization score (KGV-D; which included incoherence and irrelevance). Total composite scores were also computed for the individual PSYRATS (T-AH and T-DS).

Few relationships were found between the items in the modified KGV and those in the AH. Significant associations were found, however, between the AH control item and both T-KGV (Spearman $r = 0.403$, $P = 0.0003$) and the KGV-PS ($r = 0.397$, $P = 0.003$); T-AH was also significantly correlated with the KGV hallucinations items ($r = 0.325$, $P = 0.031$).

Similarly, few relationships were found between the items in the modified KGV and those in the DS. Significant associations were found between DS disruption and T-KGV ($r = 0.364$, $P = 0.002$), DS disruption and KGV-PS ($r = 0.400$, $P = 0.001$) and DS duration of preoccupation and KGV-A ($r = 0.339$, $P = 0.006$). In addition, the T-DS correlated significant with the KGV delusions item, T-KGV and KGV-PS ($r = 0.379$, $P = 0.004$; $r = 0.346$, $P = 0.009$; $r = 0.342$, $P = 0.009$).

Dimensional inter-relationships

Auditory hallucinations subscale

Inter-item relationships between the individual subscale items were estimated using the Spearman correlation coefficient. For the AH, five of the 121 correlations were significant at the 1% level; these were amount and degree of negative content ($r = 0.493$, $P < 0.001$), amount of distress and degree of negative content ($r = 0.533$, $P < 0.001$), amount of distress and amount of negative content ($r = 0.648$, $P < 0.001$), intensity and amount of distress ($r = 0.540$, $P < 0.001$), intensity of distress and amount of negative content ($r = 0.529$, $P < 0.001$). A Kruskal-Wallis test indicated that the median score for disruption item was significantly lower than that for the remaining items on this scale, between which there were no significant differences (K-W test; $\chi^2(1) = 60.828$, $P < 0.001$).

The factor structure of the AH was explored using a principal components (factor) analysis with a single varimax rotation. Three factors were identified as described in Table 3; the items tended to constitute an emotional characteristics factor (factor 1), a physical characteristics factor

Table 2. Item medians and ranges for the modified KGV, AS and DS

Item	Median	(Range)
KGV		
Anxiety, depression	2	(0-4)
Suicidality	1	(0-4)
Hallucinations, delusions	3	(0-4)
Flattened affect, abnormal movements	1	(0-3)
Incongruity, overactivity, psychomotor retardation, incoherence, poverty of speech, elevated mood	0	(0-3)
Cooperation	0	(0-2)
Overall total (T-KGV)	15	(5-31)
AS		
Frequency, duration, location, beliefs re-origin	3	(1-4)
Loudness	2	(1-4)
Negative content (amount and degree)	3	(0-4)
Distress		
Amount	3	(0-4)
Intensity	2	(0-4)
Disruption	2	(0-3)
Control	3	(0-4)
Overall total (T-AH)	28	(14-39)
DS		
Pre-occupation		
Amount	3	(1-4)
Duration	2	(1-4)
Conviction	3	(1-4)
Distress		
Amount	3	(0-4)
Intensity	2	(0-5)
Disruption	2	(0-4)
Overall total (T-DS)	15	(5-22)

Table 3. Factor loadings for PSYRATS(AH)

Item	Factor		
	1	2	3
Frequency	—	0.532	—
Duration	—	0.777	—
Location	—	0.476	0.477
Loudness	—	0.754	—
Beliefs re-origin	—	—	0.750
Negative content			
Amount	0.870	—	—
Degree	0.725	—	—
Distress			
Amount	0.885	—	—
Intensity	0.770	—	—
Disruption	—	—	0.529
Control	—	—	0.669
Eigenvalue	2.825	2.002	1.486
Cumulative percentage of variance	25.7	43.9	57.4

(factor 2) and a cognitive interpretation factor (factor 3). When the three factor scores were (Spearman) correlated with the modified KGV scale items, a significant correlation was found only between the cognitive interpretation factor and the KGV hallucinations score ($r = 0.396$, $P = 0.005$).

Delusions subscale

For the DS, three of the 16 Spearman correlations were significant at the 1% level. These were: amount of distress and pre-occupation ($r = 0.344$, $P = 0.009$), amount and intensity of distress ($r = 0.596$, $P < 0.001$), disruption and conviction ($r = 0.376$, $P = 0.004$). A Kruskal-Wallis test indicated that the median score for disruption item was significantly lower than that for the remaining items on this scale, between which there were no significant differences (K-W test; $\chi^2(5) = 51.742$, $P < 0.001$).

Factor analysis of the DS items using a principal components (factor) analysis with a single varimax rotation identified two factors as described in Table 4; the items tended to constitute an cognitive interpretation factor (factor 1) and an emotional characteristics factor (factor 2). When the two factor scores were (Spearman) correlated with the modified KGV scale items, a significant correlation was found only between the cognitive interpretation factor and the KGV delusions score ($r = 0.358$, $P = 0.005$).

Table 4. Factor loadings for PSYRATS(DS)

Item	Factor	
	1	2
Pre-occupation		
Amount	0.525	—
Duration	0.541	—
Conviction	0.798	—
Distress		
Amount	—	0.906
Intensity	—	0.847
Disruption	0.768	—
Eigenvalue	2.285	1.308
Cumulative percentage of variance	38.1	59.9

DISCUSSION

Inter-rater reliability

Good inter-rater reliability for the PSYRATS was established with six patients who presented with a range of interview demands and symptom characteristics, which are representative of this patient population. All AH items except two were found to have an unbiased estimate of reliability above 0.9 (disruption and control) and all DS items except disruption had estimates of reliability above 0.9 (disruption). This can be interpreted as almost perfect inter-rater agreement.

The reason for the slightly lower reliability on the disruption items may be related to the nature of the items. Unlike the other items, they do not reflect only the patients opinion on the extent of disruption. The rating is based on both the patients reply and the interviewer's judgement and knowledge of the patient's current functioning. It is possible that the ability of interviewers to get highly reliable ratings on disruption may be related to its two dimensional nature. It is possible that clearer guidelines may improve reliability for this item, or alternatively, that these items should be separated and rated independently. The slightly lower reliability coefficient for control on the AH may be due to the complexity of control as a construct. It may vary across a wide range of situations and hallucinatory experience. The conceptual basis to the control item is an important source of possible variability especially when the AH is administered to assess averaged dimensions over a number of voices. This can sometimes be problematical, for example, when a patient experiences 'good' and 'bad' voices, for which

having control may only be a priority regarding the latter category of voices. This is not an inherent criticism of the control item, as this variability is true for other dimensions measured by the scales. It is possible that the control item is for some reason more vulnerable in this respect than the other items. This difficulty can be circumvented in clinical practice by taking individual measures of each dimension relative to a particular voice. In fact, particularly in cognitive-behavioural work, additional detailed assessments of psychotic symptoms are likely to be employed in order to facilitate the therapeutic intervention. However, these assessments are likely to be in addition to instruments such as the PSYRATS.

In general, the estimates of inter-rater reliability for the PSYRATS are impressive, especially considering the relatively small number of interviews upon which the index is based. Further reliability assessment of the scales could be investigated using a test-retest methodology to investigate the stability of item dimensions over time. The reliability of the scales for other methods of administration should also be investigated. For example, when there are a number of voices or beliefs which could be rated individually by the scales or where only the most severe hallucinatory experience or delusional belief is rated.

Validity

The validity of the PSYRATS was explored by comparing ratings to the modified KGV ratings. The proposition that symptom dimensions provide a specific fine-grained analysis of a symptom was supported by the results. There were specific associations between some items on the PSYRATS and the modified KGV, the absence of an association between specific dimensions of the PSYRATS and the T-KGV and KGV-PS, augments the position that the dimensionality of symptoms provides additional information pertinent to a comprehensive assessment of auditory hallucinations and delusions.

As the assessment and validity of symptom dimension research is a relatively uncharted arena, an exploratory examination of item inter-relationships was considered valuable in this study despite statistical considerations which clearly point to the imprecision of the practice of using multiple comparisons which may greatly

reduce power estimates. The interpretation of statistical significance was considered not in terms of specific individual relationships but rather, over the context of enquiry. In addition, the use of non-parametric statistical methods increased the confidence in the observed trends as there are fewer assumptions being made of the data distribution and population characteristics.

Both subscales were found to yield inter-item relationships which specified small, robust associations and predictors over the dimensional construction of the patients symptoms. The AH items were shown to be independent of each other with few inter-item correlations. This reinforces the view that the items on the scale are relatively independent of each other, contributing a unique assessment of symptom characteristics. The exploratory nature of the statistical investigation also shows that some items might be considered as partially independent while others might be relatively dependent. The construction of the items goes some way to suggesting these relationships, as with the positive correlation between amount of negative content and degree of negative content, and the distress items. The analysis of the AH items also highlighted the specific associations between salient symptom dimensions and distress and negative content associated with voices. This approach also elucidated independent predictors for the location, loudness and duration of voices items. These relationships were further confirmed by the varimax factor solution, in which three factor groups for the AH were revealed. These appeared to represent: (1) distress-negative content items i.e. an emotional characteristics factor; (2) descriptions of voice (e.g. duration; location; loudness) i.e. a physical characteristics factor; and, (3) beliefs regarding the origin and attributions of control i.e. a cognitive interpretation factor. These factors are relatively weak, and the accounted variation is small although an interpretation of this factor solution could be that assessing individual dimensions as opposed to groups of dimensions yields a more robust picture of the variability in the symptom construct.

The DS items were found to be also relatively independent of each other. Correlations were found though, between the distress items and between distress and amount of preoccupation.

Interestingly, disruption and conviction were also significantly correlated. The DS produced two factors; (1) preoccupation, disruption and conviction i.e. a cognitive interpretation factor; and, (2) distress i.e. an emotional characteristics factor. The factor loadings on these items were moderate, with a moderate statistical account of the variance.

The tentative observation that it was the items involving cognitive interpretation which are most strongly associated with the rating given on the KGV items for hallucinations and delusions suggests that solely using KGV or similar ratings to assess outcome in treatment and research trials may not be providing a full picture of the severity of individuals' psychotic symptoms and suggests that using a combination of symptom outcome measures may provide a more accurate assessment. The factor solution is also interesting in terms of investigating response to treatment and in refining treatment strategies for symptoms. Strategies which focus on distress for example, may only target a specific aspect of hallucinations or delusions, independent of the other dimensions, and hence will not necessarily be picked up on traditional measures of symptom outcome such as the KGV. The interpretation of the emergent factor structures however needs to be replicated with a larger sample of patients. Also the validity and significance of the conjectured item groups requires empirical investigation.

The item characteristics which have been discussed, would be extremely beneficial in teasing out cognitive-behavioural symptom hypotheses (Van der Does *et al.* 1993). There are many questions awaiting consideration, such as whether control over hallucinations is a cause or consequence of coping style, or of voice characteristics (e.g. loudness, location, negative content) or the result of the wider social consequences of hearing voices (e.g. distress, disruption to life). In the same way, the relationship of delusion dimensions of preoccupation, distress and conviction to the expression, and maintenance of delusional beliefs in this clinical population is an interesting area requiring empirical investigation. The PSYRATS facilitate the testing of specific hypotheses such as whether conviction, preoccupation and distress reduce simultaneously in a favourable response to cognitive-behavioural approaches

to delusions; whether conviction alone is a key predictor of preoccupation; or whether distress is dependent upon either preoccupation and conviction (i.e. does distress reduce as an index of disconfirmation in behavioural experiments, via reductions in belief conviction?). In outcome studies, it may be useful to have a global dimensional symptom score plus a detailed measure of the specific target symptom in the way that the scales were used in this study. As already pointed out though, this may have some limitations in clinical practice when trying to put together a detailed picture of an individual's psychotic experiences. For this reason, further evaluation of the scales in terms of their use in rating individual hallucinations or individual beliefs when there are more than one of these reported is warranted. Nevertheless, the PSYRATS are likely to be of benefit to the clinician in the initial assessment and formulation of these symptoms and provide a reliable means of monitoring dimensional change over treatment (whether this is biochemical or psychological) and open a way forward to the possibility of bringing about significant clinical improvements in patients presenting for a variety of treatments.

APPENDIX 1 PSYCHOTIC SYMPTOM RATING SCALES

A Auditory hallucinations

1 Frequency

- 0 Voices not present or present less than once a week
- 1 Voices occur for at least once a week
- 2 Voices occur at least once a day
- 3 Voices occur at least once a hour
- 4 Voices occur continuously or almost continuously i.e. stop for only a few seconds or minutes

2 Duration

- 0 Voices not present
- 1 Voices last for a few seconds, fleeting voices
- 2 Voices last for several minutes
- 3 Voices last for at least one hour
- 4 Voices last for hours at a time

3 Location

- 0 No voices present
- 1 Voices sound like they are inside head only
- 2 Voices outside the head, but close to ears or head. Voices inside the head may also be present

- 3 Voices sound like they are inside or close to ears and outside head away from ears
- 4 Voices sound like they are from outside the head only

4 Loudness

- 0 Voices not present
- 1 Quieter than own voice, whispers.
- 2 About same loudness as own voice
- 3 Louder than own voice
- 4 Extremely loud, shouting

5 Beliefs re-origin of voices

- 0 Voices not present
- 1 Believes voices to be solely internally generated and related to self
- 2 Holds < 50% conviction that voices originate from external causes
- 3 Holds ≥ 50% conviction (but < 100%) that voices originate from external causes
- 4 Believes voices are solely due to external causes (100% conviction)

6 Amount of negative content of voices

- 0 No unpleasant content
- 1 Occasional unpleasant content (< 10%)
- 2 Minority of voice content is unpleasant or negative (< 50%)
- 3 Majority of voice content is unpleasant or negative (≥ 50%)
- 4 All of voice content is unpleasant or negative

7 Degree of negative content

- 0 Not unpleasant or negative
- 1 Some degree of negative content, but not personal comments relating to self or family e.g. swear words or comments not directed to self, e.g. 'the milkman's ugly'
- 2 Personal verbal abuse, comments on behaviour e.g. 'shouldn't do that or say that'
- 3 Personal verbal abuse relating to self-concept e.g. 'you're lazy, ugly, mad, perverted'
- 4 Personal threats to self e.g. threats to harm self or family, extreme instructions or commands to harm self or others

8 Amount of distress

- 0 Voices not distressing at all
- 1 Voices occasionally distressing, majority not distressing (< 10%)
- 2 Minority of voices distressing (< 50%)
- 3 Majority of voices distressing, minority not distressing (≥ 50%)
- 4 Voices always distressing

9 Intensity of distress

- 0 Voices not distressing at all
- 1 Voices slightly distressing
- 2 Voices are distressing to a moderate degree

- 3 Voices are very distressing, although subject could feel worse
- 4 Voices are extremely distressing, feel the worst he/she could possibly feel

10 Disruption to life caused by voices

- 0 No disruption to life, able to maintain social and family relationships (if present)
- 1 Voices causes minimal amount of disruption to life e.g. interferes with concentration although able to maintain daytime activity and social and family relationships and be able to maintain independent living without support
- 2 Voices cause moderate amount of disruption to life causing some disturbance to daytime activity and/or family or social activities. The patient is not in hospital although may live in supported accommodation or receive additional help with daily living skills
- 3 Voices cause severe disruption to life so that hospitalisation is usually necessary. The patient is able to maintain some daily activities, self-care and relationships while in hospital. The patient may also be in supported accommodation but experiencing severe disruption of life in terms of activities, daily living skills and/or relationships
- 4 Voices cause complete disruption of daily life requiring hospitalization. The patient is unable to maintain any daily activities and social relationships. Self-care is also severely disrupted.

11 Controllability of voices

- 0 Subject believes they can have control over the voices and can always bring on or dismiss them at will
- 1 Subject believes they can have some control over the voices on the majority of occasions
- 2 Subject believes they can have some control over their voices approximately half of the time
- 3 Subject believes they can have some control over their voices but only occasionally. The majority of the time the subject experiences voices which are uncontrollable
- 4 Subject has no control over when the voices occur and cannot dismiss or bring them on at all

B Delusions

1 Amount of preoccupation with delusions

- 0 No delusions, or delusions which the subject thinks about less than once a week
- 1 Subject thinks about beliefs at least once a week
- 2 Subject thinks about beliefs at least once a day
- 3 Subject thinks about beliefs at least once an hour
- 4 Subject thinks about delusions continuously or almost continuously

2 Duration of preoccupation with delusions

- 0 No delusions

- 1 Thoughts about beliefs last for a few seconds, fleeting thoughts
- 2 Thoughts about delusions last for several minutes
- 3 Thoughts about delusions last for at least 1 hour
- 4 Thoughts about delusions usually last for hours at a time

3 Conviction

- 0 No conviction at all
- 1 Very little conviction in reality of beliefs, < 10 %
- 2 Some doubts relating to conviction in beliefs, between 10–49 %
- 3 Conviction in belief is very strong, between 50–99 %
- 4 Conviction is 100 %

4 Amount of distress

- 0 Beliefs never cause distress
- 1 Beliefs cause distress on the minority of occasions
- 2 Beliefs cause distress on < 50 % of occasions
- 3 Beliefs cause distress on the majority of occasions when they occur between 50–99 % of time
- 4 Beliefs always cause distress when they occur

5 Intensity of distress

- 0 No distress
- 1 Beliefs cause slight distress
- 2 Beliefs cause moderate distress
- 3 Beliefs cause marked distress
- 4 Beliefs cause extreme distress, could not be worse

6 Disruption to life caused by beliefs

- 0 No disruption to life, able to maintain independent living with no problems in daily living skills. Able to maintain social and family relationships (if present)
- 1 Beliefs cause minimal amount of disruption to life, e.g. interferes with concentration although able to maintain daytime activity and social and family relationships and be able to maintain independent living without support
- 2 Beliefs cause moderate amount of disruption to life causing some disturbance to daytime activity and/or family or social activities. The patient is not in hospital although may live in supported accommodation or receive additional help with daily living skills
- 3 Beliefs cause severe disruption to life so that hospitalisation is usually necessary. The patient is able to maintain some daily activities, self-care and relationships while in hospital. The patient may also be in supported accommodation but experiencing severe disruption of life in terms of activities, daily living skills and/or relationships
- 4 Beliefs cause complete disruption of daily life requiring hospitalization. The patient is unable to maintain any daily activities and social relationships. Self-care is also severely disrupted

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