The VAGUS insight into psychosis scale – Self-report & clinician-rated versions

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Abstract

The aim of this study was to develop self-report and clinician-rated versions of an insight scale that would be easy to administer, sensitive to small changes, and inclusive of the core dimensions of clinical insight into psychosis. Ten-item self-report (VAGUS-SR) and five-item clinician-rated (VAGUS-CR) scales were designed to measure the dimensions of insight into psychosis and evaluated in 215 and 140 participants, respectively (www.vagusonline.com). Tests of reliability and validity were performed. Both the VAGUS-SR and VAGUS-CR showed good internal consistency and reliability. They demonstrated good convergent and discriminant validity. Both versions were strongly correlated with one another and with the Schedule for the Assessment of Insight and Birchwood Insight Scale. Exploratory factor analyses identified three possible latent components of insight. The VAGUS-CR and VAGUS-SR are valid, reliable and easy to administer. They are build on previous insight scales with separate clinician-rated and self-report versions. The VAGUS-SR exhibited a multidimensional factor structure. Using a 10-point Likert scale for each item, the VAGUS has the capacity to detect small, temporally sensitive changes in insight, which is essential for intervention studies with neurostimulation or rapidly acting medications.

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Keywords

Insight; Illness Awareness; Schizophrenia; Schizoaffective disorder; Symptom assessment

1. Introduction

Impaired insight into illness commonly occurs in psychosis, in particular schizophrenia spectrum disorders (Amador et al., 1993), where it is known to have a significant negative impact on medication adherence and treatment outcomes (Buckley et al., 2007).

Conceptually, insight into illness in psychotic disorders has generally consisted of three, and at times four dimensions, namely: (i) *Illness Awareness or Acceptance*, (ii) *Symptom Awareness and Accurate Symptom Attribution*, (iii) *Awareness of Need for Treatment*, and (iv) *Awareness of Negative Consequences of the Illness* (e.g. arrest, hospitalization, interpersonal or occupational dysfunction, etc.) (Amador and Gorman, 1998). Despite the face validity of these components, factor analyses of currently available measures have tended to produce single factor solutions (McEvoy et al., 1989; Birchwood et al., 1994; Sanz et al., 1998; Lincoln et al., 2007). Consistent with this, the single 'Lack of insight and judgment' item on the Positive and Negative Syndrome Scale is strongly correlated with other more elaborate measures of insight, suggesting that scales assessing the different dimensions of insight may tap a single latent construct (Sanz et al., 1998; Lincoln et al., 2007).

Insight into illness is described as having both 'trait' and 'state' like properties (Wiffen et al., 2010). Longitudinal studies indicate that insight tends to be stable or improve gradually during the maintenance phase of schizophrenia (Cuesta et al., 2000; Wiffen et al., 2010), while other research suggests that insight can fluctuate with relapses and the resolution of acute, primarily positive symptoms (Weiler et al., 2000; Mintz et al., 2003).

Novel, noninvasive neurostimulation techniques are available, including transcranial magnetic stimulation (TMS), transcranial direct current stimulation (tDCS), and caloric vestibular stimulation (CVS), to further explore the neurophysiological underpinnings of insight into psychosis through neuromodulation. When used in single sessions, however, these techniques appear to effect only small, transient changes (~15 to 60 min duration) in insight or related phenomena (Fierro et al., 2000; Oliveri et al., 2001; Giglia et al., 2011; Levine et al., 2012). There exist a number of valid, commonly used clinician-rated (McEvoy et al., 1989; David et al., 1992; Amador et al., 1993) and self-report (Marks et al., 2000; Birchwood et al., 1994) scales that assess the components of insight into psychosis. By the nature of their design (i.e. categorical response formats or restricted number of response alternatives), the instruments currently available are suboptimal assays of the subtle changes in insight over brief periods of time—a quality that is essential for intervention studies with neurostimulation or rapid acting medications. Moreover, as far as we are aware, none of these instruments have both clinician-rated and self-report versions.

The aim of this study was to develop an easy to interpret and administer insight scale with both self-report and clinician-rated versions with the capacity to detect small changes in

insight, and inclusive of the core dimensions of insight into psychosis. For both versions, we developed face valid items/subscales to assess the dimensions of insight and a composite score assessing overall level of insight, consistent with the single factor model of insight into illness and need for treatment. The development and assessment of the VAGUS, clinician-rated (VAGUS-CR) and self-report versions (VAGUS-SR) are described below (www.vagusonline.com).

2. Methods

2.1. Measure development and assessment

A 10-item self-report and a five-item clinician-rated version of the scale were developed (www.vagusonline.com). The multidimensional content domain of the VAGUS-SR and VAGUS-CR was guided by previously validated measures to ensure items assessing the core dimensions of insight into psychosis (McEvoy et al., 1989; David et al., 1992; Amador et al., 1993; Birchwood et al., 1994). For the VAGUS-CR, one item was created for each of the following dimensions: *General Illness Awareness*, *Awareness of Need for Treatment* and *Awareness of Negative Consequences* attributable to the psychotic disorder. Two items were created to form a subscale for the *Symptom Attribution* dimension, which separately assesses the accurate attribution of delusions and auditory hallucinations to the illness. For the VAGUS-SR, multiple items were created for the following dimensions: *General Illness Awareness*, *Symptom Attribution*, and *Awareness of Need for Treatment* in order to account for the 'positive' and 'negative' valences of each dimension to limit self-report response bias. For example, for the *General Illness Awareness* subscale, one item assesses the acceptance of mental illness, i.e. "I truly believe I have a mental illness/disorder," while the other assesses the denial of good mental health, i.e. "I have always been mentally healthy." Only one item was created to assess the *Awareness of Negative Consequences* attributable to the psychotic disorder. All items for both the VAGUS-CR and VAGUS-SR were created using a 10-point Likert scale. A 10-point range was chosen to facilitate the detection of subtle changes in insight. The full distribution of points for each item of the VAGUS-CR and VAGUS-SR were utilized by the sample of this study.

The VAGUS-SR and VAGUS-CR were evaluated in 215 and 140 participants, respectively, who were participants in four separate research studies from the Schizophrenia Program at the Centre for Addiction and Mental Health in Toronto, Canada. For three of the studies ($n=168$), diagnoses of a schizophrenia or schizoaffective disorder were confirmed with either the SCID (First et al., 2001) or MINI (Sheehan et al., 1998). For the remaining study, diagnoses were based on self-report ($n=68$). All participants of the last study had confirmed diagnoses of a schizophrenia spectrum disorder as community patients of the Schizophrenia Program at the Centre for Addiction and Mental Health.

Completion of either the VAGUS-SR or the VAGUS-CR requires approximately 5 min. Statistical analyses were performed using PASW 18 statistical software (Released 2009. PASW Statistics for Windows, Version 18.0. Chicago: SPSS Inc.).

2.2. Convergent and discriminant validity

Convergent validity was evaluated by performing correlations between both VAGUS versions and the Schedule for the Assessment of Insight (SAI) (David et al., 1992) and Birchwood Insight Scale (BIS) (Birchwood et al., 1994), validated clinician-rated and self-report measures of insight, respectively. Discriminant validity was assessed by performing correlations with the Brief Psychiatric rating Scale (BPRS) (Overall and Gorham, 1988), a general measure of psychopathology. As the assessment of the VAGUS involved pooling data from four different research groups, the entire sample was not available for the assessment of the convergent and discriminant validity (SAI, $n=111$; BIS, $n=132$; and BPRS, $n=81$).

2.3. Test–retest and inter-rater reliability

The VAGUS-CR includes instructions and a structured interview section that is intended to be user-friendly. Clinicians previously trained in administering psychiatric diagnostic assessments and symptom severity measures were given a brief tutorial on the administration of the VAGUS-CR.

One-month test–retest reliability for both the VAGUS-CR and the VAGUS-SR was assessed. Data for these purposes was taken from a non-intervention study in stable patients with schizophrenia or schizoaffective disorder to minimize any possible experimental factors that may influence participants' scale scores. Inter-rater reliability was obtained by comparing the independent assessments of 16 participants by two clinicians trained in using the VAGUS-CR. Clinician assessments were performed during the same study visit. Reliability analyses were conducted using two-way mixed intra-class correlation coefficients (ICC's) for consistency set at a 95% confidence interval (Fleiss, 1986).

2.4. Exploratory factor analyses

To evaluate factor structure, we conducted separate parallel analyses for the VAGUS-CR and VAGUS-SR to determine how many factors to extract (O'Connor, 2000). Parallel analysis involves comparing principal component analyses of eigenvalues from the actual data with eigenvalues generated from a random dataset. This empirical method performs random permutations of the existing dataset, which maintain the same distributional properties as the original. The eigenvalues from the actual data were compared with 95th percentile eigenvalues from 1000 random permutations of the original data. Eigenvalues from the actual data that are greater in size than the eigenvalues from the random data determined the number of components to retain (Horn, 1965; Quilty et al., 2013).

Principal component analyses were performed on the five-item VAGUS-SR and the 10-item VAGUS-CR. Tables present factor loadings sorted in descending order to aid interpretation.

3. Results

3.1. Clinical and demographic characteristics

The clinical and demographic characteristics of the 226 participants whose data contributed to the factor analyses, validity and reliability assessments are presented in Table 1. No

difference was found between the VAGUS-SR, VAGUS-CR, BIS and SAI mean scale scores from the four samples that contributed to the validation of the VAGUS.

3.2. Clinician-rated version: convergent and discriminant validity

Table 2 presents the correlations for the VAGUS-CR total scale and subscales with the SAI, BIS, and BPRS. The VAGUS-CR total scale score was significantly correlated with both the SAI (Fig. 1) and the BIS scores as were the corresponding subscales: *General Illness Awareness*, *Symptom Attribution*, and *Awareness of Need for Treatment*. The relationship between the VAGUS-CR and BIS symptom attribution subscales, however, did not reach statistical significance after Bonferroni correction for multiple testing ($r=0.35$, $p=0.008$).

The VAGUS-CR was correlated with the BPRS ($r=-0.35$, $p=0.002$), which was significantly different from its relationship with the SAI (Steiger's $z=5.42$, $p<0.001$), suggesting good discriminant validity for use in schizophrenia spectrum disorders. Only the VAGUS-CR *Symptom Attribution* subscale was significantly correlated with the BPRS after correction for multiple comparisons.

3.3. Clinician-rated version: reliability

The ICCs for inter-rater reliability were 0.990, 0.991, 0.987, 0.808 and 0.931 for the VAGUS-CR total scale, *General Illness Awareness*, *Symptom Attribution*, *Awareness of Need for Treatment*, and *Awareness of Negative Consequences* subscale scores, respectively ($p=0.001$).

The ICC for 1 month test–retest reliability ($n=61$) was 0.843, 0.928, 0.892, 0.582 and 0.669 for the VAGUS-CR total scale, *General Illness Awareness*, *Symptom Attribution*, *Awareness of Need for Treatment*, and *Awareness of Negative Consequences* subscale scores, respectively ($p=0.001$).

Cronbach's coefficient alpha for the VAGUS-CR was $\alpha=0.745$, which is considered satisfactory for research purposes (Cortina, 1993).

3.4. Clinician-rated version: exploratory factor analysis

For the VAGUS-CR, one component emerged with an eigenvalue greater in size than the random data eigenvalues generated by the parallel analysis. The first three eigenvalues from the actual data were 2.69, 1.05, and 0.79, while the first three 95th percentile eigenvalues from the random data were 1.42, 1.22, and 1.06.

The single factor solution for the VAGUS-CR explained 53.8% of the variance. The factor loadings for the *General Illness Awareness*, two *Symptom Attribution*, *Awareness of Need for Treatment* and *Awareness of Negative Consequences* items were 0.913, 0.898, 0.869, 0.474 and 0.264, respectively. The Kaiser–Meyer–Otkin measure of sampling adequacy was 0.720 for the scale and 0.6 for each item, indicating that the sample size was adequate (Tabachnick and Fidell, 2007).

3.5. Self-report version: reliability

The ICC for 1 month test–retest reliability ($n=69$) was 0.909, 0.854, 0.849, 0.888 and 0.704 for the VAGUS-SR total scale, *General Illness Awareness*, *Symptom Attribution*, *Awareness of Need for Treatment*, and *Awareness of Negative Consequences* subscale scores, respectively ($p < 0.001$).

Cronbach's coefficient alpha for VAGUS-SR was 0.773, which is considered satisfactory for research purposes (Cortina, 1993).

3.6. Self-report version: convergent and discriminant validity

Table 3 presents the correlations for the VAGUS-SR total scale and subscales with the SAI, BIS and BPRS. The VAGUS-SR total scale score was significantly correlated with both the SAI (Fig. 1) and the BIS as were the corresponding subscales: *General Illness Awareness*, *Symptom Attribution*, and *Awareness of Need for Treatment* subscales. The relationship between the VAGUS-SR and BIS symptom attribution subscales, however, did not reach statistical significance after correction for multiple testing ($r=0.24$, $p=0.006$).

As a whole, the BPRS was not correlated with the VAGUS-SR (Table 3), supporting the discriminant validity of the VAGUS-SR for use in schizophrenia spectrum disorders. Only the VAGUS-SR *Symptom Attribution* subscale was significantly correlated with the BPRS after correction for multiple comparisons.

3.7. Self-report Version: exploratory factor analysis

For the VAGUS-SR, three components emerged with an eigenvalue greater in size than the random data eigenvalues following the parallel analysis. The first four eigenvalues from the actual data were 3.56, 1.47, 1.29, and 0.94 while the first four 95th percentile eigenvalues from the random data were 1.54, 1.37, 1.25 and 1.16, suggesting the retention of three factors.

Table 4 reports the factor loadings and eigenvalues for the VAGUS-SR. The Kaiser–Meyer–Otkin measure of sampling adequacy was 0.709 for the total scale and >0.5 for each item, indicating that the sample size was adequate to reliably establish the presence of the three factors (Tabachnick and Fidell, 2007). Three factors explained 63.1% of the total variation (Table 4). Factor 1 consisted of eight of the 10 scale items: the three *Awareness of Need for Treatment* items, two *General Illness Awareness* items, two *Symptom Attribution* items, and *Awareness of Negative Consequences* item. Together they accounted for 35.6% of the variance. Factor 2 consisted of the *Awareness of Negative Consequences* item, the *Awareness of Need for Treatment* item – “*I should stop or avoid taking antipsychotic medication*”, and *Symptom Attribution* item “*Mental illness has caused me to hear voices...*” Together they explained 14.7% of the variance. All three items of Factor 2 were strongly cross-loaded with Factor 1. Lastly, the two *Symptom Attribution* items in which participants were asked to rate whether or not their hallucinations or delusions were “REAL” regardless of what others believed emerged as a separate factor (Factor 3) and explained 12.8% of the variance.

3.8. Subscale and factor convergence

Table 5 presents the inter-scale convergence for the VAGUS-CR and VAGUS-SR, subscales and factors. The VAGUS-CR and VAGUS-SR total scale and subscale scores were significantly correlated (Fig. 2) as were the corresponding subscales: *General Illness Awareness*, *Symptom Attribution*, *Awareness of Need for Treatment*, and *Awareness of Negative Consequences*.

4. Discussion

Here we presented the development and assessment of the VAGUS-CR and VAGUS-SR—novel, easy to use and administer measures of insight into illness in persons with schizophrenia spectrum disorders (www.vagusonline.com). Both scales are efficient, each taking approximately 5 min to administer/complete. The scale items utilize 10-point Likert scales, which afford the opportunity to capture subtle changes in degree of insight into illness, a quality ideal for intervention studies with neurostimulation or rapidly acting medications. The VAGUS-SR appears to build on previously developed insight scales in terms of its multidimensional factor structure.

Both self-report and clinician-rated versions demonstrated good validity and reliability. Moreover, the VAGUS-SR and VAGUS-CR had good inter-scale convergence ($r=0.70$).

The VAGUS-SR was correlated with the BIS ($r=0.61$), another self-report measure of insight, and also the SAI ($r=0.69$), a widely used, validated clinician-rated insight scale. The VAGUS-SR, in fact, may be a better alternative to the BIS as it showed greater convergent validity with the SAI than did the BIS (Steiger's $z=0.542$, $p<0.001$). The VAGUS-CR also demonstrated good convergent validity with both the SAI ($r=0.82$) and the BIS ($r=0.66$), which is consistent with that previously found among clinician-rated insight scales (Sanz et al., 1998).

Although there was good inter-scale convergence, there remains variance unaccounted for between the VAGUS scales ($r=0.51$), the VAGUS-SR and BIS ($r=0.63$), and the VAGUS-SR and SAI ($r=0.52$).

The factor analyses for the VAGUS-SR and VAGUS-CR produced different factor structures. The one-factor solution for the VAGUS-CR is consistent with the single factor solutions produced by factor analyses of previously developed insight scales (Sanz et al., 1998; Lincoln et al., 2007) and with the strong correlation found between single-item measures and other more elaborate insight scales (Sanz et al., 1998). The three-factor solution for the VAGUS-SR did not reflect the four subscales of this measure; however, the strong correlations between these factors suggested that they share common variance associated with overall level of insight. Eight of 10 items on the VAGUS-SR were loaded on Factor 1 of the VAGUS-SR, which was strongly associated with the *General Illness Awareness* and *Symptom Attribution* subscales. The interpretation of Factor 2 is compromised by low item primary loadings as well as significant item cross-loadings on Factor 1. In contrast, the two positively valenced *Symptom Attribution* items (i.e. presented as 'REAL') of the VAGUS-SR appeared to be good indicators of Factor 3, which captures

symptom 'mis'-attribution in a manner dissimilar to the other negatively/aversively valenced (i.e. attributed to mental illness) *Symptom Attribution* items. Factor 3 was highly correlated with the SAI symptom attribution subscale and was the factor/subscale most convergent with the BPRS (Table 3). In addition to representing a potential novel factor, *symptom 'mis'-attribution* appears to be the construct most correlated with symptom severity. Future replications of this work may confirm this latent structure; extensions using item response theory and other methodologies may further evaluate the distinctness of each construct and whether all scale items contribute sufficient information to warrant their continued inclusion in the scale.

Cognitive insight has become an increasingly important area of investigation. In contrast to clinical insight, which focuses on illness awareness and the need for treatment, cognitive insight refers to the mental processes involved in forming erroneous assumptions, including self-reflectiveness and cognitive flexibility (Beck et al., 2004). The VAGUS assessed clinical insight and was not designed to measure cognitive insight. For a review on cognitive insight see Riggs et al. (2012).

A limitation to this study is that not all participants received the measures utilized to determine the convergent and discriminant validity. This occurred as a result of merging data from four different research groups where not all scales were applied. That being said, for the most affected measure (i.e. BPRS) there was still a sample of 81 participants, which is generally sufficient for determining an instrument's discriminant validity.

A potential design limitation of both VAGUS versions in their current form is that the assessment of insight into symptomatology focuses on hallucinations and the most prominent delusions. To address this, both the VAGUS-CR and VAGUS-SR can be modified to create additional items for other positive, negative or cognitive symptoms experienced by the participant. Akin to the Scale to Assess Unawareness of Mental Disorder, the VAGUS-CR and VAGUS-SR can be revised to specifically focus on appropriate attribution to illness of either past or present symptoms (Amador et al., 1993).

In summary, the VAGUS is a novel, valid, reliable and easy to administer measure of insight into illness in schizophrenia spectrum disorders. It builds on previously validated insight scales by having available both clinician-rated (VAGUS-CR) and self-report versions (VAGUS-SR) and by the multidimensional factor structure of the VAGUS-SR. The VAGUS-SR also contains items with positive and negative valences for each dimension to limit self-report response bias. With a 10-point Likert scale for each item, the VAGUS has the capacity to detect small, temporally sensitive changes in insight scores, which is necessary for single session pharmacological or neurostimulation studies investigating the neural mechanisms of insight into psychosis. Whether or not these changes will translate into meaningful clinical effects is unknown; however, they may have predicative clinical utility and justify further clinical research with noninvasive neurostimulation or rapidly acting medications. Studies are underway to characterize the scales' sensitivity to subtle changes in insight over time.

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Fig. 1.
Convergence (r) for the VAGUS – self-report & VAGUS – clinician-rated versions with the Schedule for the Assessment of Insight (SAI).

Fig. 2.
Convergence (r) between the VAGUS – clinician-rated & VAGUS – self-report versions.

Table 1

Demographic and clinical characteristics.

	Total sample
<i>N</i>	226
Gender (%Female)	35.0%
	Mean (S.D.)
Age, % 60	47.7 (13.3), 15.9%
Education^a	3.7 (1.5)
Illness duration in years	23.2 (11.0)
Age of Illness onset	19.9 (10.9)
VAGUS-CR Avg total score (N=140)	7.2 (2.1)
VAGUS-CR Illness	7.5 (2.9)
VAGUS-CR Symptom	6.6 (3.2)
VAGUS-CR Treatment	8.0 (2.9)
VAGUS-CR Consequences	6.8 (2.8)
VAGUS-SR Avg total score (N=216)	7.0 (2.0)
VAGUS-SR Illness	7.1 (2.6)
VAGUS-SR Symptom	6.2 (2.5)
VAGUS-SR Treatment	7.6 (2.5)
VAGUS-CR Consequences	7.2 (3.4)
SAI (N=111)	11.0 (3.5)
BIS (N=132)	8.9 (2.4)
BPRS (N=81)	32.2 (9.6)

VAGUS-CR, clinician-rated version; -SR, self-report version; SAI, Schedule for the Assessment of Insight; BIS, Birchwood Insight Scale; and BPRS, Brief Psychiatric Rating Scale.

^a 1= 6 y, 2=7–12 y, 3=graduated secondary school, 4=some college or university, 5=completed 2 year college program, 6=completed undergraduate university degree, 7=some postgraduate training, 8=completed postgraduate degree.

Table 2

Correlations for the VAGUS – clinician-rated version and subscales with the SAI, BIS and BPRS.

Scale	SAI total score	SAI Illness Awareness	SAI Symptom Attribution	SAI Awareness of Need for Treatment	BIS total score	BIS Illness Awareness	BIS Symptom Attribution	BIS Awareness of Need for Treatment	BPRS
VAGUS-CR Average total score	0.824 *	0.772 *	0.734 *	0.476 *	0.661 *	0.512 *	0.365	0.611 *	-0.348
VAGUS-CR General Illness Awareness	0.841 *	0.855 *	0.716 *	0.415 *	0.530 *	0.450 *	0.227	0.522 *	-0.265
VAGUS-CR Symptom Attribution	0.882 *	0.784 *	0.874 *	0.394 *	0.576 *	0.401	0.350	0.556 *	-0.390 *
VAGUS-CR Awareness of Need for Treatment	0.368 *	0.335 *	0.198	0.485 *	0.450 *	0.356	0.152	0.535 *	-0.336
VAGUS-CR Awareness of Negative Consequences	0.201	0.189	0.267	0.011	0.422 *	0.330	0.350	0.227	0.117

VAGUS-CR, VAGUS – clinician-rated version; SAI, Schedule for the Assessment of Insight; BIS, Birchwood Insight Scale; and BPRS, Brief Psychiatric Rating Scale.

* $p < 0.001$, Bonferroni correction for multiple comparisons.

Table 3

Correlations for the VAGUS – self-report version, subscales and factors with the SAI, BIS and BPRS.

Scale	SAI total score	SAI Illness Awareness	SAI Symptom Attribution	SAI Awareness of Need for Treatment	BIS total score	BIS Illness Awareness	BIS Symptom Attribution	BIS Awareness of Need for Treatment	BPRS
VAGUS-SR average total score	0.694 *	0.655 *	0.617 *	0.364 *	0.607 *	0.403 *	0.411 *	0.512 *	-0.201
VAGUS-SR General Illness Awareness	0.530 *	0.541 *	0.392 *	0.324 *	0.552 *	0.420 *	0.313 *	0.476 *	-0.129
VAGUS-SR Symptom Attribution Subscale	0.580 *	0.516 *	0.580 *	0.219	0.344 *	0.268	0.239	0.230	-0.366 *
VAGUS-SR Awareness of Need for Treatment	0.608 *	0.551 *	0.476 *	0.454 *	0.486 *	0.231	0.324 *	0.534 *	-0.279
VAGUS-SR Awareness of Negative Consequences	0.331 *	0.321 *	0.358 *	0.101	0.359 *	0.236	0.295 *	0.240	0.118
VAGUS-SR Factor 1	0.731 *	0.719 *	0.619 *	0.396 *	0.589 *	0.370 *	0.391 *	0.545 *	-0.178
VAGUS-SR Factor 2	0.556 *	0.552 *	0.507 *	0.280	0.448 *	0.270	0.321 *	0.391 *	-0.007
VAGUS-SR Factor 3	0.478 *	0.382 *	0.534 *	0.150	0.102	0.167	0.064	-0.040	-0.392 *

VAGUS-SR, self-report version; SAI, Schedule for the Assessment of Insight; BIS, Birchwood Insight Scale; and BPRS, Brief Psychiatric Rating Scale.

* $p < 0.001$, Bonferroni correction for multiple comparisons.

Table 4Factor loadings for the VAGUS – Subject version^a.

Factors and eigen values			
Scale items	Factor 1 Illness Awareness, Symptom Attribution & Awareness of Need for Treatment	Factor 2 Awareness of Negative Consequences	Factor 3 Symptom misattribution
	3.562 (35.6%) ^b	1.47 (14.7%) ^b	1.28 (12.8%) ^b
I definitely NEED treatment with an antipsychotic medication	0.792		
My unusual or unique experiences are due to a mental illness	0.759		
Antipsychotic medications have lessened the intensity of my unusual or unique experiences.	0.705		
I truly believe I have a mental disorder/illness	0.659		
My mental illness has caused me to hear voices that other people cannot hear	0.630	0.457	
I should stop or avoid taking antipsychotic medication	-0.589	0.636	
My unusual or unique experiences have led to negative consequences in my life.	0.538	0.663	
I have always been mentally healthy	-0.465		
My unusual or unique experiences are REAL regardless of what others think about them.			0.826
The voices other people can't hear are REAL regardless of what they believe.			0.743

^aExtraction method: principal component analysis. KMO sampling adequacy=0.709. Loadings 0.32 are not presented to facilitate review.^bEigenvalue (percent of variance).

Table 5

Correlations between VAGUS – clinician-rated & self-report versions.

Scale	VAGUS-SR Average Total Score	VAGUS-SR Illness Awareness	VAGUS-SR Symptom Attribution	VAGUS-SR Awareness of Need for Treatment	VAGUS-SR Awareness of Negative Consequences	VAGUS-SR Factor 1	VAGUS-SR Factor 2	VAGUS-SR Factor 3
VAGUS-CR Average Total Score	0.695 *	0.566*	0.513*	0.615*	0.377*	0.708*	0.554*	0.412*
VAGUS-CR General Illness Awareness	0.647*	0.548 *	0.516*	0.583*	0.284*	0.683*	0.515*	0.384*
VAGUS-CR Symptom Attribution	0.613*	0.495*	0.552 *	0.517*	0.268	0.628*	0.466*	0.474*
VAGUS-CR Awareness of Need for Treatment	0.297*	0.301*	0.146	0.415 *	0.047	0.338*	0.167	0.089
VAGUS-CR Awareness of Negative Consequences	0.400*	0.237	0.262	0.206	0.459 *	0.366*	0.408*	0.230

VAGUS-CR, clinician-rated version; -SR, self-report version; SAI, Schedule for the Assessment of Insight; BIS, Birchwood Insight Scale; and BPRS, Brief Psychiatric Rating Scale.

* $p < 0.001$, Bonferroni correction for multiple comparisons.