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Structure of positive psychotic symptoms in individuals at clinical high risk for psychosis

Matilda Azis[1,2,3,4,5] | Pamela Rakhshan Rouhakhtar[6] | Jason E. Schiffman[6] | Lauren M. Ellman[7] | Gregory P. Strauss[8] | Vijay A. Mittal[1]

[1]Department of Psychology, Northwestern University, Illinois

[2]Department of Psychiatry, Northwestern University, Illinois

[3]Department of Medical Social Sciences, Northwestern University, Illinois

[4]Institute for Policy Research, Northwestern University, Illinois

[5]Institute for Innovations in Developmental Sciences, Northwestern University, Illinois

[6]Department of Psychology, University of Maryland, Baltimore County, Maryland

[7]Department of Psychology, Temple University, Philadelphia, Pennsylvania

[8]Department of Psychology, University of Georgia, Athens, Georgia

Correspondence
Matilda Azis, Department of Psychology, Northwestern University, Swift Hall 102, 2029 Sheridan Road, Evanston, IL, 60208.
Email: matilda.azis@gmail.com;

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Abstract

Aim: Positive symptoms are a critical dimension of psychopathology in psychotic disorders and are used as a criterion for diagnosis across the psychosis continuum. Although initially considered as one dimension, there is evidence for multidimensionality within positive symptoms. The positive symptom structure has not been examined in individuals at clinical high risk (CHR) for psychosis. Knowledge of the dimensional structure of positive symptoms within CHR may contribute to our understanding of the aetiology and trajectory of this key facet of psychosis.

Method: Exploratory factor analysis (EFA) was conducted on the Prodromal Questionnaire-Brief for 183 individuals meeting CHR criteria. Internal consistency was examined to determine the hierarchical structure of the data and alternative models were compared.

Results: EFA revealed a three factor model, grouping in to: perceptual abnormalities, grandiose/unusual delusions and persecutory/thought delusions, with a general factor accounting for 56% of the variance. Confirmatory factor analysis showed that a hierarchical model was the best fit. One item referring to nihilistic thoughts did not load on any factor.

Conclusion: There is a clear three-dimensional model, distinguishing perceptual abnormalities, and two subgroups of delusions in CHR individuals. The factors are similar to those found in psychotic disorders. The identification and comparison of symptomatic models is useful given the prominent role positive symptoms play in diagnosis, and is crucial to our understanding of the clinical progression of psychosis. This work may provide a useful tool for future studies examining correlations with varying symptom factors and disease progression in CHR.

KEYWORDS

clinical high risk for psychosis, factor analysis, positive symptoms, psychosis, schizophrenia

1 | INTRODUCTION

The clinical presentation in psychotic disorders is characterized by a broad range of symptoms and impairments, within which are well established underlying dimensions of psychopathology. Positive symptoms are arguably the most critical dimension, as they are used as a primary criterion for diagnosis in psychotic disorders such as schizophrenia, and the sole criterion in individuals at clinical high risk (CHR) for psychosis.

The wide and heterogeneous range of symptoms present in psychosis means that careful consideration must be given to how we understand and categorize their presentation. After initial findings

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differentiating positive symptoms from negative and disorganized symptoms (Liddle, 1987), there have been several studies examining positive symptoms in more detail to identify and differentiate potential subgroups. Indeed, consistent evidence has been found for distinct sub-domains differentiating perceptual abnormalities, delusions and disorganized symptoms (Andreasen, Arndt, Alliger, Miller, & Flaum, 1995; Andreasen, Flaum, Swayze, Tyrrell, & Arndt, 1990; Lindenmayer, Bernstein-Hyman, Grochowski, & Bark, 1995; Peralta & Cuesta, 1998). Furthering this distinction, there have also been consistent findings of different neural mechanisms underlying hallucinations involving different sensory modalities (Zmigrod, Garrison, Carr, & Simons, 2016). Examination of symptom structure using measures that include multiple constructs may cause positive symptom items to artificially conflate and appear more unified than they are.

Positive symptoms were initially considered to be idiosyncratic to populations meeting threshold for psychotic disorder; however, the more recent shift towards early intervention and dimensional conceptualizations of psychopathology has led to in depth investigation of their clinical presentation in prodromal or high-risk phases that can precede the onset of psychotic disorder (Cannon et al., 2008; Fusar-Poli, Byrne, Badger, Valmaggia, & McGuire, 2013; Nelson et al., 2013). The CHR state is a period characterized by the presence of positive symptoms, but at a frequency or severity which is below that which is required for a diagnosis of psychotic disorder. It is therefore crucial to examine the phenomenology of such symptoms in this premorbid or high-risk stage that may precede illness onset. Examination of positive symptoms in CHR will help us to determine the presentation and structure of psychotic symptoms and how their presentation differs in the heterogeneous risk phase from the structure present in psychotic disorders. This may allow for improved accuracy of early identification, and inform treatment options according to clinical presentation and risk within CHR, as well as informing the understanding of the aetiology of symptoms of psychotic disorders.

In a previous examination in psychotic disorders, Peralta and Cuesta (1998) found three positive symptom dimensions in the scale for assessment of positive symptoms (SAPS, Andreasen, 1984): hallucinations, Schneiderian delusions (eg, thought withdrawal, thought broadcast and thought control), non-Schneiderian delusions (eg, grandiose delusions, religious delusions and persecutory delusions); and two disorganized symptom dimensions: bizarre behaviour and thought disorder. Whereas previous investigation has distinguished distinct domains within positive symptoms of schizophrenia, there has been no investigation of positive symptoms in CHR, and it is not clear whether similar findings would emerge in CHR individuals whose symptoms are attenuated and may be phenomenologically different than schizophrenia.

Detailed positive symptom measures such as the Prodromal Questionnaire-Brief (PQ-B, Loewy, Bearden, Johnson, Raine, & Cannon, 2005) that focus predominantly on positive symptoms to determine psychosis risk, may provide the depth necessary to investigate the underlying structure of positive symptoms in CHR. The Prodromal Questionnaire (PQ) is used to reliably and accurately identify psychosis risk on the basis of positive symptoms in the general population and help-seeking clinical populations early in the psychosis continuum. Previous psychometric evaluation of the scale in a community sample has found one, two and three factor models all showing adequate fit; however, none of the factor solutions revealed a clear psychological interpretation (Cooper, Klugman, Heimberg, Anglin, & Ellman, 2016; Fonseca-Pedrero, Gooding, Ortuño-Sierra, & Paino, 2016). Previous psychometric evaluation of the longer 92 item PQ found four factors pertaining to conceptual disorganization and suspiciousness, perceptual abnormalities, bizarre experiences and magical ideation in a sample of help-seeking adolescents (Brandizzi et al., 2014). However, all studies noted above used non-clinical populations and thus, the exploration of factors within positive symptoms among those at CHR could shed light on attenuated psychotic experiences in this important population, possibly providing insight into differences between CHR and those with psychotic like experiences in the general population.

Likewise, it is important to determine whether the differentiation of sub-domains of positive symptoms that has been shown to be present in psychotic disorders, is also present in earlier in symptomatic development and how, if at all, it differs during the progression of clinical severity. Despite previous study of the factor structure across the full range of symptoms measured in the structured interview for psychosis risk syndromes (SIPS) (Comparelli et al., 2011; Hawkins et al., 2004; Klaassen et al., 2011; Tso et al., 2017), in which all four studies distinguished a positive symptom dimension from a disorganized dimension, there has been no previous exploration of the positive symptom structure in CHR. A specific exploration of these symptoms without the risk of artificial aggregation present when including other symptom domains is essential in a population that provides the opportunity to gain insight into the clinical trajectory of positive symptoms. To show consistent evidence of positive symptom dimensions across these two stages would strengthen the conceptual continuity between CHR and diagnosable psychosis. In contrast, differences in symptom dimensions between the two disease stages could inform the understanding of the clinical trajectories more broadly, and may highlight the need for stratified risk criteria within CHR. The examination of the factor structure using the range of symptoms measured in the PQ-B would be an important first step towards these goals.

The current study will examine the structure of positive symptoms in CHR. Previous investigations of positive symptoms alone have not revealed any satisfactory factor structure, but it is hypothesized that a similar three factor structure to that found in psychosis—incorporating hallucinations, and two distinct subgroups of delusions, may be present in CHR. Exploratory hierarchical factor analysis will be used to determine the structure, and a subsequent confirmatory factor analysis (CFA) will be used to establish the extent to which a hierarchical model fits the data, when compared to simple group factor or general factor models. The determination of this structure may help to inform our understanding of the clinical trajectories of positive symptoms and their component sub-domains.

2 | METHOD

2.1 | Sample

The total sample included 183 participants meeting SIPS criteria for CHR. One hundred and twelve participants were recruited through adolescent development and preventative treatment (ADAPT) programme (University of Colorado Boulder & Northwestern University; PI: Mittal), 53 through University of Baltimore, Maryland County (PI: Schiffman) and 18 via Temple University (PI: Ellman). Exclusion criteria included: presence of psychotic or neurological disorder, history of head injury and previous exposure to antipsychotic medication. Participants were recruited through the university's online subject pool at all three sites, as well as community flyers and online adverts at UMBC and ADAPT. Interviews were conducted by trained clinicians at each site, required to meet gold standard inter-rater reliability.

2.2 | Measures

2.2.1 | The Prodromal Questionnaire-Brief

The PQ-B (Loewy, Pearson, Vinogradov, Bearden, & Cannon, 2011) is a 21 item self-report questionnaire, abbreviated from the original 92-item PQ (Loewy et al., 2005). It consists of 19 positive symptom items, to assess perceptual abnormalities, suspiciousness and grandiosity, and two items assessing disorganized communication. As the data used for this analysis was collated from three sites, one of which used the full PQ, and two of which used the PQ-B (PQ-B conducted at NU and UMBC, n = 165; Full PQ conducted at Temple n = 18), the 19 positive symptoms items common to both will be used for analysis. Presence of each symptom is endorsed as Yes/No, and then distress if the item is endorsed, is rated on a 5-item Likert scale (*strongly disagree*, *disagree*, *neutral*, *agree*, *strongly agree*). The presence of each symptom was used for analysis in this study.

2.2.2 | Structured interview for psychosis risk syndromes

The SIPS was conducted on all participants to determine CHR status. Participants met criteria for CHR through inclusion in one or more of the following categories: presence of attenuated positive symptoms (APS); decline in global functioning accompanying the presence of schizotypal personality disorder (SDP) and age <19; a family history of schizophrenia with decline in functioning. A score between 3 (moderate) and 5 (severe but not psychotic) on one of the five positive items is needed to meet APS criteria. SIPS (Miller et al., 1999) interviews were conducted in person by assessors trained to reliability standards using gold standard interviews. Inter-rater reliabilities of all raters exceeded Kappa ≥80 at each site (Miller et al., 2003).

2.3 | Statistical analysis

As positive symptom factor structure has not been established in the CHR population, hierarchical exploratory factor analysis (EFA) on the presence of each item was chosen (method: minimum residual, rotation: direct oblimin). Distress scores were not used. Hierarchical EFA was chosen to consider the general factor affecting each item while group factors account for the residual variance. The hierarchical analysis produces three alternative models: (1) a general factor only model (including all items); (2) a group factor only model (using the factors found through EFA, constrained to be orthogonal) and (3) a hierarchical model ((including both the general factor and the group factors). Traditional use of alpha as a measure of internal consistency has been questioned due to its reliance on often unmet assumptions (such as the tau-equivalent model, assuming that the true score variance is constant across all items) which leads to inflated estimations of internal consistency (Dunn, Baguley, & Brunsden, 2014). Thus omega was used as a measure of internal consistency and omega hierarchical was used to determine general factor saturation, please see Zinbarg, Revelle, Yovel, and Li (2005). The Psych package (Revelle, 2017) in the R Statistical System version 3.5.1 (Team, 2013) was used for analysis. To differentiate the three models produced by the hierarchical analysis, a subsequent CFA using the Lavaan package (Rosseel, 2012) was conducted to examine the fit of the generated models using confirmatory fit index (CFI), standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA) as absolute fit indices and Akaike information criterion (AIC) and Bayesian information criterion (BIC) as comparative fit indices (Hu & Bentler, 1999).

CFA is being conducted to differentiate the comparative fit of the three variations of the model generated using the EFA, not as a test of absolute goodness of fit, therefore it is valid to use this as a post hoc test on the original data set. It is not capitalizing on the sampling error which would be the case when the CFA is being used as a test of absolute goodness of fit, thereby making it invalid to perform both the EFA and the CFA on the same data set. In this case, there is no reason why the EFA would have led to greater positive bias in the hierarchical model than in the group factor model. However, EFA may have led to greater positive bias in the hierarchical model than in the general factor model as we used the EFA to determine how many group factors to include in the hierarchical model, so the result of the chi-square difference test comparing those two models is capitalizing on sampling error to some degree, and in order to correct for this, we adopted a more stringent alpha level (.001) for their comparison.

3 | RESULTS

3.1 | Sample characteristics

Levine's test of homogeneity of variance showed no significant difference in PQ-B scores across sites, so the samples from the three sites were combined. The combined sample consisted of 183 participants, 46% male with a mean age was 18. Demographic information is

shown in Table 1. All participants completed the full SIPS and PQ/PQ-B.

3.2 | Exploratory factor analysis

Bartlett's test of sphericity was significant, χ^2 (171) = 894.22, $P < .001$, and the Kaiser-Meyer-Olkin measure of sampling adequacy showed that the relationship between variables was high (KMO = 0.86) and therefor suitable for factor analysis. Hierarchical EFA on the 19 positive symptom items of the PQ items suggested a hierarchical model, with three group factors reflecting: perceptual abnormalities, grandiose/unusual delusions and persecutory/thought delusions, and a general factor incorporating all *items* except one ("I have felt that I didn't exist, the world didn't exist, or that I was dead"). *The* alpha (α) of .87, omega total (ω_t) of 0.89, and omega hierarchical (ω_h—a measure of the variance accounted for by a general factor) of 0.56 indicated that a hierarchical model would fit the data (Dunn et al., 2014; Revelle & Zinbarg, 2008). *An* oblique rotation followed by a Schmid-Leiman transformation was used to find general factor loadings. The omega hierarchical asymptotic (ω_h of an infinite *length test with a structure similar to the observed test*) was 0.63. Factor loadings above 0.2 are shown in Table 2. No difference in factor structure was found when the 18 participants who completed the full PQ were excluded, so they were included in the full sample for additional power.

3.3 | Confirmatory factor analysis

The general factor model was a poor fit according to all indices; the group factor model did not meet the CFI (<0.95) or RMSEA (>0.06) cut-off, but did meet cut off for SRMR (>0.08) (Hu & Bentler, 1999). The hierarchical model showed the best fit, meeting the CFI, RMSEA and SRMR cut-off. While AIC and BIC also demonstrated a preference for the hierarchical model, the hierarchical model was a significantly better fit than the general factor model, $\chi^2(189) = 111.49$, $P < .001$, and the group factor model, $\chi^2(167) = 79.61$, $P < .001$. Comparative fit indices are shown in Table 3. A chi-square difference test showed that the hierarchical model was the best fit.

4 | DISCUSSION

The aim of this study was to identify the structure of positive symptoms in CHR. A three factor structure emerged, differentiating perceptual abnormalities, grandiose/unusual delusions and persecutory/thought delusions. A hierarchical model fit the data best with evidence for a general positive symptom factor as well as the group factors. This finding clearly differentiates within positive symptoms, and gives validity to more detailed assessment of these symptoms in order to capture the diversity within the category. It also elucidates important information on the continuity of these factors between help-seeking, CHR and psychosis populations.

TABLE 1 Demographic and clinical characteristics

Sample size	183
Mean age (SD)	18.2 (2.8)
Gender	46% male (n = 84)
Ethnicity	51% White/Caucasian (n = 94) 31% Black (n = 57) 10% other (n = 18) 8% Asian (n = 14)
Inclusion group	92% APS 17% GRD
Mean total SIPS score (SD)	35.5 (13.3)
Mean SIPS positive score (SD)	12.2 (4.3)
Mean PQ-B total score (SD)	10.4 (5.4)
Mean PQ-B distress score (SD)	5.6 (4.4)

Abbreviations: APS, attenuated positive symptoms; GRD, genetic risk and deterioration syndrome; PQ-B, Prodromal Questionnaire-Brief; SIPS, structured interview for psychosis risk syndromes.

There was a very clear differentiated hallucination factor, accounting for perceptual abnormalities across all sensory domains. There was also clear evidence for a divergence of two subtypes of delusions, a factor incorporating delusions around thought ("not in control of my own ideas or thoughts," "worried something might be wrong with my mind") and persecutory delusions ("I have thought that other people had it in for me," "Previously familiar surroundings have seemed strange, confusing, threatening or unreal"); and a factor incorporating unusual and grandiose delusions ("I have had experiences with telepathy, psychic forces, or fortune-telling," "I have thought that I am very important or have abilities that are out of the ordinary," "I have thought about beliefs that other people would find unusual or bizarre").

Additionally, evidence for a general positive symptom factor incorporating all but one of the PQ-B items was found. This points to the validity of assessing these items together in a positive symptom scale, however, since the hierarchical model is the best fit for the data, the differentiation of the group factors also elucidates key information that is not evident if we consider the symptoms as one category. Interestingly, the item referring to nihilism ("I have felt that I didn't exist, the world didn't exist, or that I was dead") did not load on any of the three factors, or the general factor, indicating that this symptom may not be clinically related to the others assessed in this scale, however this may also be due to the low level of endorsement (11% of the total sample).

Although the limitations of the self-report PQ-B must be taken in to account, this structure differentiating perceptual abnormalities and two sub-domains of delusions, is similar to that found in psychosis populations (Peralta & Cuesta, 1998), and this consistency across the two stages of illness is a key finding, highlighting the potential continuity of the presentation of positive symptoms from the risk to acute to chronic phases of psychosis. The heterogeneity of clinical presentation and outcome in CHR has led to many questions as to the correct application of findings from this clinical population, and the validity of

TABLE 2 Factor loadings above 0.2 of 19 PQ items

PQ item	Description	General factor	Factor 1	Factor 2	Factor 3
2	I have heard unusual sounds such as banging, clicking, hissing, clapping or ringing in my ears	0.35	0.64		
19	I have seen unusual things such as flashes, flames, blinding light or geometric figures	0.31	0.57		
20	I have seen things that other people apparently could not see	0.35	0.57		
9	I have noticed strange feelings on or just beneath my skin, like bugs crawling	0.38	0.43		
10	I have felt suddenly distracted by distant sounds that I am not normally aware of	0.41	0.39		
3	Things have appeared different from the way they usually do (brighter or duller, larger or smaller or changed in some other way)	0.41	0.36		
11	I have had the sense that some person or force was around me, even though I could not see anyone	0.54	0.33	0.22	
17	My thoughts have been so strong that I could almost hear them	0.39	0.28		
7	I have thought that I am very important or have abilities that are out of the ordinary	0.43		0.65	
4	I have had experiences with telepathy, psychic forces or fortune-telling	0.37		0.46	
16	I have felt that parts of my body had changed in some way, or that parts of my body were working differently than before	0.33	0.23	0.45	
15	I have thought about beliefs that other people would find unusual or bizarre	0.42		0.32	0.28
18	I have thought that other people had it in for me	0.42			0.42
1	Previously familiar surroundings have seemed strange, confusing, threatening or unreal	0.41			0.39
12	I have been worried that something may be wrong with my mind	0.47			0.39
14	I have been confused whether something I experienced was real or imaginary	0.49	0.25		0.35
8	I have felt that other people were watching me or talking about me	0.47			0.33
5	I have felt that I was not in control of my own ideas or thoughts	0.40			0.27
13	I have felt that I did not exist, the world did not exist or that I was dead				
	Eigen values	3.2	1.9	1.1	1.0
	Omega total	0.89	0.80	0.71	0.75

Abbreviation: PQ, Prodromal Questionnaire.

its definition in terms of "psychosis risk" (van Os & Guloksuz, 2017), however, the evidence pointing to a consistent pattern in non-clinical population to below threshold positive symptoms present in CHR, lends weight to the conceptualization of CHR as a clinical syndrome on the psychosis continuum. Although the generalizability of this scale must be considered, this makes and initial contribution to our understanding of psychosis risk, and the dimensions of positive symptoms that are evident across the continuum.

Despite manifest similarities, the structure found using this scale in CHR is not exactly the same as that found in psychosis. Two items referring to persecutory delusions ("I have felt that other people were watching me or talking about me," "I have thought that other people had it in for me") were included with the thought delusions in CHR, whereas in the psychotic disorders sample, persecutory delusions are grouped with grandiose, religious and delusions of reference. This may be because there are only two items relating to this on the PQ-B, not allowing for the factor to emerge on the basis of only those two items. It may also be an artefact of the way that the positive symptoms items of the PQ-B are worded (with dichotomous agree or disagree statements) and most importantly, the method of

TABLE 3 Comparative fit indices of three alternative models

Model	AIC	BIC	Chi square (df)	CFI	RMSEA	SRMR
General factor model	3995	4124	χ^2 (189) = 417.66***	0.741	0.087	0.085
Group factor model	3710	3842	χ^2 (167) = 306.17***	0.836	0.072	0.079
Hierarchical model	3667	3879	χ^2 (144) = 226.55***	0.903	0.060	0.066

Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; CFI, confirmatory fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.
***$P < .001$.

implementation (self-report) meaning that the subtle distinction between paranoid and other delusions is not captured. This may also highlight a difference between CHR and psychotic disorders, in which persecutory delusions are more closely tied to thought delusions, only diverging later on in the progression to psychosis.

At the other end of the continuum, the structure evident in this CHR sample is notably comparable to that found in help-seeking adolescents (Italian adolescents aged 11-18 seeking services for any psychological or behavioural problem) using the full PQ. The items included in the perceptual abnormalities, conceptual disorganization and suspiciousness and bizarre experiences factors found by Brandizzi et al. (2014) map very closely on to the perceptual abnormalities, disorganized/thought delusions and bizarre delusions (respectively) found in this CHR sample. Furthermore, the persecutory delusions that are included with the delusions around thought in the structure found here are similarly grouped in the help-seeking sample. This highlights that the shift of persecutory delusions from grouping with conceptual disorganization and delusions around thought to grouping with bizarre delusions may be something that occurs only after the transition to psychotic disorder, as the symptoms become more severe, however, assessment using the same measure over disease course would be needed to ascertain this.

This study is limited by the use of the PQ-B, which was designed as a screener intended to be used to identify participants who may meet CHR criteria (Loewy et al., 2011). However, we did not use the PQB in this way. Instead, we capitalized on the wealth of useful psychosis positive and used it purely to better characterize the nature of positive symptom presentation in CHR individuals. For this same reason, other groups have recently used the scale outside of the traditional approach to great success (Fine et al., 2019; Karcher et al., 2018; Karcher, O'Brien, Kandala, & Barch, 2019). The PQ-B is also a self-report scale. These are used as a time and resource efficient alternative, precursor to, or in this case accompaniment to longer clinical interviews, however, they may not capture the clinical depth in less structured clinician led interviews. The SIPS (Miller et al., 1999) is widely used to determine CHR status. This is done on the basis of four positive symptoms (unusual thought content/delusional ideas, suspiciousness/persecutory ideas, grandiose ideas, perceptual abnormalities/hallucinations) and one disorganized symptom (disorganized communication). Factor analysis of the four positive SIPS items is shown in Appendix Table A1 for information. However, the four positive symptoms measured in the SIPS may not provide a sufficient detail to investigate sub-domains within this complex category, thus, despite the inherent limitations of a self-report scale the more detailed PQ was chosen to explore these symptoms. Furthermore, due to the SIPS CHR criteria for these symptoms (which require a score between 3 and 5 of a possible 6-point scale on one or more of the 5 P-items), there may be significant issues of range restriction affecting the accuracy of an examination of these four symptoms. The PQ-B has been shown to have good sensitivity, specificity and positive predictive value in relation to the SIPS and demonstrated equivalent overall efficiency in capturing psychosis risk status (Kline et al., 2012).

This study also considered only the content and presence of the symptom. There is longstanding evidence that the appraisal, associated distress and preoccupation are key elements of determining the nature of positive symptoms (Chadwick & Birchwood, 1995; Peters, Joseph, & Garety, 1999; Woodward et al., 2014) and further study of these associated domains as well as the distress scale of the PQ-B would contribute considerably to our understanding of these symptoms. This study was marginally under the recommended sample size (10 times number of items in scale = 190, n = 187) (MacCallum, Widaman, Zhang, & Hong, 1999), there is dispute over the effect of sample size (Mundfrom, Shaw, & Ke, 2005) and this small discrepancy should not affect the structure, but replication through CFA in an independent sample is essential.

Furthermore, although the PQ-B is designed as a screener, study to examine the differentiation in positive symptom presentation longitudinally within CHR could determine if clinical presentation and trajectory are different according to clinical and functional outcome, including transition of psychotic disorder, as well as symptomatic recovery. The identification of clinical correlates and associated risks of these dimensions would also elucidate their unique trajectories and associations and how this may develop or enable distinction within CHR.

Despite these limitations, this study is an initial exploration of the phenomenology of positive symptoms in CHR, which has not previously been examined. A differentiation of perceptual abnormalities and delusions is present at this stage and the use of detailed positive symptom scales to elucidate these dimensions is essential. The detailed examination of this key diagnostic feature of psychosis can help our understanding of these symptoms specifically and is an initial step in clarifying the heterogeneous clinical presentation of positive symptoms in CHR.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Matilda Azis https://orcid.org/0000-0001-8164-0357

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APPENDIX A.

TABLE A1 Factor loadings above 0.2 of 4 positive SIPS items

SIPS item	Description	General factor	Factor 1	Factor 2
P2	Suspiciousness/Persecutory Ideas	0.31	0.69	
P1	Unusual Thought Content/Delusional Ideas	0.43	0.49	0.32
P4	Perceptual Abnormalities/Hallucinations	0.26	0.34	
P3	Grandiose Ideas	0.26		0.54
	Eigen Values	0.41	0.83	0.42
	Omega Total	0.66	0.45	0.29

Abbreviation: SIPS, structured interview for psychosis risk syndromes.