

The Structure of the Prodromal Questionnaire-16 (PQ-16): Exploratory and confirmatory factor analyses in a general non-help-séeking population sample

Howie, C., Hanna, D., Shannon, C., Davidson, G., & Mulholland, C. (2022). The Structure of the Prodromal Questionnaire-16 (PQ-16): Exploratory and confirmatory factor analyses in a general non-help-seeking population sample. Early Intervention in Psychiatry, 16(3), 239-246. https://doi.org/10.1111/eip.13147

Published in:

Early Intervention in Psychiatry

Document Version:

Peer reviewed version

Queen's University Belfast - Research Portal:

Link to publication record in Queen's University Belfast Research Portal

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1 The Structure of the Prodromal Questionnaire-16 (PQ-16): Exploratory and Confirmatory

2 Factor Analyses in a General Non-Help-Seeking Population Sample

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9 Aims: To examine the structure of the Prodromal Questionnaire (PQ-16) in a non-help-seeking

10 population through exploratory factor analysis and confirmatory factor analysis. Previous studies have

11 not looked at the structure of this self-report measure outside clinical settings.

12 Methods: Participants (n=1045) were recruited through Amazon's Mechanical Turk (MTurk), and

then completed the PQ-16. The data set was split randomly in two, one being used for exploratory

14 factor analysis (EFA) and the other for confirmatory factor analysis (CFA). A polychoric correlation

15 matrix was created and EFA was used to explore the factor structure of the PQ-16. Four models were

16 tested through CFA to determine best fit: one, two, three and four-factor models were all analysed.

17 Results: EFA indicated a two-factor structure in the PQ-16 in a non-help-seeking population (with a

18 mean age = 29.7 years). Factor 1 represented perceptual abnormalities/hallucinations and factor 2

19 general symptoms associated with psychosis-risk. CFA indicated that all the proposed models were

20 suitable fits for the dataset. Fit indices for the three-factor model (factor 1 representing perceptual

21 abnormalities/hallucinations, factor 2 unusual thought content, and factor 3 negative symptom)

indicated that it appeared to be a better fit for the data than the one, two, and four factor models.

23 Conclusions: This study suggests that a three-factor model of the PQ-16 is a better fit than other

24 proposed models in a non-help-seeking population. Future research of the structure of the PQ-16 in

this population may benefit from recruiting subjects with a lower mean age than the current study.

26 Keywords: Attenuated symptoms, Prodromal Questionnaire-16, Psychosis, Factor Analysis,

27 Screening

28 Abstract: 248/250

29 Word count: 2967/3000

30 Tables: 4

31 Appendices: 3

32 **1. Introduction**

33 Individuals who have experienced psychosis often report a period of prodromal symptoms before the 34 onset of the first episode (Addington & Heinssen, 2012). The "at-risk mental state" is a term for such 35 subthreshold psychotic symptoms which may preceed the onset of a psychotic episode (Yung and 36 McGorry, 1996). Around the world clinics have been established which seek to identify individuals 37 with an at-risk mental state and then offer interventions to prevent or delay the onset of psychosis 38 (Broome et al., 2005; Yung et al., 2007). Screening tools, such as the Prodromal Questionnaire 39 (Loewy, Bearden, Johnson, Raine, & Cannon, 2005), the Adolescent Psychotic Symptom Screener (Kelleher, Harley, Murtagh, & Cannon, 2011) and the Eppendorf Schizophrenia Inventory (Mass, 40 41 2000), allow clinicians to identify those who may benefit from a full assessment, utilising tools such 42 as the Comprehensive Assessment for the At-Risk Mental State (CAARMS) (Yung, Yuen, Phillips, Francey, & McGorry, 2005) or the Structured Interview for Prodromal Syndromes (SIPS) (Miller et 43 44 al., 2003). To date screening tools are typically used in clinical or help-seeking populations, and it is 45 not yet clear if any screening tool could help to determine which individuals may be at risk of 46 developing psychosis in a non-help-seeking population. If a screening tool was demonstrated to be 47 useful in a non-help-seeking populations this may lead to future initiatives which identify those at-risk 48 at an earlier stage, with obvious potential benefits to those so identified. Screening studies in large 49 population samples will also help in the development of sensitivity norms for screening tools (Kline & Schiffman, 2014). 50

51 The Prodromal Questionnaire (PQ) was developed by Loewy, Bearden, Johnson, Raine, & Cannon

52 (2005) as a 92-item self-report measure., based on the Schizotypal Personality Questionnaire (Raine,

53 1991) and probe questions in the SIPS (Structured Interview for Prodromal Syndromes; Miller et al.,

54 2003). The PQ has four subscales: positive symptoms (e.g. unusual thinking and perceptual

abnormalities), negative symptoms (e.g. social isolation), disorganised symptoms (e.g. odd

behaviour), and general symptoms (e.g. depression and functioning). While the PQ is quicker and

57 easier to administer than an interview assessment schedule, the length of the measure means that it is

still time-consuming. For this reason a shorter 16-item measure, the Prodromal Questionnaire-16

59 (Ising et al., 2012) was developed by administering the PQ to a sample of 3533 individuals seeking

60 help for mental health concerns. Using regression analyses and Chi-square automatic interaction

61 detection 92 items were reduced to 16. The PQ-16 consists of 9 items from the perceptual

62 abnormalities/hallucinations subscale, 5 items from the unusual thought content/delusional

63 ideas/paranoia subscale, and 2 items from the negative symptoms subscale. A 21-item version of the

64 Prodromal Questionnaire, the Prodromal Questionnaire-Brief (PQ-B; (R.L. Loewy, Pearson,

65 Vinogradov, Bearden, & Cannon, 2011) has also been developed. The authors have chosen to use the

66 PQ-16 in this population as it balanced the greatest sensitivity and specificity and positive predictive

- values in previous non-help-seeking populations (Howie, Potter, Shannon, Davidson, & Mulholland,2019).
- 69 There have only been two studies that have examined the structure of the PQ-16, including the
- 70 original paper (Ising et al, 2012). In a psychometric evaluation of the PQ-16 in a population of post-
- 71 partum women in Peru, Levey et al (2018) found that the measure was constructed of four factors.
- 72 They suggested that factor 1 represented an unstable sense of reality, factor 2 represented ideas of
- reference/paranoia, factor 3 represented sensitivity to sensory experiences, and were unable to
- characterise factor 4.
- 75 The current paper is the first study to examine the structure of the PQ-16 in a general non-help-
- real seeking population using factor analysis. The aims of the study are to examine the psychometric
- properties of the PQ-16, specifically employing exploratory factor analysis to identify the factor
- real structure and comparing models using confirmatory factor analysis to determine the best model-fit for
- 79 this population.

80 2. Methods

81 2.1 Participants

- 82 Participants (n=1045) were a convenience sample recruited through Amazon Mechanical Turk
- 83 (MTurk) in January and February 2019. MTurk recruits participants through 'crowd sourcing';
- 84 registered users can take part in human intelligence tasks (HITs) for financial compensation. Only
- 85 questionnaires that were completed were included for analysis. Unfinished questionnaires were
- identified (n=32) and removed from the data set. The final number of participants was 1013.
- 87 The sample was randomly split in half using SPSS Version 25 (IBM Corp, 2017) to create two data
- sets for exploratory and confirmatory factor analysis as EFA followed by CFA in the same data is
- testing factor structure and confirming it again with the same data and not considered best practice.
- 90 The exploratory analysis data set was comprised of 504 participants, with a mean age of 29.76 years
- 91 (SD=3.78), and was 51.8% male. The confirmatory analysis data set was comprised of 509
- 92 participants with a mean age of 29.63 years (SD=3.87) and was 50.1% male. There were no
- 93 significant differences in the distribution of demographic variables between the two data sets on age,
- 94 sex, relationship status, level of education, employment status or race (a full break down of these
- 95 statistics are presented in Table 1). There was also no statistically significant difference in the total
- 96 PQ-16 scores between the two data sets.

97 2.2 Measures

- 98 The online survey asked participants to provide their socio-demographic information (age, gender,
- relationship status, education status and employment status) and then to complete the PQ-16.

100 2.2.1. The Prodromal Questionnaire-16

- 101 The Prodromal Questionnaire-16 (Ising et al., 2012) requires participants to answer questions as 102 'True' or 'False', with True answers then rated on a scale from 0 being true with no distress, 1 being true with mild distress, 2 being true with moderate distress and 3 being true with severe distress. A 103 104 cut-off score of 6 or more on the symptom score is considered to indicate whether an individual 105 displays a potential at-risk mental state with a high sensitivity (87%) and specificity (87%) (Ising et 106 al., 2012). It is important to note that a recent systematic review has recommended the use of the 107 distress scale, with a score of ≥ 9 , when using the PQ-16 in non-help-seeking populations, and this 108 results in a sensitivity of 85% and specificity of 87% (Savill, D'Ambrosio, Cannon, & Loewy, 2017). 109 The endorsement and distress scales were thus combined for analysis, to represent the continuum of 110 psychotic-like experiences reported in the general population (Nelson, Fusar-Poli, & Yung, 2012).
- 111 Responses for the PQ-16 were coded from 0 4 (0 = False, 1 = True no distress, 2 = True mild
- distress, 3 = True moderate distress, 4 = True severe distress).

113 2.3 Procedure

114 Participants were recruited through MTurk's listing of available HITs. Participants confirmed that

- they had read and understood the study information provided, that they were willing to participate in
- the study and that their data could be used in scientific publications, and consented to this by agreeing
- to complete and return the HIT. Participants were only from the United States and were paid the
- equivalent of \$12 per hour upon completion of questionnaires as a compensation for their time.
- 119 Participants have their own individual MTurk ID codes for payments to be processed. To address
- 120 quality assurance, the study was only open to MTurk workers with a 95% completion rate on previous
- 121 assignments, Captcha verification was used, and the authors used attention questions throughout the
- 122 questionnaire (for example, "There are 53 weeks in a year" where the respondent would have to
- answer 'no' to demonstrate they were attending to the content). Ethical approval for the study was
- 124 obtained from Queen's University Belfast, School of Psychology Research Ethics Committee.

125 2.4 Analyses

As the literature review identified there was limited work conducted on the factor structure of the PQ-16 in the general population the initial step in the analysis was to examine the structure by employing an exploratory factor analysis (EFA). The next step was then to test the extent that this factor structure

- and the three factor structures reported in previous literature fitted the data by using confirmatory
- 130 factor analysis (CFA) to identify the structure of best fit. The sample was randomly split in half using
- 131SPSS Version 25 (IBM Corp, 2017) to allow this two-step analysis strategy. This strategy of first
- 132 conducting EFA followed by CFA on different samples (to minimise the bias of extracting and
- 133 confirming the factors within the same data set) is commonly recommended with the psychometric
- 134 literature (Tashakkori, & Teddlie, 2009; Cabrera-Nguyen, 2010; Matsunaga, 2010; Orcan, 2018).

135 2.4.1 Exploratory factor analysis

136 Factor analysis typically requires the use of interval or ratio data to create Pearson correlation

137 matrices. For factor analysis of ordinal data, it is typically recommended that a polychoric correlation

138 matrix is created (Holgado–Tello, Chacón–Moscoso, Barbero–García, & Vila–Abad, 2010). As the

139 PQ-16 was coded into an ordinal scale, a polychoric correlation matrix was created from the data set

using the 'polychor' package (Fox, 2019) in R version 3.6.1, which was subsequently used for the

141 exploratory analysis. Multivariate normality of the exploratory subsample was assessed using the

- 142 Mardia's test function from the 'psych' package in R.
- 143 Oblique rotation was used under the assumption that the factors will be correlated (Child, 1990). To

determine the number of factors to retain, parallel analysis (Horn, 1956) and Velicer's Minimum

145 Average Partial (MAP) test (Velicer, 1976) were conducted using the nFactors package on R (Raiche,

146 2010). Parallel analysis involves the creation of correlation matrices from random variables based on

147 the sample size and number of variables from the original data set. The eigenvalues created from the

simulated dataset are then compared to the original dataset. The criterion for retaining factors using

parallel analysis according to Hayton, Allen, & Scarpello (2004) is that "..factors corresponding to

actual eigenvalues that are greater than the parallel average random eigenvalues should be retained"

151 (p.194). Both indicated that it was suitable to retain two factors.

152 EFA was conducted using R version 3.6.1 'psych' package (Revelle, 2018). Based on parallel analysis

and MAP test results, two factors were chosen to be retained, using principal axis factoring with an

oblimin rotation. Principal axis factoring was chosen as this does not require the assumption of

normally-distributed data (Costello & Osborne, 2005). Items were found to be corresponding to

156 factors based on factor loadings above 0.4 (Comrey & Lee, 1992; P. Kline, 1994). R script for EFA is

available in Appendix 2.

158 2.4.2 Confirmatory factor analysis

159 Multivariate normality of the confirmatory subsample was assessed prior to confirmatory analysis 160 using the Mardia's test function in 'psych' using R. CFA was conducted in R version 3.6.1. using the 161 Lavaan package for R (Rosseel, 2012). As variables were ordinal and multivariate non-normality was 162 demonstrated by the data, CFA was conducted using a weighted least square mean and variance (WLSMV) estimator. Four models were analysed for best fit; a one-factor model, a two-factor model, 163 164 a three-factor model, and a four-factor model (see Appendix 3 for R script). A one-factor model was 165 examined as it has been proposed that the PQ may be a unidimensional scale (van Bebber et al., 2017). A two-factor model was proposed based on the EFA results. Two studies were identified from 166

2017). A two-factor model was proposed based on the Err results. Two studies were identified nom

the literature that examined the construct validity of the PQ-16. Ising et al (2012) constructed the PQ-

168 16 with three subscales, based on PQ scoring in a clinical population. Levey et al (2018) found a four

169 factor structure of the PQ-16 when used in a sample of women receiving prenatal care, for the

purposes of detecting perinatal psychosis. In their study, they stated that for EFA they used principal

- 171 components analysis with orthogonal rotation, which does not allow factors to correlate. In order to be
- as comprehensive as possible, we used CFA to test all 4 possible models. R script for CFA is
- available in Appendix 2.
- 174

175 **3. Results**

176 *3.1. Demographic statistics*

177 Unfinished questionnaires were identified (n=32) and removed from the data set. χ^2 test was

178 conducted on the completed and uncompleted questionnaires and gender. There was no significant

179 difference in gender for completed and uncompleted, $\chi^2(2, n=1045) = 1.59$, p =.45, but there was a

significant effect of age on completed and uncompleted questionnaires, t(1040) = 2.09, p = .03. χ^2

181 tests were conducted on demographic information (gender, race, relationship status, level of education

and employment status, see Table 1) and indicated that there were no significant differences between

subsamples (see Appendix 1). An independent-group t-test was conducted on age and no significant

184 difference was found between the two subsamples. As PQ responses were ordinal and not normally

distributed, differences between PQ responses in the subsamples were analysed using Mann-Whitney

186 U tests and there was found to be no significant differences, with the exception of responses to items

- 187 10 and 12 of the PQ-16 (see Appendix 2).
- 188
- 189

INSERT TABLE 1 HERE

190

191 *3.2. Exploratory factor analysis (EFA)*

192 To determine if the data was suitable for EFA, Kaiser-Meyer-Olkin test of sampling adequacy

193 conducted and found to be 0.92, which indicated that the data was 'marvelous' according to values

determined by Kaiser (1974). Bartlett's test of Sphericity ($\chi^2 = 5795.08$, df=120, p<.001) indicated

that the strength of relationships among variables were high and the data may benefit from factor

analysis (Bartlett, 1951). Mardia's test of multivariate normality was conducted and highlighted that

the data was not normally distributed at the multivariate level (*kurtosis* = 119.35, *p*<.05, see Appendix

198 3 for plot).

199

200	INSERT TABLE 2 HERE					
201						
202	Factor 1 (eigenvalue = 8.83) was comprised of thirteen items, with factor loadings ranging from .45-					
203	.97 (see Table 2), accounting for 45% of variance. Ten of the thirteen items on this factor represent					
204	hallucinations or perceptual abnormalities and the other three items represent unusual thought content,					
205	paranoia, or ideas of reference.					
206	Factor 2 (eigenvalue = 1.22) consisted of two items, with factor loadings ranging from $.6379$,					
207	accounting for 13% of variance. The two items represented either avolition or excessive social					
208	anxiety. Item 2 of the PQ-16 was excluded from this model for CFA as factor loadings were below the					
209	threshold of .4 for either factor.					
210						
211	3.4. Confirmatory factor analysis					
212	Mardia's test indicated that data of the confirmatory subsample was not normally distributed at the					
213	multivariate level (kurtosis = 108.69 , p<.05, see Appendix 3 for plot).					
214	INSERT TABLE 3 HERE					
215	To assess internal consistency of each subscale, Cronbach's alpha was calculated. Alpha values					
216	ranged from .613 – .920 for subscale (see Table 3), and values did not increase for any scale if any					
217	items were deleted.					
218	INSERT TABLE 4 HERE					
219	The chi-square statistic was significant for all the proposed models (see Table 4), however due to the					
220	sample size this is to be expected and therefore models did not need to be rejected at this stage					
221	(Schermelleh-Engel, Moosbrugger, & Müller, 2003). The one-factor model produced a RMSEA value					
222	than was below the proposed cut-off of <.08 (MacCallum, Browne, & Sugawara, 1996), however it					
223	had a SRMR value of 0.062, which is above the <.060 cut-off (Hu & Bentler, 1999). The TLI and CFI					
224	values for the one-factor model produced satisfactory values. The two-factor model produced a					
225	RMSEA of 0.06, fitting the proposed cut-off of <.08. It also had a SRMR value of 0.059, which falls					
226	below the recommended $< .060$ cut-off. The TLI and CFI values were above the 0.95 cut-off value					
227	recommended by Hu & Bentler (1999). This indicated that the two-factor model was a good fit for the					
228	data. Similarly, the three-factor model produced satisfactory values for fit; the RMSEA and SRMR					
229	were below the recommended cut-offs, as were the TLI and CFI. They produced values that indicated					
230	a slightly better model fit for the data than the two-factor model. The four-factor model produced a					
231	SRMR value that was on the cut-off for good fit, however the RMSEA was lower than the cut-off,					
232	and the TLI and CFI values were above the 0.95 recommendation.					

- All the proposed models produced fit indices that indicated that they were a good fit for the data,
- however, the three-factor model produced the lowest RSMEA and SRMR values and highest CFI and
- TLI values. Therefore, the three-factor model appears to be the best fit for the data.

4. Discussion

4.1. Main results

This study aimed to examine the structure of the PQ-16 in a non-help-seeking population through exploratory factor analysis and confirmatory factor analysis. Previous studies have not looked at the structure of this self-report measure outside clinical settings.

The exploratory factor analysis indicated a two-factor structure in the PQ-16 in a general non-helpseeking population: Factor 1 represented perceptual abnormalities/hallucinations and factor 2 represented general symptoms associated with psychosis-risk. Four models were tested through CFA to determine best fit. A one-factor, two-factor, three-factor and four-factor model were all analysed.

Fit indices for the three-factor model (factor 1 representing perceptual abnormalities/hallucinations, factor 2 unusual thought content, and factor 3 negative symptom) indicated that it appeared to be a better fit for the data than the one, two, and four factor models.

4.2. Limitations

This study has a number of strengths. There are legitimate questions to be asked regarding the use of MTurk for studies of this nature. MTurk is an effective method of gaining rapid recruitment, with the potential for a variety of participants, but concerns have been expressed regarding the validity and reliability of using MTurk 'workers', and the potential for the use of "bots" to complete online studies and creating a drop in the quality of responses (Dreyfuss, 2018).

On the other hand it has also been argued that MTurk can produce more diverse samples than other methods of convenience recruitment, such as the common use of undergraduate students in psychological research (Buhrmester, Kwang, & Gosling, 2011). Nevertheless the use of MTurk comes with disadvantages, including the limited generalisability of these samples, as they typically underrepresent ethnic minorities (Bornstein, Jager, & Putnick, 2013). In the current study white participants made up 76% of the total sample.

The age range of the study sample was 18 to 36 years, which means that an important group of those who are often seen in at-risk mental state clinics (age 14 to 17 years) were not included. Further studies of this nature would benefit from including a younger demographic.

5. Conclusions

The study findings indicate that the PQ-16 may be a good measure for attenuated psychotic symptoms in non-help-seeking populations though as this is the first study to examine this further work will be required to confirm whether this is the case. Further research on the factor structure of the PQ-16 in a

non-help-seeking population would benefit from recruiting subjects to a lower age range than the current study.

Whether this finding is generalisable to other non-clinical samples remains to be seen but at this point it will be of assistance to clinicians and researchers seeking to deepen their understanding of prodromal symptoms of psychosis as present in the general youth population.

Acknowledgments

The study was funded by the Northern Health and Social Care Trust. This work was conducted as part of Clare Howie's PhD project, a studentship funded by the Northern Ireland Department of the Economy.

Conflict of Interest statement

All authors declare they have no conflict of interest.

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Characteristics	All participants		EFA su	bsample	CFA subsample	
	(n=	1013)	(n=504)		(n=509)	
PQ-16 score: mean (SD)	9.38	(9.65)	9.95 ((10.31)	8.81	(8.91)
Age: mean (SD)	29.70	(3.83)	29.64 (3.88)		29.76	(3.78)
	Ν	%	Ν	%	Ν	%
Age (years)		•	•		•	
18-20	12	1.2	7	1.4	5	1
21-25	150	14.9	67	13.4	83	16.3
26-30	385	38	198	39.3	187	36.8
31-35	466	46	232	45.9	234	46
Gender						
Female	510	50.3	261	51.8	249	48.9
Male	492	48.6	237	47	255	50.1
Rather not say	6	0.6	3	0.6	3	0.6
Relationship status					•	
Divorced	12	1.2	7	1.4	5	1
Domestic partnership	43	4.2	17	3.4	26	5.1
Married	348	34.4	191	37.9	157	30.8
Separated	8	0.8	2	0.4	6	1.2
Single, cohabiting	144	14.2	69	13.7	75	14.7
Single, never married	457	45.1	217	43.1	240	47.2
Widowed	1	0.1	1	0.2	0	0
Level of education		•	•	•	•	
Associate degree	113	11.2	52	10.3	61	12
Bachelor's degree	438	43.2	216	42.9	222	43.6
Graduate degree	145	14.3	80	15.9	65	12.8
High school diploma	106	10.5	51	10.1	55	10.8
Less than HS diploma	4	0.4	2	0.4	2	0.4
Some college, no	207	20.4	103	20.4	104	20.4
degree						
Employment status						
Disabled, unable to	6	0.6	5	1	1	0.2
work						
Employed, Full-time	712	70.3	361	71.6	351	69
Employed, Part-time	173	17.1	73	14.5	100	19.6
Not employed, looking	62	6.1	31	6.2	31	6.1
for work						
Not employed, not	60	5.9	34	6.7	26	5.1
looking						
Race		-	1	-		1
American	7	0.7	2	0.4	5	1
Indian/Alaskan Native						
Asian/Pacific Islander	93	9.2	47	9.3	46	9
Black/African	55	5.4	24	4.8	31	6.1
American				-		
Hispanic	60	5.9	29	5.8	31	6.1
Multiple ethnicities	28	2.8	12	2.4	16	3.1
White/Caucasian	770	76	390	77.4	380	74.7

Table 1. Demographic characteristics of overall population and two subsamples

Table 2. PQ-16 items, prodromal experience it is measuring, median of each item and factor loadings from EFA.

Items	Experience it is	Median	Factor loadings	
	measuring			
			Factor 1	Factor 2
1. I feel uninterested in the	Avolition	1	.01	.79
things I used to enjoy				
2. I often live through events	Unusual thought content	1	.39	.23
exactly as				
they happened before (déjà				
vu)				
3. I sometimes smell or taste	Olfactory hallucination	0	.72	12
things that other people can't				
smell or taste				
4. I often hear unusual sounds	Auditory hallucination	0	.53	.21
like banging, clicking,				
hissing, clapping, or ringing				
in my ears.				
5. I have often been confused	Unusual thought content	0	.69	.06
at times whether something I	(perplexity)			
experienced was real or				
imaginary				
6. When I look at a person, or	Visual hallucination	0	.88	02
look at myself in a mirror, I				
have seen the face change				
right before my eyes				
7. I get extremely anxious	Excessive social anxiety	2	.09	.63
when meeting people for the				
first time.				
8. I have seen things that	Visual hallucination	0	.97	18
other people apparently can't				
see.				
9. My thoughts are sometimes	Perceptual abnormalities	0	.46	.37
so strong I can almost hear				
them.				

10. I sometimes see special	Ideas of reference	0	.71	.05	
meanings in advertisements,					
shop windows, or in the way					
things are arranged around me					
11. Sometimes I have felt that	Perceptual abnormalities	0	.45	.36	
that I'm not in control of my					
own ideas or thoughts.					
12. Sometimes I feel	Auditory hallucination	0	.69	.19	
distracted by distant sounds					
that I am not normally aware					
of.					
13. I have heard things other	Auditory hallucination	0	.88	.00	
people can't hear, like voices					
of people whispering or					
talking.					
14. I often feel that others	Paranoia	0	.53	.32	
have it in for me.					
15. I have had the sense that	Perceptual abnormalities	0	.81	.02	
some person or force is					
around me, even though I					
could not see anyone.					
16. I feel that parts of my	Somatic hallucination	0	.61	.19	
body have changed in some					
way, or that parts of my body					
are working differently than					
before.					
Note. Extraction method: Principal Axis Factoring. Rotation method: Oblimin.					

Model	Factor: Items	α
One-factor model	F1: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	.91
Current study	F1 (Perceptual abnormalities and unusual thought	
	content): 3, 4, 5, 6, 8, 9, 10, 11 12, 13, 14, 15, 16	.92
	F2 (Avolition and excessive social anxiety): 1, 7,	.61
Ising et al (2012)	F1 (Perceptual abnormalities): 3, 4, 6, 8, 9, 12, 13, 15,	.89
	16	.78
	F2 (Unusual thought content): 2, 5, 10, 11, 14	.61
	F3 (Negative): 1, 7	
Levey et al (2018)	F1 (Unstable sense of reality): 5, 6, 7, 9, 11, 12, 16	.81
	F2 (Paranoia/ideas of reference): 10, 13, 14, 15,	.78
	F3: 4, 8	.71
	F4: 1, 2, 3	.63

Table 3. Proposed confirmatory factor models, items on each factor and Cronbach's alpha for each scale

Table 4. Fit indices of confirmatory factor mode

Model	χ²	RMSEA (CI)	SRMR	TLI	CFI	Correlation between factors
1 factor model	$\chi^2 = 349.51$					
	df = 104 n < 001	0.07 (0.06-0.07)	0.06	0.96	0.97	N/A
2-factor model	$\chi^2 = 280.82$					
(current study)	df = 89	0.06	0.06	0.97	0.97	F1 - F2 = 0.43
3-factor model	P < 0.001 $y^2 = 270.36$					F1 - F2 = 0.52
	λ 270.50					
(Ising et al, 2012)	df = 101	0.05 (0.04 - 0.06)	0.05	0.97	0.98	F2 - F3 = 0.41
	<i>p</i> <.001					F1 - F3 = 0.44
4-factor model	$\chi^2 = 339.61$					F1 - F2 = 0.58
(Levey et al, 2018)	df = 98	0.07 (0.06 - 0.07)	0.06	0.96	0.97	F1 - F3 = 0.60
	<i>p</i> <.001					F1 - F4 = 0.47
						F2 - F3 = 0.61
						F2 - F4 = 0.45
						F3 - F4 = 0.45
Abbreviations: RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual; TLI, Tucker-Lewis Index; CFI, Comparative Fit Index.						