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# The Structure of the Prodromal Questionnaire-16 (PQ-16): Exploratory and Confirmatory Factor Analyses in a General Non-Help-Seeking Population Sample

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Aims: To examine the structure of the Prodromal Questionnaire (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.

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 factor analysis (EFA) and the other for confirmatory factor analysis (CFA). A polychoric correlation matrix was created and EFA was used to explore the factor structure of the PQ-16. Four models were tested through CFA to determine best fit: one, two, three and four-factor models were all analysed.

Results: EFA indicated a two-factor structure in the PQ-16 in a non-help-seeking population (with a mean age = 29.7 years). Factor 1 represented perceptual abnormalities/hallucinations and factor 2 general symptoms associated with psychosis-risk. CFA indicated that all the proposed models were suitable fits for the dataset. 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.

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

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

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## 1. Introduction

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

The Prodromal Questionnaire (PQ) was developed by Loewy, Bearden, Johnson, Raine, & Cannon (2005) as a 92-item self-report measure. , based on the Schizotypal Personality Questionnaire (Raine, 1991) and probe questions in the SIPS (Structured Interview for Prodromal Syndromes; Miller et al., 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 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 (Ising et al., 2012) was developed by administering the PQ to a sample of 3533 individuals seeking help for mental health concerns. Using regression analyses and Chi-square automatic interaction detection 92 items were reduced to 16. The PQ-16 consists of 9 items from the perceptual abnormalities/hallucinations subscale, 5 items from the unusual thought content/delusional ideas/paranoia subscale, and 2 items from the negative symptoms subscale. A 21-item version of the Prodromal Questionnaire, the Prodromal Questionnaire-Brief (PQ-B; (R.L. Loewy, Pearson, Vinogradov, Bearden, & Cannon, 2011) has also been developed. The authors have chosen to use the 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).

There have only been two studies that have examined the structure of the PQ-16, including the original paper (Ising et al, 2012). In a psychometric evaluation of the PQ-16 in a population of post-partum women in Peru, Levey et al (2018) found that the measure was constructed of four factors. 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.

The current paper is the first study to examine the structure of the PQ-16 in a general non-help-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 structure and comparing models using confirmatory factor analysis to determine the best model-fit for this population.

## 2. Methods

### *2.1 Participants*

Participants (n=1045) were a convenience sample recruited through Amazon Mechanical Turk (MTurk) in January and February 2019. MTurk recruits participants through 'crowd sourcing'; registered users can take part in human intelligence tasks (HITs) for financial compensation. Only 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.

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.

The exploratory analysis data set was comprised of 504 participants, with a mean age of 29.76 years (SD=3.78), and was 51.8% male. The confirmatory analysis data set was comprised of 509 participants with a mean age of 29.63 years (SD=3.87) and was 50.1% male. There were no significant differences in the distribution of demographic variables between the two data sets on age, sex, relationship status, level of education, employment status or race (a full break down of these statistics are presented in Table 1). There was also no statistically significant difference in the total PQ-16 scores between the two data sets.

### *2.2 Measures*

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.

*2.2.1. The Prodromal Questionnaire-16*

The Prodromal Questionnaire-16 (Ising et al., 2012) requires participants to answer questions as '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 cut-off score of 6 or more on the symptom score is considered to indicate whether an individual displays a potential at-risk mental state with a high sensitivity (87%) and specificity (87%) (Ising et al., 2012). It is important to note that a recent systematic review has recommended the use of the distress scale, with a score of ≥9, when using the PQ-16 in non-help-seeking populations, and this results in a sensitivity of 85% and specificity of 87% (Savill, D'Ambrosio, Cannon, & Loewy, 2017). The endorsement and distress scales were thus combined for analysis, to represent the continuum of psychotic-like experiences reported in the general population (Nelson, Fusar-Poli, & Yung, 2012). 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).

*2.3 Procedure*

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. Participants have their own individual MTurk ID codes for payments to be processed. To address quality assurance, the study was only open to MTurk workers with a 95% completion rate on previous assignments, Captcha verification was used, and the authors used attention questions throughout the 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 obtained from Queen's University Belfast, School of Psychology Research Ethics Committee.

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

### *2.4.1 Exploratory factor analysis*

Factor analysis typically requires the use of interval or ratio data to create Pearson correlation matrices. For factor analysis of ordinal data, it is typically recommended that a polychoric correlation matrix is created (Holgado–Tello, Chacón–Moscoso, Barbero–García, & Vila–Abad, 2010). As the 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 exploratory analysis. Multivariate normality of the exploratory subsample was assessed using the Mardia's test function from the 'psych' package in R.

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 Average Partial (MAP) test (Velicer, 1976) were conducted using the nFactors package on R (Raiche, 2010). Parallel analysis involves the creation of correlation matrices from random variables based on 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" (p.194). Both indicated that it was suitable to retain two factors.

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 factors based on factor loadings above 0.4 (Comrey & Lee, 1992; P. Kline, 1994). R script for EFA is available in Appendix 2.

### *2.4.2 Confirmatory factor analysis*

Multivariate normality of the confirmatory subsample was assessed prior to confirmatory analysis using the Mardia's test function in 'psych' using R. CFA was conducted in R version 3.6.1. using the Lavaan package for R (Rosseel, 2012). As variables were ordinal and multivariate non-normality was 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, a three-factor model, and a four-factor model (see Appendix 3 for R script). A one-factor model was 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 the literature that examined the construct validity of the PQ-16. Ising et al (2012) constructed the PQ-16 with three subscales, based on PQ scoring in a clinical population. Levey et al (2018) found a four

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 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.

## 3. Results

### *3.1. Demographic statistics*

Unfinished questionnaires were identified (n=32) and removed from the data set. $\chi^2$ test was conducted on the completed and uncompleted questionnaires and gender. There was no significant 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, $t(1040) = 2.09$, $p = .03$. $\chi^2$ 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 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 U tests and there was found to be no significant differences, with the exception of responses to items 10 and 12 of the PQ-16 (see Appendix 2).

**INSERT TABLE 1 HERE**

### *3.2. Exploratory factor analysis (EFA)*

To determine if the data was suitable for EFA, Kaiser-Meyer-Olkin test of sampling adequacy 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 3 for plot).

**INSERT TABLE 2 HERE**

Factor 1 (eigenvalue = 8.83) was comprised of thirteen items, with factor loadings ranging from .45-.97 (see Table 2), accounting for 45% of variance. Ten of the thirteen items on this factor represent hallucinations or perceptual abnormalities and the other three items represent unusual thought content, paranoia, or ideas of reference.

Factor 2 (eigenvalue = 1.22) consisted of two items, with factor loadings ranging from .63 – .79, accounting for 13% of variance. The two items represented either avolition or excessive social anxiety. Item 2 of the PQ-16 was excluded from this model for CFA as factor loadings were below the threshold of .4 for either factor.

### 3.4. Confirmatory factor analysis

Mardia's test indicated that data of the confirmatory subsample was not normally distributed at the multivariate level (kurtosis = 108.69, $p<.05$, see Appendix 3 for plot).

**INSERT TABLE 3 HERE**

To assess internal consistency of each subscale, Cronbach's alpha was calculated. Alpha values ranged from .613 – .920 for subscale (see Table 3), and values did not increase for any scale if any items were deleted.

**INSERT TABLE 4 HERE**

The chi-square statistic was significant for all the proposed models (see Table 4), however due to the sample size this is to be expected and therefore models did not need to be rejected at this stage (Schermelleh-Engel, Moosbrugger, & Müller, 2003). The one-factor model produced a RMSEA value than was below the proposed cut-off of <.08 (MacCallum, Browne, & Sugawara, 1996), however it had a SRMR value of 0.062, which is above the <.060 cut-off (Hu & Bentler, 1999). The TLI and CFI values for the one-factor model produced satisfactory values. The two-factor model produced a RMSEA of 0.06, fitting the proposed cut-off of <.08. It also had a SRMR value of 0.059, which falls below the recommended <.060 cut-off. The TLI and CFI values were above the 0.95 cut-off value recommended by Hu & Bentler (1999). This indicated that the two-factor model was a good fit for the data. Similarly, the three-factor model produced satisfactory values for fit; the RMSEA and SRMR were below the recommended cut-offs, as were the TLI and CFI. They produced values that indicated a slightly better model fit for the data than the two-factor model. The four-factor model produced a SRMR value that was on the cut-off for good fit, however the RMSEA was lower than the cut-off, 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-help-seeking 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.

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**Conflict of Interest statement**

All authors declare they have no conflict of interest.

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**Table 1.** Demographic characteristics of overall population and two subsamples

| Characteristics | All participants (n=1013) | | EFA subsample (n=504) | | CFA subsample (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) | |
| | **N** | **%** | **N** | **%** | **N** | **%** |
| **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 degree | 207 | 20.4 | 103 | 20.4 | 104 | 20.4 |
| **Employment status** | | | | | | |
| Disabled, unable to work | 6 | 0.6 | 5 | 1 | 1 | 0.2 |
| 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 for work | 62 | 6.1 | 31 | 6.2 | 31 | 6.1 |
| Not employed, not looking | 60 | 5.9 | 34 | 6.7 | 26 | 5.1 |
| **Race** | | | | | | |
| American Indian/Alaskan Native | 7 | 0.7 | 2 | 0.4 | 5 | 1 |
| Asian/Pacific Islander | 93 | 9.2 | 47 | 9.3 | 46 | 9 |
| Black/African American | 55 | 5.4 | 24 | 4.8 | 31 | 6.1 |
| 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 2.** PQ-16 items, prodromal experience it is measuring, median of each item and factor loadings from EFA.

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

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

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

| **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<br>F2 (Avolition and excessive social anxiety): 1, 7, | .92<br>.61 |
| Ising et al (2012) | F1 (Perceptual abnormalities): 3, 4, 6, 8, 9, 12, 13, 15, 16<br>F2 (Unusual thought content): 2, 5, 10, 11, 14<br>F3 (Negative): 1, 7 | .89<br>.78<br>.61 |
| Levey et al (2018) | F1 (Unstable sense of reality): 5, 6, 7, 9, 11, 12, 16<br>F2 (Paranoia/ideas of reference): 10, 13, 14, 15,<br>F3: 4, 8<br>F4: 1, 2, 3 | .81<br>.78<br>.71<br>.63 |

**Table 4.** Fit indices of confirmatory factor mode

| Model | $\chi^2$ | RMSEA (CI) | SRMR | TLI | CFI | Correlation between factors |
|---|---|---|---|---|---|---|
| **1 factor model** | $\chi^2$ =349.51<br>*df* = 104<br>*p*<.001 | 0.07 (0.06-0.07) | 0.06 | 0.96 | 0.97 | N/A |
| **2-factor model**<br>**(current study)** | $\chi^2$ = 280.82<br>*df* = 89<br>*P*<0.001 | 0.06 | 0.06 | 0.97 | 0.97 | F1 – F2 = 0.43 |
| **3-factor model**<br>**(Ising et al, 2012)** | $\chi^2$ = 270.36<br>*df* = 101<br>*p*<.001 | 0.05 (0.04 – 0.06) | 0.05 | 0.97 | 0.98 | F1 – F2 = 0.52<br>F2 – F3 = 0.41<br>F1 – F3 = 0.44 |
| **4-factor model**<br>**(Levey et al, 2018)** | $\chi^2$ = 339.61<br>*df* = 98<br>*p*<.001 | 0.07 (0.06 – 0.07) | 0.06 | 0.96 | 0.97 | F1 – F2 = 0.58<br>F1 – F3 = 0.60<br>F1 – F4 = 0.47<br>F2 – F3 = 0.61<br>F2 – F4 = 0.45<br>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.