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Brief report

Replication of the five-dimensional structure of positive psychotic experiences in young adulthood

Johanna T.W. Wigman [a,*], Wilma A.M. Vollebergh [a], Nele Jacobs [b,c], Marieke Wichers [b], Catherine Derom [d], Evert Thiery [e], Quinten A.W. Raaijmakers [f], Jim van Os [b,g]

[a] *Dept of Interdisciplinary Social Science, University of Utrecht, PO Box 80.140, 3508 TC Utrecht, The Netherlands*
[b] *Dept of Psychiatry and Psychology, School of Mental Health and Neuroscience, Maastricht University Medical Centre, PO Box 616 (DRT 10), 6200 MD Maastricht, The Netherlands*
[c] *School of Psychology, Open University of the Netherlands, PO box 2960, 6401 DL Heerlen, The Netherlands*
[d] *Department of Human Genetics, University Hospital Gasthuisberg, Catholic University Leuven, Belgium*
[e] *Association for Scientific Research in Multiple Births, Ghent, Belgium*
[f] *Research Center Adolescent Development, University of Utrecht, PO Box 80.140, 3508 TC Utrecht, The Netherlands*
[g] *King's College London, King's Health Partners, Department of Psychosis Studies, Institute of Psychiatry, De Crespigny Park, London SE5 8AF, UK*

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ABSTRACT

Previous work has examined the structure of subclinical positive psychotic experiences. The current study, using confirmatory factor analysis in a general population sample of young adult females, replicated a five-dimensional model, which showed excellent model fit. The results suggest stability of the five-dimensional model across adolescent and young adult life.

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1. Introduction

Systematic review of general population studies suggests that there is continuity in the population distribution of positive psychotic experiences that may be conceived of as the non-silent behavioral expression of increased liability for psychotic disorder (van Os et al., 2009; Linscott and van Os, 2010). Studies have attempted to examine the underlying structure of positive psychotic experiences, given that subdimensions may differ in their association with clinical syndromes, and thus in risk of transition to later psychotic disorder (Wigman et al., 2011). Therefore, further elucidation of the underlying structure of the extended psychosis phenotype is clinically relevant.

Several studies indicate that a multidimensional model may best describe the phenotype of positive psychotic experiences. Stefanis and colleagues (2004) reported four subdimensions (Paranoia, First rank symptoms, Hallucinations and Grandiosity) and Verdoux and colleagues (1998) suggested seven dimensions of delusional ideation (Persecution, Thought Disturbances, Grandiosity, Paranormal beliefs, Reference-Guilt, Religiosity and Apocalyptic ideas) as best representing these experiences in non-ill, adult populations. Furthermore, Yung et al. (2006, 2009)

proposed models with three (Bizarre experiences, Persecutory ideas and Magical thinking) and four (Bizarre experiences, Perceptual abnormalities, Persecutory ideas and Magical thinking) subdimensions in respectively clinical and non-clinical adolescent populations; a modified version of this four-factor model was replicated in both adolescent and young adult populations by Armando et al. (2010), in which the Magical thinking factor was replaced by Grandiosity.

Recently, a five-dimensional model was presented describing positive psychotic experiences as measured by the Community Assessment of Psychic Experiences (CAPE) in two general population samples of 12– to 16– year-old adolescents (Wigman et al., 2011). This model distinguished Hallucinations, Delusions, Paranoia, Grandiosity and Paranormal beliefs as distinct dimensions of these experiences. The model was statistically superior to other models reported in the literature and differentiated the subdimensions by their distinctive associations with secondary distress and other measures of psychopathology. However, the model needs replication in older populations to investigate its stability across different life phases. Furthermore, previous studies investigated mixed samples, consisting of both males and females. Addressing the dimensional structure of psychotic experiences in males and females separately may also increase our understanding of the subclinical psychosis phenotype. Therefore, the present study attempted to replicate the five-dimensional model in a young adult, female population. Since the five-factor model has already been shown to be the best representation of psychotic experiences in adolescents

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* Corresponding author at: Department of Interdisciplinary Social Science, Faculty of Social and Behavioral Sciences, University of Utrecht, PO Box 80.140, Heidelberglaan 2, 3508 TC Utrecht, The Netherlands. Tel.: +31 30 253 1873; fax: +31 30 253 4733.

E-mail address: J.T.W.Wigman@uu.nl (J.T.W. Wigman).

(Wigman et al., 2011), it was now tested only against the four-factor model of Stefanis et al. (2004).

2. Methods

2.1. Participants

The present female-only sample was recruited from the East-Flanders Prospective Twin Survey (EFPTS), a population-based survey that has prospectively recorded all multiple births in the province of East Flanders since 1964. The EFPTS examines gene-environment interactions underlying vulnerability for mental disorders and has been described previously in detail (Derom et al., 2006; Jacobs et al., 2006; Wichers et al., 2007). Being a sub-study of this original study, the present sample consisted only of women. Originally, the sample included 621 subjects (575 twins and 46 of their non-twin sisters). Non-twin sisters, subjects with missing zygosity and subjects who participated without their twin were excluded. The final sample thus consisted of 566 subjects (283 twin pairs, 172 monozygotic and 111 dizygotic), with mean age 27.3 years (SD 7.5; range 18–46)), all white and of Belgian origin.

2.2. Instruments

The Community Assessment of Psychic Experiences (CAPE) positive experiences subscale (20 self-reported items) was used to assess psychotic experiences (Peters et al., 1999; Stefanis et al., 2004; Konings et al., 2006) at three time points at approximately 6-monthly intervals. Each item in the CAPE rates two aspects of psychotic experiences: (i) frequency and (ii) associated distress, both rated on a four-point scale of never/not distressed (1); sometimes/a bit distressed (2); often/quite distressed (3); nearly always/very distressed (4). The frequency items showed excellent internal consistency (Cronbach's alpha > 0.96 at all three measurement points).

Mental health was assessed with the Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID-I) (First et al., 2002), a structured interview for psychiatric disorders providing standardized DSM-IV diagnoses. Furthermore, the participants filled in the Symptom Checklist (SCL-90R) for an additional continuous measure of psychiatric symptoms. If participants were diagnosed with a mental health disorder, they were not excluded from the sample. Reports on the prevalence of clinical disorders can be found elsewhere (e.g. Wichers et al., 2009).

2.3. Analyses

Analyses were performed with Mplus 5.1 (Muthén and Muthén, 1998–2007). Three confirmatory factor analyses (CFAs) were carried out (separately for T1, T2 and T3) with the 20 positive CAPE frequency items indicating the five factors hallucinations, delusions, paranoia, grandiosity and paranormal beliefs. The three time points allowed threefold investigation of the factorial structure, increasing the robustness and reliability of the findings. CAPE items were defined as ordinal and estimation was done with weighted least squares (WLSMV). Analyses were controlled for hierarchical clustering of individuals within twins. Due to the relatively small sample size, categories with fewer than 10 subjects were merged with the category above (e.g. with only five subjects reporting an experience 'often,' these were merged with the subjects that reported this 'sometimes'). This resulted in the deletion of items 9, 18 and 19 at T1 and T3 and of items 18 and 19 at T2. For consistency, item 9 was also deleted at T2.

Several fit indices were used to evaluate model fit. For good model fit, chi-square (χ^2) should be low; Root Mean Square Error of Approximation (RMSEA) should be lower than 0.08 or 0.05 and the Comparative Fit Index (CFI) higher than 0.90 or 0.95 for acceptable respectively good model fit (Brown, 2006). For comparing the five-factor model to competing models, ΔCFI (delta) and $\Delta RMSEA$ were used. If $\Delta CFI < 0.010$ and $\Delta RMSEA < 0.015$, the models do not differ (Chen, 2007).

3. Results

The five-factor model showed excellent fit at all three time points (Table 1), supporting the robustness and reliability of the findings. Compared to a general one-factor model and the four-factor model by Stefanis and colleagues (2004), the five-factor model was superior

to the other models at T2 and T3; at T1, it fit as well as the four-factor model. Factor loadings for the five-factor model were good (mean factor loading per factor between 0.616 and 0.892 for all factors at all time points) and comparable over time points. Thus, the five-factor model was the only model that was (one of) the best fitting models at all three time points.

4. Discussion

The five-dimensional model distinguishing hallucinations, delusion, paranoia, grandiosity and paranormal beliefs showed excellent model fit in a general population sample of young adult females. This model was the only one model that fit the data consistently as (one of) the best model(s) at all time points.

The present results not only support the notion that subclinical positive psychotic experiences are best represented by an underlying structure consisting of five subdimensions as found by Wigman and colleagues (2011), but they also suggest that this structure applies to the different life stages of adolescence and (young) adulthood. Additional support is derived from the replication of the five-factor model at three consecutive time points. Furthermore, the findings suggest that this model applies to females separately as well as to men and women together.

Although the five-domain factorial structure was sustained at all three time points, some items had to be removed, given that too few respondents reported the endorsement of some experiences at least sometimes. This phenomenon can be understood in terms of data distributional skewness, which in this sample was even more accentuated than in adolescent populations in previous publications (Wigman et al., 2011; Yung et al., 2009). The level of skewness most likely can be explained by the fact that (i) the present population is older than the adolescent population in our previous study and (ii) psychotic experiences are strongly age-dependent (Verdoux et al., 1998; Peters et al., 1999; van Os et al., 2009).

A disadvantage of the study is that analyses were carried out in a twin sample, which, although representative, may be different from the non-twin general population in subtle ways, and in which scores of co-twins may be interdependent. However, interdependency of scores was controlled for in analyses. The present study relied on self-reported psychotic experiences. Although self-report inevitably leads to less accurate information, previous research has shown that both self-report and clinical interviews can be considered reliable for the assessment of these types of experiences (Konings et al., 2006; Allardyce et al., 2007; Kelleher et al., 2011).

Confirmation of the fact that positive symptoms of psychosis are clustered along distinct dimensions of experience may feed subsequent research on distinct cognitive and biological underpinnings. Furthermore, future work should address the five-dimensional model in male-only and mixed young adult populations to expand our understanding of the psychosis phenotype.

Table 1
Fit indices of the three models (one-, four- and five-factor models) at T1, T2 and T3.

	T1			T2			T3		
	1 factor	4 factors	5 factors	1 factor	4 factors	5 factors	1 factor	4 factors	5 factors
χ^2	251.70	159.93	162.83	240.88	176.36	124.38	171.64	146.05	120.88
Df	119	113	109	119	113	109	119	113	109
P	<.0001	0.0024	0.0006	<.0001	0.0001	0.1489	0.0011	0.0198	0.2056
CFI	0.898	0.946	0.959	0.898	0.947	0.987	0.958	0.973	0.990
RMSEA	0.045	0.033	0.030	0.051	0.038	0.019	0.032	0.026	0.016

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