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The Chapman psychosis-proneness scales: Consistency across culture and time

Raymond C.K. Chan [a,*], Hai-song Shi [a,c], Fu-lei Geng [a,c], Wen-hua Liu [d], Chao Yan [e], Yi Wang [a], Diane C. Gooding [b,**]

[a] Neuropsychology and Applied Cognitive Neuroscience Laboratory, Key Laboratory of Mental Health, Institute of Psychology, Chinese Academy of Sciences, Beijing, China
[b] Departments of Psychology and Psychiatry, University of Wisconsin-Madison, USA
[c] The University of Chinese Academy of Sciences, Beijing, China
[d] Faculty of Health Management, Guangzhou Medical University, Guangzhou, China
[e] Key Laboratory of Brain Functional Genomics (MOE and STCSM), School of Psychology and Cognitive Science, East China Normal University, China

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ABSTRACT

The purpose of the present study was to examine the factor structure and the temporal stability of the Chapman psychosis-proneness scales in a representative sample of nonclinical Chinese young adults. The four psychosis-proneness scales evaluated were the Perceptual Aberration (PAS), Magical Ideation (MIS), revised Social Anhedonia (RSAS), and revised Physical Anhedonia (RPAS) scales. The sample consisted of 1724 young adults with a mean age of 18.8 years (S.D.=0.84). The results of the confirmatory factor analyses indicated that the best fitting model was a two-factor model with positive schizotypy (PER and MIS) scales and negative schizotypy (RSAS and RPAS) scales. The data add to the growing literature indicating that the measurement of schizotypal traits is consistent across cultures. In addition, the results support the measurement invariance of the Chapman psychosis-proneness scales across time, i.e., there was ample evidence of test–retest reliability over a test interval of 6 months.

1. Introduction

Schizotypy, as a personality organization, is associated with a latent liability for schizophrenia, and can be detected through various psychological, neurological, and psychophysiological measures (Ettinger et al., 2015). There are two main conceptualizations of the relationship between schizotypy and schizophrenia. In dimensional models (see Claridge and Beech (1995); Beauchaine et al. (2008)), the latent structure of schizotypy is on a continuum between normal psychological functioning and extreme dysfunction in the form of psychosis and schizophrenia. In contrast, Meehl's (1962), (1990) model of schizotypy is a taxonic model (Gooding and Iacono, 1995, Lenzenweger, 2010). Thus in Meehl's model, an individual may be categorized as possessing the hypothesized latent trait (taxon) or not. Regardless of whether one advocates the dimensional approach or the taxonic approach, research on schizotypy is valuable because it enables investigation into the etiology of schizophrenia-spectrum disorders and other psychotic disorders without the confounds associated with psychosis, such as medication effects, chronic illness, and institutionalization or hospitalization.

Psychometric assessment of psychosis-proneness in general, and in particular, schizotypy, has proven to be a viable means of screening large numbers of individuals from community (Blanchard et al., 2011) and college populations (e.g., Chapman et al., 1994; Gooding et al., 2005) who are at heightened risk for the later development of schizophrenia and schizophrenia-spectrum disorders. Longitudinal research (Gooding et al., 2007) has demonstrated that the psychometric high-risk method may identify some individuals at risk who might otherwise not be detected by the genetic high-risk paradigm. The Chapman scales are arguably the most widely used psychometric scales used in studying individual differences in risk for the later development of schizophrenia and schizophrenia-spectrum disorders. Indeed, the Chapman scales were originally designed with Meehl's (1962, 1964) definition of schizotypy in mind.

Descriptions of the factorial structure of schizotypy vary. Some investigators (Kelly and Coursey, 1992; Vollema and van den Bosch, 1995; Kerns, 2006;Brown et al., 2008; Kwapil et al., 2008, 2012) maintain that schizotypy is best described as consisting of two factors, whereas others assert that three or more factors (Reynolds et al., 2000; Venables and Rector, 2000; Stefanis et al.,

* Correspondence to: Institute of Psychology, Chinese Academy of Sciences, 16 Lincui Road, Beijing 100101, China. Tel./fax: +86 10 64836274.
** Correspondence to: University of Wisconsin-Madison, Department of Psychology, 1202 West Johnson Street, Madison, Wisconsin, USA. Tel.: +1 608 262 3918; fax: +1 608 262 4029.
E-mail addresses: rckchan@psych.ac.cn (R.C.K. Chan), dgooding@wisc.edu (D.C. Gooding).

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2004; Wuthrich and Bates, 2006; Compton et al., 2009) are better able to account for the variance underlying the latent construct. The most consistently reported factors are positive and negative schizotypy, (sometimes referred to as cognitive–perceptual and interpersonal factors, respectively) though other frequently mentioned factors include disorganization and nonconformity (Kwapil et al., 2008; Asai et al., 2011). The identification and characterization of a multidimensional structure of schizotypy is advantageous in that it helps account for the phenotypic heterogeneity observed among individuals with schizotypy and schizophrenia-spectrum disorder. To the extent that schizotypy is multidimensional, the ability to relate different dimensions of schizotypy to various biobehavioral and/or neuroimaging correlates will enhance our ability to search for hypothesized etiological pathways and mechanisms (Reynolds et al., 2000). Moreover, longitudinally studying individuals who are differentially characterized by different dimensions may lend greater insights regarding the developmental ontogeny of schizophrenia-spectrum disorders (cf. Gooding and Iacono, 1995; Gooding et al., 2005).

Brown et al. (2008) observed that the revised Social Anhedonia Scale cross-loaded on both positive and negative schizotypy factors. This small-scale study of approximately 400 undergraduates was followed up by a study of over 6000 Caucasian and African–American nonclinical young adults. Using confirmatory factor analysis, Kwapil et al. (2008) found empirical support for a two-factor structure of schizotypy that was largely invariant across gender and ethnicity. However, because they noted that the revised Social Anhedonia Scale loaded on both the positive and negative schizotypy factors, they concluded that the revised Social Anhedonia Scale was a multidimensional measure of schizotypy. Kwapil et al. (2012) conducted confirmatory factor analyses separately on a Spanish sample and an American sample to compare the structure of psychometric schizotypy across cultures. In both samples, the authors found that an alternative model in which the revised Social Anhedonia Scale cross-loaded on positive and negative schizotypy factors provided the best fit for the data, consistent with their earlier work. The findings of Kwapil et al. (2012) are noteworthy because they provide some evidence of cross-cultural factor invariance.

As measures of putative latent traits, it is important that such individual differences in status be consistent over time. That is, if a measure of individual differences is to be useful, then the scores indicating the individual differences for a given trait should be relatively unchanging (Cronbach, 1947). There are few studies of the temporal stability of the Chapman psychosis-proneness scales. A prior study (Chapman et al., 1982) based upon a test–retest interval of 6 weeks in an undergraduate student sample consisting of 178 males and 333 females reported test–retest reliabilities for the Perceptual Aberration, Magical Ideation, and Physical Anhedonia scales which were in the 70s and 80s. However, the test–retest reliability of the Social Anhedonia Scale was not measured in that investigation. In later reports, Chapman et al. (1994) stated that the test–retest reliabilities for the psychosis-proneness scales (including the revised Social Anhedonia Scale) ranged from 0.75 to 0.85. A 2-year study of the temporal stability of the scales in a German community sample revealed lower test–retest reliabilities for the Perceptual Aberration (r_{tt}=0.43), Magical Ideation (r_{tt}=0.41) and Physical Anhedonia scales (r_{tt}=0.65); (Meyer and Hautzinger, 1999).[1] Over a test–retest interval of 5 years, Erlenmeyer-Kimling et al. (1993) observed that their New York High-Risk Project sample displayed temporally stable Physical Anhedonia Scale scores (r_{tt}=0.62).

When Winterstein et al. (2010) calculated the traditional test–retest reliabilities for all four Chapman psychosis-proneness scales on two independent samples, they found that both the revised Social Anhedonia Scale and the revised Physical Anhedonia Scale were temporally stable (the *r*'s=0.81). However, the reliability coefficients for the Magical Ideation Scale (0.73 and 0.79) and those for the Perceptual Aberration Scale (0.63 and 0.76) for the two samples were lower. This group also conducted generalizability analysis (Hoyt and Melby, 1999). Generalizability analysis is largely a descriptive statistical method based on score dependability coefficients. Their results suggested that only the revised Social Anhedonia Scale accounted for an acceptable level of variance, in terms of pointing out real differences between study participants. However, their total samples were relatively small (*N*'s of 160 and 102). In summary, a review of the literature suggests that, nearly all reports of the test–retest reliability of the revised Social Anhedonia and revised Physical Anhedonia scales show generally moderate to high temporal stability, ranging from 0.62 to 0.85. The Perceptual Aberration Scale has shown low to moderate temporal stability, with retest reliabilities ranging from0.43 to 0.76, and the Magical Ideation Scale performing similarly, with retest reliabilities ranging from 0.41 to 0.82.

The increasing globalization of psychological assessment makes cross-cultural investigations of the psychometric properties of frequently-used schizotypy measures quite valuable (Fonseca-Pedrero et al., 2008). The aims of the present study are two-fold: the first goal is to examine the factor structure of the Chapman psychosis-proneness scales in a cross-cultural context. Although there have been investigations of the factor structure of the Chapman scales in American (Kwapil et al., 2008, 2012), German (Meyer and Keller, 2001) and Spanish (Kwapil et al., 2012) samples, to date, there has not been a comparable study conducted using the Chinese translations of the scales. We hypothesized that the factor structure of the Chapman psychosis-proneness scales would be invariant across culture; that is, we expected to replicate earlier findings reported in American, Spanish, and German samples, in Chinese students. More specifically, we expected that a two-factor solution would provide the best fit for the data. The second purpose of this investigation was to evaluate the temporal stability of the four most commonly used Chapman scales in a large sample of nonclinical adults. We hypothesized that the Chapman scale scores would be invariant over time, thereby indicating temporal stability. To our knowledge, this investigation is the first examination of the retest stability of the Chapman psychosis-proneness scales in a Chinese population.

2. Method

2.1. Participants

The participants were 1849 college students who were recruited from three universities in Beijing, Shanghai and Guangzhou. This was a naturalistic study of nonclinical young adults whose only requirement was age over 18 years old. Refusals per class were not documented, but response rate per school, when compared to class sizes, suggests that the refusal rate was negligible.

2.2. Materials

All participants were administered a set of questionnaires, including four Chapman psychosis proneness scales (namely, the revised Social Anhedonia (Eckblad et al., 1982), revised Physical Anhedonia (Chapman et al., 1976), Magical Ideation (Eckblad et al., 1983) and Perceptual Aberration Scales (Chapman et al., 1978)), and other checklists to capture general mental health status. The Chapman scales were designed to tap personality traits that assess a predisposition to psychosis. The psychometric properties of these scales have been reported elsewhere (see, for example, Chapman et al., 1995). Validated Chinese translations of the four scales (Wang et al., 2012) were used. The Perceptual Aberration Scale taps transient body image and perceptual distortions, with items such as "I have sometimes felt that some part of my body no longer

[1] It is noteworthy that Meyer and Hautzinger used a shortened version of the Physical Anhedonia scale, which may have resulted in a lower estimate of stability over time.