Cross-cultural invariance of the factor structure of the Schizotypal Personality Questionnaire across Spanish and American college students

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ABSTRACT

The main goal of this study was to examine the cross-cultural invariance of the factor structure of the Schizotypal Personality Questionnaire (SPQ) (Raine, 1991) in two large samples of Spanish and American young adults. The final sample was made up of 2313 college students (508 men, 22%). Their mean age was 20.5 years (S.D.=3.2). The results indicated that the Stefanis et al. (2004) four-factor model yielded the best goodness-of-fit indices compared to alternative models. Moreover, the results support configural, metric, and partial measurement invariance of the covariances of the SPQ across the two samples. The finding of measurement equivalence across cultures provides essential evidence of construct validity for the schizotypy dimensions and of the cross-cultural validity of SPQ scores. The finding of comparable dimensional structures in cross-cultural samples lends further support to the continuum model of schizotypy and schizophrenia spectrum disorders. Future studies should continue to examine the validity of scores on the SPQ and other schizotypy measures and their variation or consistency across cultures.

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1. Introduction

Schizotypy is a complex construct intimately related to schizophrenia-spectrum disorders, such as schizophrenia and related psychotic disorders; psychotic affective disorders; and schizoid, schizotypal, and paranoid personality disorders (Raine, 2006; Kwapil et al., 2008; Lenzenweger, 2010; Kwapil and Barrantes-Vidal, 2013). Schizotypy is considered to be a personality organization involving an aggregate of cognitive, behavioral, and emotional traits and experiences distributed throughout the population along a dynamic continuum of adjustment that ranges from psychological well-being, to schizophrenia-spectrum personality disorders, to full-blown psychosis (Claridge, 1997). Along this continuum we might find "intermediate" phenotypic expressions of these sets of traits and experiences that, though not reaching

clinical levels, would be associated with elevated current psychopathological intensity, severity, and social impairment (Kwapil et al., 2008; Horan et al., 2008; Yung et al., 2009; Gooding and Pflum, 2011; Fonseca-Pedrero et al., 2011; Debbané et al., 2013; Cella et al., 2013).

Empirical evidence indicates that individuals from the general population with high scores on schizotypal self-reports are at heightened risk for the later development of psychotic disorders (Chapman et al., 1994; Poulton et al., 2000; Gooding et al., 2005; Nordentoft et al., 2006; Dominguez et al., 2011; Kwapil et al., 2013; Werbeloff et al., 2012; Zammit et al., 2013). Similar results are found in the offspring of patients with schizophrenia (Shah et al., 2012), in patients with schizotypal personality disorder (Woods et al., 2009), and in those with prodromal symptoms (Morrison et al., 2006). Collectively, these findings suggest that schizotypal experiences and traits represent the behavioral expression of liability to psychotic disorders (van Os et al., 2009; Linscott and van Os, 2013).

The goal of the "psychometric high-risk" paradigm is the early detection of individuals at heightened risk for psychosis, using

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their score profiles on self-report measures. This paradigm is considered a reliable, valid, and useful method for the psychometric detection of individuals at risk for psychosis. In comparison to other techniques, the use of these tools constitutes a rapid, efficient, and noninvasive method of assessment. The Schizotypal Personality Questionnaire (SPQ) (Raine, 1991), and the Chapman Scales (Kwapil et al., 2008), are the self-report measures most widely used for schizotypy assessment. The SPQ is of particular utility toward this end, given that it spsychometric properties have been extensively analyzed in previous research (Chen et al., 1997; Fossati et al., 2003; Wuthrich and Bates, 2006; Fonseca-Pedrero et al., 2008; Compton et al., 2009a; Cohen et al., 2010; Fonseca-Pedrero et al., 2014).

The literature consistently holds that schizotypy is a multidimensional construct; however, several competing models describe different dimensions. Among the most widely replicated models is the three-factor model proposed by Raine et al. (1994). This model comprises Cognitive-Perceptual (Positive), Interpersonal (Negative), and Disorganized dimensions (Reynolds et al., 2000; Fossati et al., 2003; Badcock and Dragovic, 2006; Wuthrich and Bates, 2006; Bora and Arabaci, 2009a). However, the Stefanis et al. (2004) (Paranoid) model, which includes Cognitive-Perceptual, Interpersonal, Disorganization, and Paranoid dimensions, has also been replicated. Indeed, the goodness-of-fit indices found for the Stefanis et al. (2004) model are similar to or even better than those reported for Raine's model (Wuthrich and Bates, 2006; Bora and Arabaci, 2009b; Compton et al., 2009a; Fonseca-Pedrero et al., 2014). Notably, although the dimensionality of schizotypy has been exhaustively analyzed, it is still unknown whether the dimensions of schizotypy, measured via the SPQ, are invariant or equivalent across cultures.

The evaluation of measurement invariance (Horn and McArdle, 1992; Meredith, 1993) is important for determining the generalizability of latent constructs across groups. In the study of measurement invariance or measurement equivalence, one goal is to analyze whether the measurement instrument and the construct being measured are operating in the same way across diverse samples of interest. When comparisons between groups (e.g., Spanish and American college students) are made, it is typically assumed that the measurement instrument, the number of factors, the factor loadings, the item content, and the underlying construct behave in the same manner across the groups being compared (Byrne and Stewart, 2006; Byrne, 2008). However, this assumption must be tested. It is crucial to examine the measurement invariance of the assessment tool so that findings based on comparisons of the groups can be valid. Thus, it would be inappropriate to make comparisons with respect to schizotypy dimensions if, for example, American and Spanish college students interpret the content of the items differently or if the instrument does not behave in the same way across groups (Ortuño-Sierra et al., 2013). If measurement invariance does not hold, inferences and interpretations drawn from the data may be erroneous or unfounded.

As yet, there has been no in-depth examination of the question of whether the dimensional structure of the SPQ is invariant across cultures. According to Kwapil et al. (2012) findings of comparable dimensional structures in cross-cultural samples would lend further support to the continuum model of schizotypy and schizophrenia spectrum disorders, and would provide evidence of the validity and utility of the SPQ scores for cross-cultural research. The present study examined the cross-cultural invariance of the factor structure of the SPQ scores in large samples of Spanish and American college students. Evaluations of measurement invariance provide essential construct validity evidence for schizotypy dimensions and the cross-cultural validity of SPQ scores. We hypothesized that the Stefanis et al. (2004) model would be invariant across the samples.

2. Method

2.1. Participants

The final sample was made up of 2313 (508 men, 22%) university students from Spain and the United States. These samples have been used in previous work (Compton et al., 2009a; Fonseca-Pedrero et al., 2014). The mean age of the sample as a whole was 20.5 years (S.D.=3.2). The final Spanish sample was composed of a total of 1123 university students (19.9% male, n=224) from different courses at three Spanish institutions, the University of Oviedo (Education and Psychology), the University of La Rioja (Education) and the University of La Laguna (Psychology). The mean age of the Spanish participants was 20.2 years (S.D.=2.0), with a range of 17–29. Just 2.2% of the sample reported having a first-degree relative who had been diagnosed with a psychotic disorder or schizophrenia, while 11.1% reported having a first-degree relative with some other psychological disorder. The total number of American students was 1190 (23.9% male; n=284); all were enrolled at an urban state university in the southeastern United States. The mean age of the American participants was 20.9 years (S.D.=4.0), with a range of 17–50. Comparison of the two subsamples yielded statistically significant differences in age (t=5.54; $p < 0.001$) and sex (χ^2=5.18; p=0.023).

2.2. Measure

The Schizotypal Personality Questionnaire (SPQ; Raine, 1991) is a self-report instrument made up of 74 items with a dichotomous response format (Yes/No). The instrument was developed for measuring schizotypal traits according to DSM criteria (American Psychiatric Association, 1987). Items are distributed across nine subscales: odd beliefs or magical thinking, unusual perceptual experiences, ideas of reference, paranoid ideation/suspiciousness, excessive social anxiety, no close friends, constricted affect, odd or eccentric behavior, and odd speech. The psychometric properties of the SPQ have been widely analyzed (Fossati et al., 2003; Wuthrich and Bates, 2006; Fonseca-Pedrero et al., 2008; Compton et al., 2009a). In the present work we used the version adapted and validated for the Spanish context (Fumero et al., 2009) and the English version (Raine, 1991). The Spanish adaptation was constructed in line with international guidelines for the translation and adaptation of tests (Hambleton et al., 2005; Muñiz et al., 2013). The reliability of the SPQ scores for the Spanish sample in the present study ranged from 0.80 to 0.91; for the American sample, SPQ subscale reliabilities ranged from 0.70 to 0.83.

2.3. Procedure

In Spain, the measurement instrument was administered to groups of 10–50 students, during normal lecture hours, and in a room with the appropriate conditions. The study was presented to the participants as a research project on diverse personality traits. It was stressed that participation was voluntary and students were given assurances of the confidentiality of their responses. They received no type of incentive for taking part. Administration of the measurement instrument was always under the supervision of a researcher. This study is part of a broader research initiative on early detection of and intervention for psychological disorders in early adulthood and the analysis of psychopathological and personality variables. The study was approved by the research and ethics committees at the University of Oviedo, University La Rioja, and University of La Laguna.

For the American sample, individuals aged ≥ 18 years who were enrolled in introductory psychology classes were invited to participate via a recruitment statement posted on an online program used to manage the undergraduate research participation pool. Interested students reviewed an online informed consent form before proceeding to the survey, and then completed a set of confidential, web-based questionnaires. Automated data entry produced computerized survey data files for data cleaning and analysis. Participating students received course credit, though students were not required to participate in this or any other study. Collection of the data was approved by the Institutional Review Board at Georgia State University.

2.4. Data analyses

First, descriptive statistics were calculated for the SPQ subscales in both samples. Second, we conducted several Confirmatory Factor Analyses (CFAs) for testing different factorial models of schizotypy (Table 1). Given the continuous nature of the variables, the method used was maximum likelihood estimation with robust standard errors. Goodness-of-fit to the sample data was determined on the basis of multiple indices: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). Hu and Bentler (1999) suggested that RMSEA should be 0.06 or less for a good model fit and CFI and TLI should be 0.95 or more, though any value over 0.90 tends to be considered acceptable. As an alternative method of comparing competing models, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), two information-theory approaches to