# Confirmatory Factor Analysis of the Telugu Version of the PRIME Screen-revised (PS-R), a Tool to Screen Individuals at Clinical High-Risk for Psychosis

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# Confirmatory Factor Analysis of the Telugu Version of the PRIME Screen-revised (PS-R), a Tool to Screen Individuals at Clinical High-Risk for Psychosis

Dear Editor,

Research from India on studying clinical high-risk psychosis (CHRP) has begun only recently.[1,2] Commonly, studies assessing CHRP in India have predominantly focused on help-seeking populations, especially relatives of patients with psychotic disorders.[2,3] Both brief screening tools and structured interviews have been used, albeit independently.[1-3] For India, where voluntary help-seeking for subsyndromal symptoms is a significant challenge,[4] identifying CHRP individuals by screening for them in the community becomes the most crucial element. The self-rated PRIME Screen-Revised (PS-R),[5] a commonly used tool to screen CHRP, has been previously used in India. The Hindi-translated version of PS-R could identify 6.10%, 19.35%, and 52.94% CHRP from community samples in unaffected siblings and those referred for prodrome assessment, respectively.[1]

PS-R has also been translated into Telugu, and its preliminary factor structure was explored for screening a community sample.[6] Exploratory factor analysis (EFA) showed that three latent factors significantly loaded items of the scale. The latent factors were inferred to represent "positive symptoms of schizophrenia and distress" (items 7–12), "positive schizotypy" (items 4–6), and "apophenia and magical foretelling" (items 1 and 2).[6]

In a study sample independent of the one used for EFA, we aimed to conduct a confirmatory factor analysis (CFA) to confirm the three-factor solution of the Telugu version of PS-R and expand the process of adaptation and validation of the tool.[7]

The study was approved by the institutional ethics committee (IEC) (AIIMS/BBN/IEC/AUG/2021/84), and written informed consent was taken from all the participants. Data for the CFA were collected using a cross-sectional community-based household study. Four villages/gram panchayats (Rangapur, Kandalkuntlathanda, Thimmapur, and Peddaparvathapur) from a rural area—Bommalaramaram—and four wards (Ward nos. 4, 18, 28, and 32) from an urban area—Bhongir—from the Yadadri-Bhuvanagiri district of Telangana were chosen. Based on probability sampling, data on PS-R from 542 (273 rural and 269 urban) youth aged 15–24 years were included in the analysis (please see Tikka et al.[6] for a detailed sampling procedure). Sample characteristics are given in **Supplementary Table 1**. The sample size was sufficiently significant compared to the recommended 300 samples, per the customary "rule of thumb" for conducting factor analysis. CFA was conducted using an open-source software, *Jamovi* version 2.3.28, which uses the maximum likelihood estimation (MLE) method. For the model to be considered a "good fit," the Comparative Fit Index (CFI), the Tucker–Lewis Index (TLI), and the root mean square error of approximation (RMSEA) needed to be >0.9, >0.9, and <.005, respectively.

In the final EFA model, item 3 of the PS-R was excluded due to a low communality score (0.21). Low communality indicates the low ratio of the unique variance of the specific item to its shared variance and, therefore, needs to be excluded. Item exclusion due to low communality suggests the presence of an additional latent factor that may be explored further by adding more items related to the excluded item in future studies.[8] Nevertheless, we persisted in excluding item 3 from CFA, too. CFA was conducted on 11 items and 3 factors.

The CFA showed that this factor solution is statistically significant ($\chi^2$ = 87; $p$ < .001) and has a CFI of 0.932, TLI of 0.908, and RMSEA of 0.045, confirming a good model fit. **Figure 1** shows items, latent factors, and standardized regression coefficients in the CFA path diagram.

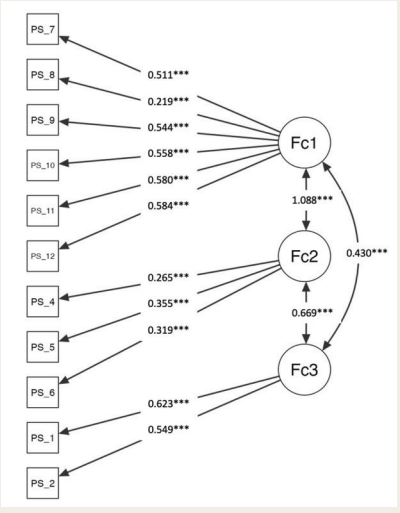
The CFA confirms the factor solution we found in the EFA and therefore validates "positive symptoms of schizophrenia and distress," "positive schizotypy," and "apophenia and magical foretelling" as three substantive factors for PS-R. Although PS-R's use in English-speaking populations is well documented,[9] other language versions of PS-R are yet to be developed elsewhere. However, Kenyan[10] and Spanish[11] language versions of the original PRIME Screen (PS) are in use. Specifically, the Spanish version, like the Telugu version of PS-R, found a three-factor solution.[11] The three factors were inferred as "alteration of setting," "sensorial-perceptual abnormalities," and "alterations of self-skills." As the structures of PS and PS-R are distinct, it is difficult to draw parallels from each of their latent factors.

This CFA validation is more important because the latter two factors were shown to have low-reliability scores (Cronbach's alpha = 0.408, viz., <0.5) in the EFA.[6] Even though underestimated reliability scores might have been spuriously produced because these two factors loaded onto too small a number of items (three and two items, respectively), violating the "tau equivalent model" on which Cronbach's alpha is based,[12] future studies might explore adding more items for each of these factors to enhance the reliability.

Having shown the goodness of fit for the factor structure of the Telugu version of the PS-R, there is a further need to

**FIGURE 1.**

**Confirmatory Factor Analysis (CFA) Path Diagram.**




Rectangles indicate the 11 items: The three circles represent latent factors (Fc1, 2, and 3); the lines represent the causal effects, and the values are the standardized estimates of factor loadings.
**$p$ < .001.

explore its concordant and predictive validity. These aspects are crucial because PS-R is a screening tool that requires further validation of those screened positive using a "gold-standard" structured interview. It needs to be seen how many of those screened positive on PS-R go on and develop the onset of psychosis.

**Declaration of Conflicting Interests**

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Ethical Approval and Informed Consent**

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**Supplemental Material**

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