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Subclinical psychotic symptoms in Indian adults: Application of the Community Assessment of Psychic Experiences (CAPE)

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Abstract

Background: The study investigated the psychometric properties of the Community, Assessment of Psychic Experiences (CAPE-42), a self-report instrument in Indians.

Method: CAPE-42 was translated in Hindi and tested on 312 Indian adults recruited online and through paper-pencil assessment. Confirmatory factor analysis (CFA) was employed to establish the factor structure of the positive, negative and depressive dimensions of CAPE-42: the bifactor model was tested to evaluate whether items converge into a major single factor defining psychotic-proneness in individuals. Latent class analysis (LCA) was conducted to identify subgroups with a different endorsement of subclinical psychotic symptoms.,

Results: CAPE-Hindi showed good reliability (Cronbach's alpha>0.80). CFA confirmed, a good fit for the bifactor model, factor loading was acceptable for all items in the general factor (Omega-h =0.83) and explained the primary variance of the subscales. Residual variance was explained by the positive, negative and depressive factors (Omega H =0.33, 0.04 and 0.12, respectively). LCA identified three classes traceable, to the three dimensions; a low endorsement group (n = 155; 50

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Appendix A. Supporting information

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Conflict of interest

None of the authors have any conflict of interest.

%); a less consistent, group with endorsement on positive and depressive items (n = 117; 38 %), and a high, endorsement group (n = 40;13 %).

Conclusion: Hindi CAPE-42 showed good reliability and factorial validity

Keywords

CAPE-42; Psychometry; Indian adults; Psychosis proneness

1. Introduction

The phenotype of psychosis lies on a continuum of severity ranging from schizophrenia in the clinical population on the one end to subtle psychotic-like experiences (PLEs) in the general population at the other end (Van Os et al., 2000, 2001). A meta-analysis revealed the mean prevalence rate of PLEs to be 5.3 % in the general population (Van Os et al., 2009). Evidence from cross-national studies suggests that psychotic symptoms range from 4.8 % (delusion of control) to 8.37 % (delusions of reference and persecution) in the general population and that the presence of a single psychotic symptom is related to an overall decline in health status, irrespective of a clinical diagnosis (Nuevo et al., 2012). About 1–3 % of the non-clinical population experience severity of delusional symptoms akin to that seen in clinical populations, with 10–15 % in the non-clinical population experiencing delusions regularly (Freeman, 2006). Thus, early detection of subclinical psychosis in the general population would enable early intervention, thereby reducing the illness burden.

The continuum hypothesis does not measure psychosis as ‘present’ or ‘absent’, but views psychosis as a quantitative trait continuously distributed in the general population as measured by different symptom dimensions (Johns and Van Os, 2001). This suggests that psychosis is present in the general population with attenuated expression as seen in schizotypy (Stefanis et al., 2002). Past research on schizophrenia and schizotypal traits has typically yielded 3 dimensions of ‘positive’, ‘negative’ and ‘disorganization’ or ‘social impairment’ symptoms (Peralta and Cuesta, 2001). However, past studies excluded affective symptoms despite evidence from cross-sectional, longitudinal and family studies suggesting a strong correlation between schizotypy and depression (Sax et al., 1996; Taylor, 1992; Van Os et al., 1999). Thus, Community Assessment of Psychic Experiences (CAPE) was developed in an attempt to capture the three dimensions: positive, negative and depressive (Stefanis et al., 2002). Symptom dimensions of ‘mania’ and ‘disorganization’ were deliberately excluded since population surveys are unlikely to report these experiences accurately in self-report instruments like the CAPE (Mann, 1986). Moreover, schizotypy scales like the one developed by Peters et al. (1999) were incomplete and measured a few symptoms in attenuated form. In order to allow for comparison between clinical patients and the general population, a comprehensive scale capturing the full range and expression of clinical psychosis in the community was developed in the form of the CAPE-42 (Stefanis et al., 2002).

Stefanis et al. (2002) provided the first empirical evidence for the factor structure of CAPE-42 using confirmatory factor analysis (CFA). The study conducted on 932 young healthy Greek males found the three-factor solution to be superior to the unidimensional and

the two-factor models. The authors found support for the three independent but correlated dimensions of psychosis, demonstrating the depressive symptom as a significant underlying dimension of psychosis-proneness. The correlation among positive, negative and depressive dimensions was in the range of 0.7, and the scale showed good discriminant validity against previously established scales. Subsequent validation studies by the same research group and their collaborators in the Netherlands, France, and Greece found support for the three-factor solution (Hanssen et al., 2003; Stefanis et al., 2004; Verdoux et al., 2003). Other independent researchers like Brenner et al. (2007) conducted a validation study for the French and the English version of the instrument on a relatively large non-clinical sample of 2275 individuals in Montreal, Canada. They found a good fit for the three-factor, four-factor and five-factor models without observing an improvement for the alternative four-factor and five-factor solution. However, the Spanish version of the scale did not find adequate support for the three-factor solution through CFA. Still, an exploratory factor analysis demonstrated a parsimonious empirical support for the three-factor solution when conducted on students and patients with psychosis (Fonseca-Pedrero et al., 2012).

Researchers from non-Western countries attempted to validate CAPE-42 in other languages (Mark and Toulopoulou (2017). Chinese version conducted on 669 adolescents and young adults did not find the three-factor solution to be an acceptable fit for the 42-item scale, however, reducing the CAPE to 15 items conformed to the three dimensions of positive, negative and depressive symptoms. Thus, the factor structure and item number and loadings may be variable for translated versions (Mark and Toulopoulou, 2016). More recently, the Persian version of CAPE-42 conducted by Mirzaei Poueenak et al. (2021) on 909 individuals supported the three-factor model with good reliability and validity.

A statistical method employed to investigate the continuum hypothesis of psychosis and its risk in the general population is Latent Class Analysis (LCA) (Gale et al., 2011). LCA identifies subgroups (classes) in the sample for probabilistic endorsement of PLEs to study the underlying latent (unobserved) patterns of their experiences. This means that individuals within a class will share a similar probabilistic response endorsement for the symptoms of CAPE, while individuals in another class will have different endorsement responses. Using LCA, some authors reported a three-class solution for PLEs (Gale et al., 2011; Mamah et al., 2013; Pionke et al., 2020; Sahu et al., 2020), while others found a four-class solution (Pignon et al., 2018; Rocchi et al., 2008; Shevlin et al., 2007). A longitudinal twin study used LCA on CAPE-42 to identify two developmental subgroups: a Persistent group and a Low group (lower expression of attenuated psychosis) (Wigman et al., 2011). The authors found that the Persistent group reported significantly more negative and depressive symptoms with significantly worse daily functioning when compared with the Low group. Thus, if PLEs persist, they have a higher likelihood of transitioning to clinical psychosis.

The factor structure of CAPE-42 has not yet been investigated on the Indian population. India has an estimated population of 1.38 billion inhabitants. The current study aimed to investigate (i) the factor structure and psychometric properties of CAPE-42 on an Indian sample, and (ii) the use of CAPE-42 to identify psychosis proneness in Indians.

2. Methods

2.1. Procedure

The study was approved by the Institutional Ethics Committee at ABVIMS-Dr. RML Hospital New Delhi, as well as by the Ethics Committee of the Sant Joan de Deu Foundation in Spain. This study is part of the ECLECTIC study, which explores the prevalence of psychosis proneness across countries and its correlates from a multidimensional perspective (Siddi et al., 2019).

The survey was conducted in two formats: a) paper pencil survey administered by trained research personnel, b) online survey using Google form that was circulated through WhatsApp mobile application. The survey was conducted between July 2018 and July 2020.

2.2. Sample

The sample consisted of individuals from the general population of the country.

The paper pencil survey was conducted on the general population from New Delhi after written informed consent. Participants were 18–65 years old and were required to exclude any experiences where they might have been under the effects of drugs or alcohol. No two participants from the same family were recruited. The paper pencil survey was conducted between June 2018 to August 2019. Surveys were conducted by trained research personnel who used the convenience sampling method to recruit participants.

The online survey format was circulated among Indians residing in different parts of the country with access to the WhatsApp application. The research team circulated the survey within their network of friends and family residing in different parts of the country. The online survey was designed such that all the information about the study was provided in the beginning followed by a checkbox for informed consent. Only those who consented to participation by checking the box could proceed further to answer the questionnaire, while for those who did not consent, the survey on Google forms did not proceed further. Inclusion criteria was both genders, individuals between 18 and 65 years and Indians residing in India. Responses from mental health professionals like psychiatrists, psychologists and social workers were deliberately excluded to prevent bias. In order to exclude duplicate online entries (two or more entries from the same email address), only the first response was retained.

2.3. Community Assessment of Psychic Experiences (CAPE)

CAPE (http://cape42.homestead.com/) is a 42-item self-report measurement of PLEs in the general population. It is primarily based on the 21-item Peters et al. Delusions Inventory that measured delusion ideation on a dimensional scale in the general population (Peters et al., 1999). CAPE-42 contains three symptom dimensions of PLEs: positive (20 items), negative (14 items) and depressive (8 items) (Stefanis et al., 2002). It has two scales: namely, (i) the frequency scale that rates frequency of the symptom dimension on a 4-point rating scale (‘never’, ‘sometimes’, ‘often’, and ‘almost always’), and (ii) the distress scale that rates the degree of distress of each dimension as ‘not distressed’, ‘a bit distressed’,

'quite distressed' and 'very distressed'. The distress scale was omitted as the current study aimed to investigate the frequency of PLEs in the general population and establish the three dimensions' factor structure. For the purpose of the current study, CAPE was translated from English to Hindi by a licensed clinical psychologist fluent in both English and Hindi. The translation was subsequently verified by a licensed psychiatrist well versed in both languages, who further simplified the terms according to the semantics and pragmatics of the spoken Hindi language. The scale was back translated into English by an Ayurveda practitioner fluent in both languages. A joint meeting of all translators was held to ensure that Hindi equivalent terms were generated for all items and that words were arranged into sentences to reflect the syntax of the Hindi language. The scale was then tested in Hindi on a few people from the general population to check for comprehension. After the tool was found acceptable, it was used in the study, and circulated in a bilingual English-Hindi format. Since the three dimensions differed in the number of items that defined them, for each dimension scores were calculated as the sum of the responses to the items belonging to the dimension weighted for the number of the items. This allowed providing a similar metric for each dimension.

2.4. Statistics

The analysis was done with the Statistical Package for Social Sciences (IBM Corp., 2020), version 27, and dedicated packages running in R (R Core Team, 2020). All tests were two-tailed, with alpha set at $p < 0.05$. Means with standard deviation, or counts and percentages, were used to report descriptive statistics.

2.4.1. Sample size justification—The primary aims of the study were to investigate the factor structure of the bilingual English-Hindi CAPE in an Indian sample and evaluate the distribution of psychosis-proneness, as measured by the CAPE, in this Indian sample. We decided to use confirmatory factor analysis (CFA) for the first goal and latent class analysis (LCA) for the second goal. The minimum sample size was set to 300 participants. Both rule-of-thumb and simulation studies suggest that this sample size is enough to obtain convergence of the model and an adequate estimation of the parameters for CFA (Boomsma, 1985), even when using ordered categorical data and mean-and variance-adjusted estimation (Myers et al., 2011), as used in this study. A sample size of 300 participants is enough to get convergence and estimation of parameters for LCA (Nylund-Gibson and Choi, 2018).

2.4.2. Confirmatory factor analysis—Reliability was measured as internal coherence using Cronbach's alpha and the McDonald omega as estimated by CFA. The CFA is used to verify the number of factor (or dimensions) structure of the observed variables, testing the model observed in previous research. CFA was applied to the CAPE items to test the standard three-factor model (positive, negative and depressive symptoms). Since Mardia's test (Mardia, 1970) revealed a violation of multivariate normality in the data (skew's $p < 0.0001$), the Diagonally Weighted Least Squares (DWLS) estimator was used in CFA. The DWLS is known to work well under several conditions, including small samples and non-normal data (Rhemtulla et al., 2012). The goodness of fit estimation was assessed with the following parameters: the chi-square, the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square

Residual (SRMR). In the presence of chi-square with $p < 0.001$, as expected with large samples ($n > 300$), RMSEA values of 0.08 or lower, SRMR values of 0.09 or lower, and CFI values of 0.90 or higher were considered an indication of acceptable fit according to conventional rules of thumb (Hu and Bentler, 1999).

Three implementations of the three-factor model have been tested: the standard three-factor correlated model; a hierarchical model with the expected three factors correlating with each other and converging into a second-order factor of propensity to psychosis; and a bifactor implementation of the three-factor model. In a bifactor model, most variance is expected to be explained by a general factor resulting from the loading of all items on a single dimension of "propensity to psychosis", with additional residual variance explained by the items pertaining to each dimension and loaded on their proper scale, which resulted in three independent orthogonal factors (Reise, 2012). Since the bifactor models tend to overfit, we checked the unidimensionality of the general factor extracted from the bifactor model. The following indicators were used: the explained common variance (ECV), the percentage of uncontaminated correlations (PUC), and Omega Hierarchical (see Rodriguez et al., 2016). All these indexes range from 0 to 1. As a rule, ECV is expected to be higher than 0.70; however, with PUC> 0.80, general ECV values are less important in predicting bias; when PUC< 0.80, ECV higher than 0.60 and Omega Hierarchical higher than 0.70 provide evidence that some multidimensionality is not severe enough to disqualify the interpretation of the instrument as primarily unidimensional (Rodriguez et al., 2016). The Relative Omega was computed, too, i.e., the ratio of Omega Hierarchical to the Omega, an estimate of the percentage of the reliable variance in the multidimensional structure attributable to the factor in itself (details in Rodriguez et al., 2016). These indicators were calculated with the package "BifactorIndicesCalculator" running in R (Dueber and Toland, 2021).

2.4.3. Latent class analysis—After establishing the best factor structure of the CAPE, we explored the distribution of scores in the sample with LCA. Model selection was conducted according to fit indices such as likelihood ratio (−2 *Ln(L)); a variant of the Akaike Information Criterion (AIC; Akaike, 1987), the consistent AIC (cAIC; Bozdogan, 1987), the Bayesian information criterion (BIC;Schwarz, 1978) and the sample-size adjusted BIC (SSABIC: Sclove, 1987). For each of these indexes, lower values indicate a better fit. The Lo–Mendell–Rubin's adjusted likelihood ratio test (LRT; Lo et al., 2001) was also used to compare models with different numbers of latent classes. A standardized entropy measure was used to assess accuracy in participants' classification (values range from 0 to 1), with higher values indicating better classification. Finally, we tested the association between classes' membership and demographic (i.e., gender and age) or clinical (e.g. cannabis use) variables.

3. Results

3.1. Sample

The survey was answered by a total of 328 participants (n = 143 online, and n = 185 paper pencil). Indians residing outside India (n = 10) and duplicate online entries (n

= 6) were excluded. For analysis 312 participants were included, 180 men (58 %) and 132 women (42 %). Their ages ranged from 18–65 years averaging 37 ± 13 years. Most participants were married (n = 200 [64 %]), and most had a higher education level (college or university degree: n = 200 [64 %]). There was no difference between the online and paper-pencil groups in age and marital status. The paper pencil had slightly more males (63 %) compared to the online group (50 %), although the two groups were balanced in gender. Tobacco smoking was reported by 70 participants (22 %); alcohol use was reported by 112 participants (36 %). A minority reported information on cannabis use, and 13 out of 185 (7 %) admitted to cannabis smoking. Among respondents, the frequency of use of cannabis was related to the frequency of tobacco smoking (Spearman's rho: 0.235, $p = 0.001$) and alcohol use (Spearman's rho: 0.323, $p < 0.0001$).

3.2. CFA of the CAPE in the Indian sample

All models were identified. Fit of the models was excellent, and there was no real advantage of a model over the others (Table 1).

Estimated Cronbach's alpha were 0.81 for the positive dimension, 0.82 for the negative dimension, and 0.83 for the depressive dimension, with McDonald'ω being, 0.79; 0.82; and 0.83 respectively.

In the hierarchical model, the McDonald'ω was 0.82 for the second-order factor, while in the bifactor model, the McDonald'ω for the general factor was 0.91.

As for the bifactor model, the indicators of adequacy were: ECV= 0.74; PUC= 0.64. The reliable variance explained by each factor (omega H), was 0.83 for the general factor; 0.33 for the positive dimension; 0.04 for the negative dimension; and 0.12 for the depressive dimension.

3.3. LCA of the CAPE in the Indian sample

A 3-class repartition of the sample was the best compromise among the information criteria indicators. Indeed, while the likelihood ratio decreased progressively from 1-class solution to 6-class solution, the cAIC increased after the 2-class solution, the BIC did that after the 3-class solution, and the ssBIC did not vary relevantly after the 3-class solution (Fig. 1).

Entropy was 0.89, which is an acceptable level of accuracy of classification for the 3-class solution.

The 3-class solution included a majority (n 155; 50 %) of participants with a very low endorsement of most CAPE items; a less consistent subgroup of 117 (38 %) participants, with a propensity to endorse positive and depressive items on the CAPE; and 40 participants (13 %) representing the third class, with a high endorsement of pretty all CAPE items (Fig. 2).

3.4. Distribution of socio-demographic and clinical indicators by CAPE class membership

There were no differences by gender across classes. As expected, younger people were more likely in the high endorsement class (Table 1).

We also tested the accuracy of the distribution by class of items endorsement and calculated the distribution of mean scores of CAPE dimensions by class. Since the dimensions of the CAPE have different numbers of items, factor scores were calculated by summing up the score of each item and then averaging for the number of items in the factor. The class membership effectively distinguished the CAPE scores, with participants in the high endorsement class reporting that the investigated PLEs occurred to them with a frequency of sometimes or often.

Finally, those in the high endorsement class were more likely than those in the other two classes to admit to tobacco and cannabis smoking (see Table 2 for details).

4. Discussion

CAPE-42 was developed with the aim to identify the distribution of the psychosis phenotype in the population (Stefanis et al., 2002). It has been validated in the general population (Konings et al., 2006), as well as in several languages (Brenner et al., 2007; Fonseca-Pedrero et al., 2012; Keřková and Martínková, 2019; Mark and Toulopoulou, 2016; Mirzaei Poueenak et al., 2021). Our study found the English-Hindi version of the CAPE-42 to conform well to the three-factor structure observed in the above studies. All three implementations of the three-factor solution namely, the standard three structure model, the hierarchical model and the bifactor model demonstrated an optimal fit. The current study, therefore, corroborates previous research from diverse cultures on the three-dimensional phenotype of psychosis in the general population, providing further evidence for the depressive symptom to be an important dimension of the psychotic phenotype (Pignon et al., 2019; Ragazzi et al., 2020; Stefanis et al., 2002). The instrument was found to have high internal consistency with reliability scores above 0.7. A previous study by the authors demonstrated the convergent and the divergent validity of the English-Hindi CAPE-42 with the Hindi version of the Launay-Slade Hallucinations Scale-Extended (LSHS-E, Sahu et al., 2020). The LSHS-E measures hallucination like experiences (positive symptoms) in the general population (Larøi et al., 2004; Larøi and Van Der Linden, 2005). As expected, the positive dimension of the CAPE had better correlation with the LSHS-E when compared with the negative and the depressive dimensions. Thus, the English-Hindi CAPE-42 is both a reliable and valid measurement of the psychotic phenotype in the general population of India.

LCA revealed the three-factor solution to best the best fit as found in previous studies (Gale et al., 2011; Mamah et al., 2013; Pionke et al., 2020). This further corroborates evidence for the continuum hypothesis of psychosis. Majority of the sample belonged to the class with low endorsement on the CAPE items. The class with the highest endorsement profile was a mere 13 %; however, certain sociodemographic correlates of this class must be discussed. Expectedly, this class consisted of younger people below 30 years of age. This class also reported tobacco smoking and cannabis use more than the other two classes. This finding is in line with previous studies suggesting that the consumption of tobacco and cannabis is associated with the onset of psychosis (Compton et al., 2009; Dragt et al., 2010; Gurillo et al., 2015; Riala et al., 2005). In fact, cannabis use has been found to be associated with the age at onset of the prodrome (Leeson et al., 2012). More recent research found aberrant

salience to mediate the relationship between cannabis use and PLEs (Anglin et al., 2019). Aberrant salience is an underlying cognitive mechanism that assigns salience to neutral stimuli, which is then experienced as distressing in psychosis (Kapur, 2003). Cannabis use combined with aberrant salience in younger individuals results in misjudging neutral stimuli, further leading to the experience of psychotic phenomena as clinically distressing (Anglin et al., 2019). This cognitive mechanism explains the risk of psychosis conversion in the high endorsement class, especially for those individuals in this class with frequent cannabis use.

We also found an intermediate class with a probabilistic endorsement of the positive and the depressive items. One explanation for this finding might be due to the overlap in the sensitivity between the depressive and the negative symptoms. Some items for negative symptoms in psychosis are sensitive to the items for depressive symptoms, however, discrimination between negative and depressive symptoms is usually made based on cognitive symptoms of sadness, pessimism, feelings of guilt, hopelessness and failure (Kibel et al., 1993). Further investigation may throw light on the nature of endorsement of the CAPE that could allow for a finer distinction of the negative and the depressive symptoms among the Indian population, although the endorsement of depressive symptoms is encouraging and implies the significance of depressive symptoms as an important dimension of psychosis.

Furthermore, longitudinal studies have reported that depression is associated with the development of positive symptoms of hallucinations and delusions, as well as subclinical experiences in non-clinical samples, which may indicate depression causal influence in triggering distressing experience (Hartley et al., 2013). Evidence from brain imaging studies have also shown that affective symptoms and psychotic symptoms can co-occur in psychotic disorders due to shared brain areas between depression and hallucinations (Siddi et al., 2019). The authors suggest that the combined brain regions in the prefrontal cortex implied in both auditory verbal hallucinations and depression may indicate that depression plays a role in hearing voices. A more recent study by Zhuo et al. (2021) indicates an overlapping underlying pathological mechanism of auditory verbal hallucinations and depression in schizophrenia, suggesting an association between positive symptoms and affective symptoms. In fact, it is suggested that psychotic phenomenon should be routinely measured during epidemiological assessments of ‘common mental distress’ like anxiety and depression (Stochl et al., 2015). The authors in their longitudinal study on teenagers found that psychotic symptoms not only co-occur with depression and anxiety, but also indicate the severity of depression and anxiety in individuals from the general population, suggesting a common psychopathological factor.

4.1. Limitation

The study results must be interpreted in the light of certain limitations. Our study employed a relatively small sample when compared to validation studies in other countries using translated versions of CAPE-42 (Brenner et al., 2007; Fonseca-Pedrero et al., 2012; Mark and Toulopoulou, 2016; Mirzaei Poueenak et al., 2021). However, the sample size was large enough to employ estimation with CFA and LCA, the primary statistical analyses of our study. Moreover, the English-Hindi CAPE-42 is applicable for use among Hindi speaking

Indians. India is a large country with diverse languages and cultures, making it difficult to screen other non-Hindi speaking Indians. Validating the scale in different Indian languages would help in more widespread use and assessment among Indians.

Additionally, a statistical cross language equivalence of CAPE-42 in Hindi and English was not conducted, i.e. the instrument was not used in the same subject twice – once in English and another in Hindi. CAPE-42 items were translated and back-translated from English to Hindi and back to English to generate Hindi equivalent items that retained the language semantics. Thus, the survey was circulated in a bilingual format for both the paper-pencil and online recruitment for validation on an Indian sample.

Another important limitation is the two different recruitment methods. We used both paper-pencil recruitment and online recruitment methods. The online method was employed in an attempt to continue the recruitment of study participants in the pandemic in 2020. Measurement Invariance analysis studies between the paper-pencil and the online formats have shown contradictory results. A study on the LSHS-E in the Chilean population demonstrated equivalent psychometric properties between the online and the paper-pencil format (Quijada et al., 2022). Although, another study did not support measurement invariance regarding assessment methods of the CAPE in the Netherlands, showing that internet samples with high psychosis proneness scored lower on the total CAPE score when compared with the paper-pencil sample (Vleeschouwer et al., 2014). Our study could not assess the measurement invariance due to smaller sample size.

Other disadvantages of online surveys must be considered. Our online survey was circulated by the research group among their groups, friends, non-medical relatives, and acquaintances resulting in sampling bias. Participants recruited online are usually literate participants having an interest in the subject matter (Andrade, 2020), and those with access to smartphones and WhatsApp application. However, using certain precautionary methods in internet studies like incorporating lie scales, excluding respondents who give the same rating to all items, and other checks like requesting some demographic information (e.g. age, sex, occupation) twice in a disguised manner may help to filter out simulated responses as well as decrease false positives (Moritz et al., 2013).

Future studies must overcome sampling bias and recruit a more representative sample in a diverse country like India. We also suggest future researchers undertake regional validation studies for the CAPE-42 in different regional languages and dialects of the country. It would also be useful to compare patients with psychosis with non-patients for a better understanding of the continuity between clinical psychosis and the subclinical phenomenon in India.

5. Conclusion

CAPE-42 in Hindi is both a reliable and a valid assessment measure of PLEs in India. The study corroborates evidence from previous research on the dimensionality of the psychosis phenotype, providing further support for the distribution of psychosis on a continuum in the

general population. Thus, the Hindi version of the CAPE-42 may be used for screening for psychosis risk in Hindi speaking Indians.

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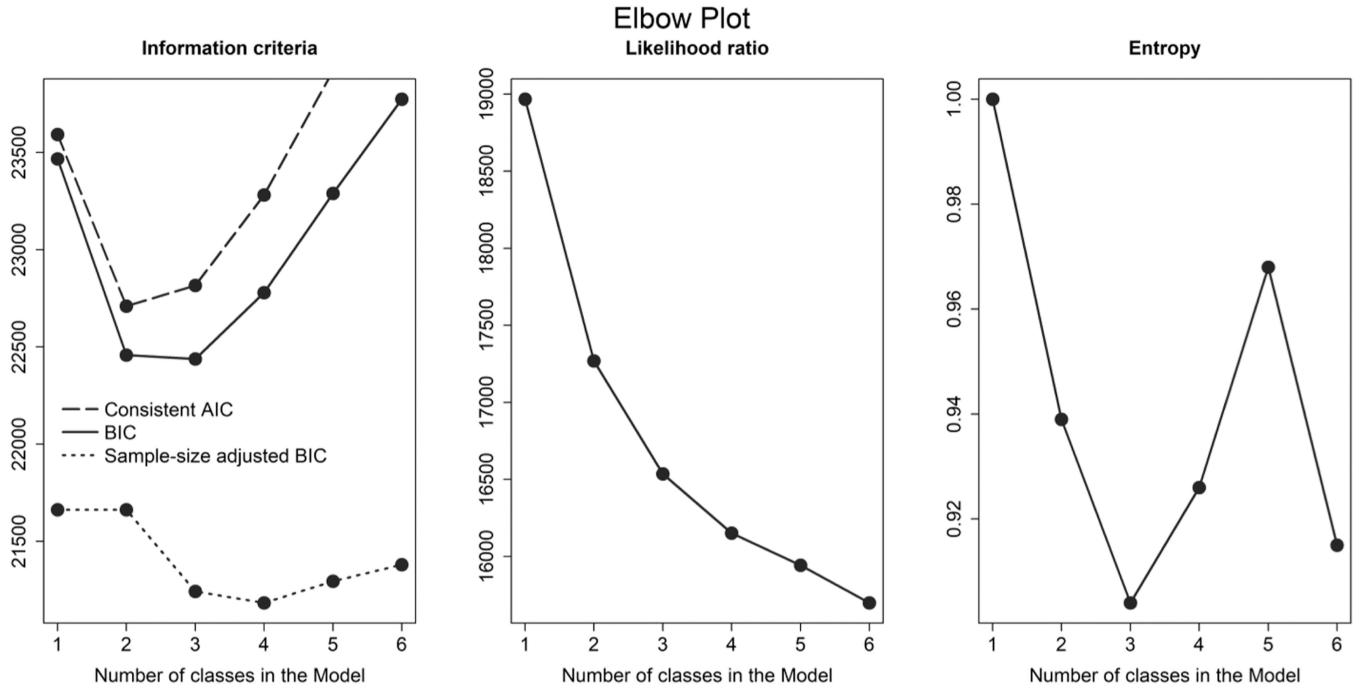

Fig. 1.

Three classes extracted by Latent Class Analysis. LCA fit indices for the total CAPE-42 score: Y-axis reports the value of each of the index scores considered; X-axis reports the number of latent class solution. The best solution is generally the solution with lowest index values: AIC=Akaike information criterion; BIC= Bayesian information criterion. A standardized entropy measure was used to assess accuracy in participants' classification (values range from 0 to 1), with higher values indicating better classification.

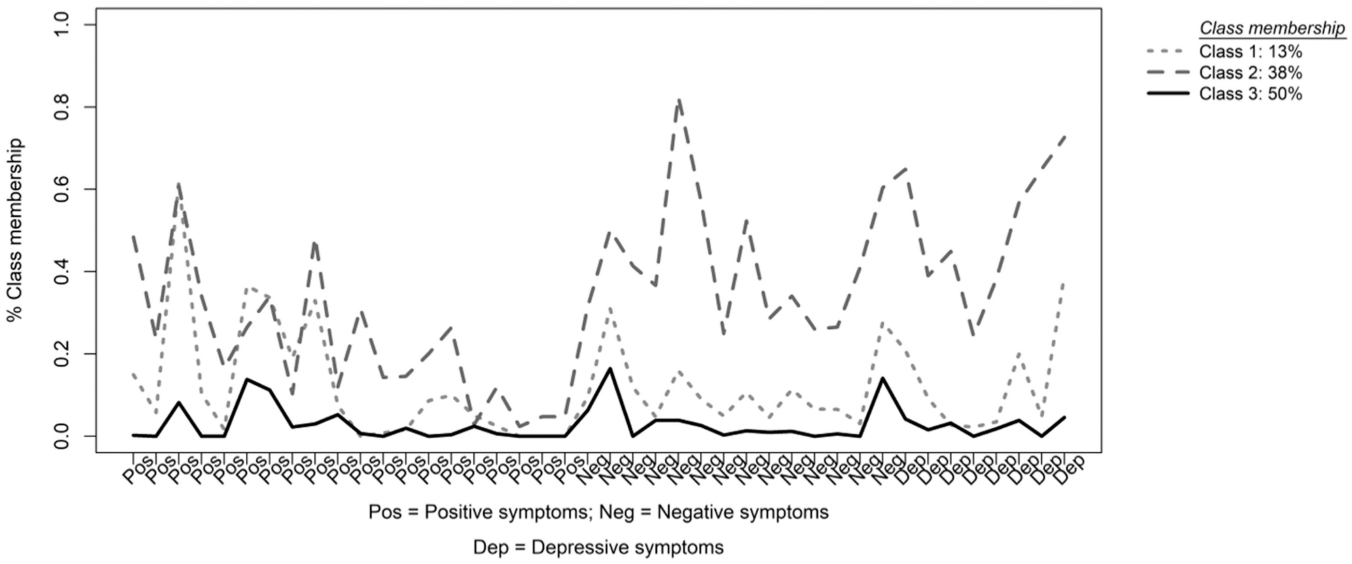

Fig. 2.

Profile plots for the 3-class solution: positive (PLEs), negative and depressive experiences. On the Y-axis class-specific mean scores as proportions of the maximum score. On the X-axis the CAPE 42-item symptom profile: Class 1: High endorsement of all CAPE items, Class 2 with a propensity to endorse positive and depressive items on the CAPE; Class 3: Low endorsement of all CAPE items.

Table 1

Confirmatory factor analysis of the 42 items CAPE. Goodness-of-fit indices of the tested models.

Model	χ^2	df	p	CFI	RMSEA (90 %CI)	SRMR
Correlated three-factor	680.9	816	1.00	1.00	0.0 (0.0 – 0.0)	0.065
Hierarchical three-factor	680.9	816	1.00	1.00	0.0 (0.0 – 0.0)	0.065
Bifactor	542.5	777	1.00	1.00	0.0 (0.0 – 0.0)	0.060
Threshold for fit			p > 0.05	0.90	≥0.08	≥0.09

Table 2

Socio-demographic and clinical indicators distribution across 3 classes extracted by LCA from CAPE. All data mean (standard deviation) or counts (percentage).

	Class 1	Class 2	Class 3	
	n = 155	**n = 117**	**n = 40**	
Gender Men Women	95 (61 %) 60 (39 %)	60 (51 %) 57 (49 %)	25 (62 %) 15 (38 %)	χ^2 = 3.17;df= 2; p = 0.205
Age	40 (13)	35 (13)	28 (12)	F[2;309]= 14.8; p < 0.0001
CAPE Positive dimension Negative dimension Depressive dimension	1.2 (0.2) 1.4 (0.2) 1.4 (0.2)	1.5 (0.2) 1.7 (0.3) 1.7 (0.3)	1.8 (0.4) 2.4 (0.4) 2.5 (0.5)	F[2;309]= 106.5; p < 0.0001 F[2;309]= 166.7; p < 0.0001 F[2;309]= 186.2; p < 0.0001
Substance use * Tobacco smoking Alcohol drinking Cannabis smoking **	31 (20 %) 48 (31 %) 1 (1 %)	23 (20 %) 47 (40 %) 1 (2 %)	16 (40 %) 17 (41 %) 11 (34 %)	χ^2 = 8.14;df= 2; p = 0.017 χ^2 = 3.23;df= 2; p= 0.190 χ^2 = 44.3;df= 2; p < 0.0001

** Data reported by 185 participants only, 89 in the 1st class, 64 in the 2nd class, and 32 in the 3rd class.

* Substance use was reclassified in a binary format: never used = 0; any frequency of use = 1.