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The validity and reliability of the Italian version of the Hypomanic Personality Scale (I-HPS)

Summary

Objectives

To validate the Italian version of the Hypomanic Personality Scale (I-HPS) in a non-clinical sample of young adults.

Materials and Methods

Reliability, convergent and divergent validity, and discriminant capacity of the Italian I-HPS were explored in a sample including 456 undergraduate students attending an Italian university (males: n = 210 [46%]). Convergent and divergent validity was tested by association with the Marlowe-Crowne Social Desirability Scale (SDS); the short Temperament Evaluation of Memphis, Pisa, Paris and San Diego – Autoquestionnaire (TEMPS-A); the 12-item General Health Questionnaire (GHQ-12); the Peters et al. Delusions Inventory (PDI); and the extended Launay-Slade Hallucination Scale (E-LSHS). Discriminant capacity of the I-HPS was tested by Latent Class Analysis (LCA).

Results

Reliability of the I-HPS, as measured with the ordinal Cronbach's alpha, was 0.91. There were no differences in the distribution of I-HPS scores by gender, or parental education, our proxy for socio-economic status. Age was negatively related to I-HPS scores (Pearson's r = -0.15, p = 0.002). Scores on I-HPS were negatively related to social desirability (r = -0.23). As expected, the I-HPS was related to TEMPS-A subscales measuring hypomania-proneness more than to TEMPS-A subscales measuring proneness to depression or anxiety (Steigers' z test p < 0.001 or lower). The I-HPS revealed a stronger association with measures of delusion- (PDI) and hallucination-proneness (E-LSHS) than with generalist psychological distress (GHQ-12): Steigers' z test p < 0.0001 in all comparisons. In the sample, 45 (10%) scored ≥ 6 on the GHQ-12 and ≥ 8 on the PDI, our psychometric threshold for higher risk of psychosis. LCA identified three classes in the sample. Compared to the baseline class (42.8% of participants), people at a higher risk of psychosis were more likely to fall in the intermediate class (23.9%), and, with greater odds, in the "high propensity to hypomania" class (33.3%).

Conclusions

The I-HPS reveals good psychometric properties in line with the other studies on the cross-cultural validity of the I-HPS as currently tested in German, Spanish, and French samples. The I-HPS is a suitable measure to identify people with hypomanic personality and a promising tool to assist the identification of individuals at a higher risk of bipolar disorder.

Key words

Bipolar disorder • Hypomanic personality • Temperament • Screening

Introduction

The widespread dissemination of the early intervention paradigm has renewed interest in the stress-vulnerability model of the onset of psychosis [1-3]. According to this model, an underlying genetic vulnerability to psychosis coupled with the impact of environmental stressors, whether psycho-social (social adversities) or biochemical (substance use) in na-

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ture, may trigger the development of psychotic symptoms in at-risk subjects [1 2]. Needless to say, the renewed emphasis on this model has reinvigorated the focus on the premorbid vulnerability traits in both schizophrenia and bipolar disorder spectra [4-9], including at-risk mental states [10 11].

As far as the schizophrenia spectrum is concerned, Meehl's schizotaxia-schizotypy heuristic model remains central for the derivation of measurement tools [12]. Indeed, several instruments are available for the measurement of the risk of psychosis within Meehl's schizotaxia-schizotypy model. This is the case of the Schizotypal Personality Questionnaire (SPQ) [13-15]; the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) [16 17]; and the Wisconsin Schizotypy Scales (WSS) [5]. Similarly, the pragmatic sample-enrichment strategy to identify subjects at presumed ultra high-risk for psychosis, is centered around ad hoc semi-standardized interviews, i.e. the Comprehensive Assessment of At-Risk Mental States (CAARMS) [10 11], and the Structured Interview for Prodromal Syndromes and the Scale of Prodromal Symptoms (SIPS/SOPS) [18 19]. As far as the bipolar spectrum is concerned, current research has mainly focused on screening tools targeting potentially unrecognized cases of already developed affective disorders, e.g. via the Mood Disorder Questionnaire [20 21], or the Hypomania Checklist (HCL-32) [22 23], and on measures of affective temperaments (e.g. Temperament Evaluation of Memphis, Pisa, Paris and San Diego - TEMPS). The TEMPS in particular is a tool specifically designed to measure the affective temperaments that define the bipolar spectrum, that is: depressive (D), cyclothymic (C), hyperthymic (H), irritable (I), and anxious (A) subscales [24-26]. As a matter of fact, there is a relative paucity of tools to detect people at a higher risk of bipolar disorder [27].

So far only the Hypomanic Personality Scale (HPS) [28 29] has proved to be a valid measure of the risk of future psychosis within the bipolar spectrum, with people scoring higher on the HPS being at the highest risk for developing psychosis at follow-up [30 31].

The HPS is a 48-item true-false scale measuring behaviors and feelings that may be related to hypomanic episodes, such as hyperactive, ambitious, or exhibitionistic behaviors, and feelings of euphoria or flights of thoughts. In the original study, involving 1,519 US undergraduates, those scoring in the top 3% were more likely to meet the criteria for bipolar spectrum disorders than were control participants with average scores [28]. At a 13-year follow-up, those scoring higher on the HPS were found to report more depressive episodes, borderline personality disorder symptoms, psychotic-like experiences, substance and alcohol problems, and a trend toward more arrests, than controls with average scores [30]. These findings were corroborated by the results of a longitudinal study of a large adolescent sample [32]. Among the investigated adolescents, higher scores on the HPS predicted increased levels of impairment in a number of areas, including depressive and internalizing symptomatology, during the follow-up [32]. Another independent 3-year follow-up study confirmed that higher scores on the HPS predicted new cases of bipolar spectrum disorders, as well as hyperthymic temperament or history of hypomania, grandiose traits, substance use disorders, and borderline traits [33]. The HPS has also good discriminative properties when applied to patients' samples [29 34], and it was found to predict relapse into a mood episode in patients with bipolar disorder [35].

Thus, the HPS might be a valid tool to screen people potentially at a high risk of developing a condition within the bipolar disorder spectrum. To our knowledge, up to now the cross-cultural validity of the HPS has been proved for the German [29], Spanish [36], and French versions of the scale [37].

Therefore, the aim of this study is to validate the Italian version of the HPS (I-HPS) in a young adult non-clinical sample. Reliability, convergent and divergent validity, and discriminant capacity of the Italian HPS are detailed, with the overarching goal of illustrating the good psychometric properties of the tool in the age range that is at a higher risk of bipolar disorder onset.

Materials and Methods

The institutional review board approved the study protocol in accordance with the guidelines of the 1995 Declaration of Helsinki, as revised in Tokyo in 2004.

Participants were 456 undergraduate students attending the courses of the University of Cagliari (Italy). Participants were enrolled from a wide array of courses: engineering (n = 98), law (n = 58), psychology (n = 57), foreign languages courses (n=33), higher education in art music and dance (music: n=32; painting and sculpture: n=32; dance: n=32; and drama: n=32), classical studies (n = 19), political science (n = 15), education (n = 13), economics (n = 12), architecture (n = 6), biology (n = 5), medicine (n = 4), pharmacy (n = 4), mathematics (n = 2), geology (n = 1), and physics (n = 1).

Participation rate was 87% of the original 520 subjects sample invited to take part in the study: 20 declined after glancing at the booklet; 44 cases were discarded because their questionnaires were left blank in some part.

Participants received a short briefing on the aims and scope of the study ("To collect information on the customary behavior of people, including their psychological and emotional wellness"). Participation was voluntary and no fee or other compensation was given for taking part in the study. All participants provided in-

formed consent. Participants were allowed as much time as they wanted to answer the questionnaires; the time dedicated to answering the questionnaires was not recorded. A short debriefing was given after the completion of the booklet containing the questionnaires, to ensure that the filling in of the questionnaires produced no negative response. Potential ethical issues (discovery of an unknown disorder, awareness of own psychological distress, list of addresses for consultation) were discussed during the debriefing when needed. A card with the contacts of the principal investigator and the staff of the Clinical Psychology Unit was given to those who desired further explanation of the items investigated by the questionnaires.

Measures

Each participant was told the data would remain confidential, and received a booklet containing the questionnaires listed below, which they were asked to complete. The Hypomanic Personality Scale (HPS): This 48-item scale is a dichotomous (True/False) tool that was designed to identify people with hypomanic personality, conceived as an overactive, highly sociable style of behavior in which episodes of hypomanic euphoria are likely to recur [28]. This questionnaire has been used as a measure of affective/hypomanic traits, and discriminates between patients with bipolar disorder and controls and predicts the onset of bipolar disorder in adulthood from the scores in late adolescence [30]. Sample items are: "There are often occasions when I am so restless that I cannot even remain seated", "I often feel excited and happy for no apparent reason", "I have such a wide range of interests that I often wonder what I will do later", "I think I have a special ability to persuade and motivate other people". Standard procedures were used to translate the HPS [38 39]. The original English version of the HPS was translated into Italian by the principal investigator then checked for correctness by an English-speaking translator. A second English-speaking translator checked the back translation into English. This version was finalized with the aid of one of the principal investigators of the HPS (T. R. Kwapil) to assure full compatibility of the translation in terms of meaning and understanding of the items (see Appendix).

For the purpose of the study we also used the following questionnaires and scales: the Marlowe-Crowne Social Desirability Scale (SDS) [40 41]; the short Temperament Evaluation of Memphis, Pisa, Paris and San Diego – Autoquestionnaire (TEMPS-A) [26 42]; the 12-item General Health Questionnaire (GHQ-12) [43 44]; the Peters et al. Delusions Inventory (PDI) [45 46]; the extended Launay-Slade Hallucination Scale (E-LSHS) [47-49].

The SDS is a 33-item self-report questionnaire aimed at measuring socially desirable response [40]. Subjects rate the extent to which they agree (True) or disagree (False) with each item: the 15 items keyed False (denial subscale, D) are likely but socially undesirable and are thought to measure denial and self-deception (e.g. "I am sometimes irritated by people who ask me some favours"); the 18 items keyed True (positive attribution subscale, PA) are improbable but socially desirable and are thought to measure a tendency to positive attribution, or to attributing the self traits that are seen by society positively (e.g. "No matter who I'm talking to, I am always a good listener"). The Italian version of the SDS showed good psychometric functioning when tested in non-clinical populations and, in past studies, it showed a negative correlation with measures of psychopathology, particularly the denial subscale [41]. Reliability of the Italian SDS, measured as Cronbach's alpha, was > 0.80 in both genders [41].

The short TEMPS-A is a 39-item Yes-or-No self-report questionnaire designed to quantify affective temperaments in psychiatric patients and healthy subjects [26 42]. It derives from a longer, 110-item version built-up on the concept of bipolar spectrum, and includes five subscales: cyclothymic, dysthymic, irritable, hyperthymic, and anxious [42]. The validated Italian version was used for this study [26]. The TEMPS-A proved able to readily distinguish patients with bipolar disorder from healthy subjects, and it is considered a good description of the affective temperaments in both clinical and non-clinical samples [26 42]. Reliability of the Italian TEMPS-A, as measured by Cronbach's alpha, was > 0.70 for all subscales [26].

The GHQ-12 is a screening tool aimed at identifying people in need of clinical attention [43]. The validated Italian version was used for this study [44]. Respondents have to rate the presence and frequency of each symptom on a 4-point scale (i.e. "not at all", "less than usual"', "more than usual", "rather more than usual") in the past four weeks [43 44]. For the purpose of this study, a dichotomous scoring system was used attributing a point to each item with a "more than usual" or "rather more than usual" answer. Previous research using this scoring method showed that a score of 4 or more is likely to be associated with a common mental disorder [44]. Reliability of the Italian GHQ-12, measured as Cronbach's alpha, was > 0.80 in past studies [26 44].

The PDI is a dichotomous (Yes/No) questionnaire that was designed to measure unusual beliefs and experiences pertaining to the dimension of delusional ideation in the general population [45]. The 21 original questions were adapted to explore life-time experience (For

example: "Do you ever feel that you are especially close to God?", "Do you ever feel as if someone is deliberately trying to harm you?"). The Italian version of the PDI discriminates patients diagnosed with psychosis from controls with a sensitivity = 0.74 and a specificity = 0.79 (AUC = 0.815) [46],and classified patients into three classes traceable to the three major dimensions of psychosis, i.e. paranoia, grandiosity/hypomania, and the schizophrenia-like profile. Reliability of the Italian PDI, measured as Cronbach's alpha, was > 0.70 in past studies [26].

The E-LSHS is a self-report scale with 16 items investigating hallucinatory experiences in the domain of auditory, visual, olfactory, tactile cognition and sleep-related perception, and including items that tap into the experience of feeling the presence of someone close who isn't there, the so-called "sensed presence" [47 48]. Respondents have to rate each item on a five-point scale: (0) "certainly does not apply to me"; (1) "possibly does not apply to me"; (2) "unsure"; (3) "possibly applies to me"; and (4) "certainly applies to me". The Italian version of the LSHS-R showed good convergent validity with other measures of psychotic-like experiences [49]. Reliability of the Italian E-LSHS, measured as Cronbach's alpha, was > 0.80 in past studies [49].

General socio-demographic information from self-report data was collected for the following variables: age, gender, and socioeconomic status. As a measure of socioeconomic status we used the highest level of parental education [50], which was further classified into three categories: lower than high school diploma, high school diploma, college graduate or higher.

Statistical analyses

Since the 44 incomplete booklets were discarded, no data were missing in the database. Once entered in the database by a researcher, data were rechecked by another researcher. Error rates – improbable values on the basis of expected (i.e. age) or requested (interval on a item) scores – were less than 1% and all were corrected based on the questionnaires. All data were coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Additional analyses were carried out in R using dedicated packages [51].

All tests were two-tailed. Due to multiple testing, significance threshold was set at $p < 0.005$. According to Bayesian interpretations, this threshold has the greatest chance of suggesting evidence against the null [52].

Descriptive and exploratory analysis

Mean with standard deviation was reported for continuous variables. Counts and percentage were reported for categorical variables (Table I).

Scale scores' reliability was measured by Cronbach's alpha or its ordinal version, which has a better fit for dichotomic items or for items showing skewness [53]. For group comparisons, reliability values of 0.70 are considered quite satisfactory, and when dealing with subscales derived from a single questionnaire, values around 0.60 are considered acceptable [54].

Finite mixture models were applied for testing whether the distribution of I-HPS scores in the sample corresponded to a single or a mixture of Gaussian distributions. Analysis was carried out with the "mixtools" package running in R [55].

Continuous variables were tested with Student's t-test or ANOVA. Categorical analyses were carried out with the Chi-square, with Yates correction whenever necessary. Pearson's correlation coefficient was used to test for associations between variables. Correlation coefficients were compared according to the Steigers' z test [56].

Convergent and divergent validity of I-HPS scores

The I-HPS is expected to be positively related to psychological distress (GHQ-12) and to the reporting of posi-

TABLE I. *General characteristics of the sample (n = 456).*

Socio-demographic groups	N (%)	I-HPS Mean (SD)	Statistics
Gender			
Male	210 (46%)	17.5 (7.8)	t = -1.08, df = 454, p = 0.280
Female	246 (54%)	16.7 (7.8)	
Age			
19-22 (%)	166 (36%)	18.3 (7.5)	t = -2.49, df = 454, p = 0.013
23-38 (%)	290 (64%)	16.4 (7.9)	
Highest level of parental education			F(2;453) = 1.96, p = 0.141
Lower than high school diploma	167 (37%)	16.2 (7.7)	
High school diploma	192 (42%)	17.7 (7.9)	
College graduate or higher	97 (21%)	17.6 (7.8)	

HPS: Hypomanic Personality Scale; SD: standard deviation.

tive symptoms of psychosis (PDI and E-LSHS). I-HPS is also expected to be related to affective temperaments within the hypomanic spectrum (cyclothymic, irritable, and hyperthymic subscales of the short TERMS-A) and to be minimally related or unrelated to affective temperaments within the dysthymic spectrum (dysthymic and anxious subscale of the short TEMPS-A). Pearson product-moment correlation analysis was used to test convergent and divergent validity.

Discriminant validity of the I-HPS

Distribution of the scores at the I-HPS is expected to vary continuously across the population. To the purpose of differentiating individuals by their degree of proneness to hypomania, we applied Latent Class Analysis (LCA) to the I-HPS dichotomous scores.

LCA was carried out with the poLCA package running in R.[57] PoLCA estimates the latent class model by maximizing the log-likelihood function [57]. Parsimony criteria are applied to strike a balance between over- and under-fitting the model to the data by penalizing the log-likelihood by a function of the number of parameters being estimated [57]. The preferred models are those that minimize the values of the Bayesian Information Criterion (BIC) [58] and the Akaike Information Criterion (AIC) [59], and of their derivation, the consistent AIC (CAIC) [60], and the sample size adjusted BIC (SSBIC) [61]. The likelihood ratio chi-square test was also used to determine how well a particular model fits the data with reference to the ratio of the observed cell counts versus the predicted cell counts [62]. Standardized entropy measure was used to assess accuracy of participants' classification (0 to 1), with higher values indicating better classification. Entropy values greater than .80 indicate a good separation of the identified groups [63].

Participants were assigned to the latent class to which they had the highest probability of belonging (average probabilities per class ≥ 85%).

Multinomial logistic regression was used to assess the association between class membership and risk of psychosis in the sample by taking into account demographic variables (i.e. gender and age). Subjects were identified as being at risk of psychosis when they scored ≥ 6 on the GHQ-12 and ≥ 8 on the PDI (see Rocchi et al., 2008 for details) [64]. Differences between classes were expressed with odds ratio (95% confidence interval [CI]).

Likelihood ratio test (LRT) was used to assess model fitting, with the null of the LRT specifying lack of fit (so, refutation of the null corresponds to good fit of the model). Goodness of fit of the model was also assessed with Pearson chi-square statistics. In this test, the null assumes that the model has a good fit, so $p < 0.05$ (refutation of the null) indicates misspecification of the model. Variance explained by the model was assessed with pseudo-R^2 measures, such as the McFadden and the Cox-Snell pseudo-R^2. These indicators are on a similar scale, ranging from 0 to 1, with higher values being a reflection of the better fit of the model [65].

Results

The final sample included 210 males (46%) and 246 females (54%). Participants were 24 years old (SD = 3.5) on average (range: 18 to 38 years). In the sample 8 participants declared to be married (2%), and 166 reported to be in a stable relationship (36%). The participants whose parents had a high school diploma were 192 (42%), while the participants whose parents had a university degree or a higher qualification were 97 (21%).

Distribution of I-HPS scores in the sample departed from normality at the very low values. Essentially, the distribution of I-HPS scores can be interpreted as a mixture of two Gaussian distributions, one with mean = 10.6 (SD = 4.1), and the other with mean = 20.5 (SD = 7.1; for details, see Fig. 1).

Mean in the whole sample was 17.1 (SD = 7.8); median = 16 (interquartile range = 12); skewness = 0.37 (standard error of skewness = 0.11); kurtosis = -0.25 (standard error of kurtosis = 0.23).

There were no differences in the distribution of I-HPS total scores by gender, or parental education, our proxy for socio-economic status (details in Table I).

Age was negatively related to I-HPS total scores (Pearson's $r = -0.15$, $p = 0.002$).

Reliability of the questionnaires used in the study

Internal coherence, as measured by ordinal Cronbach's alpha, was good for all scales and acceptable for all subscales (see Table II for details).

Convergent and divergent validity of the Italian HPS

Scores on I-HPS were negatively related to social desirability and positively related to measures of psychological distress and of psychosis-proneness (Table III).

The links of I-HPS scores with delusion (PDI) or hallucinations-proneness (E-LSHS) were stronger than the links with psychological distress (GHQ-12): Steigers'z test $p < 0.0001$ in both comparisons.

As expected, the I-HPS was related to TEMPS-A subscales measuring hypomania-proneness more than to TEMPS-A subscales measuring proneness to depression or anxiety (Steigers' z test $p < 0.0001$ in the comparisons of TEMPS-A Cyclothymic subscale versus the Dysthymic or Anxious subscale; Steigers' z test $p < 0.0001$ in the comparisons of TEMPS-A Hyperthymic or Irritable subscale versus the Dysthymic subscale; the distinction between the TEMPS-A Hyperthymic and Irritable subscales and the Anxious subscale is less evident: Steigers' z test $p > 0.001$ in both comparisons).

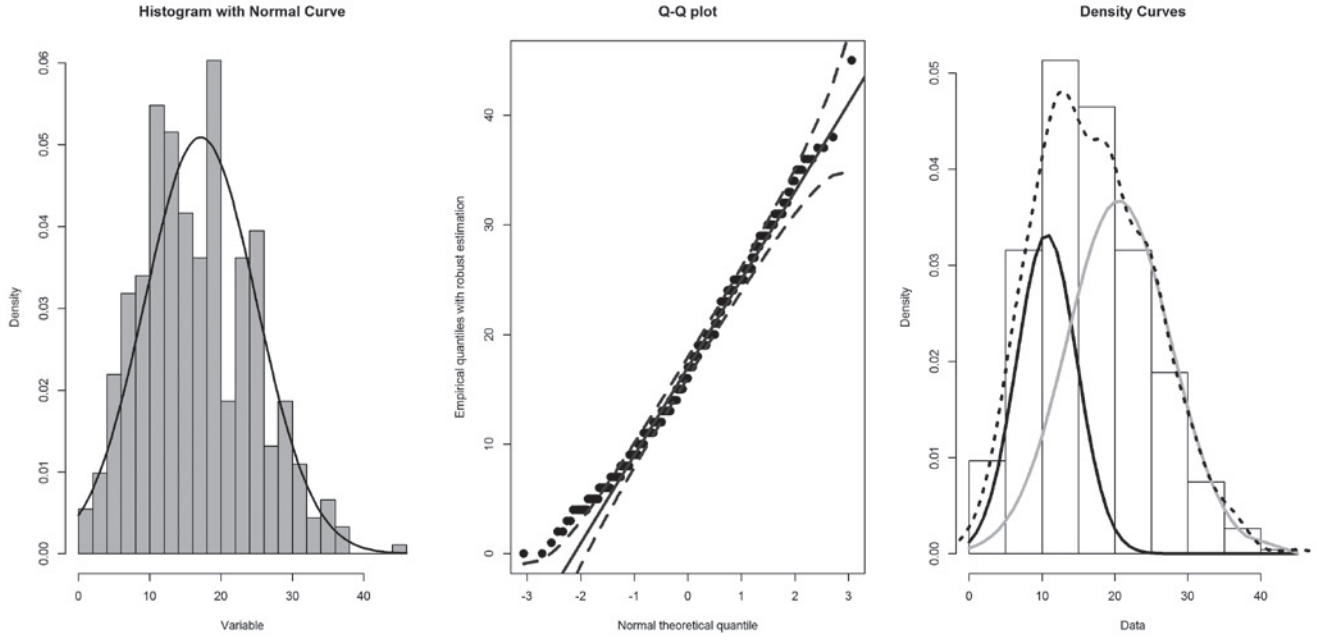

FIGURE 1. *Distribution of I-HPS test scores, 48 items (n = 456); from left to right: histogram of scores with superimposed normal curve; quantile-quantile probability plot (Q-Q plot) of scores with confidence interval; density plot of the scores (dashed line) with two superimposed Gaussian distributions (continuous lines in black and gray).*

TABLE II. *Mean scores and inter-correlation among the measures of psychopathology used in the study and the i-HPS.*

	No. Items	Item's score	Maximum possible score	Cronbach's α*	Mean (SD)	Median (IRQ)	Min - Max
I-HPS	48	0/1	48	0.91	17.1 (7.8)	16 (12)	0-45
SDS	33	0/1	33	0.84	16.1 (4.9)	16 (6)	3-33
GHQ-12	12	0/1	12	0.92	3.5 (3.0)	3 (4)	0-12
PDI	21	0/1	21	0.89	5.9 (3.7)	5 (5)	0-20
E-LSHS	16	0 to 4	64	0.93	16.1 (11.9)	13 (16)	0-57
TEMPS-A							
Cyclothymic	12	0/1	12	0.87	4.3 (2.9)	4 (4)	0-12
Dysthymic	8	0/1	8	0.83	1.9 (1.8)	1 (3)	0-8
Irritable	8	0/1	8	0.79	1.3 (1.5)	1 (2)	0-6
Hyperthymic	8	0/1	8	0.78	3.5 (2.0)	3 (3)	0-8
Anxious	3	0/1	3	0.82	1.2 (1.0)	1 (2)	0-3

** Cronbach's α was calculated on the basis of a polychoric correlation matrix due to the dichotomous or ordinal nature of data*

The correlations between the I-HPS and the measures of psychosis-proneness (PDI and E-LSHS) were of the same order – in term of effect size – as those of the TEMPS-A Cyclothymic subscale with these same scales.

It is worth mentioning that the TEMPS-A Hyperthymic subscale was statistically related to the I-HPS scores but not to the scores on the other scales.

Discriminant validity of the Italian HPS

The three-class solution represented the best compromise on the basis of the statistics used to assess comparative model fit (Fig. 2).

TABLE III. *Inter-correlation (Pearson's r) among the measures of psychopathology used in the study and the I-HPS.*

	I-HPS	SDS	GHQ-12	PDI	E-LSHS	Cycl.	Dysth.	Irr.	Hyper.
SDS	-0.234*								
GHQ-12	0.178*	-0.216*							
PDI	0.491*	-0.289*	0.225*						
E-LSHS	0.508*	-0.272*	0.234*	0.571*					
TEMPS-A									
Cyclothymic (Cycl.)	0.509*	-0.377*	0.386*	0.411*	0.464*				
Dysthymic (Dysth.)	0.069	-0.271*	0.287*	0.215*	0.202*	0.440*			
Irritable (Irr.)	0.352*	-0.357*	0.111	0.252*	0.219*	0.416*	0.256*		
Hyperthymic (Hyper.)	0.419*	0.055	-0.006	0.161*	0.021	0.097	-0.073	0.196*	
Anxious	0.236*	-0.184*	0.155*	0.197*	0.250*	0.336*	0.240*	0.184*	0.086

** Pearson's r p < .005. Pearson's r > 0.30 (medium effect size according to Cohen)75 are marked in bold.*

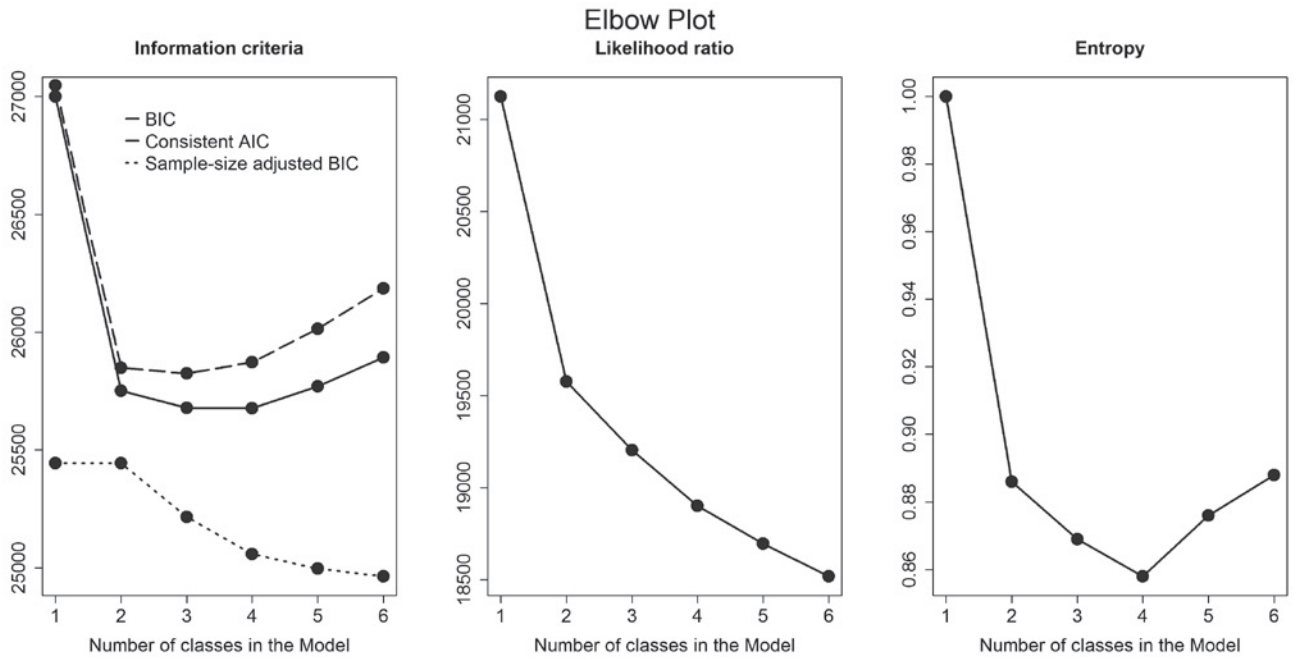

FIGURE 2. *Fit indices for the latent class analysis of the I-HPS.*

The elbow plot indicated a smoothed decrease in the sample-size adjusted BIC and a more marked decrease in the likelihood ratio; however, the BIC and the consistent AIC were congruent with a 3-class solution, advising against further decomposition of the sample. In the 3-class solution entropy was 0.87, which indicated a good classification of participants in the model. Entropy in the subsequent 4-class solution was lower (0.85) than in the 3-class solution, suggesting the preceding model had a better classification of participants.

The 3-class solution generated/produced a baseline class with low endorsement of most I-HPS items, including 195 (42.8%) participants; an intermediate class, including 109 (23.9%) participants; and a third class of "high propensity to hypomania", with high endorsement on most I-HPS items, and including 152 (33.3%) participants (Fig. 3).
Mean scores of I-HPS were 10.8 (SD = 4.3) in the baseline, 16.4 (4.2) in the intermediate, and 25.6 (4.9) in the "high propensity to hypomania" class: $F(2;453) = 466.1$, $p < 0.0001$.

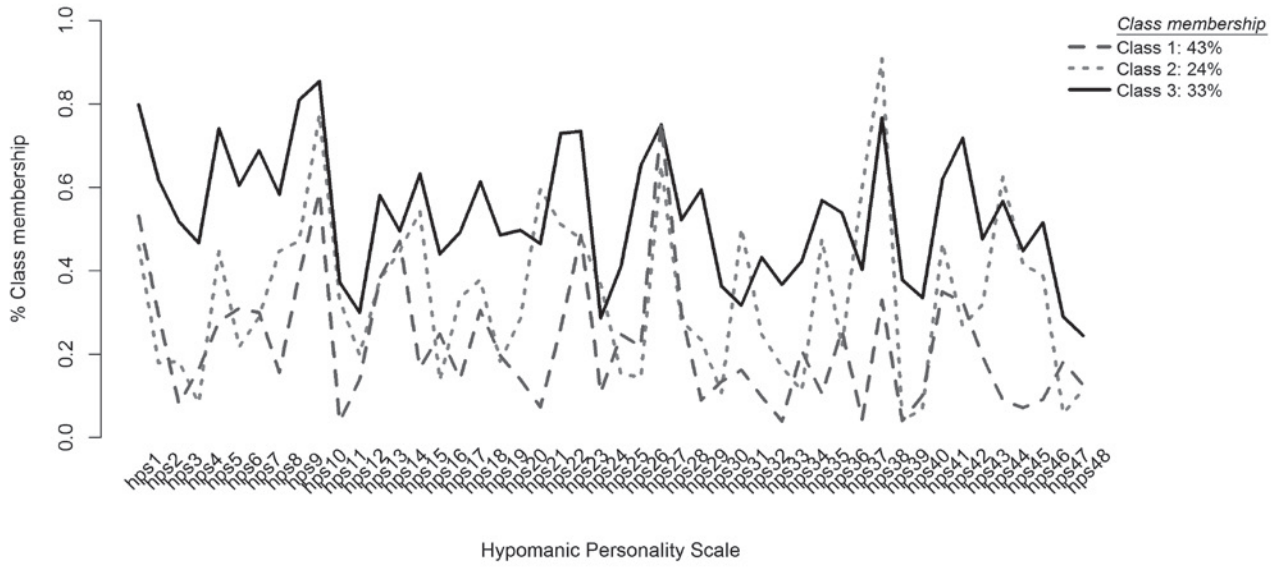

FIGURE 3. *Profile plot for the latent class analysis of the I-HPS (48 items). The Y-axis represents the class-specific mean scores as proportions of the maximum score for the indicator. The X-axis contains the 48-item profile of the I-HPS.*

In the sample, 109 participants (24%) scored ≥ 6 on the GHQ-12, 134 participants (29%) scored ≥ 8 on the PDI, and 45 (10%) scored ≥6 on the GHQ-12 and ≥8 on the PDI. This latest subsample represented our target group at a higher risk of psychosis.

Gender was not related to class membership, age was negatively related to it (Table IV).

Compared to the baseline class, people at a higher risk of psychosis were more likely to fall in the intermediate class and, with greater odds, in the "high propensity to hypomania" class.

The model had a god fit (LRT: χ^2 = 35.56, df = 6, p < 0.0001; Pearson chi-square = 98.65, df = 102, p = 0.57), albeit the variance explained by this model was low (Cox and Snell pseudo-R^2 = 7.5%; McFadden pseudo-R^2 = 3.6%).

Discussion

The study provided further robust evidence about the cross-cultural validity of the I-HPS. Reliability of the Italian version of the I-HPS was excellent, with gold-standard values of interval coherence. Concurrent validity was in

TABLE IV. *Association between latent classes of i-HPS and predictors, taking into account gender and age.*

All data: no. (%); reference term above	LC1 Baseline	LC2 Intermediate	LC3 High
	n = 195 (42.8%)	n = 109 (23.9%)	n = 152 (33.3%)
Gender			
Females	103 (52.8%)	71 (65.1%)	72 (47.4%)
Males	92 (47.2%)	38 (34.9%)	80 (52.6%)
OR (95%CI)	1	1.52 (0.93-2.49); p = 0.095	0.72 (0.48-1.12); p = 0.147
Age			
Mean (SD)	25.1 (3.5)	23.6 (3.1)	23.6 (3.7)
	1	0.89 (0.83-0.96); p = 0.002	0.88 (0.83-0.94); p < 0.0001
Risk of psychosis			
Low	185 (94.9%)	95 (87.2%)	131 (86.2%)
High	10 (5.1%)	14 (12.8%)	21 (13.8%)
OR (95%CI)	1	2.57 (1.08-6.10); p = 0.032	3.03 (1.36-6.77); p = 0.007

Latent Class I, corresponding to the Baseline class, was used as a reference term.

the expected direction, with higher correlations of I-HPS with measures within the hypomanic spectrum (cyclothymic, irritable, and hyperthymic subscales of the short TERMS-A), rather than measures within the dysthymic spectrum (dysthymic and anxious subscale of the short TEMPS-A).

Links of the I-HPS with levels of psychological distress were modest, supporting the tenet that the traits measured by the tools are more within the risk of affective disorders than indicative of the full-blown syndrome. Nevertheless, I-HPS scores showed a strong relationship with measures of delusion- and hallucinations-proneness.

Healthy people with high scores on the I-HPS were found to be more likely to report distressing perceptual anomalies and proneness to hallucinations [66], and in general a positive correlation between hypomanic and attenuated positive symptoms of psychosis was described in undergraduate students [67 68].

It should be borne in mind that both the PDI and the E-LSHS are measures of the risk of psychosis rather than tools aimed at screening people with a full-blown psychosis. Moreover, people with hypomanic traits can be more likely to reveal socially undesirable beliefs and experiences and, indeed, I-HPS scores showed a negative relationship with social desirability scores, albeit modest.

However, people with high scores on the PDI and evidence of high levels of psychological distress on the GHQ-12, our proxy for the risk of psychosis, were discriminated by the I-HPS, confirming past studies on the link between I-HPS scores and the risk of psychosis [30 31].

The LCA distinguished one baseline class, including 42% of the sample, and two classes with an enhanced risk of psychosis. These two classes of proneness to hypomania showed some kind of overlap, and probably correspond to the second Gaussian distribution retrieved by the finite mixture model. Albeit both showing an enhanced risk of psychosis, these two classes might relate to different degrees of the risk of bipolar disorder, with the intermediate class being possibly related to a nonspecific risk of depression and anxiety, which in turn may be related to a higher chance of psychotic-like experiences [69], and the other class being more specifically linked to the risk of bipolar spectrum disorders.

It is worth mentioning that the I-HPS also intercepts non-pathological traits related to the hypomanic/bipolar spectrum, such as those measured by the TEMPS-A Hyperthymic subscale with items covering socially desirable traits in the Italian population [26 70]. Adaptive traits of hypomania were linked to the greater involvement in creative activities of patients diagnosed with bipolar disorder [71 72].

Limitations

We had no opportunity to further evaluate the people identified at potential (psychometric) risk with a detailed follow-up interview (e.g. with dedicated tools such as SIPS/SOPS, CAARMS or SPI-A) [73]. Moreover, since participants were undergraduates still attending university courses, it is unlikely that they had a full-blown episode of psychosis at the time of the study. However, they could have an attenuated form of bipolar disorder that puts them at a high risk of onset of a manic episode.

The exclusive reliance on self-report measures is a major limitation of this study; nevertheless the use of self-report measures allows the enrollment of large samples, and given the guarantee of anonymity, participants might be more forthcoming when filling in the questionnaires. Thus the associations observed in the study and, in particular, the greater links of I-HPS scores with measures of hypomania- and psychosis-proneness than with measures of anxiety, depression or generalist psychological distress, may be considered a reflection of the links between the corresponding latent traits.

Conclusions

The I-HPS might be considered a tool to identify trait, non-symptomatic disposition to bipolar disorder. Kraepelin considered hypomanic states within the cyclothymic predisposition to bipolarity [74] and, indeed, there is some evidence that people scoring higher on the I-HPS suffer an increased risk of developing bipolar disorder [30 33].

The Italian version of the I-HPS has demonstrated good psychometric properties, and may be added to the armory of tools to be used for screening help-seeking people at risk of psychosis.

Conflict of interest

Antonio Preti, Marcello Vellante, Giulia Zucca, Mariangela Melis, Matthew Brown, Carmelo Masala and Donatella Rita Petretto did not receive any grant and were not consultants or speakers at symposia sponsored by companies that may be related to the study subject of this article.

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Appendix

Per cortesia, per ogni affermazione scelga l'opzione (Vero o Falso) che meglio si adatta a lei. Non salti nessuna riga. Grazie		Vero	Falso
1	Mi considero proprio il tipo della persona media.	V	F
2	Mi sentirei nervoso se dovessi fare il pagliaccio davanti ad altra gente.	V	F
3	Sono su di giri così spesso che i miei amici, per prendermi in giro, mi chiedono che droga prendo.	V	F
4	Penso che sarei un bravo comico da cabaret.	V	F
5	A volte mi vengono idee o intuizioni così velocemente da non riuscire a esprimerle tutte.	V	F
6	Quando sono con altra gente, di solito preferisco che sia qualcun altro a stare al centro dell'attenzione.	V	F
7	In ambienti a me non familiari, mi capita spesso di essere così socievole e sicuro di me stesso da stupirmene io stesso.	V	F
8	Ci sono spesso occasioni nelle quali sono così irrequieto che per me è impossibile rimanere seduto.	V	F
9	Molta gente mi considera divertente, ma anche un po' stravagante.	V	F
10	Quando sento un'emozione, solitamente la percepisco con grande intensità.	V	F
11	Sono spesso così su di giri che mi riesce difficile concentrarmi su qualsiasi cosa per molto tempo.	V	F
12	A volte ho l'impressione che non mi può capitare nulla fino a quando non avrò compiuto quello cui sono destinato nella vita.	V	F
13	La gente viene spesso da me quando ha bisogno di un'idea intelligente.	V	F
14	Non credo di essere più consapevole di me stesso della maggior parte delle persone.	V	F
15	Mi capita spesso di sentirmi eccitato e felice senza apparente motivo.	V	F
16	Non riesco a immaginare che a qualcuno possa venire in mente di scrivere un libro sulla mia vita.	V	F
17	Di solito sono di umore medio, non troppo alto né troppo basso.	V	F
18	Ho spesso dei periodi durante i quali mi sento così pieno di energia e così ottimista da pensare che riuscirei a battere chiunque in qualunque campo.	V	F
19	Ho un tale ampio ventaglio di interessi, che spesso non so cosa farò più tardi.	V	F
20	Ci sono spesso stati dei periodi durante i quali avevo un tale eccesso di energia che sentivo poco il bisogno di dormire la notte.	V	F
21	Il mio umore non sembra oscillare più di quel che capita agli altri.	V	F
22	Mi capita molto spesso di provare il desiderio di essere dappertutto e fare tutto allo stesso tempo.	V	F
23	Mi aspetto che prima o poi avrò successo in più settori professionali.	V	F
24	Quando mi sento molto eccitato e felice, quasi sempre so perché.	V	F
25	Quando vado ad una festa dove non conosco nessuno, di solito ci metto un po' prima di sentirmi a mio agio.	V	F
26	Credo che potrei essere un buon attore, perché riesco a recitare ruoli diversi in modo convincente.	V	F
27	Mi piace che gli altri pensino che io sono il tipo della persona media.	V	F
28	Spesso metto per iscritto i pensieri e le intuizioni che mi vengono in mente quando penso in modo particolarmente creativo.	V	F
29	Ho spesso convinto gruppi di amici a fare cose davvero avventate o proprio pazze.	V	F
30	Mi piacerebbe davvero essere un uomo politico ed essere il protagonista di una campagna elettorale	V	F
31	Di solito riesco a calmarmi quando lo voglio.	V	F
32	Sono considerato un tipo iperattivo.	V	F
33	Sono spesso così felice e pieno di energia da esserne quasi ubriacato.	V	F
34	Ci sono così tanti campi nei quali potrei avere successo, che è proprio un peccato doverne scegliere uno.	V	F
35	Spesso il mio umore è tale che mi sembra che molte regole della vita non si applichino a me.	V	F
36	Mi riesce facile indurre gli altri a trovarmi sessualmente attraente.	V	F
37	Sembro il tipo di persona il cui umore passa facilmente dall'alto al basso e viceversa.	V	F

		Vero	Falso
38	Mi succede spesso che i miei pensieri corrano incontrollati.	V	F
39	Sono così bravo a manipolare gli altri che mi stupisco di me stesso.	V	F
40	Agli incontri sociali di solito sono io "l'anima della festa".	V	F
41	Spesso realizzo le mie opere migliori in brevi e intensi periodi di ispirazione.	V	F
42	Mi sembra di avere un'abilità inconsueta nel persuadere e motivare gli altri.	V	F
43	Mi è spesso capitato di essere così così entusiasta di un progetto coinvolgente da dimenticarmi quasi di mangiare o dormire.	V	F
44	Mi capita di frequente di entrare in uno stato d'animo in cui mi sento come accelerato ed irritabile.	V	F
45	Mi è capitato spesso di sentirmi felice e irritabile allo stesso tempo.	V	F
46	Spesso il mio stato d'animo è così eccitato che per me è quasi impossibile smettere di parlare.	V	F
47	È sempre meglio avere un normale successo nella vita piuttosto che ottenere gloria e visibilità con un fallimento clamoroso	V	F
48	Cent'anni dopo la mia morte, probabilmente i miei successi saranno ormai dimenticati.	V	F

The Hypomanic Personality Scale
Eckblad M, Chapman LJ. Development and validation of a scale for hypomanic personality. J Abnorm Psychol 1986;95:214-22.

Punteggio:
Somma totale delle risposte in direzione della ipomaniacalità.
Per gli item: 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 18, 19, 20, 22, 23, 26, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46
Risposte "Vero" = 1, Risposte "Falso" = 0
Per gli item: 1, 2, 6, 14, 16, 17, 21, 24, 25, 27, 31, 47, 48
Risposte "Vero" = 0, Risposte "Falso" = 1