RESEARCH REPORT

Hypomania: a transcultural perspective

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This study examined the transcultural robustness of a screening instrument for hypomania, the Hypomania Checklist-32, first revised version (HCL-32 R1). It was carried out in 2606 patients from twelve countries in five geographic regions (Northern, Southern and Eastern Europe, South America and East Asia). In addition, GAMIAN Europe contributed data from its members. Exploratory and confirmatory factor analyses were used to examine the transregional stability of the measurement properties of the HCL-32 R1, including the influence of sex and age as covariates. Across cultures, a two-factor structure was confirmed: the first factor (F1) reflected the more positive aspects of hypomania (being more active, elated, self-confident, and cognitively enhanced); the second factor (F2) reflected the more negative aspects (being irritable, impulsive, careless, more substance use). The measurement properties of the HCL-32 R1 were largely invariant across cultures. Only few items showed transcultural differences in their relation to hypomania as measured by the test. F2 was higher among men and in more severe manic syndromes; F1 was highest in North and East Europe and lowest in South America. The scores decreased slightly with age. The frequency of the 32 items showed remarkable similarities across geographic areas, with two exceptions: South Europeans had lower symptom frequencies in general and East Europeans higher rates of substance use. These findings support the international applicability of the HCL-32 R1 as a screening instrument for hypomania.

Key words: Hypomania, HCL-32 R1, transcultural robustness

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Worldwide studies across cultures are extremely important to define internationally valid diagnoses of mental disorders based on stable core symptoms. Large studies carried out worldwide on schizophrenia and depression (1-3) have shown stability of core symptom clusters across cultures, with some variation. To our knowledge, there is no comparable study on hypomania or mania.

Bipolar disorder is underdiagnosed. The criteria provided in current diagnostic manuals overdiagnose pure depression at the expense of bipolarity, and several variables may lead to a misdiagnosis of bipolar disorder in unstructured interview situations (4,5). Self-assessment instruments for hypomania, such as the Mood Disorder Questionnaire (MDQ, 6), the Hypomania Checklist-20 (HCL-20, 7) and the Hypomania Checklist-32 (HCL-32, 8), can be helpful in detecting hypomania and have been shown to be applicable and reliable. This paper presents patient data across cultures collected by clinicians with the HCL-32 R1 (R1=first revised version).

Exploratory factor analyses (EFAs) of small clinical or non-clinical samples from different countries have consistently found a two-factor structure of hypomania as assessed by the HCL-32 R1 (9-16). Holtmann et al (17) found a three-factor structure in a non-clinical sample of German adolescents, while Rybakowski et al (18) found four factors in a sample of Polish patients.

The present study extends those analyses by examining whether a two-factor solution is also appropriate for a larger pooled sample combining data from 12 different countries. We aimed to answer the following questions: a) Does the HCL-32 measure manifestations of hypomania consistently across cultures ("measurement invariance")? b) Are there cross-cultural differences in the factor levels and/or in the effects of covariates (sex, age) on factors and items?

METHODS

Seventeen independent samples of patients with mood disorders from 12 countries, allocated to five geographic regions (Northern Europe, Southern Europe, Eastern Europe, South America, and East Asia), comprising 2606 patients, were studied with the HCL-32 R1 (Table 1). Most data were collected spontaneously by clinical researchers in the field of mood disorders. The sample was enriched by the data collected by GAMIAN Europe (n = 457), an international patient advocacy organization. The bulk of the data came from Northern and Southern Europe; a large group (over 600) were from East Asia and 423 from Brazil; the smallest group (about 200 patients) were from Eastern Europe.

The HCL-32 R1 is the revised version of the original HCL-32 (8), from which one difficult question (Q4) was omitted without any loss of information. The HCL-32 begins by assessing the current compared to the usual mood state; it then presents 32 symptoms of hypomania for self-checking (yes/no); finally the impact on social roles and the

Table 1 Sample characteristics by country and region

Region	Country	N	Gender (% females)[a]	Age (mean±SD)[b]	Diagnoses % UP[c]	% BP[c]
N-Europe	Belgium	38	55.3	47.3±9.55	2.6	84.2
	Germany	132	65.2	50.4±14.71	0.0	25.8
	Netherlands	73	58.9	47.6±9.45	0.0	97.3
	Sweden	429	59.0	50.2±16.55	24.0	72.3
	Total	672	60.0	49.8±15.28	15.5	66.5
S-Europe	Italy	336	64.0	45.3±12.96	32.4	62.2
	Portugal	85	60.0	41.9±13.24	4.7	77.7
	Spain	266	63.5	43.7±11.79	21.8	54.5
	Total	687	63.3	44.3±12.59	24.9	61.1
E-Europe	Croatia	99	39.4	47.0±8.93	38.4	13.1
	Russia[d]	94	43.6	42.7±13.65	-	-
	Total	193	41.5	44.9±11.63	19.7	6.7
S-America	Brasil[e]	423	63.8	44.1±11.88	9.9	19.2
	Total	423	63.8	44.1±11.88	9.9	19.2
E-Asia	China	357	51.5	36.3±13.26	29.7	70.3
	Taiwan	274	50.7	34.3±11.66	19.0	81.0
	Total	631	51.2	35.4±12.61	25.0	75.0
	Grand total	2606	58.0	43.6±14.13	19.7	55.0

[a] 11 missing cases (sex distributions among countries as well as regions are significantly different by χ^2 test)
[b] 14 missing cases (age distributions among countries as well as regions are significantly different by Kruskal-Wallis test)
[c] Percentages of unipolars (UP) and bipolars (BP) do not sum to 100% because of missing diagnostic data
[d] No diagnostic information available
[e] Diagnostic information available only for 123 subjects

duration of highs are assessed. Compared to the MDQ, the HCL-32 has been shown to have higher sensitivity but lower specificity for bipolar disorder (12,18).

The clinical diagnoses of depression, mania and bipolar disorder were based on DSM-IV criteria, but subjects were not assessed in a standardized way across countries, which serves to increase the ecological validity of the results.

The data were pooled in Zurich. An EFA was conducted for all geographical groups separately and together, using tetrachoric correlations calculated for the 32 dichotomous items and an oblique factor rotation (geomin). Item allocation to a specific factor was based on its loading on that factor (i.e., ≥0.4). The decision on how many factors to retain was based on several criteria: the Kaiser criterion (factors with eigenvalue >1.0), the scree plot, and Horn's parallel test, but mostly on the coherence and interpretability of the factors. Subscale scores for each factor were obtained by adding up the items of the corresponding factor. A total score was calculated by summing all 32 items. The reliability of HCL-32 total and subscale scores was assessed using Cronbach's alpha.

Subsequent confirmatory factor analysis (CFA) used multi-group combined with MIMIC ("multiple indicators, multiple causes") models. This tested the effects of several covariates (sex, age) on the factors and on the single items in the multiple groups (geographical regions).

To test the assumption of measurement invariance, i.e. that the HCL-32 R1 measures hypomania consistently across geographical regions, a series of models were tested statistically, stepwise. The first model served as a reference and allowed the free estimation of factor loadings and item thresholds in each geographical region. This model was then compared by χ^2 test to a more restricted one assuming that factor loadings and thresholds are equal across geographical groups. If that model fits the data as well as the reference model, there is a tentative assumption of measurement invariance. If the equality across groups is not given for some of the loadings or thresholds, "partial measurement invariance" can be still assumed, as long as the number of non-invariant items is limited. The next model (MIMIC) added covariate effects. The influence of the covariates (sex, age) was modelled by direct connections between the covariates and the factors, as well as direct connections to each single item. All models were estimated using the mean- and variance-adjusted weighted least square estimator WLSMV, as available and recommended for binary data in the Mplus 5.1 program.

There were between 30 and 80 missing cases for each HCL-32 R1 item, except for the last two, for which about 240 cases were missing (these two items had not been assessed in one of the Italian samples). Missing data for the HCL-32 R1 items were handled by multiple imputation, using the user-written program "ice" available in Stata 10.1. Five imputed data sets were produced and used to estimate the CFA models in Mplus. Mplus estimates parameters for each imputed data set and then combines them into a single point estimate and a standard error.

Several fit statistics are available for assessing the fit of CFA models to the data. We considered the comparative fit index (CFI, 19), the Tucker-Lewis index (TLI, 20), the root mean square error of approximation (RMSEA, 21), and the weight-

ed root mean square residual (WRMR). The following cut-off values have been found to be consistent with good model fit: CFI ≥0.95, TLI ≥0.95, RMSEA ≤0.06, and WRMR ≤1.0.

The relationship between the sum scores of the two factors and the total HCL-32 R1 score was visualized by locally weighted scatterplot smoothing ("lowess"). For every data point, lowess uses a linear regression of the y-variable on the x-variable(s) to predict the next point to be plotted. The regression is performed for the data point in question plus some nearby points, whereby the central data point is given the most weight. This procedure is applied to all data points.

Frequencies were compared across groups using χ^2 tests. Kruskal-Wallis tests were applied to continuous variables. All computations were done in Stata 10.1 and in Mplus 5.1.

RESULTS

The merged data set comprised 2606 depressed patients. The overall mean age was 44±14.13 years (range 15-88 years) and 58% of the patients were women. There was some heterogeneity across samples. Both samples from Eastern Europe had fewer women, and Asian patients were on average 10 years younger than patients from the other samples (Table 1). For purposes of further analysis, we split the data set into five groups from different geographical regions, labelled N-Europe, S-Europe, E-Europe, S-America, E-Asia. The missing data on sex (11 cases) and age (14 cases, 3 overlaps) led to a slightly reduced total sample size of n=2584 available for those CFA analyses using sex and age as covariates.

Initially, a factor analysis could not be performed in the merged sample due to a colinearity problem in the data. The tetrachoric correlation matrix showed that the two items "I'm more interested in sex, and/or have increased sexual desire" and "I am more flirtatious and/or am sexually more active" correlated very highly (r=0.85). When the two items were unified, factor models became computable. We therefore conducted all analyses using this unified variable, and the number of total items was thereby reduced to 31.

The ensuing EFA revealed two factors (Table 2). Factor 1 (F1) consisted of 19 items and was labelled "active/elated"; factor 2 (F2) consisted of 12 items and was labelled "irritable/risk-taking". The first factor reflects the sunny, positive side of hypomania, the second one the dark, negative side, including increased consumption of coffee, tobacco, alcohol and drugs. Together, the two factors accounted for 52.6%

Table 2 Item loadings for the two factors of the Hypomania Checklist-32, first revised version (HCL-32 R1) from the exploratory factor analysis (EFA) and the initial confirmatory factor analysis (CFA)

Item	EFA		CFA	
	F1	F2	F1	F2
Needs less sleep	0.46	0.31	0.44	0.29
Has more energy, is more active	0.87	-0.08	0.84	
Is more self-confident	0.84	-0.14	0.88	-0.22
Enjoys work more	0.66	-0.17	0.69	-0.24
Is more sociable, goes out more	0.75	0.00	0.75	
Travels more	0.52	0.12	0.55	
Drives faster, takes more risks when driving	0.19	0.56		0.67
Spends more/too much money	0.30	0.58	0.25	0.57
Takes more risks in daily life	0.37	0.53	0.33	0.51
Is physically more active	0.74	-0.10	0.77	-0.16
Makes more plans	0.79	0.01	0.78	
Has more ideas, is more creative	0.86	-0.01	0.85	
Is less shy or inhibited	0.64	0.15	0.68	
Dresses more colourfully or extravagantly	0.49	0.26	0.48	0.22
Meets more people	0.67	0.12	0.71	
Flirts more, has more sex	0.58	0.21	0.58	0.16
Talks more	0.67	0.25	0.67	0.19
Thinks faster	0.69	0.22	0.76	
Makes more jokes or puns	0.67	0.11	0.70	
Is more easily distracted	0.01	0.66		0.64
Engages in lots of new things	0.56	0.28	0.55	0.24
Thoughts jump from topic to topic	0.21	0.66	0.16	0.65
Does things more quickly/easily	0.78	-0.01	0.77	
Is more impatient and irritable	-0.13	0.82	-0.20	0.85
Tends to bug other people	-0.01	0.78	-0.08	0.80
Gets into more quarrels	-0.01	0.79		0.75
Mood is higher, more optimistic	0.82	-0.16	0.86	-0.23
Drinks more coffee	0.04	0.47		0.48
Smokes more cigarettes	-0.02	0.60		0.57
Drinks more alcohol	0.13	0.59		0.64
Takes more drugs or medicines	-0.32	0.64	-0.38	0.68

Items belonging to F1 are shaded

Table 3 Age and Hypomania Checklist-32, first revised version (HCL-32 R1) scores (mean ± SD) by region and gender

	N-Europe		S-Europe		E-Europe		S-America		E-Asia		p(M)	p(F)
	M	F	M	F	M	F	M	F	M	F		
N	265	403	247	435	111	80	153	270	308	323		
Age	49.4±14.6	50.1±15.7	43.5±12.4	44.8±12.7	45.1±12.1	44.7±11.2	43.6±11.2	44.5±12.2	33.5±12.0	37.2±12.9	0.0001	0.0001
HCL-32 total score	17.8±5.9	16.4±6.1	15.7±8.0	14.2±8.1	17.7±6.4	18.2±7.4	16.3±5.9	16.6±6.2	16.1±6.7	14.9±6.7	0.01	0.0001
F1 score	13.7±4.2	13.2± 4.4	11.6±5.5	10.9±5.7	11.9±5.4	12.3±5.5	11.3±5.2	11.8±5.1	11.9±5.2	11.3±5.3	0.0001	0.0001
F2 score	4.2±2.9	3.3±2.8	4.6±3.4	4.1±3.1	5.7±3.2	5.8±3.5	5.0±2.9	4.9±2.8	4.2±2.8	3.6±2.7	0.0001	0.0001

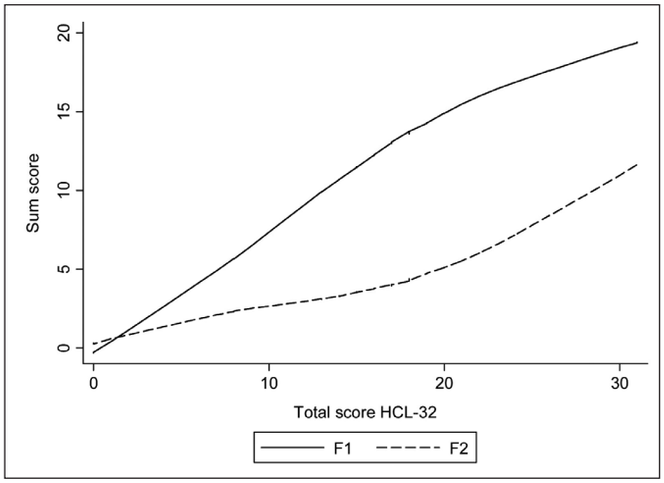

Figure 1 Relationship between factor sum scores and total score of the Hypomania Checklist-32, first revised version (HCL-32 R1). Factor 1 (F1) is "active/elated", Factor 2 (F2) is "risk-taking/irritable"

of the total variance. The reliability (Cronbach's alpha) was 0.89 for F1, 0.80 for F2, and 0.88 for the total scale. The two factors inter-correlated with r=0.16 (p<0.001). The item loadings on the two factors are given in Table 2, under the heading EFA. Table 2 also shows the primary loadings of the initial CFA, and those secondary loadings ("cross-loadings") that had to be allowed in order for the model to show a good fit to the data.

Men tended to score higher than women on F2 and on the total score, whereas there was no gender difference in F1. Patients from N-Europe and E-Europe were highest on the total score, those from N-Europe highest on F1 and those from E-Europe highest on F2 (Table 3). A plot of the factor sum scores vs. the total score demonstrated that F2 is more strongly correlated with greater severity of the hypomanic syndrome (Figure 1).

EFAs conducted separately for each geographical group yielded almost identical factor structures for all groups. It was thus concluded that the same factors underlay the test items in all regions.

Using factor structure, factor loadings and item thresholds as indicators, the HCL-32 as a whole proved to be largely measurement invariant across the geographical regions studied. Nevertheless, four individual items showed non-invariant primary loadings (Tables 4 and 5). "Overspending" was clearly more strongly related to F2 in S-America as compared to the other regions. However, the factor loading of 1.54 for S-America exceeds the theoretical maximum loading of 1, indicating that this effect is not trustworthy. In S-Europe, "faster thinking" was less strongly related to F1 than in other regions. Finally, in the East Asian sample, there were relatively lower factor loadings for the items "jumping thoughts" (F2) and "higher mood" (F1). In N-Europe, sex-related measurement non-invariance was found: women were much more likely to "dress colourfully or extravagantly" than men at the same level of hypomania. Finally, in E-Asia, there was a markedly less strong relation between "smoking" and F2 in women than in men, again at the same level of hypomania.

Some items which loaded on more than one factor (i.e., cross-loadings) were also not measurement invariant. These are listed in Table 6 and demonstrate two types of non-invariance. Firstly, two of these items showed transcultural variance (see Table 2): in S-America, "overspending" (an F2 item) was much more weakly related to F1 than in other regions, suggesting that it is perceived to have less positive aspects. In E-Asia, "jumping thoughts" (an F2 item) was much more closely related to F1 than in other regions, suggesting that this symptom is perceived to be less negative in that

Table 4 Transcultural population differences in the Hypomania Checklist-32, first revised version (HCL-32 R1)

	N-Europe (n=672)		S-Europe (n=687)		E-Europe (n=193)		S-America (n=423)		E-Asia (n=631)	
Factor	Regression coefficient[b]	Level[a]	Regression coefficient[b]	Level[a]	Regression coefficient[b]	Level[a]	Regression coefficient[b]	Level[a]	Regression coefficient[b]
F1	Female sex: -0.157* Age: -0.016***	-0.820***	Age: -0.007*	n.s.	Age: -0.019*	-1.146***	Age: -0.008*	-0.463*	Age: -0.019***
F2	Female sex: -0.278*** Age: -0.016***	n.s.	Age: -0.010**	n.s.	n.s.	n.s.	Age: -0.014**	n.s.	Age: -0.018***

[a] Factor levels are expressed as standardized deviation from a reference group, in this case N-Europe
[b] Factor loadings are unstandardized primary loadings; regression coefficients are Y-standardized
*p<0.05, **p<0.01, ***p<0.001, n.s. – non-significant

Table 5 Transcultural measurement invariance in the Hypomania Checklist-32, first revised version (HCL-32 R1)

Items	N-Europe (n=672)		S-Europe (n=687)	E-Europe (n=193)	S-America (n=423)	E-Asia (n=631)	
	Primary loading[a]	Covariate effects[a]	Primary loading[a]	Primary loading[a]	Primary loading[a]	Primary loading[a]	Covariate effects[a]
Needs less sleep	0.46		0.46	0.46	0.46	0.46	
Has more energy, is more active[d]	1.00		1.00	1.00	1.00	1.00	
Is more self-confident	1.06		1.06	1.06	1.06	1.06	
Enjoys work more	0.69		0.69	0.69	0.69	0.69	
Is more sociable, goes out more	0.88		0.88	0.88	0.88	0.88	
Travels more	0.69		0.69	0.69	0.69	0.69	
Drives faster, takes more risks when driving	0.70		0.70	0.70	0.70	0.70	
Spends more/too much money	0.63		0.63	0.63	**1.54**[b]	0.63	
Takes more risks in daily life	0.60		0.60	0.60	0.60	0.60	
Is more physically active	0.79		0.79	0.79	0.79	0.79	
Makes more plans	0.97		0.97	0.97	0.97	0.97	
Has more ideas, is more creative	1.08		1.08	1.08	1.08	1.08	
Is less shy or inhibited	0.83		0.83	0.83	0.83	0.83	
Dresses more colourfully or extravagantly	0.51	0.72*	0.51	0.51	0.51	0.51	
Meets more people	0.83		0.83	0.83	0.83	0.83	
Flirts more, has more sex	0.72		0.72	0.72	0.72	0.72	
Talks more	0.75		0.75	0.75	0.75	0.75	
Thinks faster	0.88		**0.56**[b]	0.88	0.88	0.88	
Makes more jokes or puns	0.77		0.77	0.77	0.77	0.77	
Is more easily distracted	0.94		0.94	0.94	0.94	0.94	
Engages in lots of new things	0.57		0.57	0.57	0.57	0.57	
Thoughts jump from topic to topic	0.71		0.71	0.71	0.71	**0.66**[b]	
Does things more quickly/easily	0.76		0.76	0.76	0.76	0.76	
Is more impatient and irritable[c]	1.00		1.00	1.00	1.00	1.00	
Tends to bug other people	0.91		0.91	0.91	0.91	0.91	
Gets into more quarrels	0.94		0.94	0.94	0.94	0.94	
Mood is higher, more optimistic	0.99		0.99	0.99	0.99	**0.87**[c]	
Drinks more coffee	0.47		0.47	0.47	0.47	0.47	
Smokes more cigarettes	0.69		0.69	0.69	0.69	0.69	-1.089*
Drinks more alcohol	0.78		0.78	0.78	0.78	0.78	
Takes more drugs or medicines	0.85		0.85	0.85	0.85	0.85	

[a] Factor loadings are unstandardized primary loadings; regression coefficients are Y-standardized

[b] Factor loadings in bold are non-invariant across groups, i.e., differ from the corresponding loadings in the other groups

[c] These are marker items whose factor loadings are fixed to 1 in all groups in order to pass their metric on to their corresponding factor (energy→F1, impatient→F2)

*p<0.001

Shaded items belong to F1, the other items to F2

culture. Secondly, some additional region-specific cross-loadings which had to be allowed are, by definition, non-invariant, since they are not computed for other regions: the items affected were "having more energy", "driving faster and taking more risks when driving", "thinking faster", "getting into more quarrels" and "distractibility" (Table 6).

CFA showed that the level of F1 ("active/elated") was highest in N-Europe and E-Europe and lowest in S-America, the difference exceeding one SD. The other regions took intermediate positions. There were no statistically significant differences in the level of F2 ("irritable/risk-taking") (Table 4).

Except for E-Europe, there were consistent effects of the covariate "age" on the level of the latent traits F1 and F2. In summary, however, the decrease per life-year was on average only about 0.015 SD. Effects of the covariate "sex" were only found in N-Europe, with a 0.2-0.3 SD decrease in both factors F1 and F2 in women compared to men (Table 4).

The item profiles (i.e., item frequencies) across geographical regions for the items of F1 (Figure 2) and F2 (Figure 3) are of special clinical interest. They show generally high inter-regional similarities in F1 and F2. Only two exceptions were observed: S-European patients had generally lower symptom frequencies and E-European patients had higher rates of drug use.

Importantly, fit indexes for this model were consistent with good fit. The following values were obtained: χ^2=1635.30 (df=701), CFI=0.94, TLI=0.97, RMSEA=0.051, WRMR=2.76. It can be concluded that the model provides a reasonable description of the data.

DISCUSSION

This is the first detailed report on hypomanic symptoms collected in 12 countries across the world by investigators using the HCL-32.

The main findings are the extensive evidence of the trans-

Table 6 Transculturally non-invariant secondary (cross-) loadings in the Hypomania Checklist-32, first revised version (HCL-32 R1)

Item	Item belongs to factor…	Secondary loading on factor…	N-Europe	S-Europe	E-Europe	S-America	E-Asia
Has more energy, is more active[a]	F1	F2		**-0.11**			
Drives faster, takes more risks driving[a]	F2	F1		**0.14**			
Spends more/too much money	F2	F1	0.32	0.32	0.32	**0.07**	0.32
Thinks faster[a]	F1	F2		**0.48**			
Is more easily distracted[a]	F2	F1	**-0.26**			**0.55**	
Thoughts jump from topic to topic	F2	F1	0.07	0.07	0.07	0.07	**0.40**
Gets into more quarrels[a]	F2	F1		**-0.15**			

[a] Unique region-specific cross-loading
Deviant secondary loadings are printed in bold

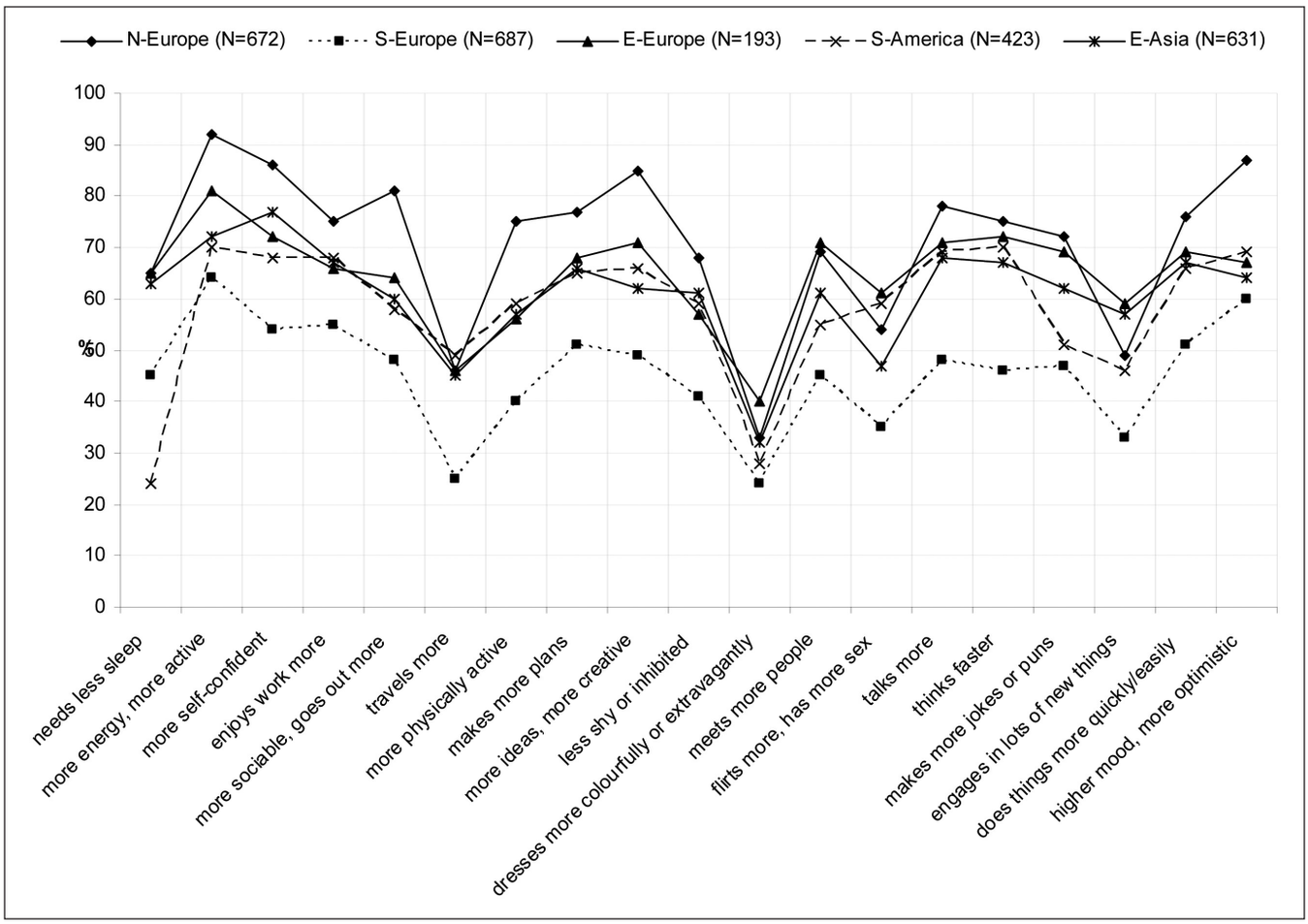

Figure 2 Item profile of Factor 1 (active/elated) by region

cultural stability of hypomania (analysed by CFA) and the replication of the two-factor solution in patients with mood disorders, compatible with previous exploratory factor analyses (12-14,22,23). The two-factor structure had also been found in normal adults (10). In addition, normal adolescents and young adults in romantic love had been compared to controls and found to score high on factor 1, but not on factor 2, of the HCL-32 (9). Thus, it is tempting to assume that the first factor (elated, energetic, self-confident, extraverted, cognitively speeded up) may to some extent represent normal "highs", while factor 2 (risk-taking, irritable, impatient, cognitively fragmented, drug-taking) may be more characteristic of psychopathological conditions. Taken together, these findings suggest that human beings have a basic capacity to develop a range of positive affect, from normal high mood via dimensional transitions to hypomanic and manic states. This would be comparable to the human capacity to become anxious and sad/depressed.

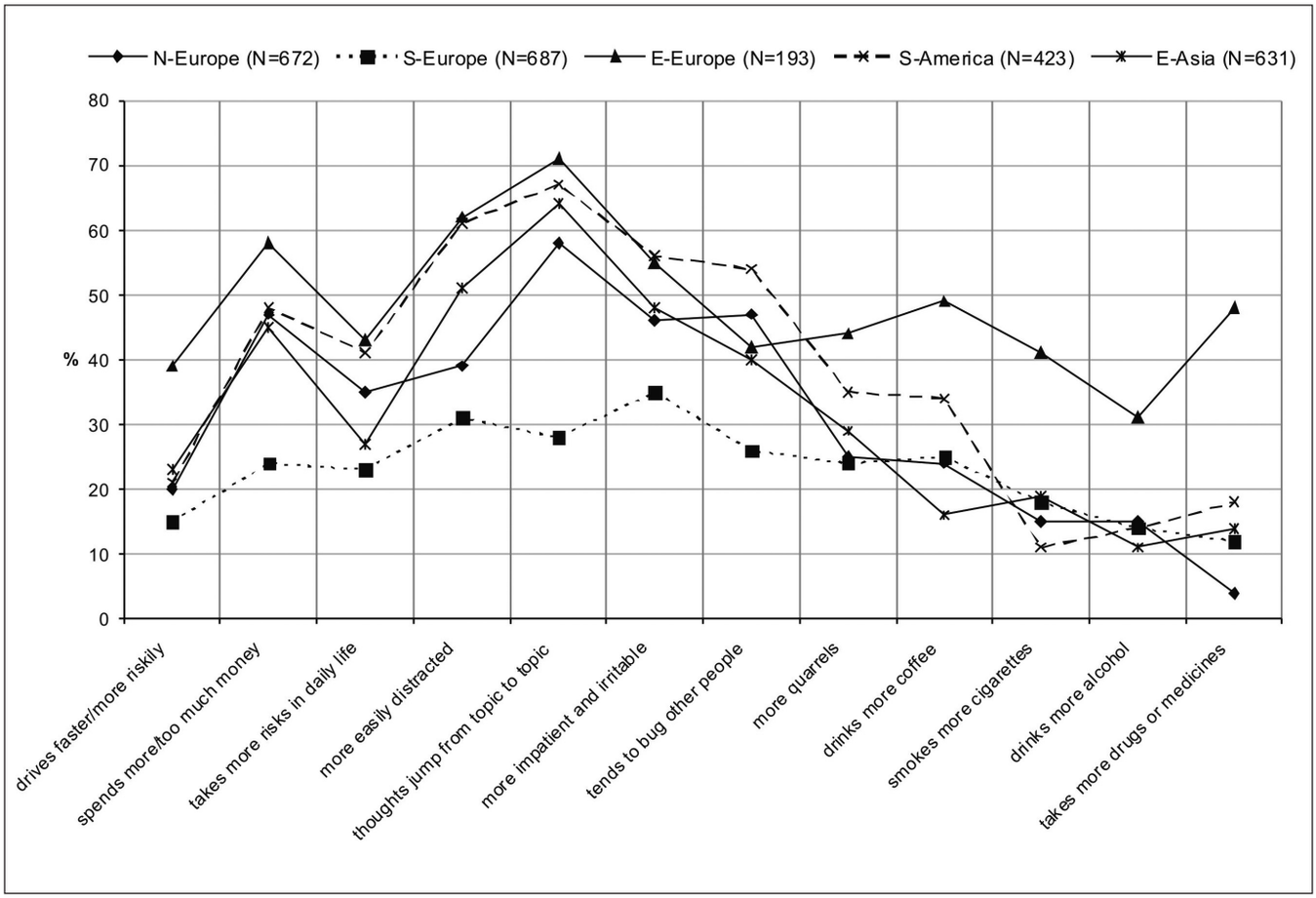

Figure 3 Item profile of Factor 2 (risk-taking/irritable) by region

The HCL-32 R1 proved to a remarkable degree to be transculturally stable: only four items showed variability in primary factor loadings and each was restricted to one geographical region. All the remaining primary loadings and item thresholds were cross-culturally invariant. There was one other type of difference, related to sex: at similar levels of hypomania, women in Northern Europe reported more often dressing more colourfully and extravagantly during hypomania than men. Furthermore, women in East Asia were much less likely to smoke cigarettes than men at comparable severity of hypomania.

Despite the replication of the two-factor solution, the need to allow substantial cross-loading in the CFA shows that the HCL-32 R1 items do not neatly segregate into two groups defining the two factors. There is substantial overlap in the mapping of items to factors. About half of all items feed, to varying extents, into both the positive, sunny, and the negative, dark side of hypomania. This also means that, while the two factors have relatively clear positive and negative connotations, many items do not. They may capture both the more pleasant as well as the more disturbing aspects of hypomanic states. This might especially be the case for symptoms about which the individual feels ambivalent or whose appraisal differs among individuals (e.g., "taking more risks" can be pleasurable sensation-seeking but may also include the potential for serious harm; and "spending more or too much money" can also change valence depending on whether the individual focuses on "more" or "too much").

There were major transcultural differences with regard to the level of the two factors of hypomania, but the results obtained by the traditional method of summing scores differed somewhat from those obtained by the CFA. For example, Northern and Eastern European patients showed the highest level of the positive aspect of hypomania, while patients from South America had the lowest levels according to the CFA, but not according to F1 sum scores. It is not entirely clear what caused these differences, but the CFA results are assumed to be more reliable because potential confounders, such as age or gender ratio differences between samples, are accounted for in the analyses. Hypomania slightly decreases with age (increasing age was almost ubiquitously associated with declining levels of both factors). In addition, females from Northern Europe manifested lower levels of hypomania in F1 and F2 than men. Both the age and sex effects seem small and might be clinically of little importance.

The most pressing issue is now to replicate our results by an independent study. Although the sample size in this study was satisfactory, it is very likely that, at a certain point in modelling, the goodness-of-fit of the analysis can be further improved only by modelling the idiosyncrasies of the data which, by their very nature, will not generalize to other samples. Replication is therefore crucial in order to distinguish those results that are robust across samples from those that are unique to a given sample. We can expect that our results will be tested soon by the independent BRIDGE diagnostic study on about 5600 depressed patients from Europe, North Africa and the Near and Far East (24-26).

In conclusion, in a merged sample of 2606 depressed patients from different geographical regions, the HCL-32 R1 was largely measurement invariant, indicating its suitability for use in different cultures to assess a lifetime history of hypomanic symptoms. It measured hypomania in a stable way across five cultural and geographical regions in Europe, South America and East Asia. Further research is needed to investigate whether the cultural robustness of the HCL-32 R1 can be replicated and extends to other cultures. However, the current evidence suggests that the HCL 32 R1 can be reliably used in different cultural contexts for identifying bipolarity in depressed patients.

Acknowledgements

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