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Special research report

A study of affective temperaments in Hungary: Internal consistency and concurrent validity of the TEMPS-A against the TCI and NEO-PI-R

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Abstract

Background: TEMPS-A (Temperament Evaluation of the Memphis, Pisa, Paris and San Diego — Autoquestionnaire) is a new self-assessed temperament 110-item scale with depressive (D), cyclothymic (C), hyperthymic (H), irritable (I) and anxious (A) subscales. To date, it has been translated into 25 languages, and validated in 10. The present Hungarian version provides the most complete external validation across the Beck Depression Scale (BDI), Profile of Mood States (POMS), the BarOn Emotional Quotient Inventory (BarOn EQ-i), Temperament and Character Inventory (TCI), and the NEO Personality Inventory — Revised (NEO-PI-R). We were particularly interested in concurrent validation against the TCI and the NEO-PI-R, the most important of the new personality instruments.
Methods: 1132 clinically-well subjects (27% male) from the general population and university students (16–81 years) were administered the above scales and instruments. The data were tested with standard psychometric batteries.
Results: Factor analysis revealed 5 factors approximating the original D, C, I, H, and A subscales, which in their superfactor confirmed an Emotional (D, C, I, A) vs. Hyperthymic structure. Except for the D ($a=0.65$), the Cronbach alpha for the remainder temperaments ranged from 0.75–0.81. Dominant temperaments ranged from the I (2.7%) to the C (4.2%); the highest prevalence was observed among men with C=6% and H=5.4%. The BDI and POMS correlated significantly with the relevant subscales, as did the BarOn. Of the many significant possible correlations with the TCI, the most noteworthy were novelty seeking and harm avoidance with D, A, C, *as well as* C, and persistence with H. As for the NEO-PI-R, we were struck by the positive correlation of openness with C, and conscientiousness negatively with C; most other positive correlations such as neuroticism with all temperaments but the hyperthymic were expected and strongly supportive of concurrent validity.
Limitations: Higher educational background of the subjects studied relative to that of the general population of Hungary. The distribution of the data may have in some instances deviated somewhat from the underlying assumptions for the standard psychometric tests for normality. We did not conduct test–retest reliability.

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Conclusions: The factorial structure of the TEMPS-A shows good reliability and internal consistency. Although the superstructure is reminiscent of neuroticism–extraversion, within it are embedded discernible classical affective temperaments. A provocative finding is the high prevalence of cyclothymia in Hungarian males (6%), which is rather unique when compared with the other 10 countries studied to date. This finding, coupled with high male hyperthymia (5.4%), may explain the high lifetime prevalence of bipolar disorders reported from Hungary. Inter alia, our psychometric data along with the foregoing epidemiologic considerations, are very much in line with the cyclothymic-bipolar spectrum model proposed by the senior author [Akiskal, H.S., Djenderedjian, A.H., Rosenthal, R.H., Khani, M.K., 1977. Cyclothymic disorder: validating criteria for inclusion in the bipolar affective group. Am. J. Psychiatry 134, 1227–1233].
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Keywords: TEMPS-A; TCI; NEO-PI-R; Internal consistency; Concurrent validity

1. Introduction

There has been a renaissance of the field of temperament during the last two decades (Akiskal et al., 1977; Akiskal and Akiskal, 1992; Kagan et al., 1988; Cloninger et al., 1993; Von Zerssen, 2002). This field represents a fascinating interface between genotype and phenotype in affective disorders (Akiskal, 1996; Evans et al., 2005; Chiaroni et al., 2005; Gonda et al., 2006). The TEMPS-A (Temperament Evaluation of Memphis, Pisa, Paris and San Diego — Autoquestionnaire) is a new self-rated instrument which measures the classical affective temperaments (Akiskal and Akiskal, 2005a). This instrument is different from the Temperament and Character Inventory (TCI: Cloninger et al., 1994) and the Five Factor Model (NEO-PI-R, Costa and McCrae, 1985, 1992) in that it frames questions in the language of affectivity. Other cogent features of the TEMPS-A is that it is rooted in an evolutionary biologic perspective (Akiskal and Akiskal, 2005b), and recently its clinical validity has been supported on a genetic basis (Gonda et al., 2006).

The TEMPS-A has been translated into 25 languages, and is validated in 10, including English, Italian, French, German, Japanese and Turkish (see Akiskal and Akiskal, 2005a), as well as Arabic (Karam et al., 2005), Polish (Borkowska et al., 2006), Spanish (Vázquez et al., 2007), and Hungarian (Rózsa et al., 2006a,b). This paper extends this Hungarian work to a much expanded clinically-well population with special focus on external validation of the TEMPS-A against two widely used instruments, the TCI (Cloninger et al., 1994) and the NEO-PI-R (Costa and McCrae, 1985, 1992), as well as other scales documented in the Methods and Results.

2. Methods

2.1. Subjects

The participants were 1132 volunteers (797 women and 335 males) drawn from university students and a community-based population. The ages of the respondents ranged from 16 to 81 years (M=27.74; S.D.= 11.13). The majority (72.8%) had high school degree, 23.7% had completed a university degree; only a minority (3.5%) had just elementary school diplomas. In this respect, the study population was somewhat different from the Hungarian population at large, where less than 20% has a high school degree and more than 20% has only elementary school diploma (Szadoczky, 2000).

2.2. Measures

The TEMPS-A is a 110 item (109 for males) self-report instrument consisting of the following five subscales: depressive, cyclothymic, hyperthymic, irritable, and anxious. Each of the subscales consists of affect-laden items, as well as socially adaptive traits (Akiskal and Akiskal, 1992, 2005a,b). TEMPS-A was scored “No” as 0 and “Yes” as 1.

TEMPS-A was translated into Hungarian by Zoltán Rihmer and Péter Pestality and then back-translated into English by a translator who had not examined the English version of the questionnaires. The accuracy of the translation and its conformity with the original versions were checked by the originators of the instrument (H.S.A., K.K.A.) and both translators. Any discrepancy was discussed until an agreement was reached. This version was then refined by paying special attention to the use of frequent and well-known words, and using a correct and easy grammar in order to ensure the items were well-understood for every level of education.

In addition to the TEMPS-A, several other instruments (Beck Depression Inventory (Beck et al., 1961, 1988), Profile of Mood States (McNair et al., 1992; McNair and Heuchert, 2003), Cloninger’s Temperament and Character Inventory (Cloninger et al., 1994)) and the NEO-PI-R (Costa and McCrae, 1985) were administered to subsamples. All instruments have been previously standardized in Hungary (Rózsa et al., 2001, 2005; Rózsa et al., 2006a,b), except POMS and BarOn EQ-i.

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Beck Depression Inventory (BDI; Beck et al., 1961, 1988; Rózsa et al., 2001) is a 21-item well-validated self-report instrument measuring characteristic attitudes and symptoms of depression over the previous two weeks. Scores range from 0 to 36. Greater scores on the BDI indicate increases in intensity of depressive symptoms. The BDI is recommended in research and clinical settings.

The Profile of Mood States (POMS; McNair et al., 1992) consists of 65 short phrases describing feeling and mood, with respondents asked to indicate mood reactions for the "past week including today". Items rated from 0 (not at all) to 4 (extremely). Six dimensions are scored: (1) tension/anxiety, (2) depression/dejection, (3) anger/hostility, (4) fatigue/inertia, (5) confusion/bewilderment, and (6) vigor/activity. The first 5 dimensions are regarded as reflecting negative mood dimensions, and the sixth is considered to be positive. The POMS has been used widely in the general population, and its reliability and validity are well-supported in the literature (McNair and Heuchert, 2003).

The Temperament and Character Inventory (TCI; Cloninger et al., 1993, 1994) is a self-administered 240-item instrument used in the dimensional study of the temperament and character components of personality. It is divided into seven independent dimensions, four of which test temperament (novelty seeking, harm avoidance, reward dependence, and persistence) and are thought to be related to biological substrates and to individual differences in procedural memory. The remaining three (self-directedness, cooperativeness, and self-transcendence) test character and are considered acquired personality traits related to propositional memory system. Novelty seeking expresses the level of activation of exploratory activity in response to novelty, impulsive decision-making and is mainly related to dopaminergic activity. Harm avoidance reflects the efficiency of behavioral inhibition system, mediated by serotonin. Reward dependence refers to behavior maintenance based on rewards and is mainly related to norepinephrine. Persistence expresses maintenance of a behavior as resistance to frustration and is related to glutamate activity. Self-directedness refers to the ability to control, regulate and adapt one's behavior in accord chosen goals and values. Cooperativeness refers to individual differences in identification with an acceptance of other people (social acceptance, tolerance, and the capacity to cooperate). Self-transcendence refers to spiritual maturity, transpersonal identification, and self-forgetfulness. The Hungarian version of the TCI showed good psychometric properties in a large normative sample, including its internal consistency, concurrent validity and factorial structure (Rózsa et al., 2005).

The NEO Personality Inventory — Revised (NEO-PI-R, Costa and McCrae, 1985, 1992) were constructed by means of factor- and item-analytic techniques and provide scores on the following five personality dimensions: Neuroticism (N; the tendency to experience negative affects such as sadness, anxiety, guilt, fear, anger, embarrassment, irrationality, impulsivity, poor coping), Extraversion (E; tendency toward assertiveness, high activity/energy level, sociability, optimism, positive emotions), Openness (O; tendency to be open to new experiences, intellectually curious, and aesthetically imaginative and sensitive), Agreeableness (A; tendency toward trust, cooperation, altruism, sympathy/empathy), and Conscientiousness (C; tendency toward self-control, organization, purposefulness, motivation, and reliability). The NEO-PI-R consists of 240 items answered on a 5-point Likert format ranging from strongly disagree to strongly agree.

The BarOn Emotional Quotient Inventory (BarOn, 2002) comprises 133 brief items and employs a five-point response set (ranging from "Not True of Me" to "True of Me"), and it gives an overall Emotional Quotient score as well as scores for the four validity indices and the following 5 composite scales and 15 subscales: Intrapersonal (Self-Regard, Emotional Self-Awareness, Assertiveness, Independence, and Self-Actualization), Interpersonal (Empathy, Social Responsibility, and Interpersonal Relationship), Stress Management (Stress Tolerance and Impulse Control), Adaptability (Reality Testing, Flexibility, and Problem Solving), General Mood Scale (Optimism and Happiness).

2.3. Statistical analyses

To assess gender differences we compared them using the *t*-test. Pearson's correlation was used to test the convergence between the TEMPS-A scales and Beck Depression Inventory, and Profile of Mood States, and scales of Cloninger's Temperament and Character Inventory, as well as the NEO-FFI-R. Internal consistency was measured using Cronbach's α coefficients. Item analyses were performed by the point-biserial coefficient, which is the correlation between the item score and the total scale score for dichotomous items. All the foregoing statistical analyses were performed using SPSS 13.0, significance was assumed with $p < 0.05$.

Full-information item factor analysis (FIFA; Bock and Aitkin, 1981; Bock et al., 1988; Wilson et al., 1991) were performed the TEMPS-A binary items. It is well-known, but often ignored, that traditional factor analytic methods were designed for use with continuous data, and therefore suboptimal for binary types of item data

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(Woods, 2002). In the FIFA model the following assumption is made: an observed item response is thought to represent an underlying, normally distributed response process, with a threshold that divides the continuum into scores that lead to one observed response (e.g., "true"), vs. the other (e.g., "false"). Exploratory FIFA were performed using TESTFACT (Wilson et al., 1991); the latter involve, among others smoothing of tetrachoric correlations, handling of missing items, use of maximum likelihood algorithm, and make TESTFACT preferable to traditional factor analysis. Further details are beyond the scope of this paper, but are available on request.

3. Results

3.1. Descriptive statistics, reliability and factor structure

This section of the results subsumes all statistical analyses within the overall construct of TEMPS-A.

3.1.1. Descriptive statistics and reliability of TEMPS-A

Table 1 shows the range, means, standard deviations, *t*-tests of sex differences, kurtosis, skewness, and α coefficients of the TEMPS-A subscales. For the comparability the total score of the TEMPS-A scales were divided by the number of items. It is noteworthy that only 8 protocols were deleted from final analyses due to missing items — negligible in light of the total 5660 possible data points. Females obtained significantly higher scores on Depressive (D) and on the Anxious (A) subscale of the TEMPS-A, whereas males showed significantly higher scores on Hyperthymic (H) temperament subscale. Similar results are found in other countries (e.g., Blöink et al., 2005; Vahip et al., 2005; Karam et al., 2005). Hyperthymic and cyclothymic (C) temperament showed the highest (negative) correlation with age.

Skewness and kurtosis are usually used as a normality test. Values outside the −1 to +1 interval have been suggested as indicators of normality violation (Muthén and Kaplan, 1985). The kurtosis and skewness values indicate that all scales except for the hyperthymic had a near-normal and -symmetrical distribution. A more conservative test for normality, the Kolmogorov–Smirnov test, was not used. It would *not* have substantially changed our results. The hyperthymic subscale raises complex methodologic points discussed in other language versions (see Placidi et al., 1998; Akiskal et al., 2005a,b; Karam et al., 2005).

The Cronbach alpha coefficients for each scales of the TEMPS-A are listed in the last column of Table 1. All alpha coefficients for scores ranged between 0.65 and 0.81. The magnitude of the coefficients α was satisfactory and very similar to that found in the other samples (Blöink et al., 2005; Vahip et al., 2005; Karam et al., 2005). Item analyses indicated that four items (14, 16, 18, 21) of the Depressive temperament scale had poor (<0.10) point-biserial correlation with the scale score.

We are aware that the effect sizes for the *t*-tests for gender differences would be more informative; again this is reserved for future work, as at this stage comparability of our methods to other language versions of the TEMPS-A is our main concern.

3.1.2. Exploratory factor analysis

The structure of the Hungarian version of the TEMPS-A for the total sample was checked through full-information item factor analysis by the TESTFACT program. The results of the factor analysis are shown in Table 2. Items with a factor loading equal or greater to 0.30 were retained.

Factor I (Anxiety) and Factor II (Hyperthymic) achieve clearest separation with rare admixtures from traits that originally belonged to other subscales. Two Depressive temperament items (D14: I am the kind of person you can always depend on, and D18: It is natural for me to be neat and organized) showed largest loading on Factor II. The I81 irritability item (I am a very skeptical person) loads

Table 1
Means, standard deviations, and *t*-test by gender

TEMPS-A subscales	*N* items	Males		Females		*t*-test	*p*	Correlation with age [a]	Kurtosis	Skewness	α
		M	S.D.	*M*	S.D.						
Depressive	21	0.31	0.15	0.33	0.15	−3.00	0.003	0.078**	0.37	0.63	0.65
Cyclothymic	21	0.33	0.22	0.35	0.20	−1.12	0.261	−0.128***	−0.47	0.48	0.80
Hyperthymic	21	0.53	0.22	0.47	0.20	4.21	0.000	−0.196***	−0.58	−0.01	0.79
Irritable	20 or 21 [b]	0.31	0.20	0.29	0.18	1.37	0.169	−0.077*	−0.23	0.49	0.75
Anxious	26	0.20	0.16	0.30	0.18	−9.21	0.000	0.091**	−0.05	0.63	0.81

Kurtosis, skewness, and α.

[a] $p^{***}<0.001$; $p^{**}<0.01$; $p^{*}<0.05$.

[b] Males answered 20 items on the irritable subscale, and females answered 21 items.

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Table 2
Factor structure of the Hungarian TEMPS-A items based on the full-information item factor analysis

Items	Factor I	Items	Factor II	Items	Factor III	Items	Factor IV	Items	Factor V
A89	0.439	H46	−0.485	I83	0.489	C23	0.440	D11	0.476
A85	0.434	H55	−0.468	I76	0.471	C25	0.440	D5	0.416
A87	0.431	H44	−0.464	H60	0.453	C35	0.435	C31	0.414
A86	0.426	H43	−0.426	I82	0.425	I69	0.412	D6	0.398
A99	0.426	D14	−0.415	I73	0.423	C28	0.405	A104	0.389
A100	0.421	D18	−0.405	I72	0.389	A92	0.395	A108	0.384
A98	0.400	H49	−0.404	H61	0.381	C33	0.382	D17	0.360
A88	0.367	H57	−0.402	H62	0.355	H63	−0.367	C42	0.315
A91	0.362	I81	0.398	I74	0.349	C34	0.357	D8	0.306
A97	0.318	H50	−0.396	H47	0.341	C22	0.355	D4	0.303
A103	0.308	H48	−0.361	D10	−0.333	D7	0.350		
		H53	−0.360	I75	0.316	D13	0.336		
		H52	−0.337			C36	0.334		
		H59	−0.325			C38	0.322		
		H54	−0.318			C27	0.321		
		H58	−0.313						
		H51	−0.301						

Loadings on a specific factor were selected according to coefficient values ≥ 0.30.
D = Depressive, C = Cyclothymic, H = Hyperthymic, I = Irritable, A = Anxious.

positively on Factor II. The Factor III has mixed irritability and hyperthymic items (H60, H61, H62, H47). One Depressive item (D10) correlated negatively with the Factor III.

Factor IV represents mostly cyclothymic items, but there are some additional factor loadings: I69, A92, D7 and D13. The H63 hyperthymic item (Normally I can get by with less than 6 hours of sleep) correlated negatively with the Cyclothymic factor.

Factor V (Depressive) presents a less homogeneous factor structure. Besides the 6 depressive temperament items, two Cyclothymic items (C31 and C42) and two Anxious items (A104 and A108) load on the Depressive factor.

3.1.3. Correlation within TEMPS-A and principal component analyses

Correlations between the five temperament scales are shown in Table 3. Notable correlations (>0.30) were found between several affective temperaments: i.e. Depressive and Anxious, Cyclothymic and Irritable, Irritable and Anxious. Temperaments were not independent of each other. Depressive and anxious temperament, and cyclothymic and irritable temperament are closely related and also show relatively high correlation to all other scales. Hyperthymic temperament is the only one that appears independent from the others.

Principal component analyses were performed for the 5 affective temperament scores, with Varimax orthogonal transformation taking into account factors with Eigenvalues of 1 or more. Two superfactors were identified for the 5 affective temperament scales, accounting 71% of the variance (Table 4). Anxious, cyclothymic, depressive and irritable temperament loaded on the Factor I, and Hyperthymic temperament correlated with the Factor II.

3.1.4. Distribution of z-scores

Dominant temperament was determined according to their *z*-scores. The distribution of *z*-scores above +2S.D. are shown in Table 5. Prevalence of the dominant temperaments

Table 3
Correlations between the different affective temperaments

TEMPS-A subscales	Cyclothymic	Hyperthymic	Irritable	Anxious
Depressive	0.42***	−0.20***	0.26***	0.55***
Cyclothymic		−0.07*	0.53***	0.46***
Hyperthymic			0.07*	−0.29***
Irritable				0.49***

***$p<0.001$; *$p<0.05$; $N=1132$.

Table 4
Principal component analysis of TEMPS-A scales (two-factor solution with eigenvalues of 1 or more, after Varimax rotation)

TEMPS-A subscales	Factor I	Factor II
Anxious	**0.842**	−0.221
Cyclothymic	**0.773**	0.338
Depressive	**0.732**	−0.250
Irritable	**0.718**	0.395
Hyperthymic	−0.197	**0.896**
Explained variance (%)	**47.89**	23.67

Loadings with absolute values of 0.40 or more are shown in bold.

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Table 5
The number of respondents with *z*-scores above +2S.D. on each of the five temperaments

TEMPS-A subscales		Total	Male	Female	16–30 years	31–40 years	41–50 years	51–81 years
Depressive	No. subjects	36	9	27	23	5	1	7
	%	3.2	2.7	3.4	2.6	4.7	1.2	9.9
Cyclothyimic	No. subjects	48	20	28	40	3	1	4
	%	4.2	6.0	3.5	4.6	2.8	1.2	5.6
Hyperthymic	No. subjects	34	18	16	32	1	–	1
	%	3.0	5.4	2.0	3.7	0.9	–	1.4
Irritable	No. subjects	30	15	15	22	6	1	1
	%	2.7	4.5	1.9	2.6	5.6	1.2	1.4
Anxious	No. subjects	42	4	38	28	4	2	8
	%	3.7	1.2	4.8	3.2	3.7	2.3	11.3

in the total sample are as follows: 4.2% for Cyclothymic temperament, 3.7 for Anxious temperament, 3.2% for Depressive temperament, 3% for Hyperthymic temperament, 2.7% for the Irritable temperament. Men had the highest percentage of *z*-scores above +2S.D: for the Cyclothymic (6%), Hyperthymic (5.4%), and Irritable (4.5%) temperaments, and *females* for the Anxious (4.8%), Cyclothymic (3.5%) and Depressive (3.4%)

Table 6
TEMPS-A correlations with other questionnaires: BDI, POMS, TCI, NEO-PI-R and BarOn EQ-i

	Depressive	Cyclothymic	Hyperthymic	Irritable	Anxious
BDI total [a]	0.51**	0.48**	−0.34**	0.38**	0.66**
POMS [b]					
Fatigue–inertia	0.37**	0.27**	−0.19**	0.31**	0.34**
Anger–hostility	0.24**	0.25**	−0.03	0.42**	0.32**
Vigor–activity	−0.29**	−0.16**	0.38**	−0.09	−0.21**
Confusion–bewilderment	0.29**	0.31**	−0.15*	0.27**	0.30**
Depression–dejection	0.49**	0.30**	−0.23**	0.33**	0.41**
Tension–anxiety	0.47**	0.33**	−0.19**	0.38**	0.53**
TCI [c]					
Novelty seeking	−0.21*	0.23*	0.07	0.18	−0.03
Harm avoidance	0.47**	0.34**	−0.48**	0.16	0.57**
Reward dependence	0.17	0.19*	−0.20*	−0.16	0.29*
Persistence	−0.04	−0.09	0.28**	0.20*	0.02
Self-directedness	−0.28**	−0.42**	0.31**	−0.33**	−0.43**
Cooperativeness	0.01	−0.15	0.00	−0.31**	−0.04
Self-transcendence	−0.10	0.22*	0.24*	0.02	−0.11
NEO-PI-R [d]					
Neuroticism	0.47**	0.47**	−0.33**	0.40**	0.67**
Extraversion	−0.20*	0.03	0.46**	0.10	−0.06
Openness	0.00	0.27**	0.12	0.07	0.04
Agreeableness	0.02	0.00	−0.19	−0.34**	0.10
Conscientiousness	−0.04	−0.28**	0.21*	−0.12	−0.12
BarOn EQ-i [c]					
Intrapersonal scales	−0.56**	−0.34*	0.54**	−0.36*	−0.45**
Interpersonal scales	−0.26	−0.05	0.29*	−0.18	−0.25
Adaptability scales	−0.18	−0.32*	0.46**	−0.27	−0.39**
Stress management scales	−0.30*	−0.35*	0.46**	−0.50**	−0.48**
General mood scales	−0.53**	−0.29	0.55**	−0.31*	−0.56**
Total EQ score	−0.47**	−0.35*	0.59**	−0.42**	−0.54**

BDI = Beck Depression Inventory; POMS = Profile of Mood States; TCI = Cloninger's Temperament and Character Inventory; NEO-PI-R = NEO Personality Inventory — Revised; BarOn EQ-i = BarOn Emotional Quotient Inventory. **$p<0.01$; *$p<0.05$.

[a] $N=390$.
[b] $N=327$.
[c] $N=103$.
[d] $N=98$.
[e] $N=44$.

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Table 7
Number and rates of dominant temperament based on *z*-scores above mean+2S.D.

	Frequency	Percent
No dominant (>2S.D.) temperament	984	86.9
1 dominant (>2S.D.) temperament	118	10.4
2 dominant (>2S.D.) temperaments	21	1.9
3 dominant (>2S.D.) temperaments	6	0.5
4 dominant (>2S.D.) temperaments	3	0.3
Total	1132	100.0

subscales. There were statistically significant gender differences in the frequency of dominant Hyperthymic, Irritable and Anxious temperaments. No significant difference was found among the prevalence of the dominant temperaments in the three age groups.

3.2. Construct validity

We first examine correlations with mood scales (shown in Table 6). The BDI correlated substantially positively with the anxious ($r=0.66$) and depressive ($r=0.51$) temperament subscale, and negatively with the hyperthymic temperament ($r=-0.34$). Likewise, "vigor activity" of the POMS correlated positively with the hyperthymic, and negatively with the depressive, cyclothymic and anxious. The reverse was true for the remainder of the POMS items (fatigue–inertia, anger–hostility, confusion–bewilderment, depression–dejection and tension anxious).

We next examine significant correlations with the TCI and NEO-PI-R. Novelty seeking correlated significantly with the depressive ($r=-0.21$), and positively with the cyclothymic ($r=0.23$) temperaments. Harm avoidance showed positive correlation with depressive ($r=0.47$) and cyclothymic ($r=0.34$), and anxious ($r=0.57$) subscales and negatively with the hyperthymic ($r=-0.48$). Reward dependence correlated best with the anxious temperament ($r=0.29$). Persistence correlated positively with the hyperthymic scale ($r=0.28$), and the irritable ($r=0.20$). Of the NEO-PI-R, neuroticism had a negative correlation with the hyperthymic and positively with all the other subscales of the TEMPS-A. Extraversion correlated positively with the hyperthymic and negatively with the depressive. Openness correlated positively with the cyclothymic, agreeableness negatively with the irritable; conscientiousness negatively with the cyclothymic and positively with the hyperthymic.

For the BarOn EQ-i, overall emotionality correlated negatively with the hyperthymic and positively with the others (such correlations occurred for each of the components of EQ).

The distribution of dominant temperaments (based on *z*-scores above mean+2S.D.) are shown in Table 7. 10.4% of the sample has only 1, and just 2.7% has 2 or more dominant temperaments.

4. Discussion

This is by far the largest study of the TEMPS-A to date in a clinically-well population, providing data on reliability, internal consistency and factorial structure very similar to previous language versions based on much smaller sample sizes, including population and affectively ill subjects. The results are reassuring. Only 4 items (from the depressive) were weak and deleted; except for the latter temperament with $a=0.65$, all Cronbach alphas were between 0.75 and 0.81. These data are also substantially similar to the preliminary Hungarian study on the psychometrics of the TEMPS-A (Rózsa et al., 2006a,b).

The higher prevalence of anxious–depressive traits in women, as well as the higher prevalence of the hyperthymic in men are also in line with data from other countries. What is of considerable interest is the higher prevalence of the irritable and cyclothymic temperaments in Hungary; in particular the high prevalence of male cyclothymic has not been recorded in any country studied to date (Akiskal et al., 2005b; Karam et al., 2005; Vázquez et al., 2007; Borkowska et al., 2006). This unusual finding deserves exploration to fully expound its epidemiologic correlates for mental illness – as well as sociology – in Hungary. This is to be explored in future papers, but we briefly refer to several hypotheses below.

The very high prevalence of cyclothymic temperament in Hungary, particularly among males is in good agreement with prior community-based epidemiological findings showing that the lifetime prevalence rate of DSM-III-R diagnosed bipolar disorders (types I and II combined) in Hungary (5.1%, males 5.7%, females 4.5%) is among the highest in the published literature, while the 15.1% lifetime prevalence of unipolar major depressive disorder (first episode and recurrent combined) in Hungary is exactly in the same range as reported from Western countries (Szadoczky et al., 1998; Rihmer and Angst, 2005). Our data support the strong relationship between cyclothymic temperament/cyclothymia and major bipolar type I and II mood disorders. This is strong evidence, from an epidemiologic perspective, for the cyclothymic-bipolar spectrum hypothesis proposed three decades earlier (Akiskal et al., 1977).

The superfactorial structure of the TEMPS-A more clearly replicates findings from, among others, Italian (Akiskal et al., 1998; Pompili et al., in press) and

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Argentinean studies which contrast the hyperthymic with all the others. This finding implicitly suggests external validation, because it replicates the neuroticism–extraversion dichotomy of the Eysenck Personality Inventory (Eysenck and Eysenck, 1969). The TEMPS-A has the virtue of bringing to this dichotomy the affective and evolutionary dimensions of temperament (Akiskal and Akiskal, 2005a,b).

All of the foregoing considerations bring us back to the main objective of this English paper on the Hungarian TEMPS-A: concurrent validation. The correlations, both (+) and (−) with the BarOn EQ-i have to do with emotionality of all but the hyperthymic of the TEMPS-A. The correlations with the TCI and NEO-FFI are substantial and extend previous research (Maremmani et al., 2005; Akiskal et al., 2005b; Blöink et al., 2005), not only for concurrent validity for the TEMPS-A, but in terms of provocative findings on the temperamental origins of key constructs in the TCI and NEO-FFI.

Role of funding source

Nothing declared.

Conflict of interest

No conflict declared.

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