Psychometric properties of the Hungarian version of the original and the short form of the Positive and Negative Affect Schedule (PANAS)

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Aim: Psychometric properties of the Hungarian version of the original and the short form of the Positive and Negative Affect Schedule (PANAS) were investigated in the present study. **Methods:** Participants were undergraduate university students (N=1163) and patients visiting their General Practitioners (GPs) for various somatic complaints (N=466). **Results**: According to the confirmatory factor analysis, both versions showed adequate fit to the theoretical one-and-one (positive and negative affect) factor model. Internal consistency coefficients (Cronbach-alpha values) were above .8 for the original positive and negative scales, .73 and .79 for the short positive scale, and .65 and .67 for the short negative scale in the student and the patient groups, respectively. The correlations between the original 10-item subscales and their 5-item counterparts were above .9 in both groups. **Conclusion:** The short PANAS scale represents a good and practical alternative for the original version, with lower but still acceptable internal consistency values.

Keywords: PANAS, negative affect, positive affect, psychometric properties

Over the past decades, numerous investigations were conducted in relation to the assessment of emotional and mood states. Positive and negative emotional states are the two factors that consistently emerged as independent constructs in different studies (Watson & Clark, 1984; Watson et al., 1988; Watson & Pennebaker, 1989; Mackinnon et al., 1999). These constructs can be measured by various questionnaires, however, it became necessary to develop a short questionnaire which allows fast and accurate data collection with reliable and valid psychometric properties. The most widely used questionnaire is the Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988) aiming to explore the positive and negative emotional states, while differentiating the *state-like* and *trait-like* characteristics of affectivity. The PANAS contains twenty statements, ten describing positive and ten describing negative personality traits. Subjects should judge on a five-point Likert scale how they feel with regards to each statement. The psychometric properties of the instrument are very good, with Cronbach alphas ranging from 0.85 to 0.90 (Watson, 1988). Over the past decade the PANAS has been adapted to several languages and cultural environments. In these investigations the psychometric properties of the PANAS were also reported to be appropriate (Thompson, 2007).

Negative affectivity became one of the most thoroughly investigated personality traits in relation to physical symptoms, while the positive affectivity seems to become an increasingly important factor for studies regarding health protection and well-being (Mackinnon et al., 1999; Diener et al., 2003; Rózsa, 2009). Individuals characterized by higher levels of negative affectivity experience more distress, are more introverted, and are more likely to judge themselves and others negatively (Watson & Clark, 1984; Pennebaker, 1995). It is important to note that state and trait negative affectivity may influence symptom evaluation and affect the report in different ways (Cohen et al., 1995).

Individuals with higher positive affectivity scores are characterized by joyful states, have more social interactions and experience less physical symptoms

(Pettit & Kline, 2001; Diener et al., 2003). Interestingly, positive affectivity as assessed by the PANAS had a stronger negative correlation with depression than with anxiety, while negative affectivity correlated well with both anxiety and depression (Crawford & Henry, 2004). Moreover, linear regression analysis showed that the positive affectivity was responsible for more than two-thirds of the variance of depression, therefore it could be regarded as a better predictor of depressed states compared to negative affectivity. The results suggest that a low positive affectivity score can be interpreted as a direct indicator for depressed mood or depression.

Negative and positive affectivity represent two relatively independent dimensions, with correlation coefficients between -0.2 and -0.3. Consequently, low levels of positive affectivity are not equal to high levels of negative affectivity, the studies on the PANAS usually treat positive and negative affectivity as completely separate factors (Watson et al., 1988; Watson & Clark, 1994; Crawford & Henry, 2004). Authors described that positive and negative affectivity are not polar opposites because there is an essential difference between the two constructs (Diener & Emmons, 1984; Goldstein & Strube, 1994). The PANAS was frequently used in other studies measuring different personality traits as well. Several research groups have identified the five main personality traits, known as the 'Big Five' which appear in a wide variety of cultures (Costa & McCrae, 1991; Digman, 1990; Bruck & Allen, 2003). There is no complete consensus on the names of the five factors, however, in the most accepted model the factors are labeled as *openness, conscientiousness, extraversion, friendliness* and *neuroticism* (Costa & McCrae, 1991). Bruck & Allen (2003) showed that *neuroticism* and negative affectivity measured by PANAS are in close relation with each other. Yik & Russell (2001) found that *extraversion* and positive affectivity, as well as *neuroticism* and negative affectivity are closely related, however, results indicate that *neuroticism* alone is more likely to predict a frequent experience of distress that should be considered in the interpretation of the relationship with negative affectivity. Moreover, positive affectivity appeared to be related to the *openness* personality factor as well (Costa & McCrae, 1991).

Although the original PANAS is not a long questionnaire with its 20 items, the creation of the abridged version for faster data collection has become necessary (Thompson, 2007). Kercher (1992) first developed a shortened version of the PANAS by selecting the items with the highest factor loadings

(Thompson, 2007). This simple method was widely criticized because the inventory contained several redundant items, moreover the remaining items did not adequately cover the theoretical constructs (Thompson, 2007). The Factorial analysis conducted by Mackinnon et al (1999) confirmed Kercher's original results (1992), thus the reliability and validity indices of the ten item inventory supported the legitimacy of the questionnaire. The authors, however, suggested additional statistical analysis in order to achieve even better psychometric characteristics. The most recent statistical examinations using modern procedures to characterize the psychometric properties of the questionnaires, namely the studies based on structural equation modeling (*SEM*), pointed out that the scale includes redundant elements and the models showed more appropriate fitting indexes if the negative affectivity scale included only five, and the positive affectivity scale included only four items (Crawford & Henry, 2004). The authors found contradictory results to the previous studies because they found that the two factors shared 9% in common of the full variance, which means they are not totally independent. The authors found a weak negative correlation between the factors (r=-0.20). Similar results have been described by Mackinnon et al. (1999) reporting a low negative correlation (r=-0.10) between the positive and negative affectivity scales within the short version of the PANAS.

Thompson (2007) developed the new short version of the PANAS that does not contain any ambiguous or confusing items even for non-native English speakers. The development of the new short questionnaire was based on quantitative and qualitative methods as well. The *qualitative* analysis was conducted in focus groups, asking the participants to judge the clarity and accuracy of each item. Seven words were found to be problematic because the participants did not clearly understand the meaning of the words. The *quantitative* analysis included factor analysis and reliability analysis taking into consideration the original construct validity of the negative and positive affectivity scales. (Thompson 2007). According to the confirmatory factorial analysis performed by Thompson (2007) (N=407), the original scales did not fit appropriately to the hypothesized one-and-one factor model. To achieve a better fit, a further factor analysis was conducted and ten items were removed from the original scale. Cronbach alpha values of the short negative and positive affectivity scales were 0.80, showing adequate reliability. In coherence with other results (Crawford & Henry, 2004) the correlation

between the positive and negative affectivity scales was r=-0.32. The correlations between the original scales and their short counterparts were r=0.92 and r=0.95 for positive and for negative affectivity respectively. Accordingly, the two questionnaires measure basically the same constructs. After the ten week retest the inventory produced adequate psychometric results. The Cronbach alpha value of the negative affectivity scale was 0.76 while the Cronbach alpha value of positive affectivity was 0.78. Correlations between the short and the original scale were r=0.65 and r=0.59 for the positive and the negative affectivity scales respectively.

In summary, previous results indicate that the short version of the PANAS developed by Thompson (2007) can preserve the validity and reliability of the original measure. The present study aimed to examine the psychometric characteristics of the short version of the PANAS.

METHODS

Sample

Two groups were included in the study. The first group consisted of 1163 volunteer undergraduate university students from two Hungarian universities (Eötvös Loránd University and Budapest University of Technology and Economics). Students' (58.8% male) mean age was 20.61 yrs (S.D.=2.134). The second sample included patients (N=466) visiting their GPs for a variety of complaints (mean age=44.76 yrs; SD=15.044; 36.9% male). Students partly completed the questionnaire in groups in their classrooms or on-line via the internet. Patients were asked to participate in the waiting rooms of their GPs. All participants filled out the questionnaires anonymously and they did not receive any financial nor educational reward for their contribution.

Tools

Positive and Negative Affectivity Schedule (PANAS)
The original PANAS questionnaire developed by Watson et al. (1988) includes 10 positive and 10 negative emotional states that should be answered on a 5-point Likert scale. The negative and positive subscales represent two relatively independent scales. The questionnaire was translated by Rózsa and Kő (Rózsa et al., 2008), the Cronbach alpha coefficients of the two Hungarian subscales were above .80 in several studies (e.g. Rózsa et al., 2008; Simor et al.,

2011). The short form of the questionnaire consists of the 5-5 items described by Thompson (2007) (see *Appendix* for details).

RESULTS

Factor structure of the original and the short scales was checked by confirmatory factor analysis (AMOS v4.01). Adequate fit between the theoretical model and the empirical data was found in both cases (for details see *Table 1*). In terms of fit indices, the short version showed a somewhat better fit to the model than the original version.

Table 1 Fit indices from the confirmatory factor analysis

Fit index	PANAS	PANAS short
CMIN/df	6.917	6.612
NFI	.97	.99
IFI	.97	.99
TLI	.97	.99
CFI	.97	.99
RMSEA	.060 [.058 - .063]	.059 [.054 - .064]

Abbreviations: CMIN/df - Minimum Chi Square / degree of freedom; NFI - Normed Fit Index; IFI - Incremental Fit Index; TLI - Tucker Lewis index or Nonnormed Fit Index; CFI - comparative fit index

Table 2 summarizes descriptive statistics and internal consistency coefficients for the negative and positive scales of the original and the short version respectively. Cronbach alpha coefficients are in the generally accepted range for the original scales (above .80) and also for the short positive scale (.73-.79). In the case of the short negative scale, however, Cronbach alpha values were lower but still acceptable (.65-.67) in both groups.

Correlation coefficients between the original and the short scales were above .9 (p<.001) for both the positive and the negative scales in both samples (*Table 3*). Correlations among the positive and the negative scales were about -.2 in the student group (p<.001) and below .02 (statistically not significant) in the patient group.

Gender and group differences in the mean scores of the scales are summarized in *Table 4*.

Means of the original and the short scales were compared by 2x2 (gender*group) ANOVAs (for

Table 2 Descriptive statistics and Cronbach alpha coefficients for the scales

	Students (N = 1163)		Patients (N = 466)	
	Cronbach alpha	Mean±SD	Cronbach alpha	Mean±SD
Panas positive	.82	35.18±5.721	.84	33.42±6.675
Panas positive short	.73	17.61±3.256	.79	17.55±3.836
Panas negative	.83	20.42±5.721	.85	19.12±6.338
Panas negative short	.65	9.77±3.087	.67	9.02±3.079

Table 3 Correlations among the scales (Pearson product-moment coefficients)

	Panas positive	Panas negative	Panas positive short	Panas negative short
Panas positive	1	-.23***	.91***	-.23***
Panas negative	.02	1	-.24***	.93***
Panas positive short	.91***	-.03	1	-.23***
Panas negative short	-.01	.95***	-.04	1

Upper triangle (marked with grey): students, lower triangle: patients. ***: p < .001

Table 4 Means and standard deviations of the scores in the different groups

	Students		Patients	
	Males (Mean±SD)	Females (Mean±SD)	Males (Mean±SD)	Females (Mean±SD)
Panas positive	35.35±5.562	35.38±5.941	32.06±6.307	33.93±6.843
Panas positive short	17.57±3.136	17.65±3.423	17.04±3.687	17.85±3.895
Panas negative	20.16±6.119	20.78±6.187	18.71±6.222	19.36±6.403
Panas negative short	9.73±3.137	9.84±3.016	9.84±3.082	9.11±3.079

Table 5 Results of 2x2 ANOVAs for the original and the short scales

	ANOVA		
	gender	group	gender* group
Panas positive	F(1) = 6.374, p < .05	F(1) = 33.321, p < .001	F(1) = 2.262, p = .133
Panas positive short	F(1) = 5.321, p < .05	F(1) = .753, p = .386	F(1) = 3.567, p < .1
Panas negative	F(1) = 3.324, p < .05	F(1) = 16.776, p < .001	F(1) = .002, p = .968
Panas negative short	F(1) = .970, p = .325	F(1) = 20.661, p < .001	F(1) = .142, p = .706

details see *Table 5*). Generally, students' mean scores were significantly (p<.001) higher than patients' scores with the exception of the short positive scale, and females' scores were slightly (p<.05) higher than males' scores with the exception of the short negative scale. No significant gender*group interaction was found.

DISCUSSION

In the present study, psychometric properties of the Hungarian version of the original (10-item) and the short (5-item) PANAS positive and negative scales have been investigated in a student and a patient sample. According to the results of the confirmatory factor analysis, the 5-item versions of the positive and negative scales proved to be as homogenous as the 10-item versions. Internal consistency of the short positive scale was good, while it was still acceptable for the short negative scale.

Both short scales showed very high levels of correlations with their long counterparts, therefore, they basically assess the same construct in both cases. Correlations between the positive and negative scales in the student group reached but not exceeded the levels described in previous (Watson et al., 1988; Thompson, 2007) studies. In the patient group, however, positive and negative scales were completely independent from each other.

In the practical work, economical considerations are usually at least as important as theoretical principles. Longer scales are generally considered more reliable (although there is a debate about the importance and the desirable range of internal consistency coefficients in the literature, see Kline, 2000), but their completion takes more time and consumes more cognitive resources. In completing a long test battery, subjects' diminishing attention and motivation can also have a negative impact on reliability. Time is often limited in field work, and the use of long scales inevitably leads to elevated drop-out rates, thus the researcher has to counterweigh opposite considerations. According to the results of the present study, the short Hungarian versions of the positive and the negative PANAS scales represent an acceptable balance between reliability and length. Therefore, the use of the sort version can be recommended in long test batteries. If these constructs may play a fundamental role in the phenomenon under study, or achieving high reliability is especially desirable, then the use of the original PANAS is a better decision.

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A Pozitív és Negatív Affektivitás Skála (PANAS) eredeti és rövidített változatának pszichometriai jellemzői

Célkitűzés: A Pozitív és Negatív Affektivitás Skála (PANAS) magyar nyelvű, eredeti és rövidített változatának pszichometriai jellemzőinek vizsgálata és bemutatása. **Módszer:** A mintát egyetemi hallgatók (N=1163) és különböző szomatikus problémákkal, a háziorvosukat felkereső személyek (N=466) alkották. **Eredmények:** A konfirmátoros faktoranalízis eredményei alapján a mérőeszköz mindkét változata megfelelő illeszkedést mutat az elméleti kétfaktoros (negatív és pozitív) modellhez. A belső konzisztencia mutatója, a Cronbach alfa értéke 0,8 fölötti az eredeti mérőeszköz pozitív és negatív skálái esetén, a hallgatói és a beteg minta vonatkozásában a rövidített pozitív skála 0,73 és 0,76; a rövidített negatív skála pedig 0,65 és 0,67 Cronbach alfa értékekkel jellemezhető rendre. Az eredeti 10 tételes skálák és azok 5 tételes rövidített megfelelői közötti korrelációs érték 0,9 fölötti mindkét csoport esetében. **Konklúzió:** A PANAS rövidített változata jó alternatívája a mérőeszköz eredeti változatának, alacsonyabb, de elfogadható belső konzisztencia mutatókkal.

Kulcsszavak: PANAS, negatív affektivitás, pozitív affektivitás, pszichometriai jellemzők

Appendix - The Hungarian version of the original and the short PANAS

Az alábbiakban felsorolt szavak érzéseket, állapotokat írnak le. Kérem, karikázza be azt a számot, ami leginkább kifejezi, hogy jelen pillanatban hogyan érzi magát.

		Egyáltalán nem, vagy alig *Very slightly, or not at all*	Kicsit *A little*	Mérsékelten *Moderately*	Eléggé *Quite a bit*	Nagyon *Very much*
1	érdeklődő *interested*	1	2	3	4	5
2	kiborult, magamon kívül vagyok *distressed*	1	2	3	4	5
3	izgatott, feldobott *excited*	1	2	3	4	5
*4	zaklatott, feldúlt *upset*	1	2	3	4	5
5	erős *strong*	1	2	3	4	5
6	bűntudatom van *guilty*	1	2	3	4	5
7	rémült *scared*	1	2	3	4	5
*8	ellenséges *hostile*	1	2	3	4	5
9	lelkes *enthusiastic*	1	2	3	4	5
10	büszke *proud*	1	2	3	4	5
11	ingerlékeny *irritable*	1	2	3	4	5
*12	éber *alert*	1	2	3	4	5
*13	megszégyenült *ashamed*	1	2	3	4	5
*14	elhivatott *inspired*	1	2	3	4	5
*15	ideges *nervous*	1	2	3	4	5
*16	elszánt, határozott *determined*	1	2	3	4	5
*17	figyelmes *attentive*	1	2	3	4	5
18	feszült *jittery*	1	2	3	4	5
*19	aktív, élénk *active*	1	2	3	4	5
*20	félénk *afraid*	1	2	3	4	5

Note: * indicates the items belong to the short version

The time frame in the instruction can be changed according to the desired measurement range.

Scoring   positive subscale: 1, 3, 5, 9, 10, 12, 14, 16, 17, 19
negative subscale: 2, 4, 6, 7, 8, 11, 13, 15, 18, 20