Advances in Social Science, Education and Humanities Research, volume 617
Proceedings of the International Conference on Social Science, Psychology and Legal Regulation (SPL 2021)

Psychometric Properties of the Ukrainian Version of the Scale of Positive and Negative Experiences (Spane)

Valerii Olefir [1 *] [0000-0003-3552-3277], Valerii Bosniuk [2] [0000-0003-0141-1920], Katerina Malofeikina [1] [0000-0001-9561-7676]

[1] *V. N. Karazin Kharkiv National University, Ukraine*
[2] *National University of Civil Defense of Ukraine, Kharkiv, Ukraine*
[*] *vaolefir@gmail.com*

ABSTRACT
Conceptualization and measurement of well-being have been carried out from different positions in positive psychology. In this cross-sectional study, the Scale of Positive and Negative Experiences (SPANE) has been adapted and validated on a sample of 458 Ukrainian adults. Confirmatory factor analysis has confirmed a two-factor model in which the positive affect (SPANE-P) and negative affect (SPANE-N) subscales were correlated (r = -0.594). The composite reliability was 0.909 for SPANE-P and 0.861 for SPINE-N. The mean removed variance was 0.630 for SPANE-P and 0.533 for SPANE-N, meaning converged validity is maintained. Discriminatory validity is satisfactory for both SPANE subscales, according to the Fornell and Larcker method and the HTMT test. The analysis of the measurement invariance of the SPANE testifies strict invariance for age and gender.

***Keywords**: SPANE, multiple-groups CFA, psychometric properties, measurement invariance.*

1. INTRODUCTION

The current field of research on well-being is represented by two different concepts that lead to different ways of measuring it [1]. In the hedonistic concept, the emphasis is on subjective well-being, and in the eudemonistic concept, on positive psychological functioning and human development. In English-language studies, one of the most common models of well-being is the triple model of subjective well-being (SWB) [2, 3]. According to this model, the SWB consists of three separate components: global satisfaction with life and its specific areas, positive affect, and negative affect. Satisfaction with life and satisfaction in a particular subject area of well-being is considered to be a cognitive component of well-being, because they are based on people's subjective assessments of their lives. Positive and negative affects evaluate the affective component of SWB, which reflects the ratio of pleasant and unpleasant emotions in a person's life. Currently, a number of scales for measuring SWB have been developed [4]. In order to assess the cognitive component, the Satisfaction with Life Scale (SWLS) [5] is most widely used, and in order to determine the SWB affective component, the Scale of Positive and Negative Affects (PANAS) [6] is used. These instruments have been validated in many countries and they have shown good psychometric properties. Due to this, transnational and cross-cultural studies of the SWB affective component have recently gained popularity [7]. Such studies require the scale to show evidence of measurement invariance [8-10]. Measurement invariance indicates whether the scale will measure the same structure regardless of the group or time of measurement [11]. If the measurement invariance of the scale is unknown, it cannot be determined whether the difference observed in scores between the two groups or two-fold measurements is due to a real difference, or simply due to differences between groups or the time of estimation of the latent variable [12].

The SPANE technique was created to improve existing senses and overcome some of the limitations and disadvantages of PANAS. The developers of the SPANE [13] identified two components of affective well-being: positive and negative experiences (SPANE-P and SPANE-N, respectively), which are mutually correlated (r = -0.60). According to E. Diener and his colleagues, SPANE has the following advantages: (1) includes a description of a wider range of positive and negative experiences with different levels of arousal; (2) in formulating the points of the scale, the emphasis is on modality rather than the intensity of emotions; (3) the

scale is not only shorter (12 points), but also conceptually clearer.

In recent years, the number of research works on the study of well-being using SPANE has grown steadily in many countries around the world [14]. The results of numerous foreign studies indicate that both SPANE as a whole and its subscales have a sufficient indicator of reliability, convergent and competing validity [15, 16], invariance of measurements depending on gender and age [17]. Research has also shown that SPANE is better at providing well-being than PANAS [17].

Unfortunately, now we have to state the absence of a Ukrainian-language version of SPANE, which makes it impossible to fully conduct research on affective well-being both within the country and in international or cross-cultural studies. Thus, the purpose of the article was to test the Ukrainian version of SPANE and to establish its psychometric characteristics and measuring invariance with respect to age and gender.

2. RESEARCH METHODOLOGY

Participants and procedure

Two bilingual translators performed the adaptation of SPANE adjectives using the reverse translation method. The author's instruction and the sequence of words in the list were preserved. Respondents were invited to participate via email, which included explanations of the study and links to Google Forms, an online service for creating tests, surveys, and data collection. Participants were required to read and to accept online informed consent prior to enrollment in the study. After that, they filled out the sociodemographic part of the questionnaire and answered the test questions. The sample of the study included persons who indicated that they were Ukrainians and they were at least 18 years old. As a result, the total sample size was 458 participants. The mean age was 24 years (SD = 7.4), ranging from 18 to 55 years. In the sample, 42.4% were men, 35.6% had higher education, 64.4% have complete secondary education and studied at universities.

Measurement

Scale of Positive and Negative Experiences (SPANE). The scale includes two subscales: positive experiences (SPANE-P) and negative experiences (SPANE-N). Each subscale includes six experiences and measures three general and three specific emotions. In order to assess them, the questionnaire uses a five-point Likert scale from 1 ("very rarely or never") to 5 ("very often or constantly").

Satisfaction with Life Scale (SWLS). It's a five-point tool for measuring general cognitive assessment of satisfaction with life [18]. Participants agree or disagree with each of the five statements using a seven-point scale ranging from 7 ("strongly agree") to 1 ("strongly disagree"). This tool has been tested on a representative sample of adult Ukrainians and it has shown a reliability-consistency of 0.792 [19]. In the present study, the scale is characterized by a sufficient assessment of reliability (McDonald's omega coefficient = 0.861).

Revised Life Orientation Test (LOT-R). The questionnaire was designed to measure optimism and pessimism [20]. The scale includes ten points, four of which are control points, three are pessimism ones, and three are optimism ones. Each LOT-R question is rated on a five-point Likert scale, ranging from 1 ("strong disagreement") to 5 ("complete agreement"). The scale has been tested on a representative sample of Ukrainian adults. It has shown adequate psychometric properties. In this sample, the internal consistency is 0.701 for the optimism subscale and 0.710 for the pessimism subscale.

Statistical Analysis

All statistical analyzes have been performed using R (R Core Team, 2020) and RStudio (RStudio Team, 2019). The *lavaan* and *semTools* packages have been used to assess reliability, convergent and discriminant validity, and measurement invariance SPANE.

The analyzes have been carried out in two stages. At the first stage, the confirmatory factor analysis (CFA) series has been carried out, as a result of which the factor structure of the Ukrainian version of SPANE has been checked. The Mardi test has found a multidimensional abnormality (multivariate kurtosis = 17.34, $p < 0.0001$) for SPANE, so the analysis has been performed using the robust maximum likelihood technique. The CFA results have been assessed using several indicators: S-Bχ^2 – test χ^2 on the Satorra-Bentler scale; Comparative Fitness Index (CFI); Tucker-Lewis index (TLI); Root Mean Square Error of Approximation (RMSEA); Standardized Root Mean Square Residue (SRMR). For CFI and TLI, a score > 0.90 indicates that the empirical data fits the model well. For RMSEA, 0.05 is considered to be a good match and 0.08 is a fair match [21].

The degree of reliability for the SPANE-P and SPANE-N scales has been assessed using the McDonald Omega coefficient [22]. In order to establish convergent validity, we have taken into account the factor loading of the indicator, Composite Reliability (CR), and Average Variance Extracted (AVE). The range of AVE values was from 0 to 1. An AVE value that was greater than 0.50 was consistent with the convergent validity [23]. Discriminant validity has been assessed using the heterotrait-monotrait ratio of correlations (HTMT) [24]. HTMT values not exceeding the 0.85 threshold have indicated discriminant validity.

At the second stage of the analysis, we have carried out a series of multiple-groups CFA to investigate the SPANE measurement invariance. We have started by testing configuration invariance (model 0), which is, the least constrained model. We then tested the metric invariance (model 1) by constraining factor loadings.

During scalar invariance testing (model 2), we have limited factor loadings and element interception. Determining the immutability of uniqueness (model 3), we have limited the factor loadings, interception of elements, and residual variances of elements. Each model is nested in the previous model, which has been compared using the following criteria: $\Delta CFI \leq -0.02$, $\Delta RMSEA \leq 0.015$, and $\Delta SRMR \leq 0.03$ for factor loading invariance tests and $\Delta CFI \leq -0.01$, $RMSEA \leq 0.015$, and $SRMR \leq 0.01$ for checking scalar and strict invariance [25].

3. RESEARCH RESULTS

Confirmatory factor analysis. We have compared four alternative SPANE models: a one-way model, in which all 12 items rated the experience scale as one common; a two-way model, in which the SPANE-P and SPANE-N scales did not correlate with each other, a two-factor model, in which the SPANE-P and SPANE-N scales were correlated with each other, and a bifactor model with one general and two specific factors. The results of testing four alternative SPANE models on a test set (n = 458) are shown in Table 1.

Table 1. Results of testing alternative SPANE models.

Model	S-Bχ^2	*df*	CFI	TLI	RMSEA	RMSEA 90% CI	SRMR
1. One-factor	356,26***	54	0,768	0,717	0,148	0,134~0,163	0,108
2. Two uncorrelated factors (P and N)	180,19***	54	0,923	0,906	0,086	0,072~0,099	0,201
3. Two correlated factors (P and N)	88,42**	53	0,979	0,974	0,045	0,028~0,061	0,037
4. Bifactor	66,57**	42	0,984	0,975	0,044	0,022~0,063	0,032

Note. P = Scale of Positive and Negative Experience (Positive); N = Scale of Positive and Negative Experience (Negative).
*** $p < 0.001$; ** $p < 0.01$.

As we can see, the indices of agreement for the one-dimensional model S-Bχ^2 (54) = 356.26; $p < 0.0001$; CFI = 0.768; TLI = 0.717; RMSEA = 0.148, 90 % CI [0.134~0.163], and SRMR = 0.108 did not fit well with the data. Then we have looked at a two-factor model with uncorrelated scales. Conformity indices have shown that the data poorly fit the data S-Bχ^2 (54) = 180.19; $p < 0.0001$; CFI = 0.923; TLI = 0.906; RMSEA = 0.086, 90% CI [0.072~0.099], and SRMR = 0.201. The model, in which the SPANE-P i SPANE-N subscales were correlated, has shown almost ideal fit with the data: S-Bχ^2 (53) = 88.42; $p < 0.003$; CFI = 0.979; TLI = 0.974; RMSEA = 0.045, 90 % CI [0.028~0.061]; SRMR = 0.037. The bifactor model (one general factor and two specific ones) has also shown very good fit with the data: S-Bχ^2 (42) = 66.57; $p < 0.003$; CFI = 0.984; TLI = 0.975; RMSEA = 0.044, 90% CI [0.022~0.063]; SRMR = 0.032. The selection of the "best" statistical model was based on the Akaike Information Criterion (AIC). According to it, the model has turned out to be the best, in which the SPANE-P and SPANE-N subscales were correlated. Compared with the bifactor model, the χ^2 difference test was significant, ΔS-Bχ^2 (11) = 23.66, $p < 0.014$.

The two-factor model of the Ukrainian version of SPANE is shown in Figure 1. As can be seen from the path diagram, all standardized factor loads were statistically significant ($p < 0.001$) and ranged from 0.404 to 0.854 for SPANE-N and from 0.688 to 0.871 for SPANE-P. The correlation between SPANE-N and SPANE-P factors was -0.594, which is moderate and it indicates that they are empirically distinct factors.

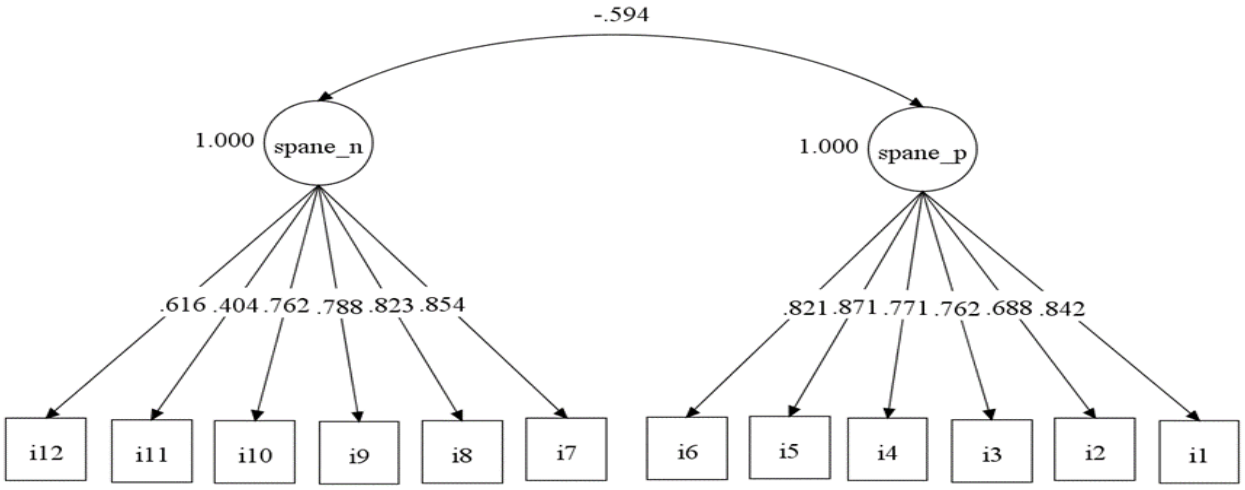

Figure 1 Structural model of the Scale of Positive and Negative Experiences

Table 2 presents the results of the analysis of CR, AVE, and correlation coefficients between the latent variables. Table 2 shows that the CR for all latent variables is above 0.70, and the AVE value is in the range of 0.509 at 0.630. Discriminatory validity has been assessed by comparing the square root of each AVE (on the diagonal) with the correlation coefficients between latent variables (off diagonal). The results indicate the discriminant validity of the SPANE-N and SPANE-P, because the square roots of each AVE are larger than the correlation between the constructs.

Table 2. The results of the analysis of composite reliability and discriminant validity of SPANE subscales

Latent Variables	CR	AVE	Latent Variables				
			1	2	3	4	5
1. Positive Experiences	0,909	0,630	**0,794**				
2. Negative Experiences	0,861	0,533	0,563	**0,730**			
3. Life Satisfaction	0,861	0,567	0,584	0,690	**0,753**		
4. Optimism	0,701	0,514	0,545	0,566	0,574	**0,716**	
5. Pessimism	0,710	0,509	0,528	0,568	0,434	0,530	**0,713**

Table 3 shows the results of the HTMT analysis. This analysis assesses discriminant validity using the heterotrait-monotrait ratio of correlations (HTMT). Absolute correlation values are recommended for calculating the HTMT matrix. The HTMT analysis results maintain discriminant validity, according to the HTMT criteria ($r < 0.85$).

Table 3. Results heterotrait-monotrait analysis

Latent Variables	1	2	3	4	5
1. Positive Experiences	–				
2. Negative Experiences	0.59 (0.403–0.740)	–			
3. Life Satisfaction	0.59 (0.442–0.744)	0.69 (0.589–0.743)	–		
4. Optimism	0.55 (0.423–0.734)	0.52 (0.395–0.730)	0.57 (0.407–0.720)	–	
5. Pessimism	0.53 (0.387–0.784)	0.57 (0.412–0.756)	0.43 (0.259–0.584)	0.56 (0.307–0.790)	–

Note. In parentheses – 95% BC bootstrap confidence interval for correlations between constructs.

Gender and age invariance of measurements

In the second round of data analysis, a series of multiple-groups CFAs have been performed across groups by gender and age to provide evidence for the invariance of the SPANE measurement across groups. First, a multiple-groups CFA has been held in groups of men and women. As shown in Table 4, the unconstrained model considered to test configuration invariance (M0) fits well with the data in the men (n = 194) and women (n = 264) groups: S-Bχ^2 (106) = 165.13, CFI = 0.973, RMSEA = 0.053, and SRMR = 0.048. All loads were statistically significantly different from zero ($p < 0.001$). The results of the metric invariance test have shown that the model (M1) also fits well with the data: ΔCFI = -0.005, ΔRMSEA = 0.002, and ΔSRMR = 0.016. Thus, the additional constraints we placed on this model did not significantly change its compliance. Next, we have checked the scalar invariance (M2), which limits the intercept of the elements so that they are the same for all groups. The results have shown that there was no significant change in the fit of the model (ΔCFI = -0.006, ΔRMSEA = 0.003, and ΔSRMR = 0.006), that is, complete scalar invariance was confirmed. In the next step, we have checked the strict invariance (M3) with limiting factor loadings, intercepts, and residual variances of elements. The results have shown that the model also fits well with the data: ΔCFI = -0.009, ΔRMSEA = 0.003, and ΔSRMR = 0.004. That is, the additional restrictions did not lead to significant changes in its consistency with the data.

Then we ran a multiple-group CFA to test the SPANE invariance for early maturity and middle-aged people. As shown in Table 4, the unconstrained model was used to test for configuration invariance (M0), fits well with data for early maturity (n = 295) and middle age groups (n = 163): S-Bχ^2 (106) = 167.69, CFI = 0.963, RMSEA = 0.060, SRMR = 0.053. All factor loadings were statistically significantly different from zero ($p < 0.001$).

Further, the results of metric invariance have shown that the model (M1) also fits well with the data: ΔCFI = -0.005, ΔRMSEA = 0.002 and ΔSRMR = 0.016. Next, we have checked the scalar invariance (M2). The results have shown that the imposition of additional constraints did not affect its fitting, which significantly confirmed the scalar invariance: ΔCFI = -0.009, ΔRMSEA = 0.001 and ΔSRMR = 0.010. The next step was to check strict invariance (M3). The results have shown that the model also fits well with the data: ΔCFI = -0.009, ΔRMSEA = 0.001 and ΔSRMR = 0.001. Thus, the imposition of additional constraints on this model did not lead to significant changes in its consistency with the data.

Table 4. Tests of Measurement Invariance of the Ukrainian version of the SPANE by gender and age.

	S-Bχ^2	***df***	**CFI**	**RMSEA**	**SRMR**	**Nested model**	**ΔCFI**	**ΔRMSEA**	**ΔSRMR**
Single-group solutions									
Men (n = 194)	82.15	53	0.964	0.064	0.068				
Women (n = 264)	72.35	53	0.974	0.047	0.047				
Measurement invariance									
M0. Configural	165.13	106	0.973	0.053	0.048				
M1. Metric	187.31	116	0.968	0.055	0.064	M1–M0	-0.005	0.002	0.016
M2. Scalar	212.60	126	0.962	0.058	0.070	M2–M1	-0.006	0.003	0.006
M3. Strict	244.77	138	0.953	0.061	0.074	M3–M2	-0.009	0.003	0.004
Single-group solutions									
Early maturity (n = 295)	99.95	53	0.968	0.058	0.044				
Middle-aged (n = 163)	62.99	53	0.952	0.059	0.092				
Measurement invariance									
M0. Configural	167.69	106	0.963	0.060	0.053				
M1. Metric	186.27	116	0.958	0.062	0.069	M1–M0	-0.005	0.002	0.016
M2. Scalar	209.06	126	0.949	0.063	0.079	M2–M1	-0.009	0.001	0.010
M3. Strict	242.27	138	0.940	0.064	0.080	M3–M2	-0.009	0.001	0.001

Note. Δ = Change in the parameter.

Analysis of differences in latent averages showed that women differ from men by a higher level of negative experiences ($z = 4.081$, $p < 0.001$, 90% CI [0.212~0.603].

4. DISCUSSION OF RESULTS

This study was dedicated to adaptation and validation of the Scale of Positive and Negative Experiences (SPANE) on a representative sample of Ukrainian adults. We have used CFA to check the psychometric properties of SPANE, considering this method is more powerful than the classical test theory. It provides a more credible and reliable assessment of the psychometric properties of the scale, due to the operation of true and false components of the trait estimates.

In particular, we have found that the best SPANE model for Ukrainians is one that structurally consists of two highly interrelated factors of positive and negative affects, which, at the same time, remain meaningfully different in their essence. The results of our analysis can be compared with the data of the original English version of SPANE [13] and foreign language counterparts from Spain [15], Serbia [17], and India [26]. Like other researchers, we insist that, despite the strong correlation of two types of affect, the construct is not necessarily interpreted as one-dimensional one. The research results show well convergent and discriminatory validity of the Ukrainian version of SPANE, as well as reliability (composite reliability index and withdrawn mean variance index) and strict invariance for gender and age.

In this study, we have found that the two-correlated factors model was in better agreement with empirical data, differing from the Chinese version of SPANE [27],

which allowed a correlation between residual variances. Taking into account the correlation between the two SPANE factors makes it possible to theoretically explain more fully the general or specific affect of the construct, while the factor loadings of the questionnaire items do not significantly change from one model to another.

In our study, we have confirmed the scalar invariance of SPANE for gender and age in the Ukrainian sample, in contrast to the Serbian study [17], which has shown no gender invariance for all items on the scale. The establishment of a strong measurement invariance made it possible to compare the latent means. We have found statistically significant differences in negative affect (women have higher scores), which is consistent with data from similar studies [15, 17].

One of the advantages of SPANE over PANAS is that it displays all degrees of positive and negative experiences and uses the manifestations of emotions included in most theories of affects. SPANE slightly improves the affect assessment, as the respondents estimate response options focusing on the frequency of experiencing an emotion rather than the intensity of the affect. The time frame is limited by the last four weeks. It is short enough for a respondent to recall a real experience and not to rely on an approximate assessment in general [13].

An important finding from this study concerns the practice of using SPANE. Ukrainian researchers will be able to benefit from this version of SPANE when assessing the effectiveness of psychocorrective interventions aimed at improving well-being.

5. CONCLUSION

This research made it possible to develop a Ukrainian-language version of SPANE. This psychodiagnostic tool is widely used in the study of a person's affective well-being. The study describes the process of reverse translation, examines in detail the factor structure and psychometric properties using the methodology of modeling structural equations, as well as the invariance of measurements depending on gender and age. Our results display that the Ukrainian version of SPANE has appropriate psychometric properties, comparable to those used in prior studies, and it can be an effective and valuable tool for researchers from Ukraine.

REFERENCES

[1] Maddux, J.E. (2018), “Subjective well-being and life satisfaction: An introduction to conceptions, theories, and measures”, In J. E. Maddux (Ed.), *Subjective well-being and life satisfaction* (pp. 3–31). Routledge/Taylor & Francis Group.

[2] Diener, E. (1984), “Subjective well-being”, *Psychological Bulletin*, vol. 95 (3), pp. 542–575. DOI: 10.1037/0033-2909.95.3.542

[3] Diener, E. Oishi, S. & Tay, L. (2018), “Advances in subjective well-being research”, *Nature human behaviour*, vol. 2 (4), pp. 253–260. DOI: 10.1038/S41562-018-0307-6

[4] Linton, M. Dieppe, P. & Medina-Lara, A. (2016), “Review of 99 self-report measures for assessing well-being in adults: Exploring dimensions of well-being and developments overtime”, *BMJ Open*, vol. 6 (7). DOI: 10.1136/BMJOPEN-2015-010641

[5] Diener, E.D. Emmons, R.A. Larsen, R.J. & Griffin, S. (1985), “The satisfaction with life scale”, *Journal of Personality Assessment*, vol. 49(1), pp. 71–75. DOI: 10.1207/S15327752jpa4901_13

[6] Watson, D. Clark, L.A. & Tellegen, A. (1988), “Development and validation of brief measures of positive and negative affect: The PANAS scales”, *Journal of Personality and Social Psychology*, vol. 54 (6), pp. 1063–1070. DOI: 10.1037/0022-3514.54.6.1063

[7] Jovanović, V. Joshanloo, M. Martín-Carbonell, M. Caudek, C. Espejo, B. Checa, I. Krasko, J. Kyriazos, T. Piotrowski, J. Rice, S. Junça Silva, A. Singh, K. Sumi, K. Tong, K.K. Yıldırım, M. & Żemojtel-Piotrowska, M. (2021), “Measurement Invariance of the Scale of Positive and Negative Experience Across 13 Countries”, *Assessment*. Advance online publication. DOI: 10.1177/10731911211021494

[8] Oyebade K. Oyedotun, Ebenezer O. Olaniyi and Adnan Khashman (2015), "Deep Learning in Character Recognition Considering Pattern Invariance Constraints", *International Journal of Intelligent Systems and Applications (IJISA)*, vol. 7, no. 7, pp.1-10. DOI: 10.5815/ijisa.2015.07.01

[9] Oyebade K. Oyedotun and Kamil Dimililer (2016), "Pattern Recognition: Invariance Learning in Convolutional Auto Encoder Network", *International Journal of Image, Graphics and Signal Processing (IJIGSP)*, vol. 8, no. 3, pp.19-27. DOI: 10.5815/ijigsp.2016.03.03

[10] E. Jebamalar Leavline, D. Asir Antony Gnana Singh and P. Maheswari (2018), "Local Binary Pattern Family Descriptors for Texture Classification", *International Journal of Image, Graphics and Signal Processing (IJIGSP)*, vol. 10, no. 10, pp. 40-45. DOI: 10.5815/ijigsp.2018.10.04

[11] Vandenberg, R. J. & Lance, C.E. (2000), “A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations

for organizational research", *Organizational Research Methods*, vol. 3 (1), pp. 4–69. DOI: 10.1177/109442810031002

[12] Brown, T. A. (2014). *Confirmatory Factor Analysis for Applied Research*. New York, NY: Guilford Publications.

[13] Diener, E. Wirtz, D. Tov, W. Kim-Prieto, C. Choi, D.-w. Oishi, S. & Biswas-Diener, R. (2010), "New well-being measures: Short scales to assess flourishing and positive and negative feelings", *Social Indicators Research*, vol. 97 (2), pp. 143–156. DOI: 10.1007/S11205-009-9493-Y

[14] Busseri, M.A. (2018), "Examining the structure of subjective well-being through meta-analysis of the associations among positive affect, negative affect, and life satisfaction", *Personality and Individual Differences*, vol. 122, pp. 68–71. DOI: 10.1016/J.PAID.2017.10.003

[15] Espejo, B. Checa, I. Perales-Puchalt, J. & Lison, J.F. (2020), "Validation and measurement invariance of the Scale of Positive and Negative Experience (SPANE) in a Spanish general sample", *International Journal of Environmental Research and Public Health*, vol. 17(22), p. 8359. DOI: 10.3390/IJERPH17228359

[16] Rahm, T. Heise, E. & Schuldt, M. (2017), "Measuring the frequency of emotions – validation of the Scale of Positive and Negative Experience (SPANE) in Germany", *PLoS ONE*, vol. 12 (2). DOI: 10.1371/IOURNAL.PONE.0171288

[17] Jovanović, V. Lazić, M. Gavrilov-Jerković, V. & Molenaar, D. (2020), "The Scale of Positive and Negative Experience (SPANE): Evaluation of measurement invariance and convergent and discriminant validity", *European Journal of Psychological Assessment*, vol. 36 (4), pp. 694–704. DOI: 10.1027/1015-5759/A000540

[18] Jovanović, V. (2015), "Beyond the PANAS: Incremental validity of the Scale of Positive and Negative Experience (SPANE) in relation to well-being', *Personality and Individual Differences*, vol. 86, pp. 487–491. DOI: 10.1016/J.PAID.2015.07.015

[19] Olefir, V.O. (2015), *Intellectual-personality potential of self-regulation of the subject of activity*, UIPA, Kharkiv, Ukraina.

[20] Scheier, M.F. Carver, C.S. & Bridges, M.W. (1994), "Distinguishing optimism from neuroticism: A revaluation of the Life Orientation Test", *Journal of Personality and Social Psychology*, vol. 67, pp. 1063–1078. DOI: 1.1037/0022-3514.67.6.1063

[21] Schumacker, R.E. Lomax, R.G. (2016), *A beginner's guide to structural equation modeling*. (4rd. ed.). New York, NY: Routledge.

[22] Flora, D.B. (2020), "Your coefficient alpha is probably wrong, but which coefficient omega is right? A tutorial on using R to obtain better reliability estimates", *Advances in Methods and Practices in Psychological Science*, vol. 3 (4), pp. 484–501. DOI:10.1177/2515245920951747

[23] Hair, J. Hult, T. Ringle, C. & Sarstedt, M. (2016), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.), Thousand Oaks, CA: Sage Publications.

[24] Henseler, J. Ringle, C.M. Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy* of *Marketing Science*, vol. 43, pp. 115–135. DOI: 10.1007/S11747-014-0403-8

[25] Chen, F.F. (2007), "Sensitivity of goodness of fit indexes to lack of measurement invariance", *Structural Equation Modeling*, vol. 14 (3), pp. 464–504. DOI: 10.1080/10705510701301834

[26] Singh, K. Junnarkar, M. & Jaswal, S. (2016), "Validating the Flourishing Scale and the Scale of Positive and Negative Experience in India", *Mental Health, Religion & Culture*, vol. 19 (8), pp. 943–954. DOI: 10.1080/13674676.2016.1229289

[27] Li, F. Bai, X. & Wang, Y. (2013), "The Scale of Positive and Negative Experience (SPANE): Psychometric properties and normative data in a large Chinese Sample, *PLoS ONE*, vol. 8 (4). DOI: 10.1371/IOURNAL.PONE.0061137