Cross-Cultural Measurement of Positive and Negative Emotions in Adolescence: Evidence from Three Countries

Veljko Jovanović1, Maksim Rudnev2, Naved Iqbal3, Sean P. M. Rice4, Magdalena Żemojtel-Piotrowska5

Accepted: 9 March 2022 / Published online: 21 May 2022
© The Author(s), under exclusive licence to Springer Nature B.V. 2022

Abstract
Cross-cultural assessment of affective well-being among adolescents has received scarce attention in positive psychological research. The present study investigated cross-cultural measurement invariance of the Scale of Positive and Negative Experience (SPANE) among adolescents from three countries (India, Poland, and Serbia). The sample included a total of 1080 adolescents (53.6% female; $M_{\text{age}}=16.75$, range = 15–19 years). Surveys were administered online in each country. Measurement invariance testing provided evidence for partial scalar invariance of the SPANE across cultures, with item “afraid” showing non-invariance across the three countries. Latent factor correlations between positive and negative emotions were stronger in Serbia compared to Poland and India. Positive emotions and life satisfaction had strong positive associations in all three countries (ranging from 0.68 to 0.75). The inverse correlations between negative emotions and life satisfaction were $-0.27$, $-0.54$, $-0.69$ in India, Poland, and Serbia, respectively. Polish adolescents demonstrated the lowest levels of affective well-being, whereas Indian and Serbian adolescents did not differ substantially in levels of positive and negative emotions. The present study demonstrated that the SPANE is a reliable and useful tool for the assessment of positive and negative emotions among adolescents from different cultural settings.

Keywords Positive emotions · Negative emotions · Life satisfaction · Culture · Adolescence · Measurement invariance

Veljko Jovanović
veljko.jovanovic@ff.uns.ac.rs

1 Department of Psychology, University of Novi Sad, Novi Sad, Serbia
2 Independent Researcher, Istanbul, Turkey
3 Department of Psychology, Jamia Millia Islamia, New Delhi, India
4 Oregon Institute of Occupational Health Sciences, Oregon Health and Science University, Portland, OR, USA
5 Cardinal Stefan Wyszyński University, Warsaw, Poland
1 Introduction

Subjective well-being (SWB) is a multidimensional construct, commonly conceptualized as having three components: life satisfaction, positive affect, and negative affect (Diener et al., 1999). Thus, SWB captures an individual’s cognitive and emotional evaluations of his or her life (Diener et al., 2018). The tripartite conceptualization of SWB has been widely used as a guiding theoretical framework in the research of both adult and adolescent well-being (e.g., Anglim et al., 2020; Bückler et al., 2018; Busseri & Sadava, 2011). However, the majority of studies on adolescent SWB tend to focus on life satisfaction (Huebner et al., 2014). Many life satisfaction measures have been developed for adolescents, such as the Satisfaction with Life Scale-Children (Gadermann et al., 2010), Students’ Life Satisfaction Scale (Huebner, 1991), Multidimensional Students’ Life Satisfaction Scale (Huebner, 1994), Brief Multidimensional Students’ Life Satisfaction Scale (Seligson et al., 2003), and Personal Wellbeing Index – School Children (Cummins & Lau, 2005), to name a few. In addition, the Satisfaction with Life Scale (SWLS; Diener et al., 1985), originally designed to measure global life satisfaction among adults, has been widely used in adolescent samples. All these questionnaires have shown sound psychometric properties in previous research (e.g., Proctor et al., 2009; Žukauskienė et al., 2015). In contrast, the choice of affective well-being measures for use among adolescents is limited, with most studies relying on the Positive and Negative Affect Schedule (PANAS), either original (Watson et al., 1988) or the version adapted for children and adolescents (PANAS-C; Laurent et al., 1999) (see, for example, Eadeh et al., 2020; Jovanović & Gavrilov-Jerković, 2016). Moreover, the cross-cultural validity and applicability of measures of positive and negative affect have rarely been evaluated in adolescent samples (see Casas et al., 2020, and Engel de Abreu et al., 2021, for recent work in this domain). This is somewhat surprising given a long history of cross-cultural research on emotion and increasing recognition of the importance of cultural differences in the structure, mean levels, correlates, and construal of SWB (Tov & Nai, 2018). Cross-cultural studies on adolescent SWB still lag far behind adult studies on this issue. The lack of cross-culturally valid questionnaires for the assessment of SWB, especially its affective dimension, has hampered the progress in the field of cross-cultural research on adolescent well-being (e.g., Morrow & Mayall, 2009). For example, many scales designed to assess SWB among children and adolescents do not show evidence of metric or scalar invariance across countries, preventing cross-cultural comparison of mean scores and correlates of SWB (Casas & González-Carrasco, 2021).

Despite widespread use, both the PANAS and PANAS-C have some limitations that hinder their use in cross-cultural research on adolescent SWB. First, both scales cover mostly high-arousal emotions, which are more valued in Western cultures than in Eastern cultures (Lim, 2016). Second, a number of non-emotional terms (e.g., active, strong) do not necessarily align with the original conceptualization of SWB, so inferences made in regard to SWB using these items may be questionable. Third, the PANAS and PANAS-C include several emotion items that are difficult to translate and have ambiguous meaning in some languages (e.g., jittery, enthusiastic, excited, alert) and might be problematic in cross-cultural research (e.g., Narayanan et al., 2020; Wedderhoff et al., 2021). Finally, an intensity-based response format (from very slightly or not at all to extremely) is used in both the PANAS and PANAS-C, a possible shortcoming because frequency, rather than intensity, of emotions tends to be more highly associated with global well-being (Pavot, 2018; Tov, 2018) and align more with SWB’s original conceptualization (Diener, 1984; Diener et al., 1991).
To address these issues with the PANAS and existing emotion questionnaires, Diener et al. (2010) developed the Scale of Positive and Negative Experience (SPANE). The SPANE consists of 12 items to assess positive and negative emotions with six items per each dimension. The positive feelings scale (SPANE-P) includes three items tapping general feelings (positive, good, and pleasant) and three items covering specific emotions (happy, joyful, and contented). The negative feelings scale (SPANE-N) also includes three general items (negative, bad, and unpleasant) and three specific items (sad, afraid, and angry). The inclusion of both general feelings and specific emotions is one of the main advantages of the SPANE, as it enables an assessment of a wide range of emotional experiences with only 12 items. The developers of the SPANE argue that their scale has several advantages compared to previous scales and the PANAS. For example, the SPANE reflects different arousal levels (e.g., sad and contented are low-arousal, whereas joyful and angry are high-arousal emotions), in contrast to the PANAS which focuses exclusively on high arousal emotions. Furthermore, the use of general feeling terms (viz., positive/negative, good/bad, and pleasant/unpleasant), which have a high degree of universality across languages and cultures, could make this scale more suitable for the assessment of emotional experiences in cross-cultural research (Jovanović et al., 2021). Finally, the SPANE uses the frequency-based instead of intensity-based response format used in the majority of emotion questionnaires, because frequency in considered more suitable than intensity for the assessment of affective well-being (see Garcia & Erlandsson, 2011, for details).

The SPANE has become an increasingly popular measure of affective well-being in the past decade, but is has been mostly used in adult and undergraduate samples (Busseri, 2018). However, its brevity, ease of administration, item clarity and simplicity, and favorable psychometric properties have led researchers to apply it in adolescent research as well. For example, the SPANE was psychometrically evaluated in adolescent samples in India (Singh et al., 2016), Serbia (Jovanović, 2015), and Spain (Prado-Gascó et al., 2020), and used in a number of single-country studies on adolescent well-being (e.g., Brouzos et al., 2016; Singh & Junnarkar, 2015; Villanueva et al., 2017). However, to our knowledge the performance of the SPANE has not yet been compared across adolescent samples from different cultures. Thus, cross-cultural measurement invariance of the SPANE among adolescents is still unknown. Measurement invariance is typically defined as “a property of a measurement instrument (in the case of survey research, a questionnaire), implying that the instrument measures the same concept in the same way across various subgroups of respondents” (Davidov et al., 2014, p. 58). Establishing cross-cultural measurement invariance is a prerequisite for a meaningful comparison across cultural groups. Without evidence of measurement invariance, researchers are likely to compare “apples with oranges” and consequently obtain potentially biased results. Three levels of measurement invariance are commonly differentiated and tested by means of multi-group confirmatory factor analysis (Sass, 2011): configural (evaluates whether the factor structure is the same across groups), metric (equivalent factor loadings across the groups), and scalar (equivalent loadings and intercepts across the groups). A meaningful comparison of structural relations (e.g., contribution of positive and negative emotions to life satisfaction) and latent means (e.g., mean levels of positive and negative emotions) across groups is justified if evidence of metric and scalar invariance, respectively, are supported.

1.1 The Present Study

The main goal of the present study was to investigate the cross-cultural measurement invariance of the SPANE among adolescents in three countries: India, Poland, and Serbia. In addition, we had three secondary aims: (1) to compare latent correlations between positive and
negative emotion factors across countries; (2) to assess latent mean differences in positive and negative emotions across countries; and (3) to compare associations between affective and cognitive well-being across countries.

The three countries were conveniently selected for the present study because they have shown marked differences in cultural values; cultural construal of emotions; economic, institutional, and social dimensions of prosperity; and mean levels of SWB. For example, based on the Hofstede’s Individualism-Collectivism index (Hofstede et al., 2010), Poland is high on individualism, Serbia is high on collectivism, and India has elements of both individualistic and collectivistic societies. All three countries are high on the restraint dimension, which means that children are trained by their environment to self-control their needs and emotions to adapt to social rules (Hofstede et al., 2010). Compared to Poland and Serbia, India is ranked much lower on indicators of social and economic development, such as the Human Development Index (e.g., United Nations Development Programme, 2020) or Legatum Prosperity Index (e.g., Legatum Institute, 2021), and typically ranks lower on measures of SWB in international surveys that use nationally representative samples (e.g., Helliwell et al., 2021). However, differences found between the three countries in the mean levels of SWB in cross-cultural studies are not fully consistent. For example, in a study conducted by Żemojtel-Piotrowska et al. (2017), Indian university students reported substantially higher life satisfaction compared to students in Serbia and Poland, who reported similar levels of life satisfaction.

Despite cultural and socioeconomic differences between the three countries, we expected to find evidence of both configural and metric invariance. Specifically, we hypothesized that the basic two-factor model of the SPANE is similar across groups (configural invariance) and that the correlations between SPANE items and their underlying dimensions of positive and negative emotions are equivalent across groups (metric invariance; Milfont & Fischer, 2010), replicating recent cross-cultural invariance findings for adult populations (Jovanović et al., 2021). This hypothesis was based on the fact that the SPANE includes six general descriptors of feelings and six specific emotions that are expected to have a high degree of universality across cultures (Diener et al., 2010), and which have previously formed two equivalent factor structures of positive and negative feelings (Jovanović et al., 2021). However, we expected that scalar invariance (equivalent factor loadings and item intercepts across groups) does not hold as this level of invariance is rarely obtained in cross-cultural research (Marsh et al., 2018).

Inconsistent results of past studies did not allow us to pose the specific hypotheses regarding the associations between positive and negative emotions, and their relations with life satisfaction across the three countries. For example, some studies found that negative associations between positive and negative emotions were stronger in more individualistic cultures (Jovanović et al., 2021; Miyamoto et al., 2017), and that negative emotions and hedonic balance were more closely associated with life satisfaction in individualistic than in collectivistic countries (Kuppens et al., 2008; Schimmack et al., 2002). On the other hand, Busseri (2018) found that correlations between life satisfaction (as measured by the SWLS), positive emotions, and negative emotions (as measured by the SPANE) did not vary significantly across countries.
2 Method

2.1 Participants and Procedure

The Indian (n = 424; $M_{\text{age}} = 16.42; \ SD_{\text{age}} = 1.09; \text{age range} = 15–19 \text{ years}; \ 60.8\% \text{ female})

the Polish (n = 392; $M_{\text{age}} = 17.15; \ SD_{\text{age}} = 1.35; \text{age range} = 15–19 \text{ years}; \ 49\% \text{ female})

and the Serbian samples (n = 264; $M_{\text{age}} = 16.67; \ SD_{\text{age}} = 1.01; \text{age range} = 15–19 \text{ years}; \ 48.9\% \text{ female})

combined for a total of 1,080 adolescents in overall sample. All participants were secondary school students.

The research in each country was approved by the Ethics Committee of the respective institutions. Questionnaires were administered online, and participation was anonymous and voluntary. Informed consent for participation in the study was obtained from adolescents or their parents. In Poland, we recruited adolescents by inviting their parents via Ariadna system of 11,000 preregistered users (http://www.paneIariadna.com). Parents were then asked to invite their child to participate in the study. They were rewarded by loyalty points in the system, which they could exchange for items offered by the research panel (e.g., pen drives, a cup). In Serbia, adolescents were recruited from four high schools in three cities (Novi Sad, Indija, and Šabac). School psychologists obtained parental consent and sent a survey link only to students for whom parental consent was obtained. In India, participants were recruited from four schools in Delhi and the National Capital Region. The study link was sent to the school teachers after explaining to them the purpose of the study, and they circulated it in their respective classes. Informed consent from the students was obtained before they filled the online survey.

2.2 Measures

The Scale of Positive and Negative Experience (SPANE; Diener et al., 2010) includes 12 items, as previously described. The participants were asked to report how much they experienced each of the feelings during the past four weeks. Items were rated on a five-point scale (1 = very rarely or never, 5 = very often or always). Internal reliabilities of the SPANE-P and the SPANE-N across the three samples in the present study were adequate (see the Supplementary Material; Online Resource 1).

The Satisfaction with Life Scale (SWLS; Diener et al., 1985) is a five-item (e.g., “In most ways my life is close to my ideal”) questionnaire designed to measure global life satisfaction. Items were rated on a seven-point scale (1 = strongly disagree, 7 = strongly agree). Internal reliability of the SWLS was adequate across the three countries (see the Supplementary Material; Online Resource 1).

We used the official Hindi, Polish, and Serbian translations of the SPANE and the SWLS. The translations were obtained using a standard back-translation procedure, following general guidelines for cross-cultural adaptation and translation of psychological questionnaires (Epstein et al., 2015).

2.3 Analytic Strategy

In order to test factor structure and measurement invariance we applied single- and multiple-group confirmatory factor analysis. Since the SPANE had only five response options, we treated the items as categorical. The parameters were obtained using weighted least squares mean and variance adjusted (WLSMV) estimator. Comparative
Fit Index (CFI) and Tucker-Lewis Index (TLI) greater than 0.95 were considered a good fit, and values greater than 0.90 were regarded acceptable for our relatively simple model (Hu & Bentler, 1999). Root Mean Square Error of Approximation (RMSEA) smaller than 0.05 was considered a good fit, the upper bound of 90% confidence interval between 0.05 and 0.10 was considered acceptable fit, and greater than 0.10 was regarded unacceptable (Browne & Cudeck, 1993). Because CFI, TLI, and RMSEA have been shown to perform differently for models with categorical indicators (Shi et al., 2020), we also considered a more robust Square Root Mean Residual (SRMR) with a cutoff value of less than 0.08. All fit indices were taken into account simultaneously to detect misspecified models. High values of $\chi^2$ were ignored as the total sample size was relatively large. Due to the WLSMV estimator, the adjusted (scaled) versions of the fit indices were used. The two-factor model of the SPANE tested in the present study is presented in Fig. 1.

At first, the model was fitted within each country and then with the pooled sample. Then, we proceeded with the cross-country invariance tests. Finally, we investigated associations with the SWLS and compared the latent means of the SPANE across the countries.

There are two common approaches to testing measurement invariance of models with categorical indicators. Millsap and Yun-Tein (2004)’s strategy of measurement invariance testing of models with categorical indicators involves three stages: configural invariance, or an overall similarity of the factor structures; metric invariance, or invariance of the factor loadings across groups; and scalar invariance, involving equality of
both factor loadings and item thresholds. Another approach suggested a different strategy based on the claim that a singular metric invariance model cannot be identified (Wu & Estabrook, 2016). In line with this alternative strategy, the configural model should be tested first, then threshold invariance, and finally, scalar invariance involving equality of both thresholds and factor loadings. We employed the latter strategy because recent evidence suggests it may be a superior to traditional invariance testing approaches; however, using the former provided similar results (please see the Supplementary Material; Online Resource 2). Model selection followed Chen’s criteria (2007), the difference in CFI larger than 0.01 and difference in RMSEA greater than 0.015 were considered to indicate substantial differences in model fit. The analysis was conducted in R 4.0.4 (R Core Team, 2020) with the “lavaan” package version 0.6 (Rosseel, 2012). The replication R codes are given in the Supplementary Material (Online Resource 3), and the data are available upon request from the authors.

3 Results

3.1 Single-Group Confirmatory Factor Analysis

The model was identified through a marker indicator approach, in which one of the loadings was fixed to 1 in all the groups. The original congeneric two-factor model with six items indicating each factor did not have acceptable fit in the pooled sample ($\chi^2 = 610.30, df = 53, p < .001$; CFI = 0.960; TLI = 0.950; RMSEA = 0.099 [0.092, 0.106]; SRMR = 0.047), as well as in Serbia ($\chi^2 = 169.12, df = 53, p < .001$; CFI = 0.986; TLI = 0.982; RMSEA = 0.091 [0.076, 0.101]; SRMR = 0.047) and India ($\chi^2 = 302.25, df = 53, p < .001$; CFI = 0.909; TLI = 0.887; RMSEA = 0.105 [0.094, 0.117]; SRMR = 0.066), but was acceptable in Poland ($\chi^2 = 196.69, df = 53, p < .001$; CFI = 0.984; TLI = 0.980; RMSEA = 0.083 [0.071, 0.096]; SRMR = 0.045). The modification indices suggested adding a covariance between the residuals of items 1 (“positive”) and 2 (“negative”) in all countries. After adding this covariance, the new model had an acceptable fit both in the pooled sample and within each of the countries as indicated by Table 1. This modification is theoretically justified, because these two items are semantic opposites, which are typically to be strongly inversely correlated (Russell, 2017).

| Model | CFI  | TLI  | RMSEA (90% CI) | SRMR | $\chi^2$ | df |
|-------|------|------|----------------|------|----------|----|
| Pooled sample | .976 | .969 | .077 (.069, .093) | .040 | 384.78* | 52 |
| India | .947 | .933 | .081 (.066, .091) | .056 | 195.88* | 52 |
| Poland | .986 | .982 | .079 (.064, .096) | .043 | 177.68* | 52 |
| Serbia | .989 | .986 | .080 (.070, .084) | .044 | 140.20* | 52 |

All models identified a two-factor structure with six positive emotion items loading onto the positive emotions factor and six negative emotion items loading onto the negative emotions factor. A residual covariance between the items “positive” and “negative” was added to each of the models. CFI Comparative Fit Index, TLI Tucker-Lewis Index, RMSEA Root Mean Square Error of Approximation, CI confidence interval, SRMR Square Root Mean Residual, df degrees of freedom. *$p < .001$
3.2 Measurement Invariance Across Cultures

Table 2 lists the results of the measurement invariance tests across the three countries. The configural model had a good fit to the data in terms of CFI, TLI, and SRMR, and had an acceptable fit in terms of RMSEA. Constraining thresholds to equality across countries decreased model fit mostly within the cutoff values; however, the drop in CFI was larger than recommended (ΔCFI = −0.016). Lagrange multiplier (score test) showed that relaxing the equality of the threshold of item 9 (“afraid”) would significantly improve the model $\chi^2$ by 68 units. Indeed, its estimates from the configural model showed that the item’s thresholds were systematically and significantly higher in Serbia compared to India and Poland. Therefore, we then tested if the partial threshold invariance model with the unconstrained thresholds for item 9 would yield a non-significant decrement in fit compared to the configural model. The partial threshold invariance model did not result in a significant decrement in fit from the configural model as evidenced by the change in CFI and RMSEA (see Table 2). It follows that the partial threshold invariance was confirmed. Next, we constrained factor loadings in addition to the majority of the thresholds. This model fit the data well, and the change in fit indices was very small. Altogether the partial scalar invariance was supported by the data. The latent correlations between the SPANE-P and the SPANE-N factors were −0.46, −0.61, and −0.81 in India, Poland, and Serbia, respectively.¹

3.3 Latent Mean Comparison

Partial scalar invariance allows for a meaningful comparison of unstandardized regression coefficients, covariances, and latent means across countries. In India, as it was first in the data alphabetically, the latent means were fixed to zero, so the means in the other countries were estimated with the reference of the means in India. In Poland, the latent mean of the SPANE-P was significantly lower ($M_{\text{diff}} = −0.34$, $SE = 0.05$, $\delta = −0.45$), and the SPANE-N was significantly higher than in India ($M_{\text{diff}} = 0.28$, $SE = 0.05$, $\delta = 0.41$). In Serbia, the latent means of the SPANE-P ($M = 0.05$, $SE = 0.07$, $\delta = 0.06$) and the SPANE-N ($M = −0.10$, $SE = 0.06$, $\delta = −0.14$) were not significantly different from the Indian sample. Respondents in Poland demonstrated lower levels of positive and higher levels of negative emotional experience compared to Serbia ($\delta = −0.52$ and 0.55, respectively).

3.4 Associations between the SPANE and the SWLS

Finally, we compared the SPANE’s associations with the SWLS in order to test the association between affective and cognitive components of SWB. Before evaluating this association, the SWLS was tested for measurement invariance across the three countries. Since the SWLS had seven response options we assumed the data continuous and applied the conventional invariance tests (see Brown, 2015), that is, first we tested configural invariance

¹ Additional models fixed the variances of the latent variables to equality across all three groups, which did not substantially decrease the model fit (CFI and RMSEA changed by 0.002). Next, we fixed the covariances between factors to equality in all countries which led to substantial drop of fit. Finally, we fixed covariances only for India and Poland, which did not change the model fit significantly (CFI even increased by 0.002 and RMSEA decreased by 0.003). It implies that the differences in the correlations between positive and negative emotions were non-significant for India and Poland, but Serbia’s correlation was significantly larger than in the other two countries.
Table 2  Fit indices of the models with the different levels of measurement invariance across the three countries

|                      | CFI  | TLI  | RMSEA (90% CI)          | SRMR | $\chi^2$ | df  | $\Delta$CFI | $\Delta$TLI | $\Delta$RMSEA | $\Delta$SRMR |
|----------------------|------|------|-------------------------|------|----------|-----|-------------|-------------|----------------|---------------|
| Configural           | 0.982| 0.977| 0.080 (0.073, 0.088)    | 0.049| 518.92*  | 156 |             |             |                |               |
| Thresholds           | 0.966| 0.970| 0.093 (0.086, 0.099)    | 0.049| 914.93*  | 224 | -0.016      | -0.007      | 0.012          | 0.000         |
| Partial thresholds   | 0.974| 0.976| 0.083 (0.076, 0.089)    | 0.049| 747.57*  | 216 | -0.008      | -0.001      | 0.002          | 0.000         |
| Partial scalar       | 0.973| 0.977| 0.080 (0.074, 0.087)    | 0.050| 784.20*  | 236 | -0.001      | -0.001      | -0.002         | 0.002         |

Small inconsistencies between the fit indices values and their differences are due to rounding.

$CFI$ Comparative Fit Index, $TLI$ Tucker-Lewis Index, $RMSEA$ Root Mean Square Error of Approximation, $CI$ confidence interval, $SRMR$ Square Root Mean Residual, $df$ degrees of freedom, $\Delta$ = change. A residual covariance between the items “positive” and “negative” was added to each of the models. For partial threshold invariance model the equality constraint on item 9 (“afraid”) was relaxed. *$p < .001$
model, then metric invariance model (invariance of factor loadings), and then scalar invariance (invariance of both factor loadings and intercepts). The SWLS contained five items, the marker indicator was item 3 (“satisfaction”), and the residuals of items 1 (“life is close to ideal”) and 2 (“conditions are excellent”) were allowed to covary as suggested by modification indices.

The configural invariance model had a near perfect fit to the data. Measurement invariance tests rejected the full metric invariance but revealed a partial metric invariance in which loadings on items 2 (“conditions are excellent”), 3 (“I am satisfied”), and 4 (“I have things I want”) were constrained to equality across countries. Difference in $\chi^2$ between the configural model and the partial metric invariance model was non-significant ($\chi^2_{\text{diff}} = 6.7$, $\Delta df = 4$, $p = 0.16$). We combined the partial metric invariance model of the SWLS and the partial scalar model of the SPANE in order to estimate the associations between the corresponding latent variables. The resulting model fit the data well ($\chi^2 = 1178.38$, $df = 434$, CFI = 0.960, TLI = 0.962, RMSEA = 0.069 [0.064, 0.074], SRMR = 0.047). See Table 3 for covariances and correlations between the latent variables estimated by this model. As expected, the SPANE-P showed a strong and significant positive association with the SWLS, whereas the SPANE-N was negatively correlated to the SWLS across the three countries.$^2$

| Country | SPANE-P Covariance (SE) | Correlation |
|---------|------------------------|-------------|
| India   | 0.94 (0.09)            | 0.75        |
|         | − 0.31 (0.07)          | − 0.27      |
| Poland  | 0.56 (0.06)            | 0.74        |
|         | − 0.44 (0.06)          | − 0.54      |
| Serbia  | 0.64 (0.08)            | 0.68        |
|         | − 0.55 (0.07)          | − 0.69      |

$^2$ Additional models fixed the variances of the latent variables to equality across groups. The resulting model fit did not substantially decrease (CFI and RMSEA change was 0.001). Next, we fixed the covariances between the SWLS and the SPANE factors across countries and it revealed almost the same model fit (both CFI and RMSEA even improved by 0.005), indicating that the correlations did not differ significantly across countries.
4 Discussion

The main goal of the present study was to evaluate the measurement invariance of the SPANE among adolescent samples in three countries: India, Poland, and Serbia. To our knowledge, this is the first study to investigate cross-cultural measurement invariance of the SPANE in adolescent samples. Furthermore, we tested: (1) associations between latent positive and negative emotion factors across the three countries; (2) latent mean differences in positive and negative emotions across the three countries; and (3) relationships between the SPANE and the SWLS across the three countries.

The original two-factor model of the SPANE provided an acceptable to good fit only in the Polish sample, but unacceptable fit in India and Serbia. To achieve an adequate fit in India and Serbia, correlated residuals between one pair of opposite items (“positive” and “negative”) had to be added. This modified two-factor model provided an adequate fit to the data across the three countries. Similar results were obtained in a recent study on cross-cultural measurement invariance of the SPANE among adults across 13 countries (Jovanović et al., 2021), in which the original two-factor model fit well in ten countries, but correlated residuals between pairs of opposite items had to be added in three countries (Colombia, Turkey, and Spain) in order to achieve a good fit. These two items are semantic opposites and capture oppositely valenced, general emotional experiences, and thus can be expected to be strongly negatively associated with one another (Russell, 2017).

In the present adolescent samples, we found evidence for partial scalar invariance of the modified two-factor model of the SPANE across India, Poland, and Serbia. One item (“afraid”) showed noninvariance (i.e., thresholds of this item were significantly higher in Serbia compared to India and Poland). This is also in line with the previous cross-national invariance findings among adults (Jovanović et al., 2021), as this item was also found to be noninvariant. Unlike the findings of the current study, Jovanović et al. identified the other two SPANE-N items capturing specific negative emotions (viz., “angry” and “sad”) as noninvariant among adults. Our findings suggest that adolescents across India, Poland, and Serbia might experience fear differently. This is not surprising, as previous studies suggest that the meaning of fear might vary across languages (Jackson et al., 2019). In addition, fear may be a less negative and more positive emotion in certain cultures (e.g., South Korea; see also An et al., 2017), indicating potential cross-cultural differences in the construal of fear. It is also worth noting that we collected data during the COVID-19 pandemic. The pandemic situation and experience of fear could be considerably different across countries (Sawicki et al., 2022).

Latent factor correlations between the SPANE-N and the SPANE-P were stronger in Serbia compared to Poland and India, and largely in line with the correlations found in the three countries with adult samples (Jovanović et al., 2021). Notably, the correlation observed among Indian adolescents in the present sample (-0.46) is stronger compared to the one found among Indian adults (-0.11) in Jovanović et al.’s (2021) study. Although the correlation between the SPANE-N and the SPANE-P in the present study was lowest in the sample of Indian adolescents, it was not significantly lower compared to the sample of Polish adolescents. These results only partially support previous findings on the greater independence of the two affective dimensions in Asian cultures (e.g., De Vaus et al., 2018), which is theoretically expected based on the promotion of interdependent social orientation, and dialectical view of emotions in Indian culture (i.e., emotions are not viewed as exclusively positive or negative, but rather a more balanced orientation with elements of negative features in positive emotions and vice versa; Goetz et al., 2008; Miyamoto et al.,...
In contrast, European countries typically endorse a categorical view, where positive and negative emotions are seen as polar opposites. Inconclusive results on the cross-national differences in the strength of associations between positive and negative emotions warrant further research. Future studies would benefit from including large, diverse samples of countries, and from investigating whether the magnitude of positive emotions-negative emotions correlations are moderated by age (e.g., adolescents vs. adults) and questionnaire used to assess emotions (e.g., the PANAS vs. the SPANE).

We found that the sample of Polish adolescents demonstrated lower levels of affective well-being (i.e., the highest levels of negative emotional experiences and the lowest levels of positive emotional experiences) compared to Indian and Serbian adolescent samples, the latter two of which did not differ substantially in levels of positive and negative emotions. These results are not in accordance with other international data on affective well-being in the three countries. For example, Gallup World Poll data on nationally representative samples of the resident population aged 15 and older consistently show that levels of positive affect are higher, and levels of negative affect are lower, in Poland compared to Serbia and India (Helliwell et al., 2019). However, a recent study found that mental well-being of Polish adolescents was among the lowest among 41 countries (UNICEF Innocenti, 2020). These findings suggest that cross-national variations in adults’ affective well-being might differ from that of adolescents’.

We found both cross-cultural similarities and differences in the relationship between emotional experiences and life satisfaction. Positive emotions and life satisfaction had strong and positive associations in all three countries (in the range from 0.68 to 0.75). The strongest association between negative emotions and life satisfaction was found in Serbia (−0.69), followed by Poland (−0.54), and then India (−0.27). As noted in the introduction, negative emotions and life satisfaction are typically more strongly correlated in individualistic than in collectivistic countries as measured by Hofstede’s index of individualism/collectivism (e.g., Kuppens et al., 2008). However, our findings suggest, similar to our mean comparison results, that this might not hold in adolescent samples. The strongest correlation between life satisfaction and negative emotions in the present study was observed in Serbia, which, according to Hofstede’s index, is high on collectivism. It is important to note that different measures of individualism/collectivism produce different rankings for the three countries used in the present study. As previously noted, based on Hofstede’s index, Serbia is considered the most collectivistic and Poland the most individualistic among the three countries. However, when using Minkov’s revised index, Serbia has the highest levels of individualism among the three countries, whereas India has the highest levels of collectivism (Minkov, 2018; see also Pelham et al., 2022). Given the problems with operationalization and measurement of individualism and collectivism (e.g., Wong et al., 2018), the role and usefulness of these cultural dimensions in interpreting cross-national differences in mean levels and correlates of SWB is yet to be understood.

Our results do align with previous research suggesting that the relationship between negative emotions and life satisfaction is weaker in countries with higher levels of national religiosity (i.e., India in the present sample) than those with lower national religiosity (Joshanloo, 2019). Testing the moderating role of national or cultural religiosity in the relationship between unpleasant emotional experiences and life satisfaction is an open question.

---

3 For example, national religiosity in India is much higher compared to Poland and Serbia, based on the percentage of people who state that religion is an important part of their daily life (Joshanloo & Gebauer, 2020). This result relies on the Gallup World Poll data from 2005 to 2017.
important avenue for future cross-cultural studies, as previous studies have found evidence for the buffering effect of national religiosity upon well-being (e.g., Berkessel et al., 2021; Gebauer & Sedikides, 2021).

4.1 Limitations and Future Directions

Although this is the first study to investigate measurement invariance of the SPANE using adolescent samples from three countries, some limitations must be noted. First, we recruited convenience samples of adolescents from only three countries, which limits the generalizability of our findings. Given the considerable cross-cultural differences in emotions (e.g., Lim, 2016), future studies should evaluate measurement invariance of the SPANE among adolescents including wider range of countries and cultures, and using nationally representative samples. Secondly, we also used country as a proxy for culture. Although these countries have been shown to differ among cultural dimensions such as individualism and collectivism, the extent to which the individual participants ascribed to these values is unknown. According to Taras et al. (2016), roughly 80% of cultural variation may occur within countries, not between. As such, future research would benefit from utilizing within-country differences in cultural values in addition to cross-national groupings in order to evaluate cross-cultural invariance. Third, although all the data were collected during the COVID-19 pandemic, country-specific COVID-19 related restrictions could have affected the results. For example, the Polish data were collected while governmental restrictions were in place (e.g., schools, restaurants, and other nonessential businesses were closed), whereas the Serbian data were collected after the government eased restrictions (e.g., after most nonessential businesses and services were permitted to reopen). It is important to note that these contextual variations are not theoretically expected to affect the measurement structure of the SPANE, but they could impact the latent mean differences in affective well-being and associations among positive and negative emotions and life satisfaction across countries. Fourth, we did not include early adolescents (age 10–14 years) in our samples, instead focusing on high school students. It is challenging to measure affective well-being in early adolescence (e.g., Casas & González-Carrasco, 2021). However, it is an important developmental period, and future studies should attempt to include participants from early adolescence to investigate invariance of the SPANE across adolescent age groups. Fifth, there is much variability in recommended statistical methods for assessing measurement invariance, and applying a different method may produce different results. For example, we utilized Wu and Estabrook’s (2016) stepwise approach to invariance (i.e., configural, threshold, scalar), which differs from previous methods (i.e., configural, metric, scalar; Brown, 2015), and we used changes in CFI and TLI of 0.01 and changes in RMSEA of 0.015 as cutoffs to indicate noninvariance. Notably, there were no differences in our results using the traditional method of invariance testing (see Supplementary Material; Online Resource 2). Simulation studies have recommended varying levels of restrictiveness in cutoffs (e.g., ΔCFI 0.002; Meade et al., 2008), as well as using different fit indices altogether (e.g., Kang et al., 2016). As such, though our results do support invariance, a different statistical approach may have an impact. Finally, future studies should investigate potential sources of noninvariance (e.g., why do the measurement properties of specific emotion items like “afraid” vary?), such as translation bias and culture bias (e.g., Bader et al., 2021), and should control for individual- and country-level factors that might affect adolescent SWB.
5 Conclusions

The present study supports the utility of the SPANE in measuring affective well-being in adolescent samples in different cultural contexts. Partial scalar invariance allows for reliable comparisons of the levels, correlates, and predictors of adolescent affective well-being across three countries with different cultural values and social and economic conditions. Further studies should expand our initial findings in other countries and continue comparing adolescent well-being levels and correlates.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10902-022-00521-6.

Funding No funding was received for conducting this study.

Availability of Data and Material Data are available by emailing the corresponding author.

Code Availability The codes for reproducing our results are available in the Supplementary Material.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethics Approval Data were collected in accordance with protocols from institutional or other relevant ethics committee.

Consent to Participate Informed consent had been obtained from participants.

Consent for Publication All authors consent to the publication of the manuscript in Journal of Happiness Studies.

References

An, S., Ji, L.-J., Marks, M., & Zhang, Z. (2017). Two sides of emotion: Exploring positivity and negativity in six basic emotions across cultures. *Frontiers in Psychology, 8*, Article 610. https://doi.org/10.3389/fpsyg.2017.00610

Anglim, J., Horwood, S., Smillie, L. D., Marrero, R. J., & Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: A meta-analysis. *Psychological Bulletin, 146*(4), 279–323. https://doi.org/10.1037/bul0000226

Bader, M., Jobst, L. J., Zettler, I., Hilbig, B. E., & Moshagen, M. (2021). Disentangling the effects of culture and language on measurement noninvariance in cross-cultural research: The culture, comprehension, and translation bias (CCT) procedure. *Psychological Assessment, 33*(5), 375–384. https://doi.org/10.1037/pas0000989

Berkessel, J. B., Gebauer, J. E., Joshanloo, M., Bleidorn, W., Rentfrow, P. J., Potter, J., & Gosling, S. D. (2021). National religiosity eases the psychological burden of poverty. *Proceedings of the National Academy of Sciences of the United States of America, 118*(39), e2103913118. https://doi.org/10.1073/pnas.2103913118
Brouzos, A., Vassilopoulos, S. P., & Boumpoulis, C. (2016). Adolescents’ subjective and psychological well-being: The role of meaning in life. *Hellenic Journal of Psychology, 13*(3), 153–169.

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Sage.

Bücker, S., Nuraydin, S., Simonsmeier, B. A., Schneider, M., & Luhmann, M. (2018). Subjective well-being and academic achievement: A meta-analysis. *Journal of Research in Personality, 74*, 83–94. https://doi.org/10.1016/j.jrp.2018.02.007

Busseri, M. (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, 122*, 68–71. https://doi.org/10.1016/j.paid.2017.10.003

Busseri, M. A., & Sadava, S. W. (2011). A review of the tripartite structure of subjective well-being: Implications for conceptualization, operationalization, analysis, and synthesis. *Personality and Social Psychology Review, 15*(3), 290–314. https://doi.org/10.1177/1088868310391271

Casas, F., & González-Carrasco, M. (2021). Analysing comparability of four multi-item well-being psychometric scales among 35 countries using Children’s Worlds 3rd wave 10 and 12-year-olds samples. *Child Indicators Research, 14*, 1829–1861. https://doi.org/10.1007/s12187-021-09825-0

Casas, F., Oriol, X., & González-Carrasco, M. (2020). Positive affect and its relationship with general life satisfaction among 10 and 12-year-old children in 18 countries. *Child Indicators Research, 13*, 2261–2290. https://doi.org/10.1007/s12187-020-09733-9

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Cummins, R. A., & Lau, A. L. D. (2005). *Personal Wellbeing Index – School Children* (3rd ed.). Deakin University.

Davidov, E., Meuleman, B., Cicciuch, J., Schmidt, P., & Billiet, J. (2014). Measurement equivalence in cross-national research. *Annual Review of Sociology, 40*, 55–75. https://doi.org/10.1146/annurev-soc-071913-043137

De Vaus, J., Hornsey, M. J., Kuppens, P., & Bastian, B. (2018). Exploring the East-West divide in prevalence of affective disorder: A case for cultural differences in coping with negative emotion. *Personality and Social Psychology Review, 22*(3), 285–304. https://doi.org/10.1177/1088868317736222

Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*(3), 542–575. https://doi.org/10.1037/0033-2909.95.3.542

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49*(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13

Diener, E., Sandvik, E., & Pavot, W. (1991). Happiness is the frequency, not the intensity, of positive versus negative affect. In F. Strack, M. Argyle, & N. Schwarz (Eds.), *International series in experimental social psychology, Vol. 21. Subjective well-being: An interdisciplinary perspective* (pp. 119–139). Pergamon Press.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*(2), 276–302. https://doi.org/10.1037/0033-2909.125.2.276

Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour, 2*(4), 253–260. https://doi.org/10.1038/s41562-018-0307-6

Diener, E., Wirtz, D., Tow, V., 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, 97*, 143–156. https://doi.org/10.1007/s11205-009-9493-y

Eadeh, H.-M., Breaux, R., Langberg, J. M., Nikoloski, M. A., & Becker, S. P. (2020). Multigroup multilevel structure of the child and parent versions of the positive and negative affect schedule (PANAS) in adolescents with and without ADHD. *Psychological Assessment, 32*(4), 374–382. https://doi.org/10.1037/pas0000796

Engel de Abreu, P. M., Neumann, S., Weaver, C., Abreu, N., Macedo, E. C., & Kirsch, C. (2021). Subjective well-being of adolescents in Luxembourg, Germany and Brazil during the COVID-19 pandemic. *Journal of Adolescent Health, 69*(2), 211–218. https://doi.org/10.1016/j.jadohealth.2021.04.028

Epstein, J., Santo, R., & Guillemín, F. (2015). A review of guidelines for cross-cultural adaptation of questionnaires could not bring out a consensus. *Journal of Clinical Epidemiology, 68*(4), 435–441. https://doi.org/10.1016/j.jclinepi.2014.11.021

Gadermann, A. M., Schonert-Reichl, K. A., & Zumbo, B. D. (2010). Investigating validity evidence of the Satisfaction with Life Scale adapted for Children. *Social Indicators Research, 96*(2), 229–247. https://doi.org/10.1007/s11205-009-9474-1
analysis comparison of latent means across many groups. Psychological Methods, 23, 524–545. https://doi.org/10.1037/met0000113

Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. The Journal of Applied Psychology, 93(3), 568–592. https://doi.org/10.1037/0021-9010.93.3.568

Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. International Journal of Psychological Research, 3, 111–121.

Millsap, R. E., & Yun-Tein, J. (2004). Assessing factorial invariance in ordered-categorical measures. Multivariate Behavioral Research, 39(3), 479–515. https://doi.org/10.1207/S15327906MBR3903_4

Minkov, M. (2018). A revision of Hofstede’s model of national culture: Old evidence and new data from 56 countries. Cross-Cultural and Strategic Management, 25(2), 231–256. https://doi.org/10.1108/CCSM-03-2017-0033

Miyamoto, Y., Ma, X., & Wilken, B. (2017). Cultural variation in pro-positive versus balanced systems of emotions. Current Opinion in Behavioral Sciences, 15, 27–32. https://doi.org/10.1016/j.cobeha.2017.05.014

Morrow, V., & Mayall, B. (2009). What is wrong with children’s well-being in the UK? Questions of meaning and measurement. Journal of Social Welfare and Family Law, 31(3), 217–229. https://doi.org/10.1080/09649060903354522

Narayanan, L., Abdelrasheed, N. S. G., Nasser, R. N., & Menon, S. (2020). Dimensional structure of the Arabic Positive Affect and Negative Affect Scale adapted from its English form. Psychological Reports, 123(6), 2597–2616. https://doi.org/10.1177/0033294119863293

Pavot, W. (2018). The cornerstone of research on subjective well-being: Valid assessment methodology. In E. Diener, S. Oishi, & L. Tay (Eds.), Handbook of well-being. DEF Publishers.

Pelham, B., Hardin, C., Murray, D., Shimizu, M., & Vandello, J. (2022). A truly global, non-WEIRD examination of collectivism: The global collectivism index (GCI). Current Research in Ecological Psychology, 3, 100030. https://doi.org/10.1080/13674676.2016.1229289

Prado-Gascó, V., Romero-Reignier, V., Mesa-Gresa, P., & Górriz, A. B. (2020). Subjective well-being in Spanish adolescents: Psychometric properties of the Scale of Positive and Negative Experiences. Sustainability, 12(10), 4011. https://doi.org/10.3390/su12104011

Proctor, C., Linley, P. A., & Maltby, J. (2009). Youth life satisfaction measures: A review. The Journal of Positive Psychology, 4(2), 128–144. https://doi.org/10.1080/17439760802650816

R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. Journal of Statistical Software, 48(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Russell, J. A. (2017). Mixed emotions viewed from the psychological constructionist perspective. Emotion Review, 9(2), 111–117. https://doi.org/10.1177/1754073916639658

Sass, D. A. (2011). Testing measurement invariance and comparing latent factor means within a confirmatory factor analysis framework. Journal of Psychoeducational Assessment, 29(4), 347–363. https://doi.org/10.1177/073428911046661

Sawicki, A. J., Žemojtel-Piotrowska, M., Balcerowska, J. M., Sawicka, M. J., Piotrowski, J., Sedikides, C., Jonason, P. K., Maltby, J., Adamovic, M., Agada, A. M. D., Ahmed, O., Al-Shawaf, L., Appiah, S. C. Y., Ardi, R., Babakr, Z. H., Bălăţescu, S., Bonato, M., Cowden, R. G., Chobthamkit, P., ... Zand, S. (2022). The fear of COVID-19 scale: Its structure and measurement invariance across 48 countries. Psychological Assessment, 34(3), 294-310. https://doi.org/10.1037/pas0001102

Schimmack, U., Radhakrishnan, P., Oishi, S., Dzokoto, V., & Ahadi, S. (2002). Culture, personality, and subjective well-being: Integrating process models of life satisfaction. Journal of Personality and Social Psychology, 82(4), 582–593. https://doi.org/10.1037/0022-3514.82.4.582

Seligson, J. L., Huebner, E. S., & Valois, R. F. (2003). Preliminary validation of the brief multidimensional students’ life satisfaction scale (BMSLSS). Social Indicators Research, 61(2), 121–145. https://doi.org/10.1023/A:1021326822957

Shi, D., Maydeu-Olivares, A., & Rosseel, Y. (2020). Assessing fit in ordinal factor analysis models: SRMR vs. RMSEA. Structural Equation Modeling: A Multidisciplinary Journal, 27(1), 1–15. https://doi.org/10.1080/10705511.2019.1611434

Singh, K., & Junnarkar, M. (2015). Correlates and predictors of positive mental health for school going children. Personality and Individual Differences, 76, 82–87. https://doi.org/10.1016/j.paid.2014.11.047

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, 19(8), 943–954. https://doi.org/10.1080/13674676.2016.1229289
Taras, V., Steel, P., & Kirkman, B. L. (2016). Does country equate with culture? Beyond geography in the search for cultural boundaries. *Management International Review, 56*, 455–487. https://doi.org/10.1007/s11575-016-0283-x

Tov, W. (2018). Well-being concepts and components. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being*. DEF Publishers.

Tov, W., & Nai, Z. L. S. (2018). Cultural differences in subjective well-being: How and why. In J. E. Maddux (Ed.), *Frontiers of social psychology. Subjective well-being and life satisfaction* (pp. 50–73). Routledge/Taylor and Francis Group.

UNICEF Innocenti. (2020). *Worlds of Influence: Understanding what shapes child well-being in rich countries, Innocenti Report Card 16*. UNICEF Office of Research – Innocenti, Florence.

United Nations Development Programme. (2020). *Human Development Report 2020. The next frontier: Human development and the Anthropocene*. United Nations Development Programme.

Villanueva, L., Montoya-Castilla, I., & Prado-Gascó, V. (2017). The importance of trait emotional intelligence and feelings in the prediction of perceived and biological stress in adolescents: Hierarchical regressions and fsQCA models. *Stress, 20*(4), 355–362. https://doi.org/10.1080/10253890.2017.1340451

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, 54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Wedderhoff, N., Gnambs, T., Wedderhoff, O., Burgard, T., & Bošnjak, M. (2021). On the structure of affect: A meta-analytic investigation of the dimensionality and the cross-national applicability of the Positive and Negative Affect Schedule (PANAS). *Zeitschrift Für Psychologie, 229*(1), 24–37. https://doi.org/10.1027/2151-2604/a000434

Wong, Y. J., Wang, S.-Y., & Klann, E. M. (2018). The emperor with no clothes: A critique of collectivism and individualism. *Archives of Scientific Psychology, 6*(1), 251–260. https://doi.org/10.1037/arc0000059

Wu, H., & Estabrook, R. (2016). Identification of confirmatory factor analysis models of different levels of invariance for ordered categorical outcomes. *Psychometrika, 81*(4), 1014–1045. https://doi.org/10.1007/s11336-016-9506-0

Żemojtel-Piotrowska, M., Piotrowski, J. P., Cieciuch, J., Adams, B. G., Osin, E. N., Ardí, R., Bălţătescu, S., Błomi, A. L., Clinton, A., Clunie, G. T., Esteves, C., Gouveia, V., Hosseini, A., Ghaheh, H. S., Khatayrjan, N., Kamble, S. V., Kawula, A., Liik, K., Letovancova, E., ... Malinauskienė, O. (2015). Systematic review of the measurement properties of questionnaires for the measurement of the well-being of children and adolescents. *Social Inquiry into Well-Being, 1*(1), 40–75. https://doi.org/10.13165/SIIW-15-1-1-05

**Publisher’s Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.