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RESEARCH ARTICLE

Development and Validation Regarding the Lithuanian Version of the Positive and Negative Affect Schedule (PANAS-X)

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Introduction: The Positive and Negative Affect Schedule (PANAS-X), a widely used and accepted instrument developed to assess multidimensional emotional experience, is used in various social and clinical settings. It has an underlying hierarchical structure of the higher order for the positive affect (PA) and negative affect (NA), and the lower order discrete affect scales that describe specific emotions; however, very little is known about the psychometric properties that this version of the instrument has.Aims: This study aims to investigate the psychometric properties in the Lithuanian version of PANAS-X, including the analysis for the factor structure of the higher and lower order scales, reliability, and validity characteristics.
Methods: The study includes a demographically representative Lithuanian sample (N = 322, with an average age of 37.34, SD = 12.50). For the psychometric evaluation of the PANAS-X, researchers performed item analysis, reliability, convergent-discriminant validity, and confirmatory factor analysis.
Results: The confirmatory factor analysis results support the basic structure of the PANAS-X PA, NA, and the discrete affect scales, although some scales were modified according to the item characteristics. The convergent validity is confirmed by the relations of the PA and NA as well as the discrete affect scales to the related constructs, which include personality traits, general, and psychological well-being.
Conclusions: The Lithuanian version of PANAS-X can be considered a reliable and valid instrument for structuring positive, negative, and specific emotional experiences.

Keywords: positive and negative affect, emotions, PANAS-X, psychometric properties, Lithuanian adaptation.

Introduction

One of the most widely accepted self-report measures for emotions is the Positive and Negative Affect Schedule (PANAS). Developed by Watson, Clark, and Tellegen (1988), its purpose is to assess two general positive and negative dimensions of affect. The positive affect (PA) refers to the pleasant experience related to such descriptors as active, enthusiastic, or happy, while the negative affect (NA) represents aversive feelings such as shame or lethargy. Later, Watson and Clark (1999) proposed the Positive and Negative Affect Schedule – Expanded Form (PANAS-X) – which was a product of investigating the hierarchical structure of emotional experience. The two-factor PANAS model was supplemented by a hierarchical taxonomic scheme recognised in the same data. This scheme proposes that two broad higher-order dimensions reflecting the valence of emotion are each composed of several correlated yet ultimately distinguishable scales of the discrete affect.

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The PA and NA account for most of the mood descriptors' variance (Watson & Tellegen, 1985) and have been consistently validated in different cultures and languages, such as English (Crawford & Henry, 2014), German (Krohne et al., 1996), Korean (Lim et al., 2010), Serbian (Mihić et al., 2014), Italian (Terraciano et al., 2003), Japanese (Sato & Yasuda, 2001). The instrument is also adapted to different demographics (Merz et al., 2013; Ortuño-Sierra et al., 2019), vocational (Dahiya & Rangnekar, 2019) or clinical samples (Serafini et al., 2016). The measure's utility is flexible in terms of a relevant time frame for the described emotional state (Watson & Clark, 1999). It can also serve as a screening tool for mood-related symptoms (Cohen et al., 2017) and is useful for many healthcare professionals in monitoring mood fluctuations. Recent research involving PANAS-X contributes to the exploration of the more complex emotional structure and content in affective and other disorders (Domaradzka & Fajkowska, 2019; Watson & Stanton, 2019). Despite the wide usage of PANAS-X, few studies investigate the hierarchical structure of the construct provided by this measure, which include Polish (Fajkowska & Marszał-Wiśniewska, 2009), Portuguese (Costa et al., 2020) amd Romanian (Cotigă, 2012) populations.

The emotional experience measurement situation in Lithuania remains also problematic regarding not only the specific, but also the broader, dimensions of affect. There is a lack of valid Lithuanian instruments with a theoretical foundation that could be used to differentiate the multidimensional emotional experience. Even though Lithuanian scholars have made a few attempts to apply PANAS in order to measure positive and negative emotionality (Maslenikova & Bulotaitė, 2013; Šilinskas & Žukauskienė, 2004;), yet scarce, if any, research has been carried out on the psychometric properties and the inner two-factor structure within the construct of affect of the Lithuanian PANAS has not been confirmed, which is essential to consider the cultural and linguistic aspects.

Studies suggest that Lithuanians might have specific semantic expressions for the emotional experiences. For example, a Big Five model confirmation study involving Lithuanian-speakers revealed the specific factor structure that includes such dimensions as "mental-toughness" or "intellect" (Livaniene & De Raad, 2016), which can reflect mental abilities as important criteria for the inner experience. Lithuanians also tend to use more words reflecting negative experiences and describe themselves more negatively than positively. In studies conducted to determine which features Lithuanians typically use to describe their national character, the most mentioned characteristics are related to anger, jealousy, selfishness, difficulties in communicating, indifference, unreliability (Čiužas & Ratkevičienė, 2005), and diligence or envy (Papaurėlytė-Klovienė, 2009). Lithuanians are also often viewed as a quite individualistic nation, which can be associated with specific problems of the mental health field, such as having one of the highest rates of suicides in Europe (World Health Organization, 2019), or the stigma of mental health problems in Lithuanian culture being still very relevant in terms of seeking help, compared to more Western societies (Chambers et al., 2010; Endriulaitienė et al., 2019). These can all possibly contribute to the general perception of negative emotions. Considering the notion that the prevailing emotional states and their interrelations could be specific to this population, it is important to consider whether the model of emotional experiences presented by previous authors would correspond to the description of emotions regarding Lithuanian-speakers. The direct translation proves insufficient for a more detailed differentiation of the discrete individual emotional states; therefore, it should be supplemented with a selection of the words most relevant to the emotional experience. Selecting items based on reliability and validity characteristics could improve the quality of future research in this area. Overall, cultural and linguistic features should be considered both in the process of translation and the analysis of the relations of constructs.

To respond to these methodological issues for future research on emotional experiences in Lithuania, the current study focuses on providing an adapted Lithuanian version of PANAS-X and investigating the psychometric properties of the PA and NA model with the underlying composition for the discrete emotional states. To achieve this goal, this study involves examining the construct validity using the confirmatory factor analysis (CFA) by exploring the internal structure of the PANAS-X instrument and its hierarchical organization for the lower order specific affect, as well as the higher order PA and NA; examining the internal consistency characteristics of the Lithuanian PANAS-X using composite reliability estimates; and exploring the convergent validity aiming to determine the relations of PANAS-X subscales with the related constructs.

Taking into account a lack of the instruments validated for measuring the emotional experience in the Lithuanian population, in order to verify the convergent validity of this construct, other tools measuring constructs related to PA and NA may be used. Therefore, the relations with personality dimensions, emotional aspects of psychological well-being, and general psychological wellness have been examined in this study. Positive and negative emotionality stands closely associated with such personality traits as extraversion or neuroticism (Watson & Clark, 1992), which altogether are known to be related to well-being and happiness (Costa & McCrae, 1980). Optimism or negative emotionality subscales of psychological well-being may also broadly reflect the PA and NA dimensions, alongside the general descriptor of psychological wellness.

Table 1. The Main Demographic Characteristics of the Study Sample

Age Group		18–24 (*n* = 52)	25–34 (*n* = 105)	35–44 (*n* = 69)	45–54 (*n* = 54)	55–64 (*n* = 42)	Total (*N* = 322)
Gender	Men, *n* (%)	26 (50.0)	57 (54.29)	37 (53.62)	20 (37.04)	14 (33.33)	154 (47.83)
	Women, *n* (%)	26 (50.0)	48 (45.71)	32 (46.38)	34 (62.96)	28 (66.67)	168 (52.17)
Place of Residence	City (densely populated areas), *n* (%)	23 (44.23)	75 (71.43)	43 (62.32)	24 (44.44)	17 (40.48)	182 (56.52)
	Town (semi-dense areas), *n* (%)	17 (32.69)	21 (20.0)	21 (30.43)	23 (42.59)	19 (45.24)	101 (31.37)
	Rural areas, *n* (%)	12 (23.08)	9 (8.57)	5 (7.25)	7 (12.96)	6 (14.28)	39 (12.11)
Level of Education	Primary, lower secondary, *n* (%)	3 (5.77)	0 (0)	1 (1.45)	0 (0)	0 (0)	4 (1.25)
	Upper secondary, vocational, *n* (%)	37 (71.15)	16 (15.24)	13 (18.84)	8 (14.81)	10 (24.39)	84 (26.17)
	Higher, *n* (%)	12 (23.08)	89 (84.76)	55 (79.71)	46 (85.19)	31 (75.61)	233 (72.58)

Methods

Participants and Procedures

The study included 322 individuals (mean age: 37.34, *SD* = 12.50; 154 men, 47.83%; 168 women, 52.17%) who participated voluntarily, signing informed consent forms approved by the Research Ethics Committee of the Institute of Psychology in Vilnius University, and completed the final translated version of the Lithuanian PANAS-X along with the instruments for eploring the convergent validity. The sample was composed to represent the demographic situation of the Lithuanian population as accurately as possible. Lithuania's general demographic data was retrieved from Statistics Lithuania (2012). All the participants were divided into four age groups, taking into account Lithuanian demographic characteristics of age, gender, place of residence, and education. Samples of the demographic characteristics are provided in Table 1.

Measures

The Lithuanian Positive and Negative Affect Schedule-Expanded Version (PANAS-X)

The original PANAS-X (Watson & Clark, 1999) is the measure of the affective experience which can be described using the higher-order PA and NA scales and the discrete emotional states with a total number of 60 items. In all, 11 different emotional content scales represent the negative affect (fear, sadness, guilt, hostility), the positive affect (joviality, self-assurance, attentiveness), and other states (shyness, fatigue, serenity, surprise). These scales represent factors that repeatedly have emerged in structural analyses (Watson & Clark, 1999). The authors of PANAS-X have given permission to translate and adapt the instrument to the Lithuanian population.

Following the work of Watson and Clark (1999), developing the Lithuanian PANAS-X version included several stages. The first stage was focused on the translation of items according to the cultural-adaptation guidelines (Beaton et al., 2000), and the "de-centering" process (Hambleton & Bollwark, 1991). It involved modifying items during the translation to achieve the most possible equivalence between the original and the translated terms. Three experts provided the English translation (i.e., an English native speaker, a Lithuanian linguistic specialist, and an experienced clinical psychologist), and the authors reached a final list via a general comparison of the translations. As the preliminary analysis revealed that some of the words did not have a direct translation (e.g., *"scornful", "jittery", "shaky"*), therefore a selection of the synonyms most relevant to the essence of each category was made. Some items that also did not have any closely related synonyms were dismissed (e.g., *"excited", "blue", "upset"*), leading to the addition of the new items that fit into the given category (e.g., several terms that represent the category of shyness like *"sheepish"* or *"timid"*, are all directly translatable to Lithuanian as *"shy"*. This category, therefore, was supplemented by similar category descriptors as *"modest"*: the term *"blue"* was replaced by the closest term *"melancholic"*). It appeared that the most variants of possible synonyms stood in the Negative Affect category (e.g., *"ashamed"* could be represented as *"susigėdęs", "sugėdintas", "jaučiantis gėdą"; "loathing"* - *"nekenčiantis", "jaučiantis panieką", "pasibjaurėjęs"*). Ultimately, a pilot version of 100 items was compiled. This

version of the instrument was administered to 100 participants to select the best-suited previously added synonyms for the words that had no direct translation. The respondents were asked to rate the extent to which they had experienced each affect during the past week. The responses were indicated on a 5-point scale labeled *"not at all", "little", "moderately", "quite a bit"*, and *"extremely"*.

To identify which descriptors should be revised or removed, the items were analysed based on the classical test theory (Penfield, 2013). This process included the analysis of the item's discriminative properties (corrected item-total correlation, Cronbach's alpha, and alpha if item is deleted), and the difficulty (the mean of the responses). Items or the items' synonyms with poorer psychometric characteristics were dismissed. Also, following the original authors (Watson & Clark, 1999), the specification remained that the terms should not have a secondary loading of .25 or greater in either analysis. The revised list of the Lithuanian PANAS-X items included 65 descriptors and was administered to the current study's participants, provided with the same instructions as in the pilot study, in order to prepare the final reliable and valid version of the instrument.

The Lithuanian Psychological Well-Being Scale (PWBS)

Psychological well-being is a broad construct that reflects a subjective evaluation of an individual's life in general or in certain domains (Ryff & Keyes, 1995). Among several subscales, the Lithuanian PWBS (Bagdonas et al., 2013) includes The Negative Emotionality and Optimism / Control subscales that generally reflect positive and negative subjective experiences of emotions. The negative emotionality subscale reveals a person's overall experience of negative emotions (Kairys et al., 2013). The Optimism / Control subscale overall covers the positive dimension of emotionality. Both subscales consisted of a total of 18 items, each item can be rated from 1 to 5 on a Likert-type scale. In this study, Cronbach's α for the Optimism/Control subscale is .86 (M = 28.21, SD = 6.69), the Negative Emotionality Cronbach's α = .89 (M = 22.48, SD = 7.43). The authors of the PWB Scale gave the permission to use and include in this study only the two relevant subscales.

The Big Five Inventory (BFI)

The Big Five Inventory (BFI) (John et al., 1999; John et al., 2008) is a multidimensional personality inventory based on the Big Five theory (Goldberg, 1993) that reflects basic personality traits. It consists of a 44 item-self-report measure designed to assess Neuroticism, Extraversion, Openness, Conscientiousness, and Agreeableness; each item can be rated from 1 to 5 on the Likert scale. The Lithuanian version of the inventory (Genevičiūtė-Janonienė & Endriulaitienė, 2008) is accessible through the official site of the Berkeley University Lab. In the present study, the estimates of Cronbach's α are .75 (Extraversion; M = 3.27, SD = 0.66); .70 (Agreeableness; M = 3.53, SD = 0.56); .68 (Conscientiousness; M = 3.47, SD = 0.64); .74 (Neuroticism; M = 3.07, SD = 0.81); and .52 (Openness; M = 3.40, SD = 0.57).

WHO-5

The World Health Organisation-Five Well-Being Index (WHO-5) (World Health Organization, 1998), a short self-reported unidimensional measure of current mental wellbeing, is a construct closely related to the overall experienced emotional attitude towards one's life. WHO-5 can be seen as the general indicator of a positive or negative feeling about one's being. The WHO-5 has been found to have adequate validity in screening for depression and measuring outcomes in clinical trials, therefore it is used in the Lithuanian samples (Psychiatric Research Unit, WHO Collaborating Centre in Mental Health, 1999). The range of total WHO-5 scores can fluctuate between 0 and 100. In our study, on the average, participants scored 49.29 (SD = 20.26); Cronbach's α = .87.

Data Analysis

Descriptive statistics such as correlations between the variables were calculated using the IBM SPSS Statistics version 23, the properties of reliability and CFA were conducted using the Mplus (version 8.4) (Muthén & Muthén, 2017). There were no missing data on any measure. The model fit was assessed using the chi-square test, the comparative fit index (CFI), the goodness of fit index, the Tucker Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual, using the provided guidelines of the appropriate indexes (Hu & Bentler, 1995). Some disagreements arise on what estimator should be employed when performing CFA in the case of PANAS-X. The problem may arise should the score of the PANAS-X items

deviate from normality, which can be quite probable, especially regarding strong emotions. Maximum likelihood (ML) assumes multinormal distribution; so as a result, it could affect the significance of the ML tests. Other methods can address this issue involving asymmetrical distribution of categorical data by not assuming normality as diagonally weighted least squares (DWLS) (e.g., Terracciano et al., 2003); however, the model results after using DWSL can lead to a tendency to smaller RMSEA and larger CFI as well as TLI index values, which can result in errors of model-fit (Xia & Yang, 2018); therefore, when using DWLS, conventional cut-offs of model fit indices should be reviewed. Since it is suggested to treat variables with five or more categories as continuous (Rhemtulla et al., 2012), in this case, ML would be sensitive to asymmetric category thresholds, especially when the sample size remains considerably small. Thus, in this study, the CFA models were evaluated using the maximum likelihood (ML) method as estimator.

Following the criterion proposed by Fornell and Larker (1981), the discriminant properties of the construct were examined by computing the average variance extracted (AVE), the properties of internal consistency in our study were assessed by providing Cronbach's alpha coefficients and composite reliabilities (CR). CR as the indicator of the shared variance among the observed variables is useful in the process of developing a new instrument (Raykov & Grayson, 2003); especially when using alpha, a risk exists of being biased, as it depends on a number of parameter characteristics for a measurement. CR calculated in conjunction with structural equation modelling allows considering both types of error and is essential for measuring the construct on the abstract level. AVE estimates the degree of variance accounted for by a construct in relation to the level due to measurement error (Fornell & Larcker, 1981).

Results

The Construct Validity of the Lithuanian PANAS-X

Discrete Emotions – Lower order scales

After eliminating some synonyms with poor results during the item analysis (e.g., the item *"nervous"* had several alternatives, among which the best suited was *"nerimaujantis"*), 54 items were used to verify the model of lower-order distinct emotions. The CFA discrete affect scales findings of the original PANAS-X model revealed that statistics associated with it were χ^2 (1169) = 2665.45, $p < .001$; RMSEA = 0.06, 90% CI [.06, .66]; CFI = 0.86; TLI = 0.84; SRMR = 0.07, which according to Hair et al. (2010), led to unsatisfactory model fit results. Changes were made after examining single item characteristics and model-fit characteristics, which included the scales of Sadness (*"melancholic"*, as the alternative to *"blue"*, demonstrated poor results and was removed), Fear (*"jittery"* and *"shaky"* were respectively represented by *"įsitempęs"* and *"netvirtas"*), and Hostility. Emotionally strong terms appeared not to be a common descriptor of the participants' emotional states. For example, the term *"disgusted"* was not a good marker of the Hostility subscale. The term has several synonyms in Lithuanian that remain substantially equivalent (*"pasišlykštėjęs"* and *"pasibjaurėjęs"*); therefore, the word has been selected according to the model-fit and reliability characteristics. Other changes were oriented toward the positive affective states, which were more difficult to differentiate. Some items representing Joviality and Self-Assurance categories were highly interrelated; therefore, the items with the strongest intercorrelations were replaced by more distinguishable markers consistent with the given category (e.g., the item *"fearless"*-*"bebaimis"* was replaced by the word *"brave"*-*"drąsus"*; due to its high correlation, *"determined"* - *"užtikrintas"* was moved from Attentiveness to Self-Assurance). The corrected model of the discrete affect states consisted of 51 descriptors and the provided model fit statistics were χ^2 (1061) = 1908.007, RMSEA = 0.05, 90% CI [.04, .50]; CFI = 0.92; TLI = 0.91; SRMR = 0.05, which indicated the model's acceptability within the recommended criteria (Hair et al., 2010). Sufficiently large factor scores of each item were obtained as shown in Table 2.

Positive and Negative Affect – Higher order scales

The CFA findings of the original PA and NA scales in the Lithuanian sample revealed that the associated statistics stood at χ^2 (134) = 606.40, RMSEA = 0.09, 90% CI [.08, .10]; CFI = 0.87; TLI = 0.85; SRMR = 0.06; therefore, the model was not acceptable. The changes included the added correlation between the errors of *"atkaklus"* (the closest translation is *"determined"*) and *"ryžtingas" ("decisive")*. Also, *"budrus" ("alert")* was replaced by the more fitting item *"atidus"* (possible translation *"focused"*). The results of the corrected model provided statistics that came to χ^2 (141) = 279.53, RMSEA = 0.05, 90% CI [.04, .60]; CFI = 0.95; TLI = 0.94; SRMR = 0.05 (Table 3), which can be considered satisfactory with relatively large factor scores for each item.

Table 2. Standardized Factor Loadings for the Best-Fitting Model of the Specific Affect Scales of the Lithuanian PANAS-X

Subscale *(Lithuanian)*	Descriptor *(Lithuanian)*	M *(SD)*	Standardized factor loading
Basic Negative Emotion Scales			
Fear *(Baimė)*	afraid *(bijantis)*	2.07 (1.09)	.66
	scared *(išsigandęs)*	1.76 (1.08)	.75
	nervous *(nerimaujantis)*	2.78 (1.19)	.77
	jittery *(įsitempęs)**	2.68 (1.16)	.73
	shaky *(netvirtas)**	2.26 (1.16)	.78
	frightened *(išgąsdintas)*	1.61 (0.96)	.62
Hostility *(Priešiškumas)*	angry *(piktas)*	2.34 (1.21)	.82
	irritable *(susierzinęs)*	2.65 (1.21)	.84
	scornful *(pasipiktinęs)**	2.38 (1.19)	.79
	hostile *(priešiškas)*	2.10 (1.12)	.72
	loathing *(jaučiantis neapykantą)*	1.87 (1.15)	.70
	disgusted *(pasibjaurėjęs)*	1.58 (0.98)	.63
Guilt *(Kaltė)*	disgusted with self *(pasibjaurėjęs savimi)*	1.73 (1.14)	.77
	guilty *(kaltas)*	1.96 (1.09)	.77
	angry at self *(piktas ant savęs)*	2.16 (1.21)	.85
	ashamed *(jaučiantis gėdą)*	1.66 (1.02)	.70
	dissatisfied with self *(nepatenkintas savimi)*	2.33 (1.23)	.87
Sadness *(Liūdesys)*	sad *(liūdnas)*	2.47 (1.19)	.87
	downhearted *(nusiminęs)*	2.37 (1.17)	.87
	lonely *(vienišas)*	2.16 (1.32)	.76
	alone *(vienas)*	2.22 (1.32)	.65
Basic Positive Emotion Scales			
Joviality *(Gyvybingumas)*	joyful *(džiugus)*	3.07 (1.02)	.74
	merry *(linksmas)***	3.18 (1.10)	.86
	cheerful *(džiaugsmingas)*	3.18 (1.05)	.84
	happy *(laimingas)*	3.24 (1.08)	.87
	enthusiastic *(entuziastingas)*	2.71 (1.10)	.42
	lively *(gyvybingas)*	2.92 (1.00)	.46
Self-Assurance *(Užtikintumas)*	decisive *(ryžtingas)***	2.80 (1.05)	.79
	bold *(užtikrintas)**	2.86 (1.05)	.83
	daring *(drįstantis)*	2.86 (1.05)	.67
	fearless *(drąsus)**	2.86 (1.05)	.74
	confident *(pasikliaujantis savimi)*	3.17 (1.02)	.74
	strong *(stiprus)*	2.99 (1.10)	.66
Attentiveness *(Dėmesingumas)*	attentive *(dėmesingas)*	3.15 (1.00)	.82
	concentrating *(susikaupęs)*	3.06 (1.04)	.80
	alert *(atidus)**	3.30 (1.06)	.82
	determined *(atkaklus)**	3.09 (1.04)	.38
Other Affective States			
Shyness *(Drovumas)*	shy *(drovus)*	2.03 (1.00)	.56
	diffident *(nepasitikintis savimi)***	2.17 (1.15)	.90
	bashful *(nedrąsus)**	1.98 (1.00)	.69
	modest *(kuklus)***	2.40 (1.04)	.48
Fatigue *(Nuovargis)*	drowsy *(apsnūdęs)*	2.54 (1.18)	.86
	tired *(pavargęs)*	3.03 (1.19)	.62
	exhausted *(išsekęs)***	2.47 (1.27)	.76
	sleepy *(mieguistas)*	2.63 (1.19)	.90
Serenity *(Ramybė)*	relaxed *(atsipalaidavęs)*	2.68 (1.06)	.81
	at ease *(atsipūtęs)*	2.63 (1.15)	.69
	calm *(ramus)*	3.21 (1.01)	.71
Surprise *(Nuostaba)*	surprised *(nustebęs)*	2.07 (1.01)	.68
	astonished *(priblokštas)*	1.70 (0.98)	.55
	amazed *(nustebintas)*	2.15 (0.99)	.71

Note. * an equivalent term or a synonym; ** a new term.

Table 3. Standardized Factor Loadings for the Best-Fitting PA and NA Scale Model's of the Lithuanian PANAS-X

Subscale	Descriptor *(Lithuanian)*	Standardized factor loading
Negative Affect	afraid *(bijantis)*	.60
	frightened *(išgąsdintas)*	.56
	hostile *(priešiškas)*	.53
	irritable *(susierzinęs)*	.63
	guilty *(kaltas)*	.74
	ashamed *(jaučiantis gėdą)*	.59
	upset *(prislėgtas)**	.83
	distressed *(nelaimingas)**	.84
	nervous *(nerimaujantis)*	.71
	jittery *(įsitempęs)**	.64
Positive Affect	active *(aktyvus)*	.77
	determined *(atkaklus)**	.66
	focused *(atidus)***	.60
	decisive *(ryžtingas)***	.78
	enthusiastic *(entuziastingas)*	.80
	inspired *(įkvėptas)*	.66
	interested *(susidomėjęs)*	.59
	proud *(besididžiuojantis savimi)*	.60
	strong *(stiprus)*	.62

Note. * an equivalent term or a synonym; ** a new term.

Table 4. Composite Reliabilities (CR), Average Variance Extracted (AVE), Maximum Shared Variance (MSV), Average Shared Variance (ASV) for the Lower and Higher Order Scales

Subscale	CR	AVE	MSV	ASV
Fear	.83	.50	.52	.27
Hostility	.88	.61	.48	.20
Guilt	.90	.32	.45	.24
Sadness	.87	.63	.46	.25
Joviality	.92	.30	.48	.19
Self-Assurance	.88	.35	.44	.15
Attentiveness	.86	.30	.40	.12
Serenity	.78	.36	.42	.14
Shyness	.80	.37	.40	.15
Fatigue	.88	.37	.40	.17
Surprise	.69	.37	.14	.06
General Positive Affect	.89	.48	.07	.01
General Negative Affect	.90	.49	.07	.01

Reliability and Discriminant Validity

The values of internal consistency are reflected by Cronbach's alpha coefficients, which for the discrete affect scales were .87 (Fear), .87 (Hostility), .89 (Guilt), .88 (Sadness), .91(Joviality), .89 (Self-Assurance), .85 (Attentiveness), .82 (Shyness), .88 (Fatigue), .78 (Serenity), and .63 (Surprise). As for the Positive and Negative Affect scales, the Cronbach's alphas were .89 (PA) and .90 (NA). All values indicate satisfactory internal consistency, with only the scale of Surprise having a relatively lower coefficient, although it is important to note that the scale consists of only three items.

The Composite Reliability (CR) estimates were computed, which are provided in Table 4. All CRs fall within the range of .69 to .92 for the specific affect scales and .89 to .90 respectively for the General Positive Affect and Negative Affect Scales. The CR measures of the lower and higher-order scales exceed the generally suggested threshold of .60 (Hair et al., 2010) which indicates proper reliability characteristics.

The discriminant validity measures are reported in Table 4. The estimates of AVE revealed that some of the distinct affect scales were not satisfactory according to the recommended threshold values (AVE > .50; Hair et al., 2010). The values of maximum shared variance (MSV) and average shared variance (ASV) for the PA and NA scales provided in Table 4 demonstrated proper characteristics (MSV < AVE; ASV < AVE; Hair et al., 2010). The discriminative properties of specific affects were questionable, as the square root of the AVE should be greater than any other correlation between the latent variables (Fornell & Larcker, 1981). As seen in Table 5, specific affect scales had relatively strong intercorrelations, especially among the basic negative emotions.

Overall, the results have shown that the Lithuanian PANAS-X serves as an essentially reliable and valid instrument except for the discriminative properties of some lower order scales.

Table 5. Intercorrelations of the Specific Affect, the PA and NA Scales

Subscale	Fear	Hostility	Guilt	Sadness	Joviality	Self-Assurance	Attentiveness	Serenity	Shyness	Fatigue	Surprise	GeneralPA	GeneralNA
Fear	(.71)												
Hostility	.69**	(.78)											
Guilt	.72**	.64**	(.56)										
Sadness	.68**	.64**	.67**	(.79)									
Joviality	–.31**	–.24**	–.33**	–.44**	(.55)								
Self-Assurance	–.21**	–.09	–.28**	–.25**	.69**	(.59)							
Attentiveness	–.13**	–.14*	–.23**	–.20**	.56**	.66**	(.55)						
Serenity	–.40**	–.22**	–.28**	–.32**	.63**	.50**	.38**	(.60)					
Shyness	.65**	.40**	.60**	.49**	–.22**	–.21**	–.05	–.23**	(.61)				
Fatigue	.63**	.59**	.54**	.56**	–.20**	–.14*	–.11*	.36**	.36**	(.61)			
Surprise	.26**	.25**	.06	.09	.35**	.31**	.38**	.14*	.14*	.18**	(.61)		
General PA	–.22**	–.14**	–.28**	–.30**	.81**	.87**	.79**	.54**	–.15**	–.18**	.40**	(.70)	
General NA	.91**	.81**	.83**	.80**	–.39**	–.24**	–.19**	–.40**	.61**	.66**	.20**	–.27**	(.70)

Note. *p<.050; **p<.001. Correlations ≥ |.30| are in bold. The diagonal elements shown in parentheses represent the square root of the average variance extracted (AVE) and the other elements are the correlations among constructs.

Convergent Validity

The convergent and discriminant pattern can be recognized in identifying the relations with personality traits and general well-being as shown in Table 6. Most of the significant relations of PANAS-X can be found within the WHO-5 and BFI-Neuroticism subscale. As expected, the PANAS-X subscales representing negative emotionality stood significantly negatively related to WHO-5 and BFI-Extraversion, and positively related to BFI- Neuroticism, which marked negative emotionality patterns, while the positive affect PANAS-X subscales demonstrated the reverse results, which reflected positive emotionality. The general PA and NA scales reflected similar results to those of the corresponding lower order scales. In general, the relations of higher and lower order scales of the Lithuanian PANAS-X and other related constructs show the expected tendencies regarding the convergent validity of the instrument.

Discussion

The purpose of this study was to investigate the psychometric properties of the PANAS-X version for the Lithuanian population, which was the first attempt to provide any of the adapted versions of this instrument in Lithuania. In general, with some modifications, the results of the confirmatory factor analysis were similar to those reported in the original (Watson & Clark, 1999). The PANAS-X scales loaded on two separate and internally consistent negatively correlated factors that were interpretable as PA and NA, as well as the distinct affect scales. The evidence provided in this article confirmed that the Lithuanian PANAS-X can be used to examine the valence of emotional experience and the underlying specific emotions.

The Construct Validity of the Higher and Lower Order Affect Scales

The analysis mainly supported the structure of the PANAS-X lower order distinct affect and the higher order PA and NA scales, although the final Lithuanian PANAS-X version required some changes.

The modifications regarding the issues of translation firstly included the lower order scales and led to some inconsistencies compared to the original. In the case of Fear and Shyness, choosing among several equivalent

Table 6. Correlations of the Specific Affect, the PA and NA Scales, and the Related Constructs

Subscale	WHO-5	PWBS-O/C	PWBS-NE	BFI-Extra-version	BFI-Agreebleness	BFI-Conscien-stious-ness	BFI-Neuroticism	BFI-Openness
Fear	–.47**	–.40*	.68**	–.25**	–.19**	–.25**	.55**	.17**
Hostility	–.37**	–.21*	.65**	–.19**	–.41**	–.22**	.51**	.09
Guilt	–.40**	–.33	.60**	–.29**	–.27**	–.36**	.57**	.07
Sadness	–.48**	–.19*	.74**	–.24**	–.26**	–.25**	.54**	.12*
Joviality	.72**	.39*	–.33**	.50**	.29**	.22**	–.42**	.19**
Self-Assurance	.61**	.51**	–.04	.48**	.21**	.30**	–.45**	.25**
Attentive-ness	.48**	.37*	–.00	.26**	.25**	.44**	–.32**	.21**
Serenity	.62**	.36	–.14*	.20**	.15*	.02	–.44**	.02
Shyness	–.32**	–.25**	.53**	–.40**	–.10	–.19**	.49**	.06
Fatigue	–.40**	–.25**	.53**	–.17**	–.12*	–.22**	.35**	.08
Surprise	.12*	.10	.03	.19**	.09	.15*	–.03	.20**
General PA	.71**	.43*	–.10	.48**	.26**	.33**	–.42**	.35**
General NA	–.53**	–.30**	.78**	–.27**	–.30**	–.30**	.62**	.15**

Note. *p<.050; **p<.001. Correlations ≥ |.30| are in bold. PWBS-O/C – Lithuanian Psychological Well Being Scale-Optimism/Control subscale; PWBS-NE – Lithuanian Psychological Well Being Scale-Negative Emotionality subscale; BFI – Big Five Inventory.

Lithuanian fear markers as *"jittery"* or *"shaky"* was complicated due to many possible synonyms. The problem regarding Shyness was the lack of possible translatable items; therefore, this scale's scope of meaning was broadened by descriptors like *"diffident"* or *"modest"*. Some emotions reflecting strong negative feelings (e.g., *"disgusted", "loathing"*) demonstrated poorer model-fit results unless they were directed toward oneself (e.g., *"disgusted with self"*). The marker *"disgusted"* was also problematic; it was rated on average lower than the term *"disgusted with self"*. Some theoretical models (Ekman, 1971; Izard, 1991) consider Disgust as one of the basic emotions, and it remains important in terms of fully reflecting broad emotional experience; hence, it was kept in the model's final version, since Watson and Clark (1999) proposed it. Lithuanians, it can be assumed, may tend to direct negative emotions more towards oneselves. As mentioned earlier, studies suggest that Lithuanians have specific semantic expressions for emotional experiences (Livaniene & De Raad, 2016), and tend to describe themselves more negatively than positively, using such characteristics as angry, jealous, or selfish (Čiužas & Ratkevičienė, 2005). On the other hand, generally, people are unlikely to express any stronger emotions (Watson & Stanton, 2017). The current study did not include the manipulations of emotional experience and the data were collected naturalistically; therefore, further investigations are needed to address the cultural specificities related to negative emotions. These results are contrary to the work of the original authors (Watson & Clark, 1999), where the subscales of negative affect like Hostility emerged with fairly clear loadings, although the primary two or three markers of the content scales related to negative affects such as Hostility, Fear, or Sadness mirror the results of Zevon and Tellegen's (1982) Mood Checklist, which served as the basis of the initial set for the original PANAS-X authors.

Looking at the scales related to positive emotional content, the main challenge involved the positive scales being highly interrelated. The difficulties in differentiating specific states were present when dealing with such positive affect scales as Joviality or Self-Assurance, indicating fairly high loadings on the higher order PA scales, which confirms the results of the previous research (Fajkowska & Marszał-Wiśniewska, 2009; Mihić et al., 2014; Watson & Clark, 1999). One of the priorities was to select such items that represent the subscale as the primary markers. It refers to the original work (Zevon & Tellegen, 1982; Watson & Clark, 1999), where after the first step of extracting distinct affect scales, another step of identifying specific positive dimensions had to be done. The analysis showed that mainly two or three markers with the highest loading match the original work (e.g., happy, cheerful; bold, fearless, confident; calm, relaxed, at ease). However, after carrying out a careful item selection, some of the items demonstrated difficulties of fitting into the category (the items that are originally placed into the category of Joviality seemed to form a new factor related to a general positive arousal). After reducing the number of potential items, the model was improved by selecting words less related to the alleged category of *"arousal"* and more to a general positivity (e.g., new item *"merry"*). It may reflect a cultural tendency to process positive emotionality less specifically in terms of the content.

A less visible but still noticeable pattern of interconnectedness can be seen in the scales of guilt and sadness, as these descriptors serve as the essential markers of negative emotionality, also confirming the authors' findings

in the original PANAS-X (Watson & Clark, 1999). This pattern seems likely to show the trace of a hierarchical structure consisting of nonspecific Positive Activation and Negative Activation dimensions (Watson & Stanton, 2017). High intercorrelations can signify the emotional blends which make up the higher level of NA. The hierarchical structure is also evident from the fact that subscales of the same valence have notably strong interrelations, forming a higher level super-cluster (e.g., Sadness, Fear, Guilt, Hostility indicate negative emotionality), and have strong but slightly smaller negative relations with the scales of the opposite valence (in this case, Joviality, Self-Assurance, Attentiveness, which are the markers of positive emotionality). Recent findings of intercultural emotion semantics (Jackson et al., 2019) confirm that valence and physiological activation are considered as universal constraints to variability in different languages.

Regarding the higher order PA and NA scales, it can be observed that in this study, some of those terms were replaced as well, and PA consists only of nine descriptors, as opposed to the original where there are ten of them (Watson & Clark, 1999) (e.g., the terms *"distressed"* and *"upset"* were replaced into similar broad concepts of negative emotional experience; the term *"alert"* was replaced by the other term *"determined"* that falls into the category of Attentiveness). Although this may be seen as a failed attempt to confirm the content of the original work, we argue that the main structure was mainly preserved, as our primary goal was for the higher order scales not to represent specific terms as accurately as possible, but instead to reflect a different content of emotions in a similar manner (i.e., to keep a similar number of terms representing different dimensions of affect). Thus, this criterion, as well as the results of item-analysis, led to the final set of PA and NA descriptors.

Overall, our results reveal that the underlying structure of the PANAS-X is similar to the structure of the original PANAS-X, provided by Watson and Clark (1999), although some cultural variation in the content of the higher and lower order scales may show more complex patterns than expected. Further comparison to the results in other cultures, however, is complicated due to the lack of studies involving the second order content of affect provided by PANAS-X; the existing research also does not provide a more detailed explanation for the construction of the specific scales. Nevertheless, it can be concluded that the overall structure demonstrated adequate results.

Reliability and Discriminant Validity

The present study has proven that the composite reliability estimates, which confirm the internal consistency, were satisfactory for both PA and NA, and for the scales of discrete affect, as well. However, the results concerning the convergent and discriminant characteristics demonstrated ambiguous results. During the selection process for the descriptors, the main goal was to avoid unnecessary synonyms which did not add any explanatory value to the data distribution. As mentioned before, it could be assumed that the Lithuanian speakers tended to describe the affective experience in a less differentiated way. Overall, the final version of PANAS-X included fewer descriptors than the original one, even though some markers were added with more flexible cut-off scores to reflect a broader and more theoretically based spectrum of emotionality. This may be related to the samples used in previous studies being mostly demographically homogeneous, usually composed of students (e.g., Watson & Clark, 1999). Future studies on affect differentiation in different age groups could provide more detailed and grounded interpretations.

Convergent Validity

The tendencies of the relations between the PA and NA with other related constructs, such as personality traits or general psychological measures of well-being, supported the instrument's convergent validity, similarly to the previous findings (Watson & Clark, 1992; 1999). As expected, the PA demonstrated the relations with the WHO-5, Optimism / Control subscale of the PWBS. Supporting similar results of previous studies (Cotigă, 2012; Fajkowska & Marszał-Wiśniewska, 2009; Mihić et al., 2014), the PA and NA relations to extraversion and neuroticism confirmed the idea that extraversion leads to positive emotions and neuroticism leads to negative emotions (as in Costa & McCrae, 1980). A clear divergent pattern was also observed in the case of distinct affective states. The specific scales that are regarded as the components of general NA, such as fear, hostility, guilt, and sadness, were related to the Negative Emotionality and negatively linked to the Optimism / Control subscales of the PWBS as well as the marker of the psychological wellness WHO-5. The negative affect scales were linked to Neuroticism and the positive affect scales were linked to Extraversion; conversely negative relations were present as well. Other traits in the context of specific emotions seemed to demonstrate tendencies that proved more independent from emotional valence, as they had visible, but still weaker, links to the PANAS-X scales.

Strengths and Limitations

Although this study investigated a complex structure of emotional experience in a demographically representable sample of the Lithuanian population, the study has some limitations. The comparison of Lithuanian PANAS-X structure to that originally produced by the authors is burdened by the linguistic differences of items used in the analysis, which may cover the underlying culturally specific affective patterns. Given the process of translation, which ultimately resulted in some differences of number and meaning in the chosen items, the measure's Lithuanian version might not be comparable to the original PANAS-X. Furthermore, a larger number of the participants would be needed to confirm the observed patterns. Also, the validity indicating the convergent patterns was limited to the existing Lithuanian instruments that measured similar, but not identical, constructs of emotional experience.

Conclusion, Implications and Future Directions

In conclusion, the PANAS-X relations with constructs of psychological well-being and personality traits confirmed its convergent validity, allowing PANAS-X to be considered an appropriate instrument for structuring positive, negative, and specific emotional experiences. It can be seen as an important contribution to the future cross-cultural studies of the specific affect in various research contexts.

To broaden the forthcoming research into the emotional experience of the Lithuanian population, future studies should be oriented to developing reliable and valid measures to be used with different time instructions. As NA can be considered a general indicator of subjective distress, the instrument could serve as a tool in not only the scientific field, but also in the mental health care context, thus, further comparative research would be valuable when delving into the perception of emotional experience in various clinical samples in different cultures; for example, whether depressiveness in various Lithuanian age groups has similar affective components as in other countries.

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All participants engaged in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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