

## **The Adaptation Study of the Brief Form of the Affective Neuroscience Personality Scales (BANPS) to Turkish**

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## **Abstract**

The aim of this study is to adapt Brief Form of Affective Neuroscience Scales (BANPS) into Turkish culture and examine its reliability and validity. BANPS was originally developed by Barrett and colleagues (2013) to shorten and improve the psychometric properties of ANPS (Davis et al., 2003). The BANPS consisted of 33 items and six scales which aim to assess personality traits on the basis of six affective systems (SEEK, PLAY, CARE, FEAR, ANGER, SADNESS). The reliability and validity analyses of Turkish BANPS were conducted with three groups of participants, including all participants (N= 873), young adults (N= 296), and adults (N= 577). The original methodology utilized in the construction of BANPS and Turkish ANPS (Özkarar-Gradwohl et al., 2014) was followed both in reliability and validity analyses. The results implicated that the gender and age of the participants are important variables in BANPS scores. The Cronbach alpha values both for total and individual scales of BANPS indicated that the Turkish BANPS has good internal reliability. The results of overall reliability and validity analyses demonstrated that Turkish BANPS is a reliable and valid tool to utilize in assessing individual differences in primary affective systems in the Turkish non-clinical young adult and adult populations. The limitations and suggestions for future studies are also discussed as well as the findings of the study.

**Keywords:** Affective Neuroscience; ANPS; Brief-ANPS; Personality; Scale adaptation

## **INTRODUCTION**

Based on the studies on the basic affective systems of the brain, Affective Neuroscience theory hypothesized that human personality could be predicted to a great extent through the strengths and weaknesses found in the primary affective systems (Davis et al., 2003; Panksepp, 1998). Since it is not possible to measure someone's emotional systems activities directly with physiological tools, the only way to objectively estimate these imprints on the emotional systems is to ask the person the most appropriate questions to understand the strengths and weaknesses in these emotional systems (Davis et al., 2003; Davis and Panksepp, 2011; Davis and Panksepp, 2018). In accordance with this purpose, the first version of Affective Neuroscience Personality Scales was introduced by Davis, Panksepp, and Normansell in 2003. The construction of the ANPS reflects the first endeavor of developing a personality scale that aims to measure the emotional nature of humans based on the knowledge acquired from modern neuroscience (Davis et al., 2003; Davis and Panksepp, 2011; Davis and Panksepp, 2018).

The original form of ANPS is a self-report questionnaire consisting of a total of 110 items that assesses six primary affective traits (SEEK, FEAR, CARE, ANGER, PLAY, and SADNESS) with an additional scale of Spirituality. The six scales, each representing a primary emotional system, comprised 14 (7 positive and 7 negative, i.e., reverse-scored) items, and the Spirituality scale consisted of 12 items, six positively and six negatively worded. Fourteen filler items that generally reflect personal interests were included in the ANPS to test the validity of given answers. The items of the ANPS were organized in an order consisting of 14 blocks and followed a specific item sequence: SEEK, FEAR, CARE, ANGER, PLAY, SADNESS, Spirituality (until all 12 items were completed), and lastly, a filler item (Davis et al., 2003; Davis and Panksepp, 2011).

Davis and Panksepp (2011) later revised the ANPS by altering several items and adding two more filler items from its 2003 version, which resulted in a 112-item scale consisting of 14-item for each six primary emotion scales, a 12-item Spirituality scale, and 16 filler items.

However, despite being a unique and valuable tool to investigate the affective experiences of humans, the ANPS also has a number of downsides, including a vague factor structure, time-consuming scales, some unclearly worded items, and ambiguous content variability of some items (Barrett et al., 2013). Among these problems, especially exceedingly long scales (it takes approximately 15 minutes to complete the

form) prevented the ANPS from being used widely. The Brief Form of the ANPS, namely BANPS, was developed to solve these issues by Barrett and colleagues (2013). On behalf of constructing BANPS, Barrett and colleagues (2013) benefited from various guidelines (for details, See Barrett et al., 2013) to take the most appropriate steps in shortening and improve the psychometric qualities of the ANPS. Following these steps, they conducted three studies to remove incomprehensible items from the scale, reduce correlations between scales and obtain a simple factor structure to increase the separability of each scale while preserving the internal consistencies of the scales. As a result of these studies, they managed to shorten the ANPS to 33 items.

The Brief ANPS was further proven to be a reliable and valid tool to assess affective personality traits, as indicated by the correlations of its subscales with scores of various related personality questionnaires, including the Big Five Inventory (BFI; Benet-Martinez and John, 1998), Affect Valuation Index (AVI; Tsai et al., 2006), Emotion Regulation Questionnaire (ERQ; Gross and John, 2003), Narcissistic Personality Inventory (NPI; Raskin and Terry, 1988), Extended Positive and Negative Affect Schedule (PANAS-X; Watson and Clark, 1994), Authentic and Hubristic Pride Proneness Scales (Pride; Tracy and Robins, 2007), Rosenberg Self Esteem Scale (RSE; Rosenberg, 1965) and Social Phobia Scale (SPS; Mattick and Clarke, 1998).

In addition, while the ANPS is measured on a 4-point Likert scale and on the scale, the lowest value indicates the highest endorsement of the item, the BANPS is evaluated with a 5-point Likert scale with the “1” reflecting the lowest and “5” reflecting highest endorsement, in accordance with the intuitive inclinations of the respondents. The BANPS utilized a 5-point scale because this rating was revealed to provide more accurate reliability estimates than the 4-point rating scales (Barrett et al., 2013).

The 33-item Brief ANPS consists of six scales which assess six core emotions. PLAY, SEEK, FEAR, and ANGER scales consist of 6 items, whereas the SADNESS scale comprises of 5 items, and the CARE scale includes 4 items. In the construction of the BANPS, the 12-item Spirituality scale was thought of as secondary to other scales and removed since this scale did not represent a primary affective system. Additionally, the 16 filler items from the revised form of ANPS were excluded based on the rationale that filler items are not essential to include in the assessment tools (Barrett et al., 2013).

For the time being, The BANPS has been translated into several languages, including Norwegian (Geir et al., 2014), Brazilian Portuguese (Esposito et al., 2016), Persian (Amiri and Azad-Marzabadi, 2017), and Portuguese (Gurfinkel et al., 2018).

These cross-cultural adaptations also found that BANPS is a reliable and valid measure and can be used safely as a short alternative to ANPS for assessing basic emotions. The main purpose of the current study was to translate and carry out the adaptation study of the BANPS into the Turkish language and culture. Another aim of the study was to prove the reliability and validity of the Turkish version of the BANPS in a general community sample. Also, the methodology of the original study (Barrett et al., 2013) was followed to allow cross-cultural comparability of the Turkish BANPS by utilizing the research instruments of BFI (Big Five Inventory), ERQ (Emotion Regulation Questionnaire), and PANAS (The Positive Affect-Negative Affect Schedule).

## RESULTS

### Sociodemographic Characteristics of the Sample

The study was carried out with a total of 873 participants (618 female and 253 male) whose mean age was 32.22 years ( $SD = 10.48$ ). The Young Adult sample consisted of 296 participants between the ages of 18 and 25 years, and the Adult sample had 577 participants between the ages of 26 and 65 years. The Young Adult and Adult samples differed significantly from each other in terms of gender,  $\chi^2(2) = 15.29, p < .001$ , and the total years of education,  $t(867) = -5.271, p < .001$ . Sociodemographic characteristics of the participants are summarized in Table 1.

**Table 1**

Sociodemographic Characteristics of the Sample

Sociodemographic Characteristics	All	Young	
	Participants (N= 873)	Adults (N= 296)	Adults (N= 577)
Mean Age (SD)	32.22 (10.48)	22.89 (2.00)	37.01 (9.81)
Gender (%)			
Female	70.8	77.7	67.2
Male	29.0	21.6	32.8
Non-binary	0.2	0.7	-

**Table 1 continued**

Sociodemographic Characteristics	All	Young	Adults
	Participants	Adults	(N= 577)

	(N= 873)	(N= 296)	
Education Status (%)			
Primary School (5 years)	0.5	-	0.7
Primary School (8 years)	1.4	0.3	1.9
High School	13.4	26.0	6.9
Associate Degree	4.1	5.1	3.6
Bachelor's	53.4	60.8	49.6
Master	21.2	7.4	28.2
Doctorate	6.1	0.3	9.0
Total Years of Education (SD)	16.97 (3.87)	16.02 (2.32)	17.46 (4.39)

### Analyses Based on Sociodemographic Characteristics of the Sample

Gender differences in the mean scale scores of ANPS and BANPS were investigated for three samples (all participants, young adults, and adults) separately (See Table 2). The results of the analyses conducted for all participants exhibited that there were significant gender differences in ANPS scales of Care, Fear, and Sadness; and in BANPS scales of Play, Care, Fear, and Sadness, with female participants having higher scores than male participants.

Among young adults, female participants' scores were significantly higher than males on Care, Fear, and Sadness scales in ANPS and Care and Fear scales in BANPS. Table 2 presents the detailed information of these t-test results.

In the adult sample, the mean scores differed significantly, with females obtaining higher scores than males on the scales of Care and Fear in the ANPS; and Fear and Sadness in the BANPS.

When the relationship between the age of the participants and their mean scale scores of ANPS and BANPS were examined, age was found to be weakly negatively correlated with Play (ANPS:  $r(873) = -.15$ , BANPS:  $r(873) = -.18$ ), Fear (ANPS:  $r(873) = -.28$ , BANPS:  $r(873) = -.26$ ), Anger (ANPS:  $r(873) = -.16$ , BANPS:  $r(873) = -.10$ ) and Sadness (ANPS:  $r(873) = -.22$ , BANPS:  $r(873) = -.18$ ) scale scores (all correlations were significant at  $p < .001$  level).

**Table 2**

T-test Results of the ANPS and BANPS Scale Scores for Gender

	All Participants (N= 871)				Young Adults (N= 294)				Adults (N= 577)			
	Scores (SD)	Female (N=618)	Male (N=253)	<i>t</i> (869) <i>p</i>	Female (N=230)	Male (N=64)	<i>t</i> (292) <i>p</i>	Female (N=388)	Male (N=189)	<i>t</i> (575) <i>p</i>		
<b>ANPS</b>												
Mean Scale												
Seek	25.44 (5.07)	25.54 (4.63)	-.283	.777	25.77 (5.32)	26.16 (4.66)	-.533	.594	25.24 (4.91)	25.33 (4.62)	-.213	.831
Play	23.27 (5.49)	23.12 (5.62)	.346	.729	24.17 (5.77)	24.31 (5.80)	-.170	.865	22.73 (5.26)	22.72 (5.52)	.015	.988
Care	28.27 (5.43)	25.94 (5.43)	5.737	<.001**	28.75 (5.43)	25.45 (6.66)	4.080	<.001**	27.98 (5.42)	26.11 (4.96)	4.008	<.001**
Fear	25.48 (6.17)	23.35 (6.44)	4.567	<.001**	26.97 (5.90)	24.80 (6.01)	2.589	.010*	24.60 (6.17)	22.86 (6.52)	3.123	.002*
Anger	25.79 (6.18)	25.00 (6.47)	1.682	.093	26.69 (6.28)	25.91 (6.28)	.885	.377	25.25 (6.07)	24.69 (6.51)	1.010	.313
Sadness	22.07 (5.19)	20.78 (5.51)	3.289	.001*	23.29 (5.14)	21.34 (5.45)	2.640	.009*	21.35 (5.08)	20.58 (5.53)	1.655	.098

**Table 2 (continued)**

	All Participants (N= 871)				Young Adults (N= 294)				Adults (N= 577)			
	Mean Scale Scores (SD)	Female (N=618)	Male (N=253)	<i>t</i> (869)	<i>p</i>	Female (N=230)	Male (N=64)	<i>t</i> (292)	<i>p</i>	Female (N=388)	Male (N=189)	<i>t</i> (575)
<b>BANPS</b>												
Seek	21.69 (3.97)	21.52 (4.47)	.558	.577	21.54 (3.85)	21.92 (3.97)	-.707	.480	21.78 (4.04)	21.38 (4.63)	1.063	.288
Play	21.04 (4.43)	20.23 (4.49)	2.446	.015*	21.87 (4.15)	21.06 (4.83)	1.319	.188	20.55 (4.52)	19.94 (4.35)	1.527	.127
Care	14.71 (3.13)	14.12 (3.07)	2.507	.012*	15.10 (3.17)	13.94 (3.52)	2.544	.011*	14.47 (3.09)	14.19 (2.91)	1.054	.292
Fear	18.52 (4.17)	16.68 (4.29)	5.856	<.001**	19.46 (3.85)	17.78 (4.22)	3.025	.003*	17.96 (4.25)	16.31 (4.26)	4.372	<.001**
Anger	18.47 (4.54)	18.11 (4.69)	1.052	.293	18.80 (4.70)	17.97 (4.79)	1.247	.213	18.28 (4.45)	18.16 (4.67)	.292	.770
Sadness	18.91 (5.47)	17.75 (5.22)	2.897	.004*	19.55 (5.82)	18.75 (5.22)	.991	.322	18.54 (5.22)	17.41 (5.19)	2.448	.015*

\*  $p < .05$ , \*\*  $p < .001$



### Reliability Analysis

In order to examine the reliability of the Turkish version of BANPS, internal consistencies of the overall BANPS and its individual scales were calculated. The Cronbach's alpha value for the overall BANPS was calculated as .79, indicating that the scale has good internal reliability. Cronbach alpha values of BANPS scales ranged from .586 to .825 (See Table 3).

**Table 3**

Internal Consistency and Descriptive Statistics of BANPS Scales

Scale	<i>M</i>	<i>SD</i>	Number of Items	Cronbach $\alpha$
Seek	21.65	4.12	6	.657
Play	20.81	4.46	6	.723
Care	14.55	3.13	4	.586
Fear	17.99	4.28	5	.755
Anger	18.37	4.59	6	.640
Sadness	18.60	5.44	6	.825

### Validity Analyses

The validity of the Turkish version of BANPS was assessed by using two approaches: construct validity and criterion validity.

#### Construct Validity

The construct validity was examined by means of investigating inter-correlations between BANPS scales and executing explanatory and confirmatory factor analyses.

The results of these analyses are presented in Table 4, 5, 6.

**Table 4**

Intercorrelations for BANPS Scales (N= 873)

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1. Seek</b>					
All	-	.278**	.245**	.120**	.072*
Young Adults	-	.178**	.130*	.226**	.123*
Adults	-	.328**	.305**	.077	.047
<b>2. Play</b>					
All	.278**	-	.418**	.042	-.057
Young Adults	.178**	-	.434**	.053	-.010
Adults	.328**	-	.402**	-.002	-.090*
<b>3. Care</b>					
All	.245**	.418**	-	.137**	-.054
Young Adults	.130*	.434**	-	.151**	-.158**
Adults	.305**	.402**	-	.112**	.001
<b>4. Fear</b>					
All	.120**	.042	.137**	-	.351**
Young Adults	.226**	.053	.151**	-	.283**
Adults	.077	-.002	.112**	-	.384**
<b>5. Anger</b>					
All	.072*	-.057	-.054	.351**	-
Young Adults	.123*	-.010	-.158**	.283**	-
Adults	.047	-.090*	.001	.384**	-
<b>6. Sadness</b>					
All	<-.001	-.181**	-.016	.609**	.347**
Young Adults	.053	-.207**	.009	.561**	.255**
Adults	-.028	-.197**	-.045	.627**	.397**

**Table 5**

Factor Loadings and Communalities for Varimax (Orthogonal) Rotation Six-Factor Solution for BANPS Items (N= 873)

Scale	Item	Factor Loading						Communality
		1	2	3	4	5	6	
Seek	3			<b>.655</b>				.519
Seek	21							.126
Seek	25			<b>.641</b>				.467
Seek	28	<b>.652</b>						.575
Seek	31	<b>.752</b>						.618
Seek	33	<b>.661</b>						.486
Play	1		<b>.661</b>					.544
Play	9		<b>.338</b>					.172
Play	13		<b>.695</b>					.576
Play	19		<b>.664</b>					.552
Play	22		<b>.433</b>					.288
Play	29		<b>.456</b>					.291
Care	4		<b>.448</b>					.220
Care	14		<b>.318</b>					.193
Care	16							.203
Care	27		<b>.443</b>					.307
Fear	6				<b>.534</b>			.398
Fear	15						<b>.550</b>	.479
Fear	17				<b>.506</b>		<b>.330</b>	.457
Fear	23						<b>.493</b>	.434
Fear	30				<b>.385</b>			.326
Anger	2					<b>.341</b>	<b>.303</b>	.296
Anger	5							.157
Anger	11					<b>.729</b>		.609
Anger	20					<b>.670</b>		.518
Anger	24					<b>.389</b>		.321
Anger	26						<b>.414</b>	.316
Sadness	7				<b>.891</b>			.862
Sadness	8				<b>.855</b>			.823
Sadness	10						<b>.631</b>	.443
Sadness	12						<b>.561</b>	.512
Sadness	18						<b>.739</b>	.568
Sadness	32						<b>.768</b>	.674

Note. Factor loadings <.3 are suppressed.

**Table 6**

Confirmatory Factor Structure of BANPS

Scale	Item	Seek	Play	Care	Fear	Anger	Sadness
Seek	3	<b>.526</b>					
Seek	21	<b>.440</b>					
Seek	25	<b>.476</b>					
Seek	28	<b>.624</b>					
Seek	31	<b>.566</b>					
Seek	33	<b>.545</b>					
Play	1		<b>.642</b>				
Play	9		<b>.512</b>				
Play	13		<b>.668</b>				
Play	19		<b>.640</b>				
Play	22		<b>.586</b>				
Play	29		<b>.510</b>				
Care	4			<b>.471</b>			
Care	14			<b>.522</b>			
Care	16			<b>.565</b>			
Care	27			<b>.524</b>			
Fear	6				<b>.552</b>		
Fear	15				<b>.607</b>		
Fear	17				<b>.625</b>		
Fear	23				<b>.632</b>		
Fear	30				<b>.543</b>		
Anger	2					<b>.458</b>	
Anger	5					<b>.382</b>	
Anger	11					<b>.398</b>	
Anger	20					<b>.403</b>	
Anger	24					<b>.421</b>	
Anger	26					<b>.419</b>	
Sadness	7						<b>.665</b>
Sadness	8						<b>.654</b>
Sadness	10						<b>.592</b>
Sadness	12						<b>.612</b>
Sadness	18						<b>.590</b>
Sadness	32						<b>.653</b>

Note. Factor loadings <.3 are suppressed.

### Criterion Validity

In order to assess criterion validity, the correlations between scales of ANPS and BANPS and ANPS and BANPS scales' correlations with external measures (BFI, PANAS, ERQ) were examined.

All participants' mean scores in each scale of the original form (ANPS) and brief form (BANPS) were calculated to compare the correlations between the scales. Table 7 demonstrates all correlations between the two scales.

The results of the between-scale correlations indicated strong correlations for Play, Fear, Anger, and Sadness scales, as well as moderate correlations for Seek and Care scales between ANPS and BANPS.

**Table 7**

Correlations Between the Scales of BANPS and ANPS for All Participants (N=873)

		BANPS					
		Seek	Play	Care	Fear	Anger	Sadness
ANPS	Seek	.581**	.238**	.238**	.016	.049	-.108**
	Play	.209**	.685**	.386**	-.077*	-.092**	-.273**
	Care	.179**	.273**	.552**	.150**	-.017	.052
	Fear	.048	-.064	.050	.729**	.387**	.563**
	Anger	.134**	.041	.031	.376**	.723**	.329**
	Sadness	-.042	-.082*	.056	.561**	.364**	.711**

\*  $p < .05$ , \*\*  $p < .001$ .

In terms of the Young Adult sample, the computed correlations between ANPS and BANPS scales yielded strong correlations for Play, Fear, Anger and Sadness scales and moderate correlations for Seek and Care scales. Table 8 shows all correlations between ANPS and BANPS scales.

**Table 8**

Correlations Between the Scales of BANPS and ANPS for Young Adult Participants (N=296)

		BANPS					
		Seek	Play	Care	Fear	Anger	Sadness
ANPS	Seek	.600**	.183**	.154*	.002	.033	-.138*
	Play	.174**	.731**	.396**	-.044	-.056	-.298**
	Care	.128*	.335**	.613**	.153**	-.085	.030
	Fear	.162**	-.046	.083	.690**	.350**	.469**
	Anger	.220**	.046	-.108	.291**	.717**	.252**
	Sadness	.048	-.087	.069	.506**	.249**	.719**

\*  $p < .05$ , \*\*  $p < .001$ .

When the correlations between ANPS and BANPS scales were computed for the Adult sample, the results showed strong correlations among Play, Fear, Anger, and Sadness scales and moderate correlations for Seek and Care scales. All of the correlations between ANPS and BANPS scales are presented in Table 9.

**Table 9**

Correlations Between the Scales of BANPS and ANPS for Adult Participants (N=577)

\*  $p < .05$ , \*\*  $p < .001$ .

		BANPS					
		Seek	Play	Care	Fear	Anger	Sadness
ANPS	Seek	.575**	.260**	.283**	.007	.055	-.102*
	Play	.231**	.654**	.372**	-.135**	-.122*	-.288**
	Care	.206**	.232**	.512**	.136**	.019	.055
	Fear	-.002	-.116**	.013	.733**	.406**	.604**
	Anger	.095*	.016	.095*	.399**	.728**	.359**
	Sadness	-.085*	-.118**	.031	.567**	.424**	.700**

Correlations between BANPS and the subscale scale scores of BFI, PANAS, and ERQ were calculated for all samples. Table 10, 11 and 12 shows the results of these correlations.

**Table 10**

Correlations Between BANPS Scales and BFI, PANAS, and ERQ Scales for All Participants (N= 873)

Scale	BANPS					
	Seek	Play	Care	Fear	Anger	Sadness
<b>BFI</b>						
Extraversion	.177**	.474**	.321**	-.201**	-.046	-.312**
Agreeableness	.032	.256**	.410**	-.138**	-.388**	-.221**
Conscientiousness	.182**	-.040	.111**	-.182**	-.131**	-.277**
Neuroticism	.003	-.153**	-.048	.533**	.545**	.583**
Openness Experience	.489**	.215**	.174**	.015	.009	-.035
<b>PANAS</b>						
Positive Affect	.282**	.235**	.214**	-.212**	-.060	-.302**
Negative Affect	-.006	-.114**	-.006	.492**	.406**	.546**
<b>ERQ</b>						
Reappraisal	.082*	-.003	-.134**	-.147**	-.193**	-.073**
Suppression	.144*	.096**	-.043	-.133**	-.222**	-.117**

\*  $p < .05$ , \*\* $p < .001$

**Table 11**

Correlations Between BANPS Scales and BFI, PANAS and ERQ Scales for Young Adults (N= 296)

<b>BANPS</b>						
Scale	Seek	Play	Care	Fear	Anger	Sadness
<b>BFI</b>						
Extraversion	.098	.537**	.366**	-.131*	.006	-.263**
Agreeableness	-.077	.279**	.477**	-.091	-.463**	-.200**
Conscientiousness	.188**	-.076	.144*	-.078	-.126*	-.275**
Neuroticism	.056	-.218**	-.074	.491**	.506**	.603**
Openness Experience	to .564**	.163**	.157**	.049	.046	-.052
<b>PANAS</b>						
Positive Affect	.237**	.209**	.175**	-.171**	-.018	-.309**
Negative Affect	.106	-.157**	-.114	.410**	.357**	.527**
<b>ERQ</b>						
Reappraisal	.139*	-.048	-.128*	-.077	-.097	-.026
Suppression	.165**	.050	-.032	-.063	-.125*	-.107

\*  $p < .05$ , \*\* $p < .001$



**Table 12**

*Correlations Between BANPS Scales and BFI, PANAS and ERQ Scales for Adult Participants (N= 577)*

	<b>BANPS</b>					
Scale	Seek	Play	Care	Fear	Anger	Sadness
<b>BFI</b>						
Extraversion	.214**	.461**	.304**	-.227**	-.072	-.336**
Agreeableness	.088*	.262**	.379**	-.151**	-.342**	-.227**
Conscientiousness	.184**	.013	.115**	-.194**	-.126**	-.257**
Neuroticism	-.020	-.159**	-.052	.533**	.566**	.567**
Openness to Experience	.456**	.248**	.187**	.007	-.008	-.023
<b>PANAS</b>						
Positive Affect	.307**	.276**	.251**	-.213**	-.078	-.286**
Negative Affect	-.057	-.123**	-.056	.515**	.430**	.549**
<b>ERQ</b>						
Reappraisal	.059	.018	-.139**	-.180**	-.239**	-.098*
Suppression	.136**	.109**	-.055	-.178**	-.272**	-.132**

\*  $p < .05$ , \*\* $p < .001$

## **DISCUSSION**

The aim of the present study was to adapt the BANPS to Turkish culture. For this purpose, the reliability and validity of the Turkish version of BANPS were assessed by adhering to the methods outlined in the original BANPS study (Barrett et al., 2013) and the Turkish adaptation study of the ANPS (Özkarar-Gradwohl et al., 2014). Additionally, since this study was executed with 873 participants with a broader age range (18-65 years) than the original study, which was conducted only with undergraduate students, the majority of the analyses carried on for three samples: all participants (18-65 years), young adults (18-25 years), which corresponds to the sample used in the original study, and adults (26-65 years).

The relationship between the age of the participants and their ANPS and BANPS scale scores presented that as the age increases, the scores on the Play, Fear, Anger, and Sadness scales tend to decrease. The literature on the issue of the relationship between age and ANPS scales is quite scarce since the studies with ANPS scales were mostly conducted with university students. Even though there are some studies conducted with broader age groups (Geir, 2014; Orri, 2016), these studies generally do not focus on the relationship between the age of the participants and the scale scores. However, findings from the present study can be viewed as compatible with the Turkish standardization study of the ANPS (İçöz, 2012; Özkarar-Gradwohl et al., 2014), in which the obtained scores depicted to differ between student and adult samples in favor of the students in Play, Seek, Fear, Anger and Sadness scales. In addition, even though their study sample consisted only of university students, Deris and colleagues (2016) also reported significant negative correlations between participants' age and their scores on the Care, Fear, and Sadness scales in ANPS.

In terms of gender differences, among all participants, females appear to be having significantly higher scores on the ANPS scales of Care, Fear, and Sadness. In BANPS, in addition to the Care, Fear, Sadness scales, the Play scale also implicated gender differences, with women scoring higher than men. In the young adult sample, females seem to be experiencing significantly higher levels of Care, Fear, and Sadness in ANPS, just as depicted in all participant samples. In contrast, females scored higher only on Care and Fear in BANPS, showing that the number of scales with significant gender differences decreased in young adults compared to all participants, unlike the ANPS. Concerning the adult sample, female participants were shown to be getting significantly higher scores than males in the Care and Fear scales of ANPS and Fear and Sadness

scales of BANPS. Since none of these gender differences reached or exceeded the standard deviation value, they were considered modest gender effects.

Gender differences found in the ANPS were in conformity with the literature (Cwojdzńska and Rybakowski, 2016; Geir et al., 2014; Narita et al., 2017; Reuter et al., 2017). Although the standardization study of the Turkish version of ANPS reported significant differences additionally for the Play scale and considered this difference “culture-specific,” the current study showed a significant gender effect in Play only in the BANPS. Similarly, Geir and colleagues (2014) also revealed gender differences in the Play scale of BANPS, with women scoring higher, yet no significant gender differences were stated in the Play scale of ANPS.

Except for the Anger scale, findings of the present study in all participant samples were compatible with the original study of the BANPS in which modest but significant gender differences were reported in the Play, Care, Fear, Anger, and Sadness scales, in the female direction.

As in the Turkish version of ANPS, the results of the present study pointed out significant gender differences for the Play scale in favor of females. Özkarar-Gradwohl and Turnbull (2021) suggested that the gender differences on the Play scale seem to be specific to the culture without showing an evident pattern across western/eastern countries, and the Play scale should be considered together with its intercorrelation with other scales. Both in the present study and Turkish ANPS, the Play showed its strongest correlation with Care, and both scales revealed a gender difference in the direction of women. Considering both Play and Care affects involve being in a relationship with someone else, namely having fun in social interactions as in Play or showing affection and giving care for someone as in Care, these gender differences might be associated with women having more collectivistic tendencies than men in the Turkish culture (Dirilen-Gumus and Buyuksahin-Sunal, 2012; Yetim, 2003).

In regard to individual scales of the Turkish version of BANPS, Cronbach’s alpha values of the individual scales found to be in range of .59 and .83. These reliabilities shown to be comparable to the results of the original BANPS study (Barrett et al., 2013). In the present study, the Seek, Play, Care, and Anger scales’ reliability coefficients were below the values obtained in the original BANPS study and thus needed to be improved. Barrett et al. (2013) asserted that the individual BANPS scales exhibited enhanced reliabilities relative to ANPS (in which alpha reliabilities were in the range .65 and .85) (Davis et al., 2003). Likewise, excluding Care, results of the

present study obtained for primary dimensions of BANPS indicated better reliability compared to the Turkish version of ANPS (where Cronbach's alphas were between .55 and .73).

With respect to inter-scale correlations, positive scales (Seek, Play and Care) were shown to be significantly and positively correlated with each other, and negative scales (Fear, Anger, Sadness) also displayed significant positive associations with each other in BANPS. These obtained intercorrelations among positive and negative scales replicated the patterns in the original ANPS and BANPS studies, and this pattern was confirmed in the various studies suggesting there might be cross-culture commonality of the higher-order factor (as positive affect and negative affect) structure of the scale (Abella et al., 2011; Amiri and Azad-Marzabadi, 2017; Geir et al., 2014; Giacolini et al., 2017; Montag et al., 2017; Narita et al. 2017; Özkarar-Gradwohl et al., 2014; Pahlavan et al., 2008; Pingault et al., 2012; Reuter et al. 2017).

Explanatory factor analyses of the Turkish version of the BANPS were conducted in accordance with the methodology outlined in the original BANPS study (2013). Firstly, a factor analysis was carried out to investigate whether or not the scale reflects its theoretical basis. Accordingly, the factor structure of the scale was explored with selecting a 6-factor solution so that the items could be loaded onto the factors that are expected to reflect affective dimensions on a theoretical basis. Additionally, since the item-total correlation coefficient was suggested to be above the cut-point of .30 (Field, 2003; Kline, 2011) to be considered acceptable, values below .30 were suppressed in the factor analysis. Since some items were found to be loaded on the other factor that has a high correlation with the intended factor instead of the target factor in this explanatory factor analysis, further confirmatory factor analysis executed with cross-loadings of the items onto non-intended factors were set to zero in the model. When items are loaded only on their primary factors, the item-total correlations of all items were shown to be above .30, and the factor loadings were increased compared to the loadings computed in explanatory factor analysis. Consequently, the factor structure of the Turkish version of BANPS was found to be parallel to the factor structure of the original BANPS.

The correlations between the scales of ANPS and BANPS were examined for all participants, young adults, and adults. Correlations between ANPS and BANPS for each scale yielded moderate to strong correlations ( $r$  values ranging between .51 to .73) for all samples. Although the correlations between forms were shown to be greater ( $r =$

.73 to .92) in the original BANPS study compared to the present study, the researchers stated that the calculated between-form reliabilities possibly overinflated due to the fact that BANPS scores were computed via selecting some items from the same ANPS form (Davis and Panksepp, 2011). Therefore, it can be advocated that the between-forms correlations for individual scales of ANPS and BANPS are expected to be lower in studies that present ANPS and BANPS separately (such as the present study) compared to the values depicted in the original study and accept the between-forms reliabilities set forth in the original study as the expected values would not be safe to make inferences.

Starting from the construction of the first ANPS scale (Davis et al., 2003), the individual variations in the primary affective systems assessed through ANPS scales have been reliably shown to be associated with Big Five personality factors (Marengo et al., 2021). In the present study, in line with the original ANPS and BANPS studies, the highest correlations were found between Play and Extraversion, Seek and Openness to Experience, Care and Agreeableness, Fear, Anger and Sadness, and Neuroticism.

The expected relationships between BANPS and PANAS scales were upheld in all samples with detected positive correlations between positive scales of BANPS and Positive Affect (PA) as well as negative scales of BANPS and Negative Affect (NA). When comparing the original study, the strength of the correlations we obtained between positive BANPS scales and PA was found to be very close to the original study, while the correlation strength between negative BANPS scales and NA was shown to be increased compared to the original study.

The relationships between ERQ and BANPS scales yielded complicated results for all samples in the present study. In the original study, predicted relationships between ERQ and BANPS were confirmed with positive correlations between positive BANPS scales and Reappraisal and between negative BANPS scales and Suppression (Barrett et al., 2013). However, the findings of the present study failed to reflect this pattern. These contradicting and complicated results might be explained by the fact that the emotion regulation strategy people use depends on several variables, such as cultural background, other than individual tendencies (Ramzan and Amjad, 2017). Therefore, findings in the present study that contradict the original study on the relationship between BANPS and ERQ scales might be, at least partly, related to the fact that the sample of the present study reflected emotion regulation practices in a collectivistic culture, whereas the original study reflected those in the individualistic culture.

## **CONCLUSION**

Bringing Turkish version of the Brief Affective Neuroscience Personality Scales to the literature would both accelerate and make important contributions to future genetic, neuroimaging, clinical and behavioral studies aimed at investigating primary affective systems in humans. The fact that Turkish BANPS can be applied more quickly and has strong psychometric properties make the usage of this scale more advantageous than ANPS especially in multi-stage genetic and neurobiological studies and studies conducting with using several scales.

There are also several limitations of the present study. The main limitation of this study is the possible decline in the quality of the collected data for subsequent items in the questionnaires due to respondent fatigue (Hess et al., 2012). Since the number of items in the total survey is over 200, it seems very likely that the reliabilities of the results might have decreased because of the respondent fatigue phenomenon. Therefore, we believe that the validity and reliability values of Turkish BANPS will be found higher in future studies conducted using fewer scales.

Since the present study was conducted only with the non-clinical sample, further studies conducted with inpatient and outpatient clinical samples are needed to prove the usability of Turkish BANPS for clinical purposes.

The overall examination of the reliability and validity analyses demonstrated that Turkish BANPS is a reliable and valid tool to utilize in assessing individual differences in primary affective systems in the Turkish non-clinical young adult and adult populations. The Turkish version of BANPS generally managed to replicate the findings presented in the original BANPS study.

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