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Developing a Turkish adaptation of the connectedness to nature scale

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ABSTRACT

The aim of this study was to adapt the Affective, Behavioural, and Cognitive Connectedness to Nature Scale (ABC-CNS), which was developed by Cuadrado et al. (2022) and focuses on the affective, behavioural and cognitive components of the interrelationships between knowing, feeling and doing towards the natural environment, into Turkish conditions. The linguistic equivalence study of the scale was conducted by using the final Turkish form and the English forms, and was conducted using to 45 English teachers all of whom were native Turkish speakers and proficient in English. The collected data were analysed t using the hrough dependent samples *t* test, and no significant differences were found between the responses of the respondents to the Turkish and English forms (p<.01). In the next stage, for the purpose of validity and reliability, the Turkish form was administered to 300 participants aged 18 and over from different regions and various occupational groups in Turkey. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted as part of validity and reliability studies. According to the results of the factor analysis, it was concluded that the adapted scale in Turkish is a valid scale with three dimensions, which are intrinsic to the original structure of the instrument. The internal consistency reliability of the scale was calculated through Cronbach Alpha and reached 0.90. The adapted ABC Connectedness to Nature Scale (ABC-CNS) is a valid and reliable scale that can be used to reveal the cognitive, affective and behavioural aspects of the connection between Turkish living adults and nature.

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Introduction

Although humans are inherently dependent on natural resources (Tam, 2013), the dramatic increase in urbanisation (United Nations Department of Economic and Social Affairs, 2018) has resulted in people spending less time in nature than ever before (Leung et al., 2022). The relationship between humans and nature is characterised by mutual interaction and endures throughout a lifetime (Özalemdar, 2021). The rising demands of an increasing population, driven by scientific and technological advancements, have led to excessive and unmindful exploitation of natural resources, consequently disrupting ecological balance and causing regional and global issues that affect humanity (Köğce et al., 2008). The radical changes necessary for a sustainable future, with the interrelationship between climate change, depletion of natural resources, and biodiversity loss, require

humans to establish a new relationship with nature (Ives et al., 2018). Rethinking the human-nature relationship is seen as a leverage point for sustainability by many researchers (Folke et al., 2011) and is identified as a significant area of research (Fischer and Riechers, 2019). Therefore, establishing a new relationship with nature requires interventions and approaches that can bring about large-scale changes across complex systems (Richardson et al., 2020).

The conceptualization of nature among humans are influenced by their physical interactions with natural environments and by whether they reside in an urban or rural setting, which subsequently shape their understanding of nature encounters (Faruhana et al., 2022). The relationship between humans and nature, mirroring the interdisciplinary field of sustainability science, has become a shared research area for psychologists, environmental psychologists, ecologists, sociologists, educators and scientists from various fields (Tam, 2013; West et al., 2020). This is because the boundaries of the human-nature relationship are not fully defined, and therefore, a more comprehensive understanding can be achieved through an interdisciplinary approach to the issue (McMichael et al., 2003).

Literature Review

In recent years, environmental psychologists have shown interest in the concept of "Connectedness to Nature "as it defines the human-nature relationship and is believed to play an important role in mitigating the environmental crisis (Tam, 2013). Connectedness refers to the extent to which individuals include nature in their cognitive representation; connectedness to nature is a multidimensional psychological construct (Harvey et al., 2020). Connectedness to nature represents an individual's experiential sense of connection to the natural world, reflected in an affective or cognitive perspective (Mayer and Frantz, 2004), and it is also a significant predictor of environmental behaviour (Whitburn et al., 2020). Connectedness to nature is important for both the psychological well-being of individuals and the increase in pro-environmental behaviours (Richardson et al., 2020) because when individuals feel connected to nature, they recognise that harming nature ultimately harms themselves (Mayer and Frantz, 2004; Nisbet et al., 2009).

Schultz (2002) identifies three core structural components, namely connectedness, caring and commitment, to understand the human-nature relationship. Connectedness is considered cognitive, caring is affective, and commitment is behavioural. Based on this definition, human-nature connectedness appears to be a subjective construct consisting of at least three interrelated dimensions: cognitive (knowledge and beliefs about nature), affective (feelings and emotions towards nature), and behavioural (actions and experiences in nature) (Nisbet et al., 2009; Zylstra et al., 2014; Whitburn et al., 2020).

In the early 2000s, empirical research on measuring human-nature relationships and investigating factors that influence this relationship increased, leading to the development of various scales. Schultz (2002) introduced the concept of "Inclusion of nature in self"(INS), Clayton (2003) proposed "Environmental identity"(EI), Mayer and Frantz (2004) developed the "Connectedness to nature"(CTN) scale, Miller and Johnson (2008) focused on motivation for change, Davis et al. (2009) examined "Commitment to nature"(CON), Nisbet et al. (2009) explored "Nature relatedness"(NR), Perkins (2010) studied love and care for nature, Milfont and Duckitt (2010) developed the "Environmental Attitude Inventory," and Barnes et al. (2021) created the "Nature Connectedness Parental Self-Efficacy Scale," among others. Reviewing the literature, it can be observed that there are two scales have already been adapted for use in the Turkish context: the "Nature Relatedness Scale" by Çakır et al. (2015) and the "Connectedness to Nature scale "by Bektaş et al. (2017), which is an adaptation of the scale developed by Mayer and Frantz (2004). These scales are intended to measure emotional attachment and connections derived from experiences with nature. Their adaptation for the Turkish context involved not only linguistic translation but also necessary contextual modifications to ensure both cultural and contextual relevance. However, no comprehensive scale has been identified that examines the human-nature relationship in its affective, behavioural and cognitive dimensions.

To maintain a sustainable relationship with nature, it is important to ensure the well-being of the environment itself. However, environmental issues both globally and in Turkey are compromising this state of well-being. Climate change (Sıygın and Afacan, 2020; Şen, 2022), global warming (U.S. Global Change Research Program, 2023), air pollution, depletion of natural water resources (Şen, 2022; Yüzüak and Erten, 2022), water pollution (iklimin.org, 2020; Yümün et al., 2023), drought (Erdem and Bilgili, 2023), waste management issues (Kizioğlu, 2023), mass migration (Karagözoğlu, 2020), and unplanned urbanisation (Kutsal and Polatoğlu, 2023) are among the environmental problems affecting the natural environment in Turkey due to its geological location, climate characteristics, and structure, leading to a higher occurrence rate (Öztürk and Ünlü, 2022; Şen, 2022; Yüzüak and Erten, 2022). In addition, both human-induced and natural disasters such as earthquakes, landslides and forest fires also cause harm to the environment (Çelik et al., 2020).

Turkey is considered one of the countries at risk in terms of the potential impacts of global warming, as highlighted in international publications and reports (Climate Change, 2007). According to the Köppen-Geiger method widely used for climate classification worldwide, Turkey has approximately 18% of its land characterised by arid climates (Öztürk and Ünlü, 2022). As a result of a global temperature increase of 1 °C, it is anticipated that the arid zones will shift about 250 km to the north, making Turkey one of the most affected countries (Şen, 2022; UNEP, 2020). Additionally, due to increasing drought and decreasing natural water resources, it is expected that Turkey will become one of the water-stressed countries by 2050 (Turan, 2018). In terms of living dynamics, it is evident that these impacts will not be limited to the natural environment alone but will also adversely affect all areas that humans are dependent on, such as the economy, agriculture, industry, tourism, food production, livestock and social life (iklimin.org, 2020).

According to research, environmental insensitivity and lack of education are identified as the primary causes of environmental problems in Turkey (Karagözoğlu, 2020). Consequently, fostering conscious awareness and responsibility toward the environment among all members of society is imperative (Kiziroğlu, 2023). This underscores the critical need for comprehensive nature education, as emphasised by Özata-Yücel and Özkan (2014), to equip individuals with the knowledge, attitudes and awareness necessary for addressing environmental challenges and promoting sustainable interactions with nature. Positive environmental change can only be achieved when individuals modify their behaviour and adopt lifestyles that benefit nature (Sıygın and Afacan, 2020). Thus, to sustain Turkey's development without compromising its biodiversity, it is crucial to educate society and promote conservation awareness, ensuring the preservation of nature and biodiversity for future generations (Tergenbayeva et al., 2023).

As for national studies conducted in Turkey, Çakır et al. (2015) measured individuals' attachment to nature by associating it with individuals' well-being in the "Relationship with Nature" scale adapted for use in Turkey by Çakır et al. (2015), while Bektaş et al. (2016) adapted the scale of attachment to nature and addressed attachment to nature in the dimension of emotional experience. In this context, there is no study that has adapted or developed the commitment to nature with affective, behavioural and cognitive dimensions into Turkish as a unity yet.

The studies conducted internationally to develop scales aiming to describe the human connection to nature examined individuals' attachment to nature; Mayer and Frantz (2004)'s Connectedness to Nature Scale (CTS), Dunlap et al. (2000)'s The new environmental paradigm (NEP) scale, Nisbet and Zelenski (2009)'s connectedness to nature scale, the self-concept and the individual's relationship with the environment, and Navarro et al. (2017)'s connectedness to nature as a sense of belonging to the natural world. When the scales in the literature are examined, it is seen that the dimensions of each of them take into account cognitive and affective characteristics in different ways. However, there is a need to develop a more holistic scale that includes affective, behavioural and cognitive dimensions (Sevillano, et al. 2017). The A(affective)-B(behavioural)-C(cognitive) Connectedness to Nature Scale (ABC-CNS), which was developed by focusing on this need and focuses on 3 dimensions: affective, behavioural and cognitive, considering the balance of the

relationship between knowing, feeling and doing, is suitable for cognitive, affective and behavioural assessments of individuals' attachment to nature (Cuadrado et al., 2022).

Given Turkey's status in the current "global alarm"situation, the adaptation of the holistic scale developed by Cuadrado et al., 2022 for Turkish use is considered an urgent need to reveal the connection between Turkish individuals and nature and plan individual and social change steps accordingly. This is because strengthening the human-nature connection requires first understanding how individuals feel in nature and defining their relationship with nature (Ives et al., 2018).

Aim and Objectives of the Study

The primary aim of this study is to adapt the ABC (Affective-Behavioural-Cognitive) Connectedness to Nature Scale (ABC-CNS), developed by Cuadrado et al. (2022), for use in the Turkish context. Specifically, the study seeks to evaluate the linguistic equivalence of the ABC-CNS in Turkish, ensuring that the scale retains its conceptual integrity after translation and adaptation. Additionally, the study aims to assess the psychometric validity of the adapted ABC-CNS among Turkish-speaking individuals, examining its reliability and consistency across the affective, behavioural, and cognitive dimensions of nature connectedness.

Methods

This section provides information about the research sample, the process of obtaining permission and translation, the data collection instruments utilised, the implementation process, and the statistical analyses performed on the collected data.

Research Model

The objective of this research was to perform a comprehensive examination of the validity and reliability of the adapted Turkish version of the ABC Connectedness to Nature Scale (ABC-CNS). To this end, a research design utilising a descriptive survey approach was employed. Descriptive survey research aims to provide a comprehensive understanding of a specific group's characteristics through the implementation of various data collection instruments, including interviews, questionnaires, and tests (Fraenkel and Wallen, 2009).

Study Group

This research consisted of two distinct study groups. The first study group used during the linguistic equivalence phase and consisted of a total of 45 individuals, including 32 females and 13 males, within the age range of 25 to 56. The second study group, utilized for the analysis of validity and reliability, comprised a total of 300 participants, with 206 females and 94 males, ranging in age from 18 to 56. The study sample was constructed using a convenience sampling method, as described by Fraenkel and Wallen (2009), where participants were selected based on their accessibility and willingness to participate in the study.

The demographic characteristics of the participants involved in the linguistic equivalence study are detailed in Table 1, while Table 2 provides the demographic details of the participants involved in the validity and reliability studies.

Table 1

Demographic information of participants involved in the linguistic equivalence study

		n	%
Gender	Female	32	71%
	Male	13	29%
Age	18-24	1	2%
	25-34	22	49%
	35-45	18	40%
	46-55	3	7%
	56 and above	1	2%
Fields of Study	English Language Teaching	41	91%
	Translation and Interpreting	4	9%
Educational Level	Bachelor's degree	24	53 %
	Master's degree	17	38%
	Doctorate degree	4	9%
Total		45	100,00%

Table 2

Demographic information of participants included in the validity and reliability study

		n	%
Gender	Female	206	68.67%
	Male	94	31.33%
Age	18-24	16	5.33%
	25-34	126	42.00%
	35-45	100	33.33%
	46-55	38	12.67%
	56 and above	20	6.67%
Occupation	Lawyer	3	1.00%
	Banker & Financial Specialist	4	1.33%
	Information Technology& IT Specialist	5	1.67%
	Civil Servant	1	0.33%
	Dentist	1	0.33%
	Doctor	26	8.67%
	Engineer	20	6.67%
	Academician & Instructor	16	5.33%
	Teacher	122	40.67%
	Marketing& Communication Specialist	11	3.67%
	Police	1	0.33%
	Other	90	30.00%
Educational Level	High School	30	10.00%
	Associate's degree	16	5.33%
	Bachelor's degree	130	43.33%
	Master's degree	97	32.33%
	Doctorate	27	9.00%
Total		300	100.00%

Data Collection Instruments

In this study, a 5-point Likert-type scale was used to collect data. The instrument consisted of three sections: an informed consent form, a demographic information form, and the ABC Connectedness to Nature Scale.

Demographic Information Form

This form, prepared by the researcher, included four questions addressing participants' gender, age, highest level of education completed, and occupation. Measurement Instrument: Characteristics of the Original Affective-Behavioural-Cognitive (ABC) Connectedness to Nature Scale (ABC-CNS).

The original version of the ABC (Affective-Behavioural-Cognitive)- CNS (Connectedness to Nature Scale) consists of a total of 15 items. Based on a three-dimensional framework rooted in the concept of attitudes, the ABC-CNS was developed to analyse individuals' level of affective, behavioural, and cognitive connectedness to nature. These dimensions include;

A: Affective- how individuals affectively perceive themselves in relation to nature,

B: Behavioural-their inclination to behave as a part of the natural world,

C: Cognitive- how they perceive themselves in terms of nature.

Correspondingly, the scale is divided into three factors or dimensions (affective, behavioural and cognitive) that form different aspects of an individual's relationship with the natural environment. Each of these factors consists of five items, evaluated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Regarding the item structure of the scale, three items were directly translated from other scales, six were adapted from previous scales, and the remaining six were newly created based on the intended purpose.

The study sample consisted of 1375 students, of whom 878 (63.9%) were Ecuadorian (age range = 18-45) and 497 (36.1%) were Spanish (age range = 18-49). Exploratory and confirmatory factor analyses were conducted to ensure the validity of the scale. Prior to conducting the exploratory factor analysis, the researchers assessed the suitability of the correlations for factor analysis using the Kaiser-Meyer-Olkin index (0.943) and Bartlett's test of sphericity ($\chi2 = 8931.093$; df = 105; $p < .001$). The results indicated that the correlations were suitable for exploratory factor analysis. As a result, three factors were identified, explaining 69.75% of the variance, and all items loaded appropriately onto their proposed dimensions. The cross-cultural invariance of the three-dimensional structure found in the exploratory factor analysis was tested using multi-group confirmatory factor analysis. The results were within statistically acceptable limits.

The factor loadings of the items in the scale ranged from 0.62 to 0.90. The reliability of the scale was assessed using Cronbach's alpha coefficients, ranging from .73 to .96, and H coefficients, ranging from .80 to .98, as recommended. These coefficients demonstrated acceptable levels of reliability for each of the three factors across all samples examined.

Implementation Process

To adapt the ABC Connectedness to Nature Scale (ABC-CNS) for Turkish conditions, an email was sent to Esther Cuadrado, the original scale developer and responsible author, to obtain permission for the adaptation.

The translation-back translation method was employed to translate the scale into Turkish. In the first stage, three experts proficient in the English language translated the scale into Turkish. One of the translators was an academic teaching English Translation at the university, while the other two had undergraduate degrees in English Language Teaching. In the second stage, the different translations were compared, and areas of discrepancy were identified. The translators were brought together to reach a consensus on the items with discrepancies. In the third stage, the final version of the translated form was presented to a Turkish language expert proficient in both English and Turkish for evaluation. The final Turkish version of the form was sent to three different experts, specialising in

English Language and Literature and Translation and Interpretation, to re-translate the form into English. The re-translated English form was then sent to an expert proficient in English and knowledgeable in Turkish for review, with minor adjustments made to 1-2 words. Thus, both forward and backward translation methods, which are necessary to ensure language validity in scale adaptation studies (Boztunç Öztürk, et al., 2015), were completed separately in this study.

The English and Turkish versions of the scale were administered to a group of English teachers using Google Forms, with a one-week interval between administrations. The correlation analysis conducted on the data obtained from the administration revealed a statistically significant relationship, indicating that the responses given to the Turkish and English forms were associated. In this context, the final version of the Turkish form was prepared to be administered digitally on Google Forms. The form was administered to 300 participants aged 18 and above, representing a diverse range of professional and academic backgrounds from various cities across Turkey, over a 15-day period in April 2023. After the completion of the administration, the collected data were subjected to data analysis.

Data Analysis

Before conducting the validity and reliability analyses of the scale, data accuracy, minimum-maximum values, and missing data analysis were performed. Based on these analyses, no missing data was found, and the validity and reliability analyses were conducted using the responses of the 300 participants.

In adaptation studies, although exploratory factor analysis (EFA) is generally used for scale development studies, it can also be used to test whether the original item interpretations do not alter in the process of translation into a new language (Seçer, 2015). EFA and CFA can be used together in scale adaptation studies, the purpose of which is to confirm the latent construct identified by EFA (Osborne & Fitzpatrick, 2012). In scale adaptation studies, CFA also checks the model fit between the factor structures of the original version and the translated version (Seçer, 2015). Sousa and Rojjanasrirat (2011) listed verifying the factor structure as the sixth step in scale adaptation studies and determining the model fit as the seventh step. Therefore in this study Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to determine the construct validity by analyzing the collected data. The SPSS and AMOS software packages were used for data analysis. For the reliability analysis, the Cronbach's alpha reliability coefficients of the sub-dimensions of the model obtained from the EFA and CFA results were examined.

Ethical Considerations

In accordance with research and publication ethics principles, all participants in the study were provided with necessary information regarding the purpose of the research, and voluntary participation was ensured. Personal information that could reveal the identities of the participants was not requested. The analysis, interpretation, and reporting of these data were conducted in accordance with ethical principles. The entire process was completed within the framework of the document numbered 20230402014, dated 05.04.2023, obtained from the Yildiz Technical University Ethics Committee to facilitate the execution of the research.

Findings

Linguistic Equivalence Findings

To test the linguistic equivalence of the scale, the English version of the scale was administered first, followed by the Turkish version. The results of the correlation analysis for the total scores obtained from the scales indicate a near-perfect positive correlation between the English and

Turkish forms of the scale (r = .95, p < .01). The results of the correlation analysis are presented in Table 3.

Table 3

Item total correlation analysis between the English and Turkish versions of the scale

	N	p	r
Turkish Version			
English Version	45	0.00*	.95

Note. p <.01

To determine whether there was a statistically significant difference between the Turkish and English items of the scale, a paired samples t-test was conducted. The results showed that there was no statistically significant difference between the mean scores of the original English items and the Turkish items [t(45) = 2.103, p < 0.01]. This indicates that the ABC Connectedness to Nature Scale (ABC-CNS) meets the condition of linguistic equivalence. The results of the paired samples t-test analysis are illustrated in Table 4.

Table 4

Results of the Dependent Samples t-Test Analysis Examining the Relationship between Turkish and English Scale Items

	N	X̄	Ss	Sd	t	p
Turkish Version	45	59.89	10.63			
English Version	45	58.73	11.57	44	2.10	0.41

Note. p<.01

Findings Regarding Validity

To test the construct validity of the ABC Connectedness to Nature Scale (ABC-CNS) and confirm the structure of the original scale, exploratory and confirmatory factor analyses were conducted.

Exploratory Factor Analysis

Exploratory factor analysis is an analysis that uses the relationships between items in the measurement tool to identify appropriate factors (Osborne and Fitzpatrick, 2012). The Kaiser-Meyer-Olkin (KMO) coefficient was calculated and the Bartlett's test of sphericity was performed to assess the suitability of the data for factor analysis. The results are provided in Table 5.

Table 5

Results of KMO coefficient and Bartlett's test

KMO Coefficient		.87
Bartlett Test		
	Approx. Chi-Square ($\chi2$)	2181,266
	df	105
	Sig.	.000*

Note. p<0.001

When examining the values in the table, it can be seen that the KMO coefficient is within acceptable limits (1.00 ≥ KMO ≥ 0.70) and the Bartlett's test of sphericity is statistically significant at p = .00 (p < .05) level. These results indicate that the data is assumed to come from multivariate normal distribution and is suitable for factor analysis (Field, 2009).

During the exploratory factor analysis, a minimum item loading value of .30 was considered to identify the items that should not be included in the adapted scale but were present in the original scale (Pallant, 2005). Additionally, a minimum difference of .10 between factors was considered to avoid overlapping items in the scale (Büyüköztürk, 2015). Eigenvalues and percentage of variance were utilized to determine the number of factors that could reveal the relationship between the items in the construct validity, and a direct oblimin rotation method was used for factor rotation. In the oblique rotation method, which is used when factors are correlated (Büyüköztürk, 2015), the pattern matrix represents the relationship between the observed variables and the factors (Tabachnick and Fidell, 2012). In this sense, the pattern matrix table was examined to identify the items within the factors. Furthermore, the eigenvalues table was checked for total scores with eigenvalues of 1.0 and above. As a result of the analysis, three factors were obtained. It was found that, similar to the original version, the Turkish form of the scale also comprises three factors. These factors were labelled as Cognitive, Affective, and Behavioural to align with the corresponding dimensions of the adapted scale.

Table 6

Eigenvalues and explained variance ratios of the emerged factors

Factor (F)	Eigenvalue	Explained Variance %	Cumulative %
Cognitive (F1)	6,14	40,93	40,93
Affective (F2)	1,67	11,11	52,04
Behavioural (F3)	1,26	8,42	60,46

The scale with three factors explains a variance ratio of 60.46%. The factor loadings of the obtained factors are summarized in Table 7.

Table 7

EFA results of ABC Connectedness to Nature Scale

Items	Factor Communalities	Factor 1 (Cognitive)	Factor 2 (Affective)	Factor 3 (Behavioural)
M1	0,670	0,839		
M2	0,674	0,878		
M3	0,681	0,778		
M4	0,649	0,716		
M5	0,578	0,717		
M6	0,576		0,637	
M7	0,606		0,771	
M8	0,618		0,542	
M9	0,625		0,660	
M10	0,395		0,668	
M11	0,392			0,486
M12	0,887			0,967
M13	0,369			0,503
M14	0,872			0,968
M15	0,476			0,558

As depicted in Table 7, when examining the factor loadings, it can be observed that the lowest factor loading is .48 and the highest loading is .96, indicating that all items load onto the three factors. Factor loadings between 0.30 and 0.59 indicate a moderate level of relationship, while loadings of 0.60 and above indicate a high level of relationship (Büyüköztürk, 2015).

Confirmatory Factor Analysis

To determine whether the three-factor structure obtained from exploratory factor analysis is confirmed, confirmatory factor analysis (CFA) was conducted using AMOS 23 software. For this analysis, the chi-square goodness-of-fit test, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), non-normed fit index (NNFI), root mean square residual (SRMR), and root mean square error of approximation (RMSEA) were examined. The values obtained were $\chi^2/df = 2.40$, CFI = .95, NNFI = .94, RMSEA = .068, and SRMR = 0.54. These values indicate that the three-factor structure of the scale is acceptable and provides valid results (Browne and Cudeck, 1993; Byrne, 2011; Kline, 2011). The significant values and levels of fit indices are listed in Table 8.

Table 8

Indices of fit related to CFA

Analysed Fit Indices	Perfect Fit Criteria	Acceptable Fit Criteria	Obtained Fit Indices	Result
χ^2/sd	$0 \leq \chi^2/sd \leq 2$	$2 \leq \chi^2/sd \leq 3$	2,40	Perfect Fit
GFI	$.95 \leq GFI \leq 1.00$	$.90 \leq GFI \leq 95$	.91	Acceptable Fit
AGFI	$.90 \leq AGFI \leq 1.00$	$.85 \leq AGFI \leq .90$	.88	Acceptable Fit
CFI	$.95 \leq CFI \leq 1.00$	$.90 \leq CFI \leq .95$	.95	Perfect Fit
NFI	$.95 \leq NFI \leq 1.00$	$.90 \leq NFI \leq .95$	.90	Acceptable Fit
NNFI	$.95 \leq NNFI \leq 1.00$	$.90 \leq NNFI \leq .95$	.94	Perfect Fit
RMSEA	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$	.068	Acceptable Fit
SRMR	$.00 \leq SRMR \leq .05$	$.05 \leq SRMR \leq .10$	.054	Acceptable Fit
PGFI	$.95 \leq PGFI \leq 1.00$	$.50 \leq PGFI \leq .95$	.65	Acceptable Fit

Based on the conducted confirmatory factor analysis in light of these data, it has been determined that all items in the factors are significant for their respective factors. The path diagram depicting the factor structure of the items can be seen in Figure 1.

Figure 1

Confirmatory factor analysis model for ABC Connectedness to Nature Scale (ABC-CNS)
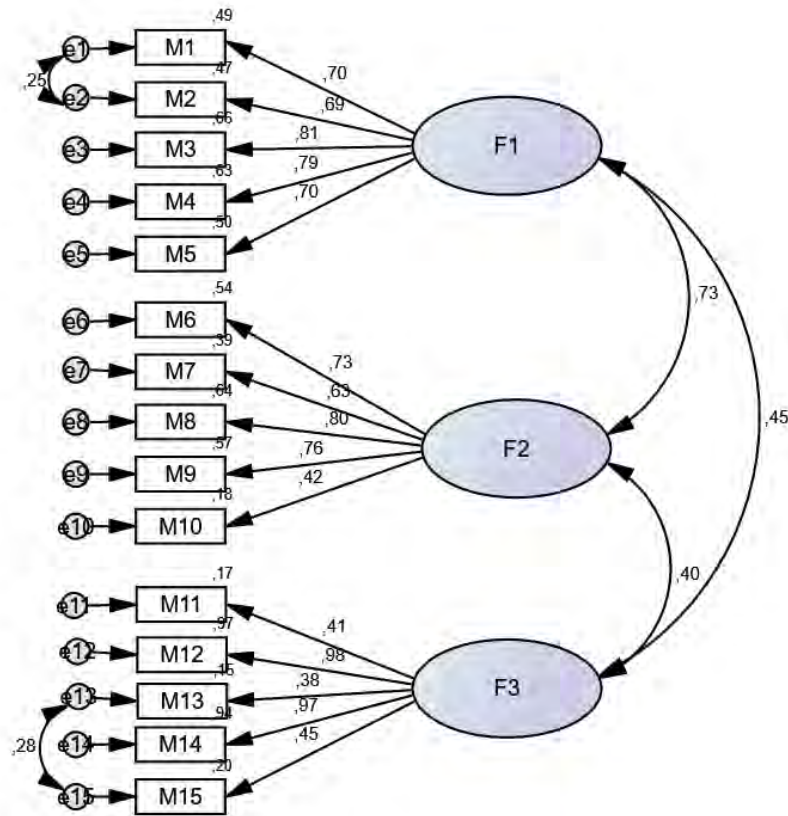
CMIN=204,209; DF=85; CMIN/DF=2,402; p=,000; RMSEA=,068; CFI=,948; GFI=,914

Reliability Findings

Internal Consistency (Cronbach's Alpha) Coefficients

In order to determine the internal consistency reliability of the scale, Cronbach's Alpha coefficients were examined for the overall scale and its sub-dimensions. The Cronbach's Alpha coefficient was found to be .87 for the Cognitive (F1) sub-dimension, .81 for the Affective (F2) sub-dimension, and .80 for the Behavioural (F3) sub-dimension. Additionally, the internal consistency coefficient for the entire scale was calculated as .90. The reliability calculations for the 15-item scale are displayed in Table 9.

Table 9

Reliability coefficients of ABC Connectedness to Nature Scale (ABC-CNS)

Cronbach's Alpha Coefficient		.90
Inter-Form Correlation		.84
Spearman-Brown Coefficient	Equal Length	.91
	Unequal Length	.91
Guttman Split-Half Coefficient		.91

Based on the Cronbach's Alpha coefficient value above .80, it can be concluded that the scale is highly reliable (Field, 2009).

Conclusion and Recommendation

In this study, the adaptation, validity, and reliability of the ABC Connectedness to Nature Scale (ABC-CNS), developed by Cuadrado et al. (2022), which examines the relationship between feeling, doing and knowing in nature through the three dimensions of affective, behavioural and cognitive aspects, were conducted in Turkish. After the translation of the scale into Turkish was completed, data obtained from the applications conducted with a group of 45 participants at two-week intervals revealed no statistically significant difference between the English and Turkish versions of the scale.

The validity and reliability studies of the research were carried out with a sample of 300 adults aged 18 and over from different cities and occupational groups in Turkey. Exploratory and confirmatory factor analyses were performed using the data obtained from this group. According to the results of the exploratory factor analysis, a three-factor structure consistent with the original scale was identified. The factor loadings of the items ranged from .48 to .96, and the items in the scale accounted for 60.46% of the variance. In the original scale, these three factors account for 69.75% of the variance, and the factor loadings range from .62 to .90 (Cuadrado et al., 2022). The three-factor structure of the scale was confirmed by the results of the confirmatory factor analysis. There were no reverse-scored items in the scale.

The internal consistency reliability studies conducted to determine the reliability coefficient of the ABC-CNS (ABC Nature Connectedness Scale) have shown that the Cronbach's Alpha coefficient is .90. In tests applied in social sciences, a reliability value of .70 and above is considered sufficient for the reliability of the scale (Büyüköztürk, 2015). Therefore, the Cronbach's Alpha reliability coefficient of the scale has been measured at an appropriate level.

Following the conducted analyses, it has been ascertained that the Turkish version of the ABC Connectedness to Nature Scale (ABC-CNS) is a valid and reliable instrument for measuring nature connectedness. The scale has demonstrated its utility as a tool suitable for use among Turkish adults aged 18 and above.

The global environmental challenges facing Turkey, including climate change, biodiversity loss, and environmental pollution, highlight the critical importance of fostering a stronger connectedness to nature (Şen, 2022). The ABC Connectedness to Nature Scale (ABC-CNS), adapted for the Turkish context, has proven to be a valuable instrument for assessing individuals' environmental awareness and their connection to nature (Perkins, 2010; Richardson et al., 2020). This scale plays a pivotal role in enhancing societal awareness of pressing environmental issues such as waste management and water scarcity. Moreover, it can be effectively utilized to inform the development of environmental policies and the implementation of localized solutions to ecological challenges (Kiziroğlu, 2023).

Additionally, the validity and reliability studies of the research were conducted on a sample of individuals from different cities and occupational groups in Turkey. This not only demonstrates the general applicability of the scale in Turkish culture but also shows that it yields reliable results among participants with different demographic characteristics.

Research indicates that the cultural context shapes individuals' environmental behaviors, emphasizing the importance of cultural appropriateness in the connectedness to nature scale (Schutz, 2002). The adaptation of the scale to Turkish culture not only helps understand connectedness to nature in Turkey but also provides a model for how similar adaptations can be made in different cultures. This can be a valuable resource for researchers working in cross-cultural environmental psychology and related fields.

For future studies, detailed methodological research on how the ABC Connectedness to Nature Scale can be adapted to different cultures and geographies can be encouraged. The Turkish adaptation of the scale has not only considered linguistic changes but also cultural and social differences, making the measurement universally relevant. This can guide international researchers who want to understand connectedness to nature in various geographical locations and perform similar adaptations. Furthermore, it opens the door to in-depth analyses on how the scale's societal change impacts and can enhance environmental awareness.

In conclusion, the adaptation of the connectedness to nature scale into Turkish is not only crucial for measuring individuals' levels of connectedness to nature but also serves as a key tool in informing and shaping environmental sustainability strategies. The scale provides a comprehensive framework for understanding how individuals relate to the natural environment, directly supporting Turkey's efforts to address pressing environmental challenges such as climate change, biodiversity loss, and resource depletion. This adaptation contributes to both the development of current environmental policies and the long-term sustainability needed to protect the natural environment for future generations.

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Appendix

Turkish Version of the ABC Connectedness to Nature Scale (ABC-CNS)

Boyutlar	Soru No	Sorular	Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
Bilişsel Boyut	1	Doğanın ayrılmaz bir parçasıyım.					
	2	Doğayla olan ilişkim kim olduğumun önemli bir parçasıdır.					
	3	Çevremdeki doğal dünya (insan eli değmemiş doğal güzellikler) ile bir bütünlük hissediyorum.					
	4	Kendimi doğaya ruhsal olarak bağlı hissediyorum.					
	5	Doğal dünyayı ait olduğum bir topluluk olarak görüyorum.					
Duyuşsal Boyut	6	Sadece doğada olarak bile mutlu hissediyorum.					
	7	Doğaya karşı derin bir sevgi hissediyorum.					
	8	Doğayla duygusal bir bağım vardır.					
	9	Doğada olduğumda mutlu ve evimde hissederim.					
	10	Doğa ile iç içe olmak bana huzur ve dinginlik verir.					
Davranışsal Boyut	11	Sık sık kırsal alanlara ya da doğaya çıkarım.					
	12	Doğada olduğum zaman onunla bütünleşirim.					
	13	Doğayı kendi parçammış gibi korurum.					
	14	Doğayı sık sık dinler ve izlerim.					
	15	Hayvanlara insanmış gibi davranırım.					