

Validity and Reliability Study of the Turkish Form of the Pro-Nature Conservation Behavior Scale

Doğa Yanlısı Davranış Ölçeği Türkçe Formunun Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

Objective: This study aims to adapt the Pro-Nature Conservation Behavior Scale, which was developed to identify pro-nature conservation behaviors, into Turkish.

Method: For the validity and reliability study, 371 participants were included in the study. The suitability of the scale for Turkish culture was tested with Confirmatory Factor Analysis (CFA).

Results: The scale, which consists of 18 items in total, has 4 sub-dimensions (Individual engagement, planting, collective engagement, wildlife). Overall Cronbach Alpha internal consistency coefficient of the scale was .85; .73 for the individual engagement factor, .86 for the planting factor, .71 for the collective engagement factor and .61 for the wildlife factor, and convergent validity was supported by positive correlations with the Environmental Behavior Scale, the New Ecological Paradigm Scale, the Generalized Self-Esteem Scale and the Warnick-Edinburg Mental Well-Being Scale.

Conclusion: Pro-Nature Conservation Behavior Scale is a valid and reliable measurement tool that can be used in Türkiye.

Keywords: Pro-nature behavior, pro-environmental behavior, nature conservation, scale, adaptation

ÖZ

Amaç: Bu çalışmanın amacı, doğa yanlısı davranışları belirleme adına geliştirilmiş olan Doğa Yanlısı Davranış Ölçeği'nin Türkçeye uyarlamasını yapmaktır.

Yöntem: Geçerlik ve güvenilirlik çalışması için 371 kişi çalışmaya dahil edilmiştir. İlgili ölçeğin Türk kültürüne uygunluğu Doğrulayıcı Faktör Analizi (DFA) ile test edilmiştir.

Bulgular: Toplamda 18 maddeden oluşan ölçeğin 4 alt boyutu (Bireysel Faaliyet, Bitki Ekimi, Kolektif Faaliyet, Yaban Hayatı) bulunmaktadır. Yapılan analizler neticesinde, ölçeğin genel Cronbach Alfa iç tutarlık katsayısının .85; bireysel faaliyet alt boyutunun .73, bitki ekimi alt boyutunun .86, kolektif faaliyet alt boyutunun .71 ve son olarak yaban hayatı alt boyutunun .61 olduğu bulunmuştur. Eş zamanlı geçerlilik Çevreci Davranış Ölçeği, Yeni Çevresel Paradigma Ölçeği, Genelleştirilmiş Özyetki Ölçeği ve Warnick-Edinburg Mental İyi Oluş Ölçeği ile pozitif korelasyonlarla desteklenmiştir.

Sonuç: Doğa Yanlısı Davranış Ölçeğinin Türkiye'de kullanılacak geçerli ve güvenilir bir ölçüm aracı olduğu saptanmıştır.

Anahtar sözcükler: Doğa yanlısı davranışlar, çevreci davranış, doğayı koruma, ölçek, uyarlama

Introduction

Humans have been in constant interaction with nature since the first day they appeared on the stage of history. This mutual interaction has sometimes resulted in consequences against humans and sometimes against nature. After the mid-20th century, the developing industrial and industrial sectors have increased the demand for manpower, which has paved the way for an increase in the global population and a greater need for natural resources (Ahuti 2015). With the increase in the human population at a rate that has not been seen very often in the historical stage, both the excessive and uncontrolled use of natural resources and the unconscious destruction of natural habitats have paved the way (Mittal and Gupta 2015). This process has forced people to live with climate change and global warming, one of the most important problems of today. Due to climate change, we are faced with disasters, severe droughts, rapid and widespread epidemics, famines due to the

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decrease in forestry/agricultural areas, and the extinction of many species due to the narrowing of ecological habitats (McMichael et al. 2006, Ciscar et al. 2011, Schäfer 2014). Humans are both the architect and the exacerbator of climate change due to reasons such as uncontrolled carbon emissions, conversion of natural areas into settlements, poaching, unconscious water use and excessive use of fossil fuels. Many studies in the literature underline that humans may face more destructive and irreversible global problems if non-climate-friendly attitudes continue (Easterling and Apps 2005, Mehta et al. 2022). In addition, some studies have emphasised the human need to be connected to the environment and suggested that this need can reduce human destruction of nature (Prévot et al. 2018).

People's need to be connected to the environment they live in and their attitudes towards nature have been studied by social scientists for nearly three decades (Barbett et al. 2020, Barrows et al. 2022). There is no clear picture of the conditions under which people act on behalf of nature and which factors push individuals to exhibit pro-nature behaviours (Çakır et al. 2015). In this context, environmental scientists have been conducting systematic studies for a long time in order to increase the pro-nature behaviours of individuals. In fact, there are research findings that individuals exhibit more protective attitudes the more knowledge they have about their environment and nature and the more close contact they have with nature (Arbuthnot 1977, Hines et al. 1987, Vining and Ebreo 1990, Zelenski et al. 2015). In contrast to these studies, another study conducted in Turkey shows that having environmental knowledge alone is not sufficient for environmentally friendly attitudes (Erten 2005). As a result of this inconsistency in the literature, research has been conducted on which variables affect attitudes towards the environment and the concept of 'Relatedness to Nature' has been put forward (Dunlap and Mertig 1995, Allen and Ferrand 1999, Kaiser et al. 1999, Nordlund and Garvill 2002). These studies brought a different direction to the field and tried to predict attitudes and behaviours by examining individuals' relationship with nature.

Pro-nature conservation behaviours include all behaviours that aim to support wildlife in local, regional, national or international areas and to protect our ecosystem in general (Barbett et al. 2020). All actions taken for this purpose are examples of pro-nature behaviours. Although they are clearly classified by definition, pro-nature behaviours can sometimes be confused with environmental behaviours. In the literature, pro-environmental behaviours are defined as positive actions that aim to minimise the negative impact of individuals on the environment (e.g. using public transport instead of personal vehicles, reducing carbon footprint) (Christmas et al. 2013, Hughes et al. 2018), while pro-nature behaviours generally include positive actions that protect nature, such as increasing biodiversity, protecting wildlife, and taking active roles in organisations/associations working for this purpose (Prévot et al. 2018, Barbett et al. 2020). Another important point where pro-nature behaviours differ from other environmental behaviours is individual well-being. Related literature studies show that people's participation in volunteering activities for nature conservation is effective not only on the ecosystem but also on individual well-being and welfare (Rogerson et al. 2017). In fact, pro-nature behaviours contribute to people's more frequent contact with nature and being related to nature (Lumber et al. 2017), which positively affects individual well-being (Pritchard et al. 2020).

When the psychology literature is analysed in terms of current studies, it is seen that the relationship between nature and the individual is mentioned more frequently today than in the past. The first issue that draws attention in these studies is that young generations who spend excessive time with technological devices are isolated from natural life (Migliarese 2008, Kahyaoglu and Yetişir 2015). In this context, many studies show that children who spend most of the day in digital environments instead of spending time in nature experience problems in social, emotional, academic and psychological areas more frequently than other individuals (Hoge et al. 2017, Drouin et al. 2020). In addition to these problems, it is often emphasised that these people who are away from nature have both weakened social skills and decreased motivation/consciousness to protect nature (Nisbet et al. 2009, 2011). Recently, return to nature techniques have become widespread in the process of treating these problems, especially in young individuals. In order to treat psychological and emotional problems and to raise environmental awareness, the relevant groups are provided to interact with nature more frequently. While emotional recovery is provided through practices such as gardening practices, nature walks, observation of natural habitats, animal husbandry and plant breeding, individuals' attachment to nature is also reinforced (Annerstedt and Währborg 2011, Larson 2018). There are many current studies that support this phenomenon. For example, in a recent study conducted in our country, it was found that regular nature walks support self-efficacy and life satisfaction (Barut et al. 2019). Similar to these findings, Ardahan (2012) emphasised that being closely related to nature improves emotional intelligence and increases life satisfaction. In studies conducted abroad, there are many supportive results that being related to nature increases subjective well-being, supports life satisfaction, reduces state anxiety, has a positive relationship with happiness, depression levels decrease as

the time spent with nature increases, and even writing some articles about nature increases the awareness of nature conservation (Nisbet et al. 2011, Zelenski and Nisbet 2014, Kotera et al. 2021, Harvey et al. 2022).

In the last few decades, environmental psychology studies have been more popular than ever in the psychology literature and the field of study has expanded (Steg and De Grot 2018). Intensive migration from rural areas to cities, the intense and stressful living conditions of urban life, and our distance from natural environments / green areas that have been our home for years throughout human history have pushed many mental health experts to examine the psychopathological effects of this situation. As a matter of fact, some natural prescriptions have been presented in the field of environmental psychology to identify various psychological problems related to these issues and to treat them by returning to nature (Adewuyi et al. 2023). For example, there are current studies that find a negative relationship between psychological health and living in cities with crowded human population away from natural environments and green areas (Evans et al. 1989, Alcock et al. 2014, Mantler and Logan 2015, Clark and Paunovic 2018). In addition to these results, it is pointed out that prolonged exposure to technological devices, living in cities with intense noise and polluted air, and being away from natural environments such as long-term home life following pandemics such as Covid-19 pose a serious mental health threat (Hoge et al. 2017, Zhang et al. 2017, Mc Bridge et al. 2020).

There are also several theoretical approaches that are popular in the literature on the identification and treatment of mental health problems caused by withdrawal from natural areas. 'Stress Recovery Theory' (Ulrich et al. 1991) (SRT) and "Attention Restoration Theory" (Kaplan and Kaplan 1989) (ART) are good examples of these approaches. The SRT theory, which suggests that nature is the most important supporter of people in the process of reducing the stress and related emotional problems caused by living in crowded cities and establishing a natural sense of trust, emphasises that people should return to nature, which is their first evolutionary home (Ulrich et al. 1991). On the other hand, ART theories, which claim that green spaces will provide psycho-evolutionary gains to people in the process of collecting and repairing their attention, which is scattered due to busy work and city life, and that the attention damaged without any effort will undergo a healthy repair process as the exposure to nature increases, have inspired the development of many treatment techniques (Kaplan and Kaplan 1989). In this context, techniques such as nature-based therapies, horticultural therapy, trekking and occupational therapies have been developed that recommend people to have frequent contact with nature (Bennet et al. 2017, Song et al. 2018, Uldall et al. 2022). These techniques are also called 'Green Prescription' in the field (Ulmer et al. 2016). When the studies in the literature are examined, it is seen that these techniques have achieved effective results in combating many different mental health problems such as post-traumatic stress disorder, depression, anxiety disorders, panic attacks, attention deficit hyperactivity disorder and schizophrenia (Vella et al. 2013, Sahlin et al. 2015, Maund et al. 2019, Hood and Baumann 2024). At this point, where the healing power of nature has been discovered and turned into a psychotherapy technique, it is noteworthy that people should be in touch with nature and pro-nature behaviours should be reinforced. With our related scale, it is aimed to determine the pro-nature behaviours of individuals and to pave the way for risky groups to have more contact with nature. Thus, it is expected to contribute to both the prevention and treatment of many problems in the field of mental health by taking the first step towards more effective use of the therapeutic side of nature.

The aim of this study is to adapt the 'Pro-nature Conservation Behaviour Scale' (Barbett et al. 2020) developed to measure pro-nature behaviour into Turkish. When the related literature is reviewed, it is seen that many scales have been developed in Turkey and abroad on relations with nature and the environment. For example, it is seen that many psychometric tools have been developed/adapted to measure the human-environment relationship, such as the Commitment to Nature Scale (Perrin and Benassi 2009), which measures the relationship of people with their environment; the Environmental Behaviour Scale (Goldmann et al. 2006), Environmental Awareness Scale (Ak 2008), which aims to determine environmentalist behaviours adapted into Turkish by Timur and Yilmaz; the Attitude Towards Environmental Problems Scale (Kılıç and Kan 2020) and the Commitment to Nature Scale (Bektaş et al. 2017). When all these scales are examined in detail, it is seen that almost all of the scales are tools that try to determine the extent to which people are related to nature and the environment. However, it has been observed that the scales measuring environmentalist behaviours generally focus on determining behaviours that do not harm nature, and they contain very limited items about what actions can be taken to protect nature. This deficiency has also attracted attention in some studies in the literature and the necessity to investigate what can be done differently to protect nature beyond not harming nature (Richardson et al. 2020). The Pro-nature behaviour scale differs from other scales in terms of determining individual and organisational attitudes and behaviours that aim to protect nature beyond these non-destructive behaviours, which have been frequently repeated until today. While recent studies focus only on minimising the negative effects of humans on nature in the determination of environmental behaviours (Çakır et al. 2015,

Sarıçam and Şahin 2015), the Pro-nature behaviour scale focuses on active behaviours that have rarely been mentioned before, such as voting for parties that protect the habitats of plants and animals, volunteering in associations that protect nature, supporting biodiversity and creating wildlife habitats (Barbett et al. 2020). In this respect, the fact that entrepreneurial attitudes towards nature conservation have not been included in any measurement tool in the literature before can be shown as the most important reason for adapting this scale to Turkish. In addition, pro-nature behaviours, which are differentiated from environmentalist behaviours with their sub-dimensions including self-efficacy, commitment to nature, ecological worldview and well-being, have recently started to be mentioned more frequently (Barbett et al. 2020). When all these details are carefully examined, the necessity of using a scale in this direction in our country is evident and the adaptation of this scale into Turkish is expected to make valuable contributions to the relevant literature.

Method

Sample

To determine the minimum sample size required for confirmatory factor analysis (CFA), an a priori power analysis was conducted with the semPower (Moshagen and Bader, 2023) package of the R program using the Root Mean Square Error of Approximation (RMSEA) as an effect size measure. The target RMSEA was 0.07, the desired statistical power was 0.90 and the significance level (α) was 0.05. The degrees of freedom (df) for the CFA model was calculated as 129. The analysis yielded that a sample size of 88 participants was necessary to reach the desired power. While conducting the adaptation studies, the studies indicating the need for five or ten times as many participants as the scale item (Bryman and Cramer 2002) were taken into consideration, and in this context, more than the sample of 180 participants required for the 18-item scale was reached. According to the convenience sampling method, 371 people participated in the study. While collecting the data for the research, survey prepared through Google Forms and sent to the participants as a link were utilized. In this regard, our research is an online study.

Variable		n	Mean	%
Gender	Women	224		60.4
	Men	143		38.5
	Do not want to specify	4		1.1
Age		371	25.85	
Education level	Literate	21		5.66
	Primary-Secondary School	7		1.88
	High School-University	299		80.59
	Master's Degree	36		9.70
	PhD	8		2.15
Maternal education level	Literate	166		44.74
	Primary School	118		31.80
	Middle School	31		8.35
	High School -University	51		13.74
	Master's Degree	4		1.07
	PhD	1		0.26
Paternal education level	Literate	51		13.74
	Primary School	118		31.80
	Middle School	85		22.91
	High School -University	105		28.31
	Master's Degree	5		1.34
	PhD	7		1.9
City they live	Muş	128		35.5
	Diyarbakır	70		18.86
	Bingöl-Bitlis-Batman	31		8.35
	Diğer	142		38.27

The gender distribution of the participants in the study consists of 60.4% female, 38.5% male and 1.1% who did not want to specify their gender. It is seen that 5.66% of the participants are literate, 1.88% are primary and secondary school graduates, 80.5% are high school-university graduates, 9.70% have a master's degree and 2.15% have a doctorate degree. Frequency according to the places of residence shows that most of the participants are from Muş with 35.5%, followed by Diyarbakır with 18.86%, Bingöl-Bitlis-Batman with 8.35%,

and a total of 371 participants from other provinces with 38.2%. The maternal education levels of the participants shows that the literacy rate is the highest with 44.74%. In the other groups, 31.80% are primary school, 8.35% secondary school, 13.74% high school-university, 1.07% master's degree and 0.26% doctorate. In the paternal education levels, 13.74% were literate, 31.80% were primary school graduates, 22.91% were secondary school graduates, 23.71% were high school-university graduates, 1.34% were master's degree graduates and 1.88% were doctorate graduates. Finally, the average age of the participants was 25.85 years and the youngest participant in this group was 18 years old and the oldest participant was 52 years old (see Table 1). The distribution of the demographic characteristics of the participants included in the study is given in Table 1.

Before reaching the participants who will be included as participants in the current study, some inclusion and exclusion criteria were determined. After sorting according to these inclusion and exclusion criteria, analysis procedures were initiated. The relevant inclusion criteria were; being within age range from 18 to 55, must be residing in Türkiye, should answer all of the questions in survey and voluntarily participating to the study. The exclusion criteria were; not being within the age range of 18-55 years old, living in a country other than Türkiye, not completing the survey and not approving the informed consent form.

After applying the relevant inclusion and exclusion criteria, a total of 375 individuals were reached as a result of the study. Among these 375 individuals, the study was conducted with 371 participants in total, after excluding 2 individuals who were under the age of 18, excluding 2 individuals for being outliers. At the end, the data of all the remaining 371 participants were sequentially checked by the researchers and no participant responses were found to be inappropriate for inclusion in the study.

Procedure

In the adaptation process of the pro-nature conservation behavior scale, the online forms were first prepared via Google Forms, and 137 people living in Ankara were tested to see whether the scale items were understood and whether they worked correctly. As a consequence of this preliminary study, it was observed that the scale items were well understood by the participants and there were no technical problems. After making sure that the online data collection process could be managed properly, the stage of reaching the participants was initiated. In the process of reaching the relevant participants, we tried to reach the participants through social media (facebook, instagram, etc.) communities and whatsapp chat groups. No advertising activities were carried out during the process. Finally, in the process of determining pro-nature conservation behaviors, invitation messages were preferred as you are invited for a scale adaptation study conducted in our country.

For each question of the online survey prepared for data collection, a compulsory marking option was preferred. In other words, the participants did not have the option to leave the questions blank, but they were allowed to return to check some answers if desired. The participants filled out a questionnaire consisting of 7 sections in total, 6 scales and 1 demographic form. Faced with 7 different screens, the participants answered 86 questions, which took about 15 minutes on average, and this information was provided to the participants in advance. As participation was voluntary, none of the participants were charged or given anything of monetary value. Finally, 375 people started to fill out the questionnaires, and it was observed that 2 people left some questions blank and did not complete the study. The data of the the same people were not included in the study.

First, in order to adapt the Pro-Nature Conservation Behavior Scale into Turkish, the necessary permissions were obtained from the responsible author of the study (Barbett et al. 2020), then it was reviewed and approved by the AYBU Health Sciences Ethics Committee with the ethical reference number 07.04.2022/06. The scale items were translated independently by 3 researchers who are subject matter experts. Taking into account the opinions of a separate group of researchers, some adjustments were made on the translations obtained and the scale form was created. Immediately after this process, a different group of researchers retranslated the translated scale in order to make a comparison with the original scale (Maneesriwongul and Dixon 2004). After translation and retranslation, the final version of the scale was created by adding an informed consent form. The data were collected through Google Forms between 01.04.2023 and 19.04.2023.

Measures

In the study, Pro-Nature Conservation Behavior Scale, Environmental Behavior Scale, New Environmental Paradigm Scale, Generalized Self-Efficacy Scale, Warnick-Edinburg Mental Well-Being Scale were used to collect data from the participants.

Pro-Nature Conservation Behavior Scale

The Pro-Nature Conservation Behavior Scale which aims to measure the pro-nature conservation behaviors of individuals, is a scale developed by Barbett and colleagues in 2020. In the original form of the scale, which consists of eighteen items, there are 4 factors in total: individual engagement (items 1, 2, 3, 4, 5), planting (items 6, 7, 8, 9), collective engagement (items 10, 11, 12, 13), wildlife (items 14, 15, 16, 17, 18). There are no reverse coded items in this 7-point Likert-type scale. A high score in the overall scale means that an individual performs pro-nature conservation behaviors more. In the original study, the Cronbach's alpha internal consistency coefficient for the individual engagement factor (e.g., I pick up trash when I see it on the ground), which includes pro-nature conservation behaviors other than gardening, was .86, and the Cronbach's alpha internal consistency coefficient for the collective engagement factor (e.g., I volunteer in an area not mentioned in the items above in associations that protect nature such as fundraising, education) was .79. The Cronbach's alpha internal consistency coefficient for the planting factor (e.g., If I had a garden, I would plant pollination-friendly plants), which includes pro-nature conservation behaviors related to gardening, is .87, and the Cronbach's alpha internal consistency coefficient for the wildlife factor (e.g., I leave undisturbed/undisturbed areas for wildlife) is .78. The total internal consistency coefficient of the scale is .89.

Environmental Behavior Scale

The adaptation study of the environmental behavior scale developed by Goldman et al. (2006) to measure the environmental behavior of individuals was conducted by Timur and Yılmaz in 2013. The scale, in which participants rate themselves from 1 (never) to 5 (always), consists of 20 items and 6 factors. In the scale, which includes items such as "I reuse nylon bags that were previously used as shopping bags", high scores mean high environmental behavior. The internal consistency coefficient of the scale was .79 in the original study (Goldman et al. 2006) and .85 in the adaptation study (Timur and Yılmaz 2013).

New Ecological Paradigm Scale

The New Environmental Paradigm Scale, first developed by Dunlap and Vanliere (1978) to measure environmental attitudes, was revised by Dunlap and colleagues in 2000. Bektaş and Şirin (2018) conducted the adaptation study in Türkiye. The scale consists of 15 items with 2 factors; environment-centered (e.g., "Humans are seriously abusing the environment") and anthropocentric (e.g., "The so-called ecological crisis is greatly exaggerated.") approach. Respondents rated themselves on a Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate a more environmental attitude. High scores on the scale mean that people have high environmental awareness. The internal consistency coefficient is $\alpha = .83$ for the original scale and $\alpha = .65$ for the Turkish version.

Generalized Self Efficacy Scale

The Generalized Self-Efficacy Scale developed by Schwarzer and Jerusalem (1995) was adapted into Turkish by Yeşilay et al. (1996) in 1996. The scale, which includes items such as "I know what to do when I encounter a new situation", consists of 10 items and 1 factor. Participants rated themselves on a Likert-type scale from 1 (not true) to 4 (completely true). High scores on the scale represent high self-confidence in coping with problems. In the original study of the scale, Cronbach's alpha internal consistency coefficient was .82 (Schwarzer and Jerusalem 1995); in the adaptation study, it was found to be .83 (Yeşilay et al., 1996).

Warnick-Edinburg Mental Wellbeing Scale

The Warnick and Edinburg Mental Well-Being Scale developed by Tennant and colleagues (2007) and adapted into Turkish culture by Keldal (2015) was used to measure the mental well-being of individuals. The scale, which consists of a single-factor structure and has 14 items, includes items such as "I can make my own decisions". The participants evaluated themselves on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores on this scale can be interpreted as indicating that people have recently considered themselves mentally healthy. While the Cronbach's Alpha internal consistency coefficient was .89 in the original study, it was found to be .92 in the adaptation study.

Statistical Analysis

The data collected within the scope of this study were analyzed using the R package program. Before the analyses, the data were checked for normality, linearity and extremity (details of the data screening can be found at https://osf.io/5cq2n/?view_only=fff333246bd045998d4bbffea932d606). 375 participants took part in the survey. 2 people were excluded because they did not meet the age criteria. Reverse items were corrected. Mean

scores were taken for all scales (to avoid variance differences). Normality test was performed for the scales (skewness- kurtosis), within the normal range (-1.5 ≤ X ≤ +1.5). Mahalanobis distance was calculated for multivariate outlier. For univariate outlier, z score was calculated (-3.29 - +3.29). 2 individuals were deleted for being univariate and multivariate outlier. Analysis started with 371 participants. Confirmatory factor analysis (CFA) was performed. Reliability analyses (Cronbach's alpha internal consistency coefficient) and correlations between scales (Pro-Nature Conservation Behavior Scale, Environmental Behavior Scale, New Environmental Paradigm Scale, Generalized Self-Esteem Scale and Warnick-Edinburg Mental Well-Being Scale) were calculated.

Results

Construct Validity

In the present study, confirmatory factor analysis (CFA) was conducted using the R package (Schermelleh et al., 2003) to test the 4-factor structure proposed in the original study. Covariance matrix was used as input and Maximum Likelihood Estimation was used for parameter estimation. Chi-square test χ^2 , Root Mean Square Error of Approximation (RMSEA), standardized root mean square error of approximation (SRMR), Akaike Information Criterion (AIC), Comparative Fit Index (CFI) and Goodness of Fit Index (GFI) were used to assess model fit. A non-significant χ^2 statistic, $RMSEA \leq .08$, χ^2/df ratio ≤ 3 , $SRMR < .08$, a relatively lower AIC, $CFI \geq .90$, and $GFI \geq .95$ were considered indicators of good fit (Bollen 1989, Hu and Bentler 1999, Kline 2023).

Table 2. Pro-Nature Conservation Behavior Scale confirmatory factor analysis results

Model	χ^2	df	p	RMSEA	CI	SRMR	AIC	CFI	GFI
Model 1	585	129	.00	.09	.09 - .10	.09	24871	.81	.82
Model 2	585	129	.00	.14	.13 - .15	.11	25517	.55	.67
Model 3	376	127	.00	.07	.06 - .08	.07	24666	.90	.82

χ^2 = chi-square test, *df* = degrees of freedom, *p* = p value, RMSEA = root mean square approximation, CI = Confidence Interval, SRMR = standardized root mean residual, AIC = Akaike information criterion, CFI = comparative fit index, GFI = Goodness of fit index

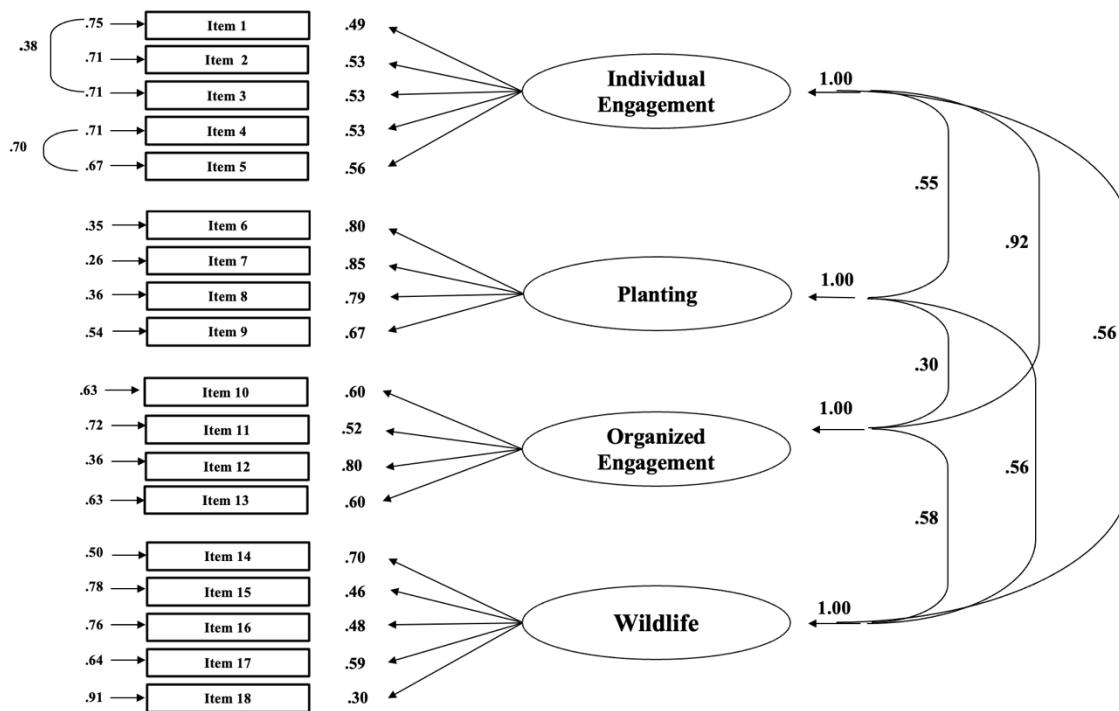


Figure 1. CFA factor structure for Pro-Nature Conservation Behavior Scale

The factor model (Model 1) proposed in the original study for the pro-nature conservation behavior scale was tested against two alternative models. These are the one-factor structure (Model 2) and the final model (Model 3). According to the results of the analysis, the fit values of the 4-factor structure in the first model tested (Model 1) were not within an acceptable range, [χ^2 (129, N = 371) = 585, $p < .05$, $\chi^2/df \cong 4.53$, $RMSEA = .09$, $SRMR = .09$, $AIC = 24871$, $CFI = .82$, $GFI = .82$]. The fit values of the one-factor structure were not within an acceptable

range [χ^2 (129, N = 371) = 585, $p < .05$, $\chi^2/df \cong 4.53$, RMSEA = .09, SRMR = .11, AIC = 25517, CFI = .55, GFI = .67] (see Table 2). When both scale items and modification indices were examined, the final model (Model 3) was created with the error covariances added between Items 1 and 3, Items 4 and 5, and it was found to be at an acceptable level in general, [χ^2 (127, N = 371) = 376, $p < .01$, $\chi^2/df \cong 2.96$, RMSEA = .07, SRMR = .07, AIC = 24666. CFI = .90, GFI = .82. The standard values of the model for the four-factor structure of the scale are presented in Figure 1.

Descriptive Statistics and Correlations between Variables

To test the convergent validity of the Pro-Nature Conservation Behavior Scale, the Environmental Behavior Scale (Goldman et al., 2006, Timur and Yılmaz 2013), the New Environmental Paradigm Scale (Dunlap and Van Liere 1978, Dunlap et al., 2000, Bektaş and Şirin 2018), Generalized Self-Esteem Scale (Schwarzer and Jerusalem 1995, Yeşilay et al. 1996) and Warnick-Edinburg Mental Well-Being Scale (Tennant et al. 2007, Kendal 2015). There is a positive significant relationship between the pro-nature conservation behavior scale and the other scales $p < .05$ (see Table 3 for descriptive statistics, internal consistency coefficient and correlations between variables).

	n	M	SD	α	1	2	3	4	5	6	7	8	9
1. Pro-Nature Conservation Behavior Scale	371	4.60	.97	.85	-	.82**	.66**	.79**	.70**	.68**	.11*	.34**	.25**
2. Individual engagement (Pro-Nature Conservation Behavior Scale)	371	4.12	1.29	.73		-	.41**	.63**	.35**	.58**	.04	.30**	.20**
3. Planting (Pro-Nature Conservation Behavior Scale)	371	5.76	1.28	.86			-	.28**	.35**	.30**	.17**	.19**	.17**
4. Collective engagement (Pro-Nature Conservation Behavior Scale)	371	3.63	1.50	.71				-	.39**	.59**	.00	.26**	.17**
5. Wildlife (Pro-Nature Conservation Behavior Scale)	371	4.94	1.16	.61					-	.52**	.13*	.26**	.20**
6. Environmental Behavior Scale	371	3.35	.68	.88						-	.06	.37**	.39*
7. New Environmental Paradigm Scale	371	3.64	.51	.64							-	.00	.01
8. Generalized Self-efficacy Scale	371	2.98	.60	.89								-	.58**
9. Warnick-Edinburg Mental Well-Being Scale	371	3.68	.82	.89									-

** . $p < .01$, * $p < .05$, M = mean, SD = Standard Deviation, α = Cronbach's Alpha

Discussion

With the uncontrolled population growth, consumption habits and rapid development of large industries around the world, natural habitats are being severely destroyed and irreversible climate crises are occurring (Abrahams et al. 2023, Steg 2023). Among these problems that will directly affect the lives of all humanity, perhaps the most important and relatively least attention has been paid to the destruction of biodiversity (Cardinale et al. 2012, Legagneus et al. 2018). Undoubtedly, one of the most important steps to ensure the continuity of biodiversity is the change in human behaviour (Young et al. 2005, Gosselin and Callois 2018).

When the current literature is examined, almost all of the scales related to nature and the environment so far have tried to determine human attitudes that do not harm nature (e.g. I do not use plastic cups, I use public transport instead of my personal vehicle, etc.) (Dunlap and Vanliere 1978, Hwang et al. 2000, Goldman et al. 2006). The concept of 'Pro-Nature Behaviours', which is very important for the continuation of biodiversity and the protection of nature, has been introduced (Barbett et al. 2020, Richardson et al. 2020). Unlike the studies that traditionally focus on determining the behaviours of humans that harm nature, this study focuses on

determining pro-nature behaviours. Although it is important to identify behaviours that harm nature, it is thought that identifying and measuring behaviours that protect nature beyond harming it is more important for sustainability in terms of protecting and supporting biodiversity (Barbett et al. 2020, Durazzo et al. 2021). The scales currently in use in Turkey measure environmentalist behaviour (Ardahan 2012, İpar 2018). The Pro-Nature Behaviour Scale fills the gap in this field by measuring pro-nature behaviour.

At this point, the Pro-Nature Behaviour Scale is the most up-to-date and valid scale developed to determine the behaviours that try to protect nature. As a result of the analyses, the scale retained the 4-factor structure proposed in the original version, and various psychometric tests (confirmatory factor analysis, reliability tests, correlation analysis) showed that it is a valid and reliable measure to measure pro-nature behaviours in the Turkish context. When interpreting the CFA results, according to Klein (2023), the chi-square test χ^2 , RMSEA, CFI and SRMR values should be reported. When the results were analysed, it was seen that these values were within the acceptable range and the model showed a good fit in general. When the correlation values for criterion validity were examined, a positive significant relationship was found between the Environmental Behaviour Scale (Goldman et al. 2006, Timur and Yılmaz 2013), the New Environmental Paradigm Scale (Dunlap and Van Liere 1978, Dunlap et al. 2000, Bektaş and Şirin 2018), the Generalised Self-Esteem Scale (Schwarzer and Jerusalem 1995, Yeşilay et al. 1996) and the Warnick-Edinburg Mental Well-Being Scale (Tennant et al. 2007, Kendal 2015). These results show that the structure proposed by Barbett et al. (2020) is also valid for Turkey.

As in every scale that tries to measure human attitudes and behaviours, there are some issues to be considered in this scale. For example, it was observed that some items (items 6-7-8-9) were left blank by the participants when the scale was applied to people living in places where access to areas such as gardens or fields is limited (sites without gardens, plazas, slum neighbourhoods, etc.). In this respect, it is recommended that the people to whom the scale will be applied should be people who can access areas such as gardens and fields, or if it is applied to groups including these people, it is recommended not to use the relevant questions (Barbett et al. 2020). Another area to be considered is the presence of questions that emphasise contact with wild nature. For example, questions such as 'I feed wild animals such as some bird species' may not be successful in assessing the pro-nature behaviour of groups with limited opportunities to contact wild nature. One of the most important problems that can be encountered during the adaptation of a scale developed in one country to other cultures is cultural differences (DeVellis and Thorpe 2021). Another limitation of the current study is that no questions were asked about the mental health of individuals. The Pro-Nature Behaviour Scale was developed in the UK and there may be some limitations in its adaptation to Turkish. For example, people living in places such as Europe and the USA, where government policies on the protection of natural life are much more effective, participate more actively in discussions on this issue (Halofsky et al. 2020, Chiarle et al. 2021, Ciscar et al. 2021). Finally, the lack of reverse items in the scale may cause some respondents to fill in the questions with the same answer choices. However, since pro-nature behaviours are essentially positive behaviours, a measurement compatible with the concept was formed.

For many years, many different techniques such as pharmacotherapy, cognitive behavioural therapies, behavioural therapies, mindfulness and yoga have been tried in the treatment of disorders with serious health burden in the field of psychopathology (Coffey et al. 2010, Hofman 2011, Varambally and Gangadhar 2016, Yakeley 2018). In contrast to traditional treatments, the concept of 'green prescription' emerged with the idea of contact with nature, being in touch with nature and using the healing power of nature in the treatment of psychological disorders (Adewuyi et al. 2023). Especially in Europe and America, there is increasing evidence that psychopathologies can be treated by spending time in green areas rather than medication or long-term psychotherapies (Vella et al. 2013, Poulsen et al. 2015). In addition to the treatment of psychopathologies, promising results are obtained that many psychological disorders can be prevented by being in touch with nature and exhibiting pro-nature behaviours (Stigsdotter et al. 2011, Barbett et al. 2020). At this point, it is stated that studies should be carried out in order for people to have more frequent contact with nature, long-term green space exposure, to have attitudes that protect nature and to exhibit pro-nature behaviours (Lee et al. 2011, Vella et al. 2023). Our scale offers convenience to experts in the field at the point of what pro-nature behaviours of people in our country are, how they can be determined and measured. While exhibiting pro-nature behaviours, people will experience the psycho-evolutionary gains provided by being in natural environments without any effort and develop a strong sense of trust (Ulrich et al. 1991). In addition to this, there is an expectation that being in natural environments while exhibiting pro-nature behaviours will enable people to easily collect their distracted attention and improve their attention skills (Kaplan and Kaplan 1989). Considering all these processes, it is thought that the processes of identifying, encouraging and measuring pro-nature behaviours in a healthy way are very important for preventive and curative mental health services.

Conclusion

The Pro-Nature Behaviour Scale differs from other scales in terms of determining attitudes of support for political persons or institutions trying to protect nature, determining various behaviours towards protecting wild nature and determining practices that support the sustainability of natural habitats, and offers meaningful facilities to field experts. Considering the fact that most of the existing measurement tools are prepared by focusing on adult individuals, it is recommended for future researchers to develop measurement tools specific to children in order to create a stronger pro-nature culture. In this way, intervention programmes can be prepared in local and national contexts by determining the level of children's motivation to protect nature. As a consequence, in our study aiming to adapt the Pro-Nature Behaviour Scale developed by Barbett et al. (2020) in the UK into Turkish, it was found that its 4-factor structure was also valid in the culture of our country. When we look at the reliability and validity values, it was observed that all values were at an acceptable level. All the findings obtained within the scope of this study show that the Pro-Nature Behaviour Scale is a valid scale that can be used in Turkey to determine the pro-nature behaviours of individuals.

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Addendum 1. Pro-Nature Conservation Behaviour Scale Turkish Form

Pro-Nature Conservation Behaviour Scale Turkish Form

Below are several statements that may or may not describe you. Next to each statement, please write a number between 1 (strongly disagree) and 7 (strongly agree) to indicate whether you agree or disagree with the statement, taking into account the level to which the statement describes you.*

		1	2	3	4	5	6	7
1.	Doğa koruma konuları ile ilgili yerel konsey/yerel yönetim toplantılarına katılırım.							
2.	Yerde çöp gördüğümde toplarım							
3.	Doğanın korunmasında karşılaşılan sorunlarla ilgili yerel yöneticilerle iletişime geçerim.							
4.	Yerel seçimde ya da referandumda doğayı veya doğal hayatı koruyan kişilere ve/veya yasalara oy veririm.							
5.	Seçimlerde doğanın korunması konusunda etkili politikalar öneren partilere oy veririm.							
6.	Bahçem olsaydı tozlaşma dostu bitkiler dikerdim.							
7.	Bahçem olsaydı çiçeklenme mevsimi farklı olan bitkiler dikerdim.							
8.	Bahçem olsaydı yerli bitkiler dikerdim.							
9.	Bahçem olsaydı meyve veren bitkiler yetiştirirdim.							
10.	Doğayı koruma ile ilgili çalışmalar yapan derneklerde doğal yaşam alanının yönetiminde gönüllü olurum.							
11.	Doğayı koruyan derneklerde yukarıdaki maddelerde bahsedilmeyen bir alanda gönüllüyüm (bağış toplama, eğitim gibi).							
12.	Çevreyi temizleme organizasyonlarına katılırım.							
13.	Doğa koruma çabalarını destekleyen kampanyaları imzalarım.							
14.	Yaban hayatı için bozulmamış/tahrip edilmemiş alan bırakırım.							
15.	Kuşların üreme döneminde yuvalarını dağıtmam, zarar vermem. (Mart, temmuz arası)							
16.	Böcek öldürücü ilaç kullanmaktan kaçınırım.							
17.	Yaban hayatı tarafından ev/barınak olarak kullanılabilir kütük yığınları veya diğer malzemeleri bırakırım.							
18.	Kuşlar gibi vahşi canlıları beslerim.							

Note. This scale can only be used in scientific research provided that they comply with ethical principles. No permission is required for the use of the scale as long as you give the reference.

Scoring of the Scale

Total score is not used in the scale, average score is calculated in subscales. There are no reverse coded items. Each item is given a score from one to seven.

There are four subscales:

1. Individual engagement (items 1, 2, 3, 4, 5),
2. Planting (items 6, 7, 8, 9),
3. Collective engagement (items 10, 11, 12, 13),
4. Wildlife (items 14, 15, 16, 17, 18).

Reliability scores (Cronbach's α) for Turkish form

Total = .85

Individual engagement (Items 1, 2, 3, 4, 5) = .73

Planting (items 6, 7, 8, 9) = .86

Collective engagement (items 10, 11, 12, 13) = .71

Wildlife (items 14, 15, 16, 17, 18) = .61