Journal of Environmental Science and Management 20-2: 68-76 (December 2017) ISSN 0119-1144

Psychometric Properties of the Turkish Version of the Environmentally Desirable Responding Scale (EDRS)

ABSTRACT

This study was aimed to test the reliability and validity of the Turkish version of the Environmentally Desirable Responding Scale (EDRS). The EDRS contained 18 items, which were expressed on a 4-point Likert scale. The study group consisted of 221 recreational outdoor sports participants from Ankara, Turkey. The participants included 78 females and 143 males, with a mean age of 23.2 years and a standard deviation of 3.92 years. Principal Axis Factoring (PAF) produced a 3-factor solution with the sub-dimensions self-deception/denial of negatives, image management and self-deception/assertion of positives. Confirmatory factor analysis (CFA) confirmed this 3-factor solution, AGFI=0.87, GFI=0.90, NFI=0.91, CFI=0.96, RMSEA=0.061 SRMR=0.053. Cronbach's Alpha coefficient values for 3 sub-dimensions ranged from 0.74 to 0.87. These suggest that the Turkish version of the questionnaire is a valid and reliable data collection tool for recreational outdoor sports participants.

Key words: *environment, factor analysis, outdoor sports, scale, social desirable*

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INTRODUCTION

Self-report surveys and scales are generally used in studies regarding environmental attitudes (*Dunlap et al. 2000; Ewert and Baker 2001; Stern et al. 1995*). Over the past several decades, a number of self-report scales have been developed to measure abnormal environmental behaviour, as well as athletes', students' and sports and recreation participations' attitudes (*Arnocky and Stroink 2011; Bjerke and Kleiven 2006; Dunlap et al. 2000; Thapa 1999*).

Researchers of social science frequently rely on questionnaires to provide self-reported data and they can be useful, particularly since they often offer a comparatively direct means of data collection (*Loving and Agnew 2001*). In addition, self-report data collection has a number of advantages over other methods of data collection, including, relatively low cost and providing information about infrequent behaviour (*Sullman and Taylor 2010*). With self-reports, however, respondents often tend to minimize their negative attributes and overstate their positive attributes when completing a self-report survey (*Kam 2013*). Behaviors described above, known as socially desirable responding (SDR), present oneself as favorable concerning present social norms and standards (*Zerbe and Paulhus 1987*). *Paulhus* (*2002*) characteristically defined the socially desirable responding (SDR) as the tendency to give positive self-descriptions.

According to the current thinking surrounding SDR, individuals with a broader set of social norms and standards represent a large potential for significant concern in organizational research (*Zerbe and Paulhus 1987*). From an organizational management perspective, *Ones et al.* (*1996*) found a significant correlation with social desirability in the following instances: social desirability was not as common as was expected by industrial organizational psychologists; emotional stability and responsibility were linked to individual differences in social charm; and social desirability served as a practical useful suppressor, not as a mediator variable or function as a predictor for job performance criteria (*Ones et al. 1996*).

A Concept of Socially Desirability and Measurement

Social desirability refers to the tendency of self report test items to respond in a way that makes them look good rather than to respond in an accurate and truthful manner (*Holtgraves 2004*). The three main types of socially desirable respondings include: self deceptive-enhancement, impression management, and self deceptive denial (*Paulhus 2002*). The Paulhus Balance Inventory of Desirable Responding (BIDR) and the Marlowe Crowne Social Desirability Scale (MC-SDS) (*Crowne and Marlowe 1960*) are the most commonly used

measurement tools used in identifying Social Desirability (*Paulhus 1991*). These scales are the most widely used instruments for measuring social desirability response, and the psychometric properties of these scales have been used in numerous studies (*Andrews and Meyer 2003; Kroner and Weekes 1996; Sârbescu et al. 2012*). The MC-SDS includes 33 true-false items that describe both acceptable but improbable behaviors, as well as those deemed unacceptable but probable, designed by Crowne and Marlowe in 1960. MC-SDS items were viewed as culturally sanctioned and not linked to occurrence behaviors (*Crowne and Marlowe 1960*). The BIDR, designed by *Paulhus* (*1991*), contains 40 items within two subscales: impression management (deliberate self-presentation to an audience), and self-deceptive positivity (the tendency to give self-reports that are honest but positively biased). Moreover, many scholars have suggested that self-report methodologies are particularly susceptible to socially desirable responding (*Ellingson et al. 2001*).

He et al. (*2015*) conclude that social desirability has both a negative and a positive impression management dimension that are meaningfully associated with country-level characteristics. Accordingly, we argue that social desirability can be interpreted as a culturally regulated response amplification.

Why Environmental Desirable Responding?

From an environmental perspective, a discrepancy between what people "know" and what they actually "do" exists. A number of theoretical frameworks have been developed to explain this gap between environmental awareness and knowledge and the application of this knowledge, in often pro-environmental behaviors (*Kennedy et al. 2009; Kollmuss and Agyeman 2002; Maiteny 2002*). *Ewert and Galloway* (*2009*) also suggested that environmental attitudes should involve the development of a better understanding of what role environmentally desirable responses play in the connection between attitudes and behaviors.

As an example of the relationship between environmental knowledge and attitudes, *Ewert and Baker* (*2001*) found significant differences in environmental attitudes that were observed in As an example of the relationship between environmental knowledge and attitudes, *Ewert and Baker* (*2001*) found significant differences in environmental attitudes that were observed in academic disciplines (e.g., forestry, wildlife management, recreation) express fundamentally different beliefs and levels of concerns regarding the environment.

There has been some research investigating the environmental attitude on the sports field (*Demirel et al. 2009*) but there is currently no research which has examined any of the measures of environmentally desirable responding in Turkey. In addition, considering the international view about the phenomenon of environmental protection in the world of sport, the aim of this study was to validate the Turkish version of the Environmentally Desirable Responding Scale (*Ewert and Galloway 2009*).

MATERIALS AND METHODS

Participants and Procedure

This study used a survey method based on an adaptated scale of the EDRS originally developed by *Ewert and Galloway* (*2009*). Participants for this study were selected from those participating in a recreational outdoor sport where an appropriate method of sampling was used in choosing the study group. The study was conducted on rock climbers who studied in Ankara University Faculty of Sports Sciences, Mountaineering Community of Gazi University, Ankara Orienteering Community, Middle East Technical University of Orienteering and Navigation Team Members and Ankara Cyclists Common Platform Members of Cyclists. The data on this study were collected between March 2015 and May 2015.

First, incomplete or improperly filled out questionnaires were eliminated from the analysis. Participants' permissions were obtained using an informed consent form and a detailed explanation of the purpose of the study. The participants in this research were 78 females and 143 males for a total of 221 participants. The study group's age varied between 18 and 34 and their average age was (M = 23.23, SD=3.92). The participants had three different sport branches: rock climbing= 63 participants; cycling= 78 participants; orienteering= 80 participants). The EDRS took approximately 10 min to complete and the scales were self-reported.

The Environmentally Desirable Response Scale (EDRS)

In order to measure the existence and level of environmental desirable responding, the Environmentally Desirable Response Scale (EDRS) was used as the data collection tool (*Ewert and Galloway 2009*). The original scale is a 4-point Likert type scale. The scale scored between '1' ('does not describe me at all') to '4' ('describes me very well'). The sub-dimensions of

the scale are 'Self-deception/Assertion of positives" (9 items); 'Image management" (5 items); and 'Self-deception/Denial of negatives" (4 items). Factor loadings for items varied between 0.36-0.67, with Cronbach's Alpha estimates of reliability for the three factors being .74, .66, and .61. When including these psychometric properties, the original EDRS scale presented as a valid and reliable research tool.

Linguistic Adaptation Process

Within the Turkish adaptation process, permission for use of the original scale was requested from the corresponding author Alan Ewert by e-mail. With permission granted, the translation process started. A serial approach has been used for a linguistic adaptation study (*Herrera et al. 1993*). The original form of the EDRS was translated into Turkish by the researcher and by four translators who know English at a high level. The translations were then analyzed by an expert in English who considered the best expression for each item. The Turkish form of suitability of each item was also analyzed and discussed with three academic members from Ankara University Faculty of Sport Sciences. From this effort, a Turkish version of the EDRS form was created. The final version of the Turkish form translated into English by native two speakers using a back translation method. Implementation of the scale took approximately 10 min. Background information about the survey were given to the academics and graduate students in recreation and sport sciences. The study group voluntarily participated in the study and the data collected by the researcher.

Analysis

The exploratory factor analysis using Principal Axis Factor Extraction was conducted to determine the factor structure of the EDRS. For interpretation of the factors, a direct quartimin rotation was used. It was accepted as the criteria that factor loads of the clauses should be at least 0.35 (*Hair et al. 2009*), and the difference between the item factor loads included in the 2 factors should be at least 0.10 (*Tabachnick and Fidell 2014*). The internal consistency of the overall scale and subscales were measured by Cronbach's Alpha Coefficient.

Confirmatory Factor Analysis (CFA.: A CFA was performed on the data, using LISREL 8.80 and the model parameters were estimated using maximum likelihood estimation (*Marsh et al. 1988*). CFA is a powerful statistical tool for examining the nature of and relations among latent constructs (*Jackson et al. 2009*). In CFA, fit indices between theoretical model and the actual data to be revealed is indicated through a number of fit index values (*De Frias and Dixon 2005; Hu and Bentler 1999; Marsh and Balla 1994*). The most common indices include Root Mean Square Residuals- RMR or RMS, Chi-Square Goodness- $\chi 2$, Adjusted Goodness of Fit Index-AGFI, Goodness of Fit Index-GFI, Root Mean Square Error of Approximation-RMSEA, Comparative Fit Index-CFI, and Normed Fit Index-NFI.

Hu and Bentler (*1999*) suggested that for continuous data, data cutoff value close to CFI>.95, RMSEA<.06, and SRMR<.08. In addittion, RMR, GFI, AGFI and NFI indices are acceptable for compliance value >0.90 and a perfect fit value > 0.95 (Marsh et al. 2006). However, in the evaluation of the model fit GFI > 0.85, and AGFI > 0.80 fit indicedes values are considered acceptable levels (*De Frias and Dixon 2005; Marsh and Balla 1994*).

Reliability. Assessing reliability of the scale scores was examined using a test-retest procedure. To establish reliability, a sample of Ankara University Faculty of Sport Sciences students who participated in outdoor sports (n=42) repeated the test EDRS 15 days following the initial test administration. For anonoymity, participants used a "nickname" during the first administration of the test, and they were asked to use the same "nickname" for the second administration. The study group voluntarily participated in the two phase study.

RESULTS AND DISCUSSION

Linguistic Equivalence Study

In order to eliminate the possible "learning effect," associated with repeated measures, the original English and Turkish forms were given, respectively, after an interval of two weeks. There was a significant correlation between the scores obtained between the two forms ($r = 0.86$, $p < 0.05$). These finding suggest that the consistency between the two versions of the scale is at an acceptable level and language equivalence has been attained.

Reliability

In order to examine the reliability of EDRS, test-retest and internal consistency calculations were made, with the scale being applied to 32 individuals with a 15-day gap. Cronbach's Alpha correlation coefficient between the two measurements was 0.84 ($p = 0.000$).

Validity

To examine the validity of the instrument, analysis

of sampling adequacy was conducted on the 18 items of the EDRS to determine whether it was suitable for factor analysis. Kaiser-Meyer-Olkin measure of sampling adequacy indicated a value of 0.80 and the Bartlett's test of Sphericity indicated a chi-square value of 1506.321 ($p < 0.001$). This demonstrates that the sample size was sufficient for the application of a factor analysis and the data were appropriately distributed. When a basic scree-plot test and eigenvalue >1.0 criteria were used, three factors were generated from the EDRS. The cut-off criteria used to determine acceptable factor loading was 0.35, with the difference between the item factor loads associated with the two factors being at least 0.10 (*Field 2005*) (**Table 1**). Item 2, not reaching the established criteria, were excluded from the scale. The a direct quartimin rotation rather than varimax is reported the study, because the oblique rotation methods accounts for correlations among factors (*Fabrigar et al. 1999*).

After excluding item 2, the scree plot suggested that three factors would be the appropriate extraction (**Figure 1**). Once again, the three-factor solution was retained because of previous theoretical support, the scree plot analysis, and the insufficient number of primary loadings and difficulty of interpreting the other factors. According to *O'Connor* (*2000*), statistical software packages do not have appropriate procedures to determine the number of factors, so parallel analysis were employed to determine the appropriate number of factors to retain. Parallel analysis enables researchers to have a high degree of confidence of the number of factors to extract prior to exploratory factor analysis (*Wood et al. 2015*). Parallel analysis was done through SPSS syntax using for parallel analysis using raw data. Three-factor structures were identified using parallel analysis performed at the 95% confidence interval (*O'Connor 2000*). The three factors explained 44.95% of the total variance (**Table 2**). According to the literature in the humanities, the variance rates ranging from 40 to 60% are considered to be adequate (*Field 2005; Williams et al. 2012*). The scale

Table 1. Correlations between the factors.

	Factor 1	**Factor 2**	**Factor 3**
Factor 1 Self-deception- Assertion of positives	1.000	,233**	,080
Factor 2 Image management		1.000	,202**
Factor 3 Self-deception- Denial of negatives			1.000

**Correlation is significant at the 0.01 level

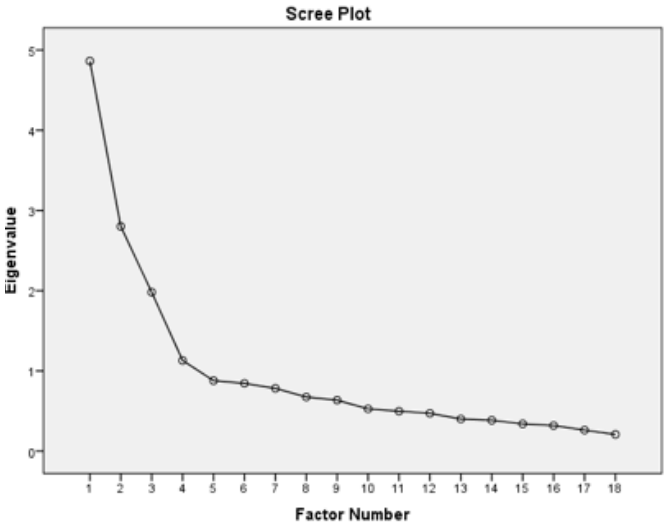

Figure 1. Scree plot of principal axis factoring.

consisted of three subfactors (self-deception/assertion of positives, image management, and self-deception/ denial of negatives). All items had high loadings on their respective factor, consistent with the original form. *Ewert and Galloway* (*2009*) developed EDRS on university students from Japan, Australia, and the US. The current study's sampling group consisted of recreational oudoor sports participants in Turkey where item factors loadings were higher than the original scale. This may be due to recreational outdoor sports participants' attitudes towards the environment being somewhat different from the students used in the *Ewert and Galloway* (*2009*) sample.

After factor structure was assessed, the three factors were subjected to a reliability analysis. In Table 2, the three factors had high reliabilities (Cronbach's $\alpha > .70$; Nunnally and Bernstein 1994), with Cronbach's α of .87, .82, and .74 for Self-deception – Assertion of positives, Image management, Self-deception – Denial of negatives, respectively. Overall, these analyses identified the three distinct factors that were underlying outdoor sports participants to the EDRS items and were internally consistent.

The EDRS as tested with CFA analyses, using the sub-factor structure determined by the PAF. The initial model fit indices were $\chi 2 = 257.20$, $\chi 2/df = 2.217$, GFI= 0.88, AGFI= 0.84, RMSEA= 0.074, NFI=0.89, CFI = 0.94, RMR= 0.043. These indicated that the for original EDRS model needed to be respecified to fit better with the sample data. The modifications were made to improve the model. The $\chi 2$ statistic is generally significant in large samples (*Byrne et al. 1989*). For this reason, rather than only using $\chi 2$ values, a ratio of the calculated $\chi 2$ to the degrees of freedom was used. An acceptable fit using this

Table 2. Direct quartimin rotated Principal Axis Factoring of the EDRS items.

	Factor 1 Self-deception-Assertion of positives	Factor 2 Image management	Factor 3 Self-deception-Denial of negatives	Communalities
EDRS Items				
3. I am always honest with myself about how I really feel about the environment.	.829	.228	.054	.318
6. I do not know the reasons why I feel the way I do about the environment.*	.773	.108	.033	.027
4. I do not regret my decisions about environmental issues.	.771	.085	.056	.688
7. I appreciate other people's opinions regarding the environment.	.756	.341	.081	.608
5. I have very definite views about what government policy should be regarding the environment.	.688	.162	.040	.474
9. I try to understand other people's views about the environment, particularly when they differ from my own.	.655	.179	.073	.607
1. My behavior is consistent with my beliefs about environmental issues.	.561	.196	.090	.595
8. I am not concerned about environmental issues.*	.451	.080	.116	.211
11. I never say anything to hurt the feelings of someone who disagrees with me about an environmental issue.	.248	.731	.188	.531
10. I never say bad things about people who disagree with my views about the environment.	.134	.727	.160	.539
12. I never get upset when people express opinions about the environment, which differ from my own.	.285	.681	.186	.478
13. I am not interested in trying to influence people's thinking about the environment.	.219	.678	.201	.464
14. I do not disagree about environmental issues with new people I meet	.085	.657	.109	.440
18. I form opinions about environmental issues without always thinking about the issues thoroughly.*.	.064	.094	.672	.401
16. I feel resentful when I don't get my own way in a discussion about environmental issues.*	.064	.168	.647	.419
17. It bothers me if people dislike me because of my views about the environment.*	.027	.125	.637	.407
15. I try to cover up mistakes I make in conversations about environmental issues.*	.112	.219	.627	.455
Cronbach Alphas	.87	.82	.74	
Eigenvalues	4.86	2.80	1.98	
% of Variance	24.3%	12.72%	7.88%	
Total Variance accounted for rotated factors = 44.95%				

Note: *Item is reverse scored.

ratio ($\chi 2/df$) is ≤ 2.5 (*Klem 2000*). The $\chi 2$ values were significant ($\chi 2 = 208.06$ df = 114, $\chi 2/df = 1.82$, $p < 0.000$). GFI, AGFI, and NFI values higher than 0.90 in fix indicedes show a good fit (*Marsh and Hocevar 1988*), but the 0.85-0.90 range for GFI, AGFI, and NFI value higher than 0.80 shows the existence of an acceptable fit (*Marsh et al. 1988*). High values were found or the fit indicedes GFI=0.90, NFI=0.91, indicating a good fit. AGFI=0.87 and was found in this research (*Anderson and Gerbing 1988; Hooper et al. 2008*). *Hu and Bentler* (*1999*) suggested that for continuous data cutoff value close to CFI>.95, RMSEA<.06, and SRMR<.08. In current study, CFI=0.96, RMSEA =0.061, and SRMR=0.053 were found, so these indicides are considered a good fit (*Hu and Bentler 1999*).

Modification indices were used in the measurement model. Considered only the largest modification values

and their conceptual suitability prior to implementing any model re-specifications. When the modification indices are examined, it is seen that the modifications to be made between the 10-13th items and 16-18th items made a significant contribution to the $\chi 2$. These items can represent each other. Modifications were made between 10-13th items (decrease in Chi-Square=18.5) in the image management and 16-18th items (decrease in Chi-Square=23.2) in the Self-deception -Denial of negatives. These modifications improved model fit, and yielded the final model. According to the CFA, the factor loadings changed between 0.41 and 0.72 (**Table 3**). If the value is less than 0.10 it denotes a small effect; if around 0.30 it denotes a medium effect; and if higher than 0.50 it denotes a large effect (*Kline 201*0). Factor loadings generally had a large effect in this study. Also, the t-values of all items were significant. These values show that the three-factor structure of the scale provides acceptable and valid results.

Significant $\chi 2$ values were also found in the analysis ($\chi 2 = 208.06$, df = 114, $\chi 2/df = 1.82$, $p < 0.000$) (Figure 2). High values were found for the fit indexes GFI (0.90), AGFI (0.87), NFI (0.91), indicating an acceptable fit CFI (0.96), indicating a good fit, and the values of RMSEA (0.061) and SRMR (0.053). These values show that the scale gives acceptable and valid results.

Reliability

The stability of the scale was established by evaluating test-retest reliability. There was a significant positive correlation between the two tests. The 15 days later test-retest reliability scores were: 0.87 (self-deception/assertion of positives); 0.82 (image management); 0.74 (self-deception/denial of negatives).

Table 3. CFA maximum likelihood estimates of first order.

Items	Factor loading estimates	t-values	R^2
1	0.45	8.85	0.33
3	0.64	14.39	0.68
4	0.67	12.64	0.57
5	0.57	11.09	0.47
6	0.72	13.03	0.59
7	0.61	13.32	0.55
8	0.41	7.03	0.22
9	0.57	10.34	0.42
10	0.52	8.92	0.45
11	0.63	12.14	0.55
12	0.63	11.89	0.53
13	0.44	8.22	0.41
14	0.55	10.16	0.45
15	0.67	9.47	0.39
16	0.45	6.59	0.45
17	0.61	9.00	0.38
18	0.47	6.83	0.46

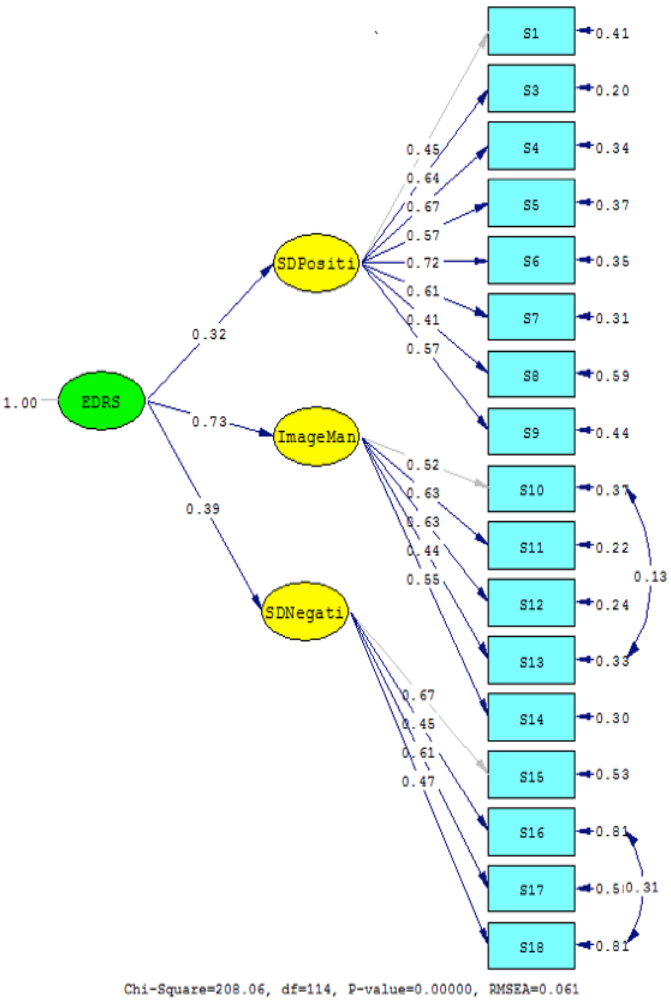

Figure 2. Three Factor Model of EDRS Scores.

Theoretical Issues

The purpose of this study was to use factor analyses to investigate the psychometrics proporties of the EDRS, reflective of original EDRS' three-factor conceptualization. The result revealed that the hypothesized three-factor model holds and that the three dimensions are valid and reliable for measuring Self-deception-Assertion of positives, Image management and Self-deception-Denial of negatives. Factor analysis indicated the removal of one item (item 2) from Self-deception-Assertion of positives construct.

Self-reported questionnaires may be susceptible to expectations of what the participants think is the answer desired by the researchers (*Schacter 1999*). Also self-reports of environmental behavior may be prone to the effects of social desirability. When addressed

theoretically, *Ewert and Galloway* (*2009*) classified three types of environmentally desirable respond that included self-deception/assertion of positives, image management and self-deception/denial of negatives. These classifications are similar to those realized by *Paulhus* (*2002*) that focused on the construct of socially desirable responding. *Paulhus* (*2002*) describes three types of socially desirable responding, including: self deceptive-enhancement, impression management, and self deceptive denial.

Similarly, *Kollmuss and Agyeman* (*2002*) described the most infuential and commonly used frameworks for analyzing pro-environmental behavior. *Kollmuss and Agyeman* (*2002*) went on to analyze the factors that have been found to have some infuence, negative or positive, on pro-environmental behavior such as demographic factors, internal factors (e.g., motivation, environmental knowledge, awareness, values, attitudes, emotion, locus of control, responsibilities and priorities) and external factors (e.g., institutional, economic social and cultural factors). EDR fits into the environmental knowledge, values, attitudes, and emotional involvement complex advocated by *Ewert and Galloway* (*2009*) where they found variables identified within these studies include: how significant others view behaviors related to the attitudes; demographic variables such as sex, age, or education; self-perceived ability to do the attitude-related behavior; attitude strength; and personal relevance of the attitude.

CONCLUSION AND RECOMMENDATION

This study demonstrated that the Turkish version of the scale is a valid and reliable instrument for recreational outdoor sports participants. The EDRS is a domain-specific tool, which directly measures the likelihood of a systematic bias in addressing questions related to the natural environment.

The most important limitation of this study was that the data were derived from one location, Ankara, Turkey. The instrument was applied to a convenient sample of participants in order to prevent the limitation of generalizability of the results. Nevertheless, the participants in Ankara were selected from three outdoor sport branches. Hence, the results obtained from this group could be generalised to other outdoor sport participants and other groups.

The second limitation of the study was that the scale was originally developed in the English language. It is recommended that future studies should develop an original scale in the Turkish language rather than adapting an existing instrument. However, this study is considered to be the first step in this direction. In order to further examine the validity of the scale, future studies could examine its correlation with other scales, and determine the validity and reliability of the scale for the other groups (academic personnel, students) participating in sports. Using this scale could make significant contributions to the measurement power. Future studies based on conducting the same adaptation procedures in order to make intercultural comparisons would make a valuable contribution to the studies of environment.

REFERENCES

Anderson, J.C., and Gerbing, D.W. 1988. "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach". *Psychological Bulletin* 103(3): 411-423.

Andrews, P., and Meyer, R.G. 2003. "Marlowe-Crowne Social Desirability Scale and Short Form C: Forensic Norms" *Journal of Clinical Psychology* 59(4): 483-492.

Arnocky, S., and Stroink, M.L. 2011. "Variation in Environmentalism among University Students: Majoring in Outdoor Recreation, Parks, and Tourism Predicts Environmental Concerns and Behaviors". *The Journal of Environmental Education* 42(3): 137-151.

Bjerke, T., and Kleiven, J. 2006. "Outdoor Recreation Interests and Environmental Attitudes in Norway". *Managing Leisure* 11(2): 116-128.

Byrne, B.M., Shavelson, R.J., and Muthén, B. 1989. "Testing for the Equivalence of Factor Covariance and Mean Structures: The Issue of Partial Measurement Invariance". *Psychological Bulletin* 105(3): 456-466.

Crowne, D.P. and Marlowe, D. 1960. "A New Scale of Social Desirability Independent of Psychopathology". *Journal of Consulting Psychology* 24(4): 349-354.

De Frias, C.M. and Dixon, R.A. 2005. "Confirmatory Factor Structure and Measurement İnvariance of the Memory Compensation Questionnaire". *Psychological Assessment* 17(2): 168-178.

Demirel, M., Gürbüz, B., and Karaküçük, S. 2009. "Effects of Recreational Activities Participation on Environmental Attitudes and Reliability and Validity of New Ecological Paradigm Scale". *Spormetre Journal of Physical Education and Sport Sciences* 7(2): 47-50.

Dunlap, R., Liere, K.V., Mertig, A., and Jones, R.E. 2000. "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale". *Journal of Social Issues* 56(3): 425-442.

Ellingson, J.E., Smith, D.B., and Sackett, P.R. 2001. "Investigating the Influence of Social Desirability on Personality Factor Structure". *Journal of Applied Psychology* 86(1): 122-123.

Ewert, A. and Baker, D. 2001. "Standing for Where You Sit an Exploratory Analysis of the Relationship Between Academic Major and Environment Beliefs". *Environment and Behavior* 33(5): 687-707.

Ewert, A., and Galloway, G. 2009. "Socially Desirable Responding in an Environmental Context: Development of a Domain Specific Scale". *Environmental Education Research* 15(1): 55-70.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., and Strahan, E. J. 1999. "Evaluating the Use of Exploratory Factor Analysis in Psychological Research". *Psychological Methods* 4(3), 272-299.

Field, A. 2005. Discovering Statistics Using SPSS: And Sex, Drugs and Rock'n'Roll. SAGE Publications. 665-719 pp.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., and Tatham, R.L. 2009. Multivariate Data Analysis. Pearson Prentice Hall. 91-149 pp.

He, J., van de Vijver, F.J.R., Espinosa, A.D., Abubakar, A., Dimitrova, R., Adams, B.G., Aydinli, A., Atitsogbe, K., Alonso-Arbiol, I., Bobowik, M., Fischer, R., Jordanov, V., Mastrotheodoros, S., Neto, F., Ponizovsky, Y.J. Reb, J., Sim, S., Sovet, L. Stefenel, D., Suryani, A.O., Tair, E., Villieux, A. 2015. "Socially Desirable Responding Enhancement and Denial in 20 Countries". *Cross-Cultural Research* 49(3): 227-249.

Herrera, R.S., DelCampo, R.L., and Ames, M H. 1993. "A Serial Approach for Translating Family Science Instrumentation". *Family Relations* 42(3):357-360.

Holtgraves, T. 2004. "Social Desirability and Self-reports: Testing Models of Socially Desirable Responding". *Personality and Social Psychology Bulletin* 30(2), 161-172.

Hooper, D., Coughlan, J., and Mullen, M. 2008. "Structural Equation Modelling: Guidelines for Determining Model Fit". *Electronic Journal of Business Research Methods* 6(1): 53-60.

Hu, L.T. and Bentler, P.M. 1999. "Cutoff Criteria for Fit Indexes In Covariance Structure Analysis: Conventional Criteria Versus New Alternatives". *Structural Equation Modeling: A Multidisciplinary Journal* 6(1): 1-55.

Jackson, D.L., Gillaspy Jr., J.A., and Purc-Stephenson, R. 2009. "Reporting Practices in Confirmatory Factor Analysis: An Overview and Some Recommendations". *Psychological Methods* 14(1): 6-23.

Kam, C. 2013. "Probing Item Social Desirability by Correlating Personality Items with Balanced Inventory of Desirable Responding (BIDR): A Validity Examination". P*ersonality and Individual Differences* 54(4): 513-518.

Kennedy, E.H., Beckley, T.M., McFarlane, B.L., and Nadeau, S. 2009. "Why We Don't "Walk The Talk": Understanding the Environmental Values/Behaviour Gap in Canada". *Human Ecology Review* 16(2): 151-160.

Klem, L. 2000. "Structural Equation Modeling". In: Reading and Understanding More Multivariate Statistics (eds. G.G. Laurence and P.R. Yarnold). American Psychological Association, Washington DC. pp. 227-260.

Kline, R.B. 2010. Principles and Practice of Structural Equation Modeling. Guilford Press. 23-264 pp.

Kollmuss, A. and Agyeman, J. 2002. "Mind the Gap: Why Do People Act Environmentally and What are the Barriers to Pro-Environmental Behavior?" *Environmental Education Research* 8(3): 239-260.

Kroner, D.G. and Weekes, J.R. 1996. "Balanced İnventory of Desirable Responding: Factor Structure, Reliability, and Validity with an Offender Sample". *Personality and Individual Differences* 21(3): 323-333.

Loving, T.J. and Agnew, C.R. 2001. "Socially Desirable Responding in Close Relationships: A Dual-Component Approach and Measure". *Journal of Social and Personal Relationships* 18(4): 551-573.

Maiteny, P.T. 2002. "Mind in the Gap: Summary of Research Exploring 'İnner' İnfluences on Pro-Sustainability Learning ond Behaviour". *Environmental Education Research* 8(3): 299-306.

Marsh, H.W. and Hocevar, D. 1988. "A New, More Powerful Approach to Multitrait-Multimethod Analyses: Application of Second-Order Confirmatory Factor Analysis". *Journal of Applied Psychology* 73(1): 107-117.

Marsh, H.W., Balla, J. R., and McDonald, R.P. 1988. "Goodness-of-Fit Indexes on Confirmatory Factor Analysis: The Effect of Sample Size". *Psychological Bulletin* 103(3): 391-410
.

Marsh, H.W. and Balla, J. 1994. "Goodness of Fit on Confirmatory Factor Analysis: The Effects of Sample Size and Model Parsimony". *Quality and Quantity* 28(2): 185-217.

Marsh, H.W., Hau, K.T., Artelt, C., Baumert, J., and Peschar, J.L. 2006. "OECD's Brief Self-Report Measure of Educational Psychology's Most Useful Affective Constructs: Cross-Cultural, Psychometric Comparisons Across 25 Countries". *International Journal of Testing* 6(4): 311-360.

Nunnally, J.C. and Bernstein, I.H. 1994. Psychometric Theory. McGraw Hill Press. 248-292 pp.

O'Connor, B. P. 2000. "SPSS and SAS Programs for Determining the Number of Components Using Parallel Analysis and Velicer's MAP Test". *Behavior Research Methods* 32(3), 396-402.

Ones, D.S., Viswesvaran, C., and Reiss, A.D. 1996. "Role of Social Desirability on Personality Testing for Personnel Selection: The Red Herring" *Journal of Applied Psychology* 81(6): 660-679.

Paulhus, D.L. 1991. "Measurement and Control of Response Bias". In: Measures and personality and Social Psychological Attitudes (eds. J. P. Robinson, P. R. Shaver and L.S. Wrightsman). Academic Press. pp 17-59.

Paulhus, D.L. 2002. "Socially desirable responding: The evolution of a construct". In: The Role of Constructs in Psychological and Educational Measurement (eds. H. I. Braun, D.N. Jackson, and D.E. Wiley). Lawrence Erlbaum, Mahwah NJ. pp. 49-69.

Sârbescu, P., Costea, I., and Rusu, S. 2012. "Psychometric Properties of the Marlowe-Crowne Social Desirability Scale in a Romanian Sample". *Procedia-Social and Behavioral Sciences* 33: 707-711.

Schacter, D.L. 1999. "The Seven Sins of Memory: Insights from Psychology and Cognitive Neuroscience". *American Psychology* 54:182–203.

Stern, P.C., Dietz, T., and Guagnano, G.A. 1995. "The New Ecological Paradigm in Social-Psychological Context". *Environment and Behavior* 27(6): 723-743.

Sullman, M.J., and Taylor, J.E. 2010. "Social Desirability and Self-Reported Driving Behaviours: Should We be Worried?" *Transportation Research Part F: Traffic Psychology and Behaviour* 13(3): 215-221.

Tabachnick, B.G. and Fidell, L.S. 2014. "Using Multivariate Statististics", 6th Ed. Boston, Pearson. pp. 659-730.

Thapa, B. 1999. "Environmentalism: The Relation of Environmental Attitudes and Environmentally Responsible Behaviors Among Undergraduate Students". *Bulletin of Science, Technology and Society* 19(5): 426-438.

Williams, B., Brown, T., and Onsman, A. 2012. "Exploratory Factor Analysis: A Five-Step Guide for Novices". *Australasian Journal of Paramedicine*, 8(3): 1-13.

Wood, N.D., Akloubou Gnonhosou, D.C., and Bowling, J.W. 2015. "Combining parallel and exploratory factor analysis in identifying relationship scales in secondary data". *Marriage & Family Review*, 51(5), 385-395.

Zerbe, W.J. and Paulhus, D.L. 1987. "Socially Desirable Responding in Organizational Behavior: A Reconception". *Academy of Management Review* 12(2): 250-264.