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Adaptation and Validation of Ecological Identity Scale (EIS) on a Sample of Participants From Serbia: A Preliminary Study[1]*

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Abstract

Studying environmental identity is crucial for understanding diverse relationships between people and the natural world, which has direct implications for fostering pro-environmental attitudes and behaviors. The aim of this research was to adapt the Ecological Identity Scale into Serbian and examine the psychometric characteristics of the adapted version in comparison to the original version, using a sample of participants from Serbia. The sample consisted of 146 participants (M_{age} = 34.21, SD_{age} = 13.41, Min = 18, Max = 67), of whom 66.4% were female. To assess the construct validity of the adapted scale, confirmatory factor analysis was conducted. The results indicate that the same number of dimensions showed in both the original and adapted versions of the scale (sameness, differentiation and centrality). The assessment of convergent validity, conducted by comparing the scores obtained on the Ecological Identity Scale with those from the Revised Ecological Identity Scale and the New Ecological Paradigm Scale, supports the scale's convergent validity. The nomological network of the adapted version was examined by calculating correlations between the Ecological Identity Scale scores and measures of self-transcendence and self-enhancement, with the results largely supporting its equivalence to the nomological network of the original scale. The internal validity of the scale was assessed through the relationships between its measures, and the results support this aspect of validity. The scale demonstrated satisfactory internal consistency reliability in the current sample. Despite the study's limitations, the adapted version of the scale can be used for assessing ecological identity with some caution and primarily for research purposes to allow for potential modifications of the instrument.

Keywords: ecological identity, Ecological Identity Scale, adaptation, validation.

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Introduction

In today's world, one of the most pressing issues is the condition of the environment and the need for its protection and preservation. Identity can enhance our understanding of individual responses to climate change, especially when taking climate action reflects a person's sense of self (Vesely et al., 2021). In this context, the development of ecological identity plays a crucial role, as it lays the foundation for pro-environmental behavior that can ensure a sustainable and meaningful existence for both present and future generations. Ecological identity refers to the way individuals relate to nature, encompassing their connection to it on cognitive, emotional, and behavioral levels. It involves gaining knowledge about the natural world, forming emotional bonds with it, and expressing these bonds through environmentally responsible actions (Marković et al., 2024).

Literature Review

Ecological Identity

Ecological psychology has been explored since the 1970s early research focusing on predictors of environmental concern and related behaviors (Perrin & Benassi, 2009). Later studies shifted toward examining identity, questioning whether it is based solely on self-perception or also shaped by social group membership and role-based experiences (Stets & Burke, 2000).

Some authors argue that the literature contains multiple, competing, and often ambiguous meanings of ecological identity, making the concept not entirely clear (Dunlap & McCright, 2008). It is also known as the ecological self and refers both to the degree and the ways in which an individual perceives and experiences themselves as part of the social and biophysical (ecological) system (Walton & Jones, 2018). It pertains to the extent to which a person perceives themselves as part of a broader, integrated system characterized by mutually beneficial processes and an interconnected network of relationships (Walton & Jones, 2018; Hayes-Conroy & Vanderbeck, 2005).

Ecological identity is reflected in individuals' choices and behaviors across various life domains, such as daily decisions, careers, and social or political engagement (Tomashow, 1996). It encompasses both personal and social dimensions and functions as a role identity, influencing group affiliations and roles individuals assume within those groups (Stets & Burke, 2000; Zavestoski, 2003).

Measuring Ecological Identity

A review of the literature and existing instruments suggests that most tools have been developed to examine constructs within the domain of environmental psychology, while significantly fewer instruments have been designed specifically to operationalize ecological identity and its various aspects.

Some authors have explored and measured the relationship between an individual and their natural environment, offering insights into the operationalization of ecological identity. Examples include: *The Inclusion of Nature in the Self (INS)* scale (Schultz, 2001), initially developed as a single-item implicit measure and later adapted into an *Implicit Association Test* (Schultz et al., 2004); *The Environmental Identity Scale (EI)* (Stets & Biga, 2003; 11 items); *The Mayer-Frantz Connectedness to Nature Scale (CNS)* (Mayer & Frantz, 2004), an explicit, one-dimensional measure of emotional attachment to nature (14 items); *The Connectivity with Nature Scale (CWN)* (Dutcher et al., 2007; 5 items); *The Nature Relatedness Scale (NR)* (Nisbet et al., 2009), which consists of three dimensions (emotional, cognitive, and experiential; 21 items), along with a shorter version (*Nature Relatedness Short Version (NR6)*; Nisbet & Zelenski, 2013; 6 items); *The Love and Care for Nature (LCN) Scale* (Perkins, 2010; 15 items).

In order to operationalize the relationship between identity and the natural environment, Clayton (2003) developed the *Environmental Identity Scale (EID)*, which consists of 12 items and measures individual differences in a stable sense of interdependence and connection with nature. Over time, the instrument has been modified and the latest version titled the *Revised Environmental Identity Scale* (Clayton et al., 2021), which consists of 14 items. This scale has been adapted for use in different cultural contexts, including a validated version for a Croatian sample (Anđić & Hadela, 2021).

The authors of the *Ecological Identity Scale*, which was adapted and validated in this study (Walton & Jones, 2018), argue that while various ecological identity operationalizations are used worldwide, they do not encompass all dimensions or aspects of ecological identity. They acknowledge that some scales are more comprehensive than others (Clayton et al., 2021; Stets & Biga, 2003) but also highlight certain shortcomings. They note that the Environmental Identity Scale (EI) (Stets & Biga, 2003) primarily focuses on individual foundations of ecological identity. Moreover, they argue that both the Revised Environmental Identity Scale (Clayton et al., 2021) and the Environmental Identity Scale (Clayton, 2003) are conceptualized based solely on individual experiences resulting from direct interaction with the environment and beliefs related to membership in ecological groups. The authors suggest that they overlook key aspects of construct, differentiation and centrality (the tendency of identity to be activated) which are fundamental characteristics from the perspective of Identity theory.

Correlates of Ecological Identity

People who see themselves as environmentally conscious are more likely to engage in behaviors that protect the environment (Burke & Stets, 2009). Repeated pro-environmental actions help express and reinforce ecological identity. A strong ecological worldview—seeing ecology as central to life—also supports this identity (Dunlap et al., 2000). The New Ecological Paradigm Scale measures such views (Dunlap et al., 2000), which shape how individuals perceive the world. While worldview reflects one's outlook, identity reflects how one lives within it. Thus, a pro-environmental worldview often fosters an ecological identity, which is closely linked to personal responsibility and a deep connection with nature (Walton & Jones, 2018). Additionally, the results of meta-analyses indicate the existence of a significant overall effect, precisely, that both Ecological Worldview and Connectedness to Nature are good predictors of Environmental Identity (Veljković et al., 2021).

Research indicates that individuals who prioritize others and the collective, reflecting self-transcendence values, are more likely to develop a strong ecological identity (Walton & Jones, 2018). These values relate to social values, self-transcendence values, and self-enhancement values, which represent trans-situational goals and beliefs about desired end states of existence and the principles that guide achieving such states (Schwartz, 1992; Schwartz, 2012). Self-transcendence values foster self-awareness, concern for others, and care for nature, increasing the likelihood of adopting environmentally protective roles (Schwartz, 2012). Studies have shown strong links between these values, ecological identity, and pro-environmental attitudes (Clayton, 2003; Steg & de Groot, 2012; Stern et al., 1995). In contrast, those who prioritize personal status, control, success, and self-enhancement values, are less likely to form an ecological identity. Self-enhancement or self-promotion values motivate people to satisfy their own needs, strive for personal success, achieve prestige, and exert control or dominance over resources and other people (Schwartz, 2012). These values are associated with egoistic, individualistic motivations and a sense of separation from others and the natural world (Colvin et al., 1995; Steg & de Groot, 2012). Self-transcendence and self-enhancement thus represent opposing motivational orientations that shape one's relationship to the ecological and social world. When environmental protection is central to one's identity, it can indirectly influence broader drivers of pro-environmental behavior, such as ecological worldview and self-transcendence values (Walton & Jones, 2018). These values are expressed through identity, which serves as a specific channel linking values to behavior (Hitlin, 2003). Identity thus bridges abstract values and concrete environmental actions, even in uncertain contexts (Leary et al., 2011). Walton and Jones (2018) propose that internalizing ecological identity enables consistent expression of values and worldview through environmental engagement. Results of meta-analyses suggest robust, medium-sized to strong links of both pro-environmental intentions and environmental self-identity (Vesely et al., 2021) and that overall identity associates pro-environmental behavior with a medium Pearson's r (Udall et al., 2021).

The Ecological Identity Scale and Psychometric Characteristics Obtained in Previous Studies

Walton and Jones (2018) developed the Ecological Identity Scale from a cognitive perspective, grounded in Identity Theory (Stets & Burke, 2000) and Social Identity Theory (Tajfel & Turner, 1979). The scale's items reflect key theoretical aspects linked to sustainable consumer behavior, emphasizing that identification with an issue is necessary for meaningful action (Walton & Jones, 2018). While it was once thought that limited knowledge hindered sustainable behavior, a study with adolescents found that a positive attitude toward nature was a stronger predictor of sustainable consumer behavior than ecological knowledge alone (Roczen et al., 2014).

The instrument includes 18 items and was designed to capture different aspects of ecological identity: *sameness, differentiation,* and *centrality*, within a broader socio-ecological context. Building on previous scales (e.g., Clayton et al., 2021; Stets & Biga, 2003), the authors added differentiation and centrality to the existing identification dimension. *Sameness* measures the stability of one's ecological identity at both personal and group levels, including feelings of connectedness with nature and identification with environmentally conscious groups. *Differentiation* captures how individuals distinguish themselves from anti-ecological traits, roles, or groups. *Centrality* assesses how central ecological identity is to a person's self-concept and how often it influences behavior. The scale thus integrates not only identification with pro-environmental individuals but also differentiation from non-ecological influences and the importance of ecological identity in everyday life.

The scale was adapted on a sample of students from Turkey (Gezer & Ilhan, 2018). Exploratory factor analysis supported retaining three factors, confirmed by CFA with acceptable fit indices (model characteristics: $\chi^2/df = 2.02$, RMSEA = .069, SRMR = .071, NFI = .90, NNFI = .94, CFI = .94, IFI = .94). The internal consistency was generally satisfactory (sameness $\alpha = .85$; differentiation $\alpha = .66$; centrality $\alpha = .77$, total $\alpha = .78$). In a Portuguese sample (Neves, 2021), initial confirmatory factor analysis of the three-factor model showed poor fit. After removing four items, a 14-item version achieved acceptable fit, which improved to good fit following the addition of correlated residuals ($\chi^2_{(70)} = 206.413$, $p = .000$, $\chi^2/df = 2.949$, CFI = .964, TLI = .953, RMSEA = .061). The internal consistency was satisfactory (sameness $\alpha = .88$; differentiation $\alpha = .82$; centrality $\alpha = .83$, total $\alpha = .87$).

It is important to note that several limitations of both the original study and subsequent validation studies warrant attention. The authors of the original study (Walton & Jones, 2018) did not clearly define the exact number of dimensions of the Ecological Identity Scale. Although they propose three dimensions—sameness, differentiation, and centrality—based on theory, they also suggest the scale may be unidimensional and that these dimensions emerge dynamically. They used principal component analysis instead of exploratory factor analysis which found that the first component (41% variance) captures core ecological identity aspects, such as identification with nature and valuing environmental protection, considered primary.

The authors consider these characteristics to be of primary importance in ecological identification. The second (differentiation) and third (centrality) components are seen as secondary. Notably, the original study also did not include confirmatory factor analysis which is one of the notable psychometric shortcomings. Similar issues appear in translated versions, where initial CFA results showed poor fit and were extensively modified based on data-driven decisions which raised concerns about overfitting and violating core principles of CFA. Furthermore, neither the original study nor the Portuguese adaptation (Neves, 2021), as can be seen from the previously mentioned text, offers strong support for a stable three-factor structure. The need for different post hoc modifications across studies undermines the argument for structural equivalence.

However, this instrument was adapted and validated because it assesses how individual and group-based ecological identity influence environmental action. Although an adapted Revised Environmental Identity Scale exists in the Bosnian-Croatian-Montenegrin-Serbian region (Anđić & Hadela, 2021), it measures only one dimension. In contrast, the scale used in this study captures a broader range of key aspects, as emphasized by its original authors.

The main goal of this study was to adapt and validate the Ecological Identity Scale using a sample of participants from Serbia. The equivalence of the factor structure of the adapted version of the scale with that of the original was examined through confirmatory factor analysis. Convergent validity was assessed by calculating correlations between scores on the Ecological Identity Scale and scores on the New Ecological Paradigm Scale (Dunlap et al., 2000) and the Revised Ecological Identity Scale (Clayton et al., 2021). Additionally, the equivalence of the nomological network of the adapted version was examined by correlating it with measures of social values, gender and age. Finally, interscale correlations among the scale's dimensions were calculated, and internal consistency reliability was assessed. All analyses were conducted based on the empirical findings presented in the previous sections.

Method

Sample and Procedure

From a convenience sample of 157 participants, 11 were excluded (8 failed attention checks and 3 were multivariate outliers), resulting in 146 participants. Most were female (66.4%), while males comprised 33.6%. The mean age was 34.21 years (SD = 13.41), ranging from 18 to 67. Regarding educational attainment, 41.1% completed high school, 41.8% held a university degree or higher, 4.1% had only primary education, and 13% completed vocational education. The mean score of satisfaction with participants' financial situation related to households was 2.98 (SD = 1.14).

The participants were recruited online (Google Forms via social media and personal contacts; 86) and offline (71) via social media and personal contacts.

Participation was anonymous, voluntary, with informed consent provided. The only inclusion criterion was being 18 years or older. Permission to use the original scale was obtained. The adaptation used a back-translation method with two independent translators. Ethical approval was granted by the Ethics Committee of the Department of Psychology, Faculty of Philosophy in Niš (approval no. 6-2024).

Instruments

Sociodemographic variables: gender, age, level of education, socio-economic status (subjective assessment of satisfaction with family income, five-point Likert scale (extreme values: 1 - *Strongly disagree*; 5 - *Strongly agree)*).

Ecological Identity Scale (EIS; Walton & Jones, 2018). The instrument consists of 18 items. It was conceptualized to establish a connection between different forms of identification with nature and the environment (*sameness*, *differentiation*, and *centrality*), but the instrument is conceptualized so that it can also be one-dimensional. Respondents are required to indicate their level of agreement with each statement on a five-point Likert scale (extreme values for items 1 through 12: 1 - *Strongly disagree*; 5 - *Strongly agree;* for items 13 through 15: 1 - *Not at all likely;* 5 - *Very likely*; for item 16: 1 - *Not at all close*; 5 - *Very close*; for item 17: 1 - *Not at all important*; 5 - *Very important*; for item 18: 1 - *Do not play a role at all*; 5 - *Play a very significant role*). The adaptation used a back-translation method with two independent translators.

The New Ecological Paradigm Scale (Dunlap et al., 2000). This scale is designed to assess respondents' pro-ecological attitudes. It consists of 15 statements. Within the scale, two dimensions can be operationalized, measuring two different orientations: *the NEP orientation* (*New Ecological Paradigm Orientation*) and *the DSP orientation* (*Dominant Social Paradigm Orientation*). *NEP orientation* focused on beliefs about humanity's ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity's right to rule over the rest of nature (item example: "Plants and animals have as much right as humans to exist"). *DSP orientation* consists of the traditional values, attitudes, and beliefs (anthropocentric) (item example: "The so-called "ecological crisis" facing humankind has been greatly exaggerated"). The respondent is required to indicate their level of agreement with each statement on a five-point Likert scale (extreme values: 1 - *Strongly disagree*; 5 - *Strongly agree*).

The Revised Environmental Identity Scale (EID-R; Clayton et al., 2021; for Croatian adaptation see Anđić & Hadela, 2021). The scale consists of 14 statements. Respondents are required to indicate their level of agreement with each statement on a seven-point Likert scale (extreme values: 1 - *Does not apply to me at all*; 7 - *Fully applies to me*).

The Portrait Values Questionnaire (Schwartz et al., 2001) is designed to examine the values that respondents hold by presenting them with various descriptions of values that people may have in their lives. It consists of 21 statements that operationalize

10 different values (*Benevolence, Universalism, Self-Direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity,* and *Tradition*). The dimensions considered in this study were *Benevolence, Universalism, Hedonism, Achievement*, and *Power*. Respondents are required to indicate their level of agreement with each description of people provided in the statements, assessing how similar each described person is to them on a six-point Likert scale (extreme values: 1 – *Very much like me*; 6 – *Not like me at all*; the sum scores were calculated after inverting the responses).

A single-item marker for checking attention and response validity among participants ("Please, as a sign that you are reading carefully, select "Strongly agree" or "7" " and "Please, as a sign that you are reading carefully, select "Not at all like me" or "1" ").

Data Processing

Participants who failed the attention check (item 8) and three multivariate outliers were excluded from the analysis. The factor structure of the Ecological Identity Scale was assessed using JASP. After examining the multivariate distribution (kurtosis and critical values), substantial deviations from multivariate normality were observed, therefore, a robust estimation method, diagonally weighted least squares (DWLS) was employed (Mindrila, 2010; Petrović et al., 2020). Model fit was evaluated using several indices: chi-square test; RMSEA (< .06 good, < .08 acceptable); SRMR (< .08 good); CFI and TLI (> .90 acceptable, > .95 good) (Brown, 2015; Browne & Cudeck, 1993; Hu & Bentler, 1999, cited in Pedović et al., 2022). Internal consistency was measured with Cronbach's alpha and McDonald's omega using JASP. Normality tests guided the use of parametric correlations, and external validity and inter scale correlations were examined via Pearson's correlations using SPSS 20.0.

Results

Descriptive statistics for all study variables are presented in Table 1.

Table 1
Descriptive Statistical Indicators of the Variables Used in the Study

Variable	Min	Max	*M*	*SD*	*Sk*	*Ku*	α	ω
Sameness	1.57	5.00	3.69	0.82	-0.50	-0.26	.93	.93
Differentiation	2.00	5.00	3.90	0.84	-0.71	-0.40	.85	.86
Centrality	1.33	5.00	3.80	0.99	-0.92	-0.03	.94	.94
Environmental identity - R	1.57	7.00	5.35	1.50	-1.16	0.21	.97	.97
Benevolence	2.50	6.00	4.85	1.03	-0.83	-0.20	.68*	/
Universalism	2.00	6.00	4.76	0.96	-0.56	-0.47	.69	.76
Hedonism	1.00	6.00	3.95	1.17	-0.10	-0.50	.68*	/

Achievement	1.00	6.00	4.25	1.10	-0.54	0.22	.51*	/
Power	1.00	5.50	3.34	1.17	-0.18	-0.52	.33*	/
NEP orientation	1.38	5.00	3.83	0.78	-1.24	1.17	.84	.85
DSP orientation	1.29	4.57	2.76	0.74	0.65	-0.06	.75	.78
Ecological identity (mean score)	1.84	5.00	3.79	0.76	-0.90	0.26	.95	.95

Note. Environmental identity – R – the mean score obtained on the Revised Environmental Identity Scale (Clayton et al., 2021); NEP orientation – New Ecological Paradigm Orientation; DSP orientation – Dominant Social Paradigm Orientation; *Omega coefficients were not calculated for four PVQ values scales because there were only two items per scale and we reported Pearson's correlation coefficients between two items than an alpha coefficient

Examination of Factor Structure

Confirmatory factor analysis was conducted using JASP. Due to multivariate non-normality (kurtosis = 59.011; c.r. = 13.827), Diagonal Weighted Least Squares (DWLS) estimation method was used to assess the difference between the empirical and theoretical intercorrelation matrices. This estimation method was chosen because it has been shown to be suitable in situations where the assumption of multivariate normality is violated or when data are measured at an ordinal level (Mindrila, 2010). This method has been demonstrated to produce accurate and precise parameter estimates under such conditions, as it calculates robust chi-square values and fit indices, applying a correction for non-normal data distributions (Mindrila, 2010). Several models were tested based on prior studies: a one-factor model (due to authors suggesting that the latent structure of the scale can be viewed as unidimensional; Walton & Jones, 2018), a two-factor model with uncorrelated factors (due to the high correlation obtained between sameness and centrality (which were considered as a single factor) and differentiation and three-factor model conceptualized with correlations allowed between all factors (Gezer & Ilhan, 2018; Neves, 2021) (Table 2).

Table 2

Absolute Fit Indices and Incremental Fit Indices of the Examined Models

Model	χ^2	*df*	CFI	TLI	RMSEA	RMSEA 90% CI		SRMR
One-factor model	996.863*	135	.903	.890	.210	.198	.222	.148
Two-factor model (with uncorrelated factors)	1.306.929*	135	.898	.885	.215	.203	.227	.238
Three-factor model (with correlated factors)	331.999*	132	.977	.974	.102	.089	.116	.075

Note. * $p < .001$

The three-factor model with correlated factors showed the best fit for the data ($\chi^2(132) = 331.999$, $p < .001$; SRMR = .075; CFI = .977; TLI = .974; RMSEA = .102). Although the chi-square test was significant, it is often sensitive to sample size and not solely relied upon (Cherry, 2005; Schermelleh-Engel et al., 2003; Vandenberg, 2006, as cited in Gallagher et al., 2008); other indices suggest a mostly good fit. Both CFI and TLI indicated good fit, SRMR was acceptable, but RMSEA did not meet the acceptable threshold. Overall, the model shows a partially good fit. Additionally, the results indicate that the value of the CFI index supports the notion of acceptable model fit when considering the one-factor model. The TLI index is close to the threshold value of .90, at which point it could be interpreted as indicating acceptable fit, a level that could be achieved by adding correlated residuals between pairs of items. Other fit indices, however, do not indicate an acceptable model fit.

Examination of Convergent Validity

The obtained results indicate a statistically significant correlation between the dimensions within the Ecological Identity Scale, the Revised Ecological Identity Scale (Clayton et al., 2021), and the New Ecological Paradigm Scale (Dunlap et al., 2000) (Table 3).

The Ecological Identity Scale's dimensions (sameness, differentiation, centrality) and overall score show significant moderate positive correlations with the Revised Ecological Identity Scale. These dimensions and the overall score also correlate moderately and positively with the dimensions of New Ecological Paradigm Orientation Scale. Differentiation, centrality, and the overall score correlate negatively (low to moderate) with the Dominant Social Paradigm Orientation, while sameness shows no significant correlation with it.

Table 3

Pearson Correlation Coefficients Between the Dimensions of the Ecological Identity Scale, Revised Ecological Identity Scale and New Ecological Paradigm Scale

	Environmental identity - R	NEP-O	DSP-O
Sameness	.56**	.56**	-.15
Differentiation	.40**	.56**	-.54**
Centrality	.54**	.65**	-.22**
Ecological identity (mean score)	.59**	.69**	-.35**

Note. Environmental identity - R – the mean score obtained on the Revised Environmental Identity Scale (Clayton et al., 2021); NEP-O – New Ecological Paradigm Orientation; DSP-O – Dominant Social Paradigm Orientation; *$p < .05$; **$p < .01$

Examination of the Nomological Network

The assessment of external validity was conducted through an examination of the nomological network. Pearson correlation coefficients were calculated between the measures of the dimensions of the Ecological Identity Scale, as well as the overall measure obtained on this scale, the measures of social values (Benevolence, Universalism – self-transcendence values; Hedonism, Achievement, and Power – self-enhancement values), gender and age. Moreover, variables from all three instruments were included to enable comparison.

Table 4

Pearson Correlation Coefficients Between the Dimensions of the Ecological Identity Scale and External Variables

	S	D	C	EI (ms)	EI-R	NEP-O	DSP-O
Benevolence	.34**	.24**	.30**	.34**	.66**	.26**	-.17*
Universalism	.47**	.40**	.45**	.52**	.69**	.43**	-.32**
Hedonism	.09	.06	.06	.08	.23**	.15	-.06
Achievement	.05	.11	-.03	.05	.16	.08	-.07
Power	-.29**	-.19*	-.33**	-.32**	-.29**	-.29**	.08
Gender	.17*	.16*	.24**	.23**	.32**	.30**	.01
Age	.10	-.07	.10	.05	.06	-.01	.05

Note. S – Sameness; D – Differentiation; C – Centrality; EI(ms) – Ecological identity (mean score); EI-R – the mean score obtained on the Revised Environmental Identity Scale (Clayton et al., 2021); NEP-O – New Ecological Paradigm Orientation; DSP-O – Dominant Social Paradigm Orientation; *Note*: *$p < .05$; **$p < .01$

The obtained results (Table 4) indicate a statistically significant correlation between the measures of the dimensions within the scale, as well as the overall measure on the Ecological Identity Scale, the social values of Benevolence and Universalism (self-transcendence values; negative correlation), Power (self-enhancement value; positive correlation) and gender (positive correlation).

Interscale Correlations

The original authors (Walton & Jones, 2018) and subsequent adaptations (Gezer & Ilhan, 2018; Neves, 2021) did not report interscale correlations. However, in this study Pearson's correlations were calculated to examine relationships between the scale's dimensions. It was hypothesized that all dimensions would show significant positive correlations, consistent with the theoretical framework.

The obtained results indicate that there are statistically significant positive correlations between all dimensions within this scale (moderate to high intensity (Table 5).

Table 5
Pearson Correlation Coefficients Between the Dimensions of the Ecological Identity Scale

Variable	Differentiation	Centrality	EI (ms)
Sameness	.45**	.83**	.89**
Differentiation		.49**	.74**
Centrality			.92**
EI (ms)			

Note. EI(ms) – Ecological identity (mean score); *$p < .05$; **$p < .01$

Discussion

The main goal of this study was the adaptation and validation of the adapted version of the Ecological Identity Scale (Walton & Jones, 2018) on a sample of participants from Serbia. Therefore, adapting this instrument could contribute to raising awareness about environmental problems, encouraging people to think more actively about their potential impact on the environment. Given the global importance of environmental issues, such an instrument can help raise awareness and promote environmental consciousness at the individual level. While the BCMS region has a unidimensional ecological identity measure (Anđić & Hadela, 2021), it lacks the multidimensional perspective of this scale. Given the original scale's United States context, this study examined its reliability and validity within the BCMS cultural and social setting.

The initial hypothesis was that the adapted Ecological Identity Scale would replicate the original's factor structure, three-factor or one-factor, though the original authors did not specify the optimal solution or conduct confirmatory factor analysis (Walton & Jones, 2018). Confirmatory factor analysis in this study showed the three-factor model with correlated factors achieved acceptable fit, generally supporting the hypothesis. However, it is important to mention again that the characteristics of the one-factor model were such that, based on the CFI index values, an acceptable model fit could be assumed, while the TLI value was close to the threshold of .90. With a small number of model modifications, the fit indices could be improved and would indicate acceptable model fit when considering a broader set of fit indices.

This study hypothesized and confirmed positive correlations between all Ecological Identity Scale dimensions (sameness, differentiation, centrality) and overall score with the Revised Ecological Identity Scale, supporting convergent validity. Previous studies did not examine the relationship between the Ecological Identity Scale (Walton & Jones, 2018) and the Revised Ecological Identity Scale (Clayton et al., 2021). Significant positive correlations with the New Ecological Paradigm (NEP) Scale (Dunlap et al., 2000) further supported convergent validity, consistent with the original study's moderate correlations ($r = .53$ to $.76$; Walton & Jones, 2018).

It was hypothesized that the Ecological Identity Scale's dimensions (sameness, differentiation, centrality) and overall score would positively correlate with self-transcendence values (Benevolence and Universalism) (Walton & Jones, 2018). This was confirmed, supporting the scale's external validity and equivalence with the original version of scale. Correlations were moderate compared to the original study's (Walton & Jones, 2018) moderate to high values (r = .54 to .81). Based on previous findings (Walton & Jones, 2018), it was also hypothesized that scores on all Ecological Identity dimensions would negatively correlate with self-enhancement values (Hedonism, Achievement, Power) (Walton & Jones, 2018). This was partially supported because no significant correlations were found between scores on Hedonism and Achievement, but a significant negative correlation was observed with Power values. These results are consistent with the study by Cheung et al. (2014), showing lower ecocentrism and personal norms among those emphasizing these values less. Previous research indicates people with strong self-transcendence values are more likely to form environmental self-identity, while those prioritizing self-enhancement are less likely to form it (van der Werff et al., 2014). Bearing in mind that self-transcendence values emphasize concern for others and the environment, promoting intrinsic motivation for environmental protection (Cheung et al., 2014; Slimak & Dietz, 2006), these results are expected.

It was hypothesized that there would be a statistically significant positive correlation between all the dimensions of the Ecological Identity Scale. It is once again important to note that the authors of the original version of the scale did not calculate interscale correlations (Walton & Jones, 2018). It can be said that this hypothesis was confirmed, meaning that the results support the internal validity. Therefore, these results and conclusions should be taken with caution, as the hypothesis was based on the theoretical framework of the scale, not on empirical data.

The hypotheses regarding the satisfactory reliability of internal consistency for the sameness, differentiation, and centrality dimensions, as well as the scale as a whole, were confirmed.

Limitations

The limitations primarily relate to the sample because the sample was convenient, consisting of a relatively small number of people (146 after excluding respondents), given that this is a validation study. Therefore, the results should be interpreted with caution because this is merely a preliminary study and that further research is necessary.

One notable limitation of the present study concerns the sampling strategy. The use of a convenience sample, with a relatively small number of participants (N = 146 after exclusions), limits the generalizability and statistical power of the findings. Consequently, the results should be interpreted with caution. This study should be viewed as an initial step, and further research involving larger and more representative samples is essential to confirm and extend these findings.

Additionally, the sample was uneven in terms of gender, with female respondents predominantly making up the sample. For these reasons, the ability to generalize the obtained data is limited. Certainly, one of the necessary steps for future research is to include a larger, more heterogeneous sample. The recommendation for future researchers is that the sample could include high school students, as well as university students and older adults, in order to examine the differences between groups and to track the intensity of the experience of ecological identity.

Finally, it is important to highlight some limitations of the original study (Walton & Jones, 2018) and the validation study of this scale (Neves, 2021). The psychometric decisions made in the original study are subject to critique. Walton & Jones (2018) applied principal component analysis instead of exploratory factor analysis for dimensional exploration and did not conduct confirmatory factor analysis. Similar methodological concerns are evident in the translated validation study (Neves, 2021) where confirmatory factor analyses initially yielded poor model fit and were subsequently adjusted extensively based on data-driven modifications. Such an approach raises overfitting risks and violates basic principles of confirmatory analysis. Moreover, neither the original study nor the Portuguese adaptation (Neves, 2021) provided compelling evidence for a robust three-dimensional structure. Neves (2021) removed 4 items to show acceptable fit and added correlated residuals. The necessity of specifying different correlated residuals or removing some items across adaptations to attain acceptable model fit undermines the argument for structural equivalence between original and adapted version of scale. Moreover, given the high correlation observed between sameness and centrality, a more parsimonious two-factor model was also tested, but it did not prove to be the most adequate solution, with the note, once again, that neither the original study authors nor those of the validation study (Neves, 2021) reported them. Based on everything, we can say that the reliance on numerous post-hoc modifications across different adaptations to attain acceptable model fit indicates model instability rather than providing evidence of model confirmation. Authors of the original scale suggest that the biggest shortcoming of existing ecological identity operationalizations is considered to be their lack of content validity, however, the question arises as to whether the items from the Differentiation (especially the item: “I identify with large businesses and corporations”) constructs are adequate for the domain of ecological identity.

Conclusion

The results obtained in this study indicate that the same number of dimensions showed in both the original and adapted versions of the scale (sameness, differentiation and centrality). Convergent validity was supported by positive correlations between the Ecological Identity Scale scores and both the New Ecological Paradigm Scale and the Revised Ecological Identity Questionnaire. Correlations with self-transcendence values (Benevolence and Universalism) and self-enhancement values (Hedonism, Achievement, Power) partially supported equivalence in the nomological network

between the adapted and original scales. Interscale correlations supported the scale's internal validity, despite the lack of previous interscale correlation for comparison. The scale also demonstrated satisfactory internal consistency reliability.

Although the CFA results indicated that the one-factor model may not be the most adequate representation of the latent structure of the Ecological Identity Scale (despite the possibility of achieving acceptable model fit through minor modifications), the findings suggest stronger correlations with related constructs and external variables when the total score is used, that is, when the scale is treated as unidimensional. Additionally, the correlations between scores on the three individual aspects of ecological identity and the total scale score were high. Moreover, the overall scale also demonstrated satisfactory internal consistency reliability. Considering the above, this preliminary examination suggests that the scale captures three distinct dimensions of ecological identity. As such, it may serve as a useful tool for researchers and applied psychologists aiming to gain a more nuanced understanding of its latent structure. However, it can also be used as a unidimensional measure when a single, comprehensive indicator of ecological identity is sufficient.

This study contributes to understanding why some individuals adopt pro-environmental beliefs, attitudes, and values while others do not. We cautiously conclude that the scale can be used on Serbian samples for scientific research on ecological identity; however, given that this is only a preliminary study, further psychometric evaluation and modification are necessary.

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Adaptacija i validacija Skale ekološkog identiteta (Ecological Identity Scale – EIS) na uzorku ispitanika iz Srbije: preliminarna studija

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Apstrakt

Proučavanje ekološkog identiteta je važno jer nam pomaže da razumemo kako i zašto se ljudi odnose prema prirodnom svetu, što ima direktne implikacije na negovanje proekoloških stavova i ponašanja. Cilj ovog istraživanja bio je adaptacija na srpski jezik i ispitivanje psihometrijskih karakteristika adaptirane verzije Skale ekološkog identiteta u odnosu na originalnu verziju skale na uzorku ispitanika iz Srbije. Uzorak je činilo 146 ispitanika ($AS_{starost}$ = 34.21, $SD_{starost}$ = 13.41, $Min_{starost}$ = 18, $Max_{starost}$ = 67) od kojih su 66.4% bile ispitanice ženskog pola. Da bi se ispitala konstruktivna validnost adaptirane verzije skale, korišćena je konfirmatorna faktorska analiza. Dobijeni rezultati ukazuju na to da postoji jednak broj dimenzija koji se izdvaja u okviru originalne i adaptirane verzije skale (Istovetnost, Diferencijacija i Centralnost). Rezultati provere konvergentne validnosti preko računanja mera dobijenim na Skali ekološkog identiteta sa merama dobijenim na Revidiranoj skali ekološkog identiteta i Skale nove ekološke paradigme idu u prilog konvergentnoj validnosti. Nomološka mreža adaptirane verzije skale je ispitana računanjem korelacija između mera dobijenim u okviru Skale ekološkog identiteta i mera dobijenim na vrednostima samoprevazilaženja i samopoboljšanja i rezultati su uglavnom išli u prilog njenoj ekvivalenciji sa nomološkom mrežom originalne verzije skale. Interna validnost skale razmatrana je ispitivanjem međusobnih odnosa njenih mera i ti rezultati idu u prilog ovoj vrsti validnosti. Ova skala je pokazala zadovoljavajuću pouzdanost interne konzistencije na sadašnjem uzorku. Uprkos ograničenjima studije, adaptirana verzija skale se može koristiti za ispitivanje ekološkog identiteta, ali sa određenom dozom opreza i u naučno-istraživačke svrhe radi eventualne modifikacije instrumenta.

Ključne reči: ekološki identitet, Skala ekološkog identiteta, adaptacija, validacija.

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