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Janusz Surzykiewicz^{1,2}  Sebastian Binyamin Skalski-Bednarz^{1,3}  Loren L Toussaint⁴ 
 Łukasz Kwadrans⁵  Anna Kwiatkowska⁶  Karol Konaszewski⁷ 

¹*Catholic University of Eichstätt-Ingolstadt, Eichstätt, Germany*

²*Cardinal Stefan Wyszyński University in Warsaw, Warsaw, Poland*

³*University of Economics and Human Sciences in Warsaw, Warsaw, Poland*

⁴*Luther College, Department of Psychology, Decorah, IA, USA*

⁵*University of Silesia in Katowice, Institute of Pedagogy, Katowice, Poland*

⁶*Polish Academy of Sciences, Institute of Psychology, Warsaw, Poland*

⁷*University of Białystok, Faculty of Education, Białystok, Poland*

CORRESPONDING AUTHOR – Sebastian Binyamin Skalski-Bednarz, Sebastian.Skalski@ku.de

Measuring Human Relationships With Nature. Polish Adaptation of the Multidimensional AIMES Connection to Nature Scale

Abstract: ‘Return to nature’ has become a buzzword in both scientific and public discourse. The growing interest in this phenomenon calls for the development of reliable tools for scientific research, for example the adaptation of various connectivity to nature (CN) scales developed by researchers from other cultural circles and other countries. The purpose of this study is to evaluate the psychometric properties of a Polish version of the AIMES scale for multidimensional assessment of CN as conceptualized by Ives et al. (2018). Validation studies were conducted using a survey administered on Prolific, an online platform, with a sample of 516 Poles (56% of them women) aged 18-66. The Polish version of AIMES showed high internal consistency ($\alpha = .92$). Confirmatory factor analysis confirmed that the scale structure consists of a unified second-order factor with five first-order factors: attachment, identity, materialism, experiential, and spiritual. Relevance analysis showed significant positive associations of CN with perception of nature and silence, pro-environmental attitude and behaviour, psychological well-being, gratitude/awe, forgiveness, spirituality, extraversion, conscientiousness, and agreeableness, and a marginal positive association with openness to experience. The results strengthen the psychometric qualities of the AIMES scale, indicating its applicability to the study of CN in Polish contexts.

Keywords: *AIMES, scale, connection to nature, nature and silence, pro-environmental attitude*

The search for potential solutions that can halt the unfolding climate crisis (Hartig et al., 2007) and the health benefits (Twohig-Bennett & Jones, 2018) of exposure to nature have inspired social scientists to pay increasing attention to human-environment interaction, particularly in terms of an individual's connectivity with nature (CN). This phenomenon refers to the subjective sense of relationship with the natural world, including fauna, flora, and geological landforms (Martin & Czellar, 2016). The CN construct seems all the more important because, according to psychologists and educators, modern society's

disconnection from nature has been proposed as the root cause of the progressive climate crisis (Folke et al., 2011). Thus, more and more researchers are calling for ‘recoupling social and ecological systems’ (Fischer et al., 2012) to promote sustainability.

Theorists and researchers point out that there is a need for new thinking in a world of global change with its demand for sustainability that compatibly links individual development with human life and existence in various world domains, including nature and wildlife (Chandler, 2014; Walker & Salt, 2012). In such an analysis of the



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world and the demand for sustainability-oriented thinking, it is important to realize what is already implied about the ontology of the world or life itself as complex matter (Chandler, 2014). This, in effect, frames a way of approaching the world that includes individual humans, social systems, and the natural environment as complex entities, constantly adapting through cycles of ongoing change aimed at achieving sustainability.

Initial concepts of CN focused exclusively on human affect (Kals et al., 2016; Perkins, 2010) or exclusively on cognition (Mayer & Frantz, 2004; Schultz, 2002). Ives et al. (2018) proposed a multidimensional view of the phenomenon and distinguished five different types of connections: (a) *material*, which relates to the extraction and consumption of deposits, as well as other goods derived from nature; (b) *experiential*, which describes direct experiences with nature, such as outdoor recreational activities; (c) *cognitive*, which explains environmental awareness, values, and attitudes describing attachment to the natural environment; (d) *emotional*, which describes emotional attachments, empathy, and affective reactions toward nature; and (e) *philosophical*, which relates to one's ethical obligations toward the environment. These types of connections have proved to be very broad, thus representing many different types of consumption behaviours, experiences in nature, cognitions, emotions, and philosophies that interact and are influenced by each other. In turn, the multidimensional model itself made it possible to internally distinguish connections to nature between identity and experience.

Based on the theoretical considerations of Ives et al. (2018), the AIMES scale (Meis-Harris et al., 2021) was developed to measure CN. However, its authors decided to adapt the five original categories to individual-level constructs, similar to in the New Ecological Paradigm (Dunlap et al., 2000). As a result, Meis-Harris et al. (2021) chose "attachment" from the broader emotional category, "identity" instead of the general cognitive category, and "spiritual" from the philosophical category. Thus, in the approach taken by AIMES, CN refers only to individual beliefs toward the environment involving a mix of emotions, beliefs, and behavioural judgments in potentially many types of human-environment interactions.

Most of the measures used to study environmental problems originated in American (U.S.) contexts and are gradually being adapted for use in other countries and languages. Although human-nature connectivity is nowadays one of the three main streams of environmentalism research (Navarro et al., 2017), none of the CN scales has yet been adapted to Polish cultural, including language, conditions. In such a situation, the purpose of this study is to assess the psychometric properties of a Polish version of the AIMES as a scale that might provide a multidimensional assessment of CN.

Correlates of CN

Mackay and Schmitt (2019) and Whitburn et al. (2019) pointed out that CN accounts for human behaviour towards the environment. Earlier in Zaradic et al.'s (2009)

study, experiences with nature predicted a willingness to donate to conservation. Similarly, in a study by Gosling and Williams (2010), CN was a predictor of farmers' vegetation conservation behaviour. Other researchers have postulated that CN can be a form of therapy for environmental problems. For example, in a study by Conrad and Hilchey (2010), CN developed environmental knowledge, personal concern, and pro-environmental behaviour. Conversely, forces driving declining CN include waning social concern and continued technological advances (Pyle, 2003; Seppelt & Cumming, 2016; Steffen et al., 2011), urbanization (Cumming et al., 2014), limited access to green spaces (Lin et al., 2014), and the development of electronic media (Pergams & Zaradic, 2006).

In addition to CN's positive impact on pro-environmental attitudes and behaviour, previous meta-analyses suggest that an individual's level of CN is positively related to psychological well-being, improved mood, cognitive function, and health (Capaldi et al., 2014; Pritchard et al., 2008). Mayer et al. (2008) noted that CN mediates the relationship between contact with nature (exposure to the environment) and positive emotional states. A similar kind of relationship was also demonstrated in an experiment by Whitburn et al. (2019), where contact with the environment increased nature connectivity. In a recent study by Skalski-Bednarz et al. (2022), the researchers noted that CN explains the effect of religious coping on well-being and life satisfaction in Catholics, as nature is sometimes perceived as a place to encounter the Sacred, and spiritual people may be more likely to spend time in silence outside for reflection, religious contemplation, and prayer. Chen et al. (2022) showed that positive self-transcendent emotions mediate the effect of gratitude on CN. Finally, among personality correlates, positive associations of CN with extraversion, conscientiousness, agreeableness, and openness to experience are indicated (Nisbet et al., 2009).

Since the purpose of this study is to preliminarily evaluate the psychometric properties of the AIMES, based on a previous literature review we formulated the following hypothesis to assess the convergent and divergent validity of the scale: CN will be positively related to perceptions of nature and silence, pro-environmental attitudes and behaviour, psychological well-being, gratitude/awe, decisional and emotional forgiveness, spirituality, and personality dimensions, such as extraversion, conscientiousness, agreeableness, and openness to experience. It should be noted that to date, the relationship between forgiveness and CN has not been assessed, but according to researchers, CN positively correlates with various self-transcendent emotions and pro-social behaviour (Capaldi et al., 2014; Chen et al., 2022). This expected correlation can also be explained by norm activation theory (Schwartz, 1977), according to which forgiving individuals will demonstrate a greater sense of moral obligation towards the environment due to concern for the welfare of others.

MATERIALS AND METHODS

Participants and Procedure

The study was approved by the Ethical Committee of the Institute of Psychology of the Polish Academy of Sciences in Warsaw (No. 14/05/2021). It involved 516 Poles (56% of whom were women) aged 18-66 ($M = 36.3$, $SD = 6.5$). Participation in the study did not involve meeting any recruitment criteria. Before joining, each person gave informed consent to participate. Data were collected in the fall of 2022 via the online Prolific survey platform. Of the participants, 61% lived in urban areas, while 39% lived in rural areas. As for marital status, 46% of respondents were married, 31% were single, 15% were divorced, and 8% were widowers. The vast majority (85%) indicated a Christian religious affiliation, while the remaining 15% were agnostics and non-believers. The survey consisted of questionnaires to measure CN, forgiveness, spirituality, gratitude/awe, psychological well-being, pro-environmental attitudes and behaviour, and personality. The average time to participate in the study was 25 minutes. Participants were paid £4.

Measures

The study included a Polish adaptation of the AIMES (Meis-Harris et al., 2021) to measure human-environment interaction through CN with 19 statements. Translation of the scale from English was done by three independent translators, and in a subsequent step it was compared and analyzed by a psychologist. The translation process was carried out according to World Health Organization (WHO) guidelines for cross-cultural research (Ozolins et al., 2020).

The AIMES scale is based on the five dimensions of CN clarified by Ives et al. (2018), which in a subsequent step were refined by Meis-Harris et al. (2021) in accordance with concepts from the environmental psychology literature (e.g., Dunlap et al., 2000; Perkins, 2010) in such a way that they relate to CN theory only at the individual level. The original version of AIMES includes the following factors: *Attachment* (e.g., "I feel uneasy if I am away from nature for too long"), *Identity* ("I think of myself as an 'environmentalist'"), *Materialism* ("Forests are valuable mostly because they produce wood products, jobs, and income for people"), *Experiential* ("I enjoy spending time in nature"), and *Spiritual* ("My connection to nature is something I would describe as 'spiritual'"). In addition, the dimensions of the scale are clustered in a second-order factor, providing support for CN as an overarching variable. AIMES scores were positively related to environmental values, environmental behaviour, environmental awareness, and time spent in nature. The English version of the scale presents high reliability ratings (Meis-Harris et al., 2021). The participant is asked to respond to each statement on a 5-point Likert scale, where 1 = "Strongly disagree" and 5 = "Strongly agree". In addition to the Polish version of AIMES, the survey incorporated additional measures to assess the validity of the scale.

Experiencing nature and time spent in quiet contemplation were assessed using the *Nature/Silence* subscale (in this study $\alpha = .89$) of the Perceived Change Questionnaire (PCQ) by Büssing et al. (2020) and translated in the Polish language, as standardized by Skalski-Bednarz et al. (2022). This subscale consists of four statements: 1) "I go outdoors much more often" 2) "I consciously take more time for silence" 3) "I perceive nature more intensely" and 4) "I more enjoy quiet times of reflection" The participant's task is to respond to each statement on a 5-point Likert scale, where 0 = "Strongly disagree" and 4 = "Strongly agree".

The WHO's 5-item Well-Being Index (WHO-5) developed by Topp et al. (2015) and translated in Polish (Cichoń et al., 2020) was used to measure mental well-being. The scale consists of five statements arranged into a single factor ($\alpha = .87$). The participant's task is to respond to each item on a 6-point Likert scale, where 0 = "At no time" and 5 = "All the time" in reference to experiences over the past 2 weeks.

The Decision to Forgive Scale (DTFS) by Davis et al. (2015) and translated in Polish by Mróz et al. (2022) has been used to measure decisional forgiveness as "*the cognitive letting go of resentment and bitterness and need for vengeance*" (DiBlasio, 1998, p. 78). Decisional forgiveness incorporates an intellectual dimension and modifies one's intentions as to one's behaviour toward a transgressor, particularly motivation for revenge and avoidance (Exline et al., 2003). The DTFS consists of five statements arranged into a single factor ($\alpha = .91$). The participant's task is to respond to each item on a 5-point Likert scale, where 1 = "Extremely uncharacteristic" and 5 = "Extremely characteristic".

The Emotional Forgiveness Scale (EFS) developed by Hook et al. (2012) and standardized and translated in Polish by Mróz et al. (2022) was used to measure emotional calmness and forgiveness in relation to a specific offense, chosen by the participant. The EFS consists of eight items describing the presence of positive and prosocial feelings toward the aggressor and the reduction of negative feelings toward the offender, which are arranged into two factors: *Positive emotion* ($\alpha = .79$) and *Reduction of negative emotion* ($\alpha = .74$). The participant's task is to respond to each statement on a 5-point Likert scale, where 1 = "Extremely uncharacteristic" and 5 = "Extremely characteristic".

The Gratitude/Awe Questionnaire (GrAw-7) developed by Büssing et al. (2018) and standardized and translated in Polish by Konaszewski et al. (2022) was used to measure self-transcendent feelings, including gratitude and awe. This extended scale was designed with a focus on the experiential aspects of being moved and touched by certain moments and places/nature, on related reactions of pausing with daily activities, and on the subsequent feelings of awe and gratitude. The single-factor questionnaire ($\alpha = .85$) consists of seven statements. The participant's task is to respond to each statement on a 4-point Likert scale, where 0 = "Never" and 3 = "Regularly".

An abbreviated version (Kira et al., 2021) of the Interfaith Spirituality Scale (IFS) standardized and translated in Polish by Surzykiewicz et al. (2022) was used to measure spirituality in an interfaith paradigm. The IFS assesses spirituality as a direct connection to the Creator and the capacity for self-transcendence (i.e., orientation toward something other than oneself and attribution to something/someone else). An abbreviated version of the scale consists of four statements arranged into a single factor ($\alpha = .81$). The participant's task is to respond to each on a 4-point Likert scale, where 1 = "Not true about me" and 4 = "Mostly true about me".

The Environmental Concern Scale (ECS) by Diekmann and Preisendörfer (2003) and translated in Polish by Skalski et al. (2022) was used to measure pro-environmental attitudes. This single-factor scale ($\alpha = .81$) consists of nine statements and includes three components: cognitive, affective, and conative. The participant is asked to respond to each statement on a 5-point Likert scale, where 1 = "Strongly disagree" and 5 = "Strongly agree".

The Pro-Environmental Behaviour Scale (PBS) developed by Preisendörfer (1998) and translated in Polish by Skalski (2022) was used to measure environmental behaviour. This single-factor scale ($\alpha = .79$) consists of 16 statements identifying pro-environmental behaviours related to shopping, water and energy conservation, recycling, as well as movement and transportation. The participant's task is to respond to each statement on a 5-point Likert scale, where 1 = "Definitely no" and 5 = "Definitely yes".

To measure personality according to the Big Five theory (BFI; Costa & McCrae, 2011), we used the Ten-Item Personality Inventory (TIPI, or BFI-10) developed by Gosling et al. (2003) and translated in Polish by Sorokowska et al. (2014). The questionnaire consists of 10 statements arranged into five factors: *Extraversion* ($\alpha = .68$), *Conscientiousness* ($\alpha = .58$), *Agreeableness* ($\alpha = .75$), *Emotional stability* ($\alpha = .72$), and *Openness to experience* ($\alpha = .47$). The participant's task is to respond to each statement on a 7-point Likert scale, where 1 = "Strongly disagree" and 7 = "Strongly agree".

Statistical Analyses

Statistical analysis of the data was carried out in IBM SPSS Statistics 28 and IBM SPSS Amos 28. The normality of the distributions was verified using the Kolmogorov-Smirnov test. Levene's test was used to verify homogeneity of variances. The results obtained allowed the use of parametric tests. To determine the relationships between variables, Pearson correlation analysis was used. Confirmatory factor analysis (CFA) using the maximum likelihood (ML) estimation method was used to assess scale structure. The CFA used the following goodness of fit indices: goodness of fit index (GFI), adjusted GFI (AGFI), and comparative fit index (CFI) with acceptable values being greater than .9; root mean square error of approximation (RMSEA) was used with acceptable values being less than .08; and χ^2 with acceptable test values being nonsignificant. In addition, standardized root mean

squared residual (SRMR) was used with acceptable values being less than .05 (Byrne, 2016). If, in each evaluated model, the fit indices approach the above-mentioned thresholds but are not close enough to be considered satisfactory then minor adjustments can be made to the relationships in the model, and the model can be retested. Determining what adjustments should be made can be justified by using modification indices that provide an estimate of the improvement in model fit (Schumacker & Lomax, 1996). The model was modified after the initial analysis only if the modification met statistical criteria and fit the theoretical understanding of AIMES. Once a modification was added to the model, the model was reinterpreted with the new fit indices. The significance level was set at $p \leq .05$.

RESULTS

The means obtained in the study are shown in Table 1. All statements that were part of a given AIMES factor presented satisfactory discriminatory power, in other words they correlated with its total score (when excluding the item in question from the scale) at a level above .5.

The content validity of the Polish version of the AIMES was assessed by competent judges (four psychologists) according to Lawshe's (1975) method. The content validity ratio (CVR) for each statement exceeded the required value of .75.

Theoretical validity was assessed with CFA using the maximum likelihood estimation method. A model including a second-order factor with five first-order factors obtained GFIs: $\chi^2_{(190)} = 217.9$, $p = .081$; GFI = .988; AGFI = .985; CFI = .929; RMSEA = .072 (.066, .079; 90% CI); SRMR = .049. In the model, the modification indexes were examined and one pair of items was identified that shared the common error variance. Figure 1 demonstrates the standardized estimates of the confirmatory model.

Internal consistency was assessed using Cronbach's α coefficient and McDonald's ω . The Cronbach's α coefficient for the AIMES scale was .92, $\alpha = .89$ for *Attachment*, $\alpha = .88$ for *Identity*, $\alpha = .70$ for *Materialism*, $\alpha = .86$ for *Experiential*, and $\alpha = .75$ for *Spiritual*. In addition, the value of McDonald's ω coefficient was analyzed, which was .92 for AIMES, $\omega = .89$ for *Attachment*, $\omega = .88$ for *Identity*, $\omega = .72$ for *Materialism*, $\omega = .86$ for *Experiential*, and $\omega = .75$ for *Spiritual*.

Convergent validity was estimated using correlation analysis. The AIMES had a strong positive correlation with the *Nature/Silence* subscale of the PCQ and *Gratitude/Awe* (GrAw-7). In addition, we observed moderate positive correlations between AIMES and ecological behaviour, pro-environmental attitudes, dispositional forgiveness (with the DTFS), interfaith spirituality, and mental well-being per the WHO-5. AIMES also had a weak positive correlation with emotional forgiveness (with the EFS), *Extraversion*, *Conscientiousness*, and *Agreeableness* on the BFI-10. Detailed values of correlation coefficients with AIMES component factors are

Table 1. Descriptive Statistics and Correlations.

	M	SD	Con- nection to nature	Attach- ment	Identity	Material- ism	Experien- tial	Spiritual
Connection to nature (AIMES)	60.6	14.6	–					
Attachment (AIMES)	13.1	4.5	.89***	–				
Identity (AIMES)	10.7	4.1	.82***	.67***	–			
Materialism (AIMES)	9.1	2.9	.33***	.10*	.11**	–		
Experiential (AIMES)	14.3	4	.84***	.75***	.55***	.14**	–	
Spiritual (AIMES)	13.4	3.6	.82***	.66***	.62***	.14**	.63***	–
Nature/Silence (PCQ)	9.7	3.6	.58***	.60***	.42***	.05	.57***	.45***
Mental well-being (WHO-5)	14.6	5.3	.31***	.26***	.24***	.16***	.25***	.25***
Decisional forgiveness (DFS)	16.8	5.7	.31***	.30***	.20***	.09*	.24***	.30***
Gratitude/Awe (GrAw-7)	11.9	4.4	.61***	.59***	.48***	.09*	.56***	.50***
Interfaith spirituality (IFS)	8.9	3.4	.43***	.42***	.34***	.08	.34***	.39***
Pro-environmental attitude (PAS)	31.4	5.3	.38***	.28***	.38***	.06	.30***	.37***
Ecological behavior (PBS)	54.3	10.8	.42***	.38***	.49***	-.02	.32***	.35***
Emotional forgiveness (EFS)	23.5	5.9	.22***	.25***	.17***	.07	.18***	.20***
Positive emotion (EFS)	11.2	4.6	.32***	.31***	.29***	.06	.21***	.28***
Reduction of negative emotion (EFS)	12.3	3.9	-.03	.01	-.08	-.05	.02	-.01
Extraversion (BFI-10)	10.3	2.7	.16***	.14**	.06	.06	.23***	.12**
Conscientiousness (BFI-10)	11	2.1	.12**	.13**	.10*	-.01	.17***	.05
Agreeableness (BFI-10)	10.5	2.4	.19***	.14**	.09	.07	.27***	.14**
Emotional stability (BFI-10)	7.2	3	.08	.06	.09*	.07	.08	.06
Openness to experience (BFI-10)	9.3	2.1	.06	.10*	.01	-.10*	.11***	.08

*** $p < .001$, ** $p < .01$, * $p < .05$.

presented in Table 1; the table also shows values of intercorrelation coefficients within AIMES.

Gender ($r = -.17$, $p < .001$; 0 = female, 1 = male), religious affiliation ($r = -.15$, $p < .001$; 0 = non-believers/agnostics, 1 = believers) and village residence ($r = .16$, $p < .001$) were associated with CN intensity. Other socio-demographic variables did not correlate statistically significantly with AIMES scale scores.

DISCUSSION

Social researchers postulate that reconnecting humans with nature is essential to stop further environmental degradation (Fischer et al., 2012; Hartig et al., 2007). In light of the above, CN not only refers to a subjective sense of relationship with nature but it can also predict ecological concerns and behaviour, making it one of the three main streams of environmentalism research today (Navarro et al., 2017). Given the critical role of CN scales in environmental psychology, the purpose of the present study was to validate a Polish adaptation of the AIMES scale for assessing CN.

The factor analyses conducted confirmed the multifaceted nature of the CN construct, and the saturation of individual factors was arranged according to the theoretical assumptions of Meis-Harris et al. (2021). As in the case of the original English version of the scale, we distinguished the following AIMES dimensions: 1) *Attachment*, describing emotional attachment to nature, 2) *Identity*, defining individual environmental values and attitudes, 3) *Materialism*, concerning the consumption of goods from nature, 4) *Experiential*, describing direct experience with the planet, and 5) *Spiritual*, representing the manifestation of the spiritual connection between humans and the environment. In addition, we showed that the dimensions of the scale are clustered in a second-order factor, providing support for CN as an overarching variable.

Our Polish version of AIMES met the basic requirements for reliability and relevance. The results indicate good internal consistency of the questionnaire. In line with theoretical expectations (Capaldi et al., 2014; Pritchard et al., 2008), we observed strong to moderate positive correlations of CN with perceiving nature and

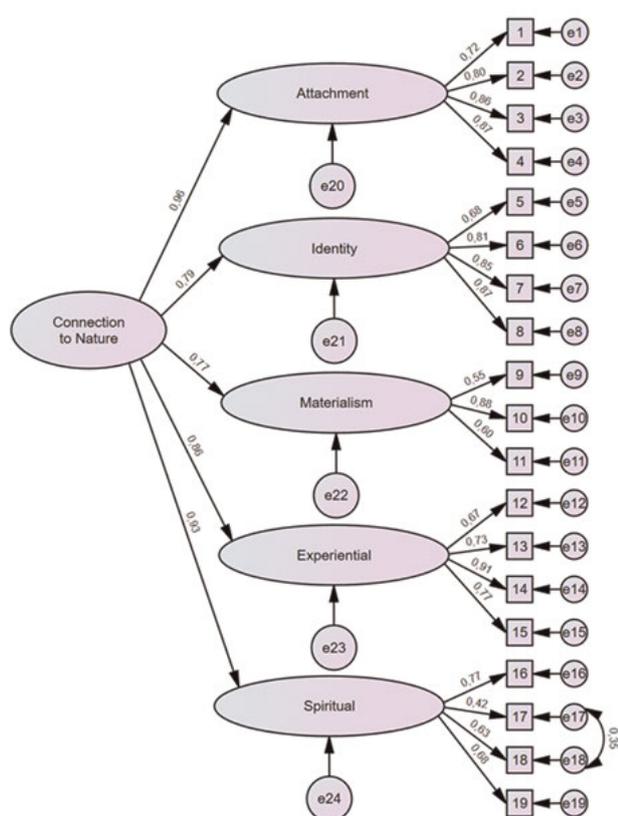


Figure 1. Structure of the Polish Version of the AIMES Scale.

spending contemplative time in silence, pro-environmental attitudes and behaviour, psychological well-being, and self-transcendent feelings, such as gratitude/admiration and spirituality. In addition, we were probably the first to observe a positive correlation between CN and forgiveness. This relationship can be explained by norm activation theory (Schwartz, 1977), which posits that pro-social (i.e., more forgiving) individuals manifest a sense of moral obligation towards the environment due to greater concern for the well-being of others. Interestingly, decisional forgiveness was somewhat more strongly related to CN than emotional forgiveness. According to Hook et al. (2012), decisional forgiveness is more strongly associated with collectivist cultures, while emotional forgiveness is more strongly associated with individualist cultures. On the other hand, according to Kim and Choi (2005), collectivist value orientations influence consumers' efficiency beliefs and green purchasing behaviour, which could potentially explain our observation. It should also be noted that the significant associations with CN were only for the positive dimension of emotional forgiveness. This suggests that arousing positive emotions toward the offender may be more important for CN than reducing negative emotions toward the offender. The present finding also seems to support the common view that negative and positive aspects of forgiveness are distinct dimensions with different predictors and consequences expressed by different correlates (Fincham et al., 2004; Worthington & Wade, 1999).

While spirituality correlated positively with CN, having a Christian religious affiliation was negatively associated with CN, which indirectly corresponds to the observation of Cui et al. (2014). Skalski et al. (2022) had already explained the paradox of religious environmentalism through the separate and opposing influences of spirituality leading to compassion and moral concern for others, on the one hand, and religious fundamentalism reinforcing climate change denial on the other. Also, in our study, participants living in rural areas presented higher CN scores than those living in urban areas, which can be explained by the former's greater exposure to nature (Twohig-Bennett & Jones, 2018). Additionally, women indicated a stronger connection to nature than did men, which corresponds with the consensus in the literature (Uram et al., 2021). Eisler et al. (2003) noted that although men present higher environmental knowledge, women are more mobilized for ecological thinking and behaviour.

CN correlations with specific traits provided some insight into the environmentally-connected personality. Overall AIMES index scores were significantly, positively correlated with higher extraversion, conscientiousness, and agreeableness scores and positively marginally with higher openness to experience scores, suggesting that individuals with high nature connectivity may be more adventurous and carefree while engaging in responsible environmental behaviour or presenting a general sense of responsibility in the environmental (or other) domain. Given the variation in effects between the different dimensions of CN, we point to the need for further exploration of the personality determinants of CN, for example using latent profile analysis.

The Polish adaptation presented here has some limitations. Further research using a larger sample is needed to confirm the results. Second, the survey did not control for detailed sociodemographic data such as personal wealth or consumer behaviour, which may differentiate the AIMES results. In addition, only Christians were included among those with religious affiliations, making it impossible to infer CN's ties to other religions. In addition, future research would benefit from using experimental methods and data that are not self-reported in order to better understand the predictors and consequences of CN. Finally, it should be noted that we did not measure the absolute stability of AIMES in the validation study. However, we assumed that CN is not dichotomous and should be considered in terms of intensity/severity, which can change under the influence of psychopedagogy and one's own experiences.

CONCLUSIONS

AIMES provides support for existing tools designed to measure human-environment interaction. On the basis of the present study, it can be concluded that AIMES is a reliable, accurate, and credible measure of CN in educational and psychological research on the subjective sense of relationship with the natural world, perception of environmental threats, climate concern, eco-spirituality,

etcetera, in a Polish-speaking context. AIMS can be both used to test the impact of situational factors and personality traits that may influence CN and to assess whether interventions undertaken to increase children's or adults' contact with the environment actually increase their sense of CN. The data obtained also add another dimension to theorizing in social psychology and pedagogy over the need for belonging (i.e., connection to others and to nature), as our findings underscore the individual importance of the human-environment relationship not only for promoting sustainable development, but also for human health and well-being.

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