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The green connection: The relationship between connection with nature and pro-environmental attitudes, behavior, and well-being of young adults in Poland – A longitudinal study

Abstract: Preliminary findings are promising and suggest that a stronger connection to nature may contribute to the development of pro-environmental attitudes and behaviors while also potentially enhancing well-being and psychological resilience. However, previous research has often been limited to cross-sectional analyses, which do not provide a comprehensive understanding of the dynamics involved in human-nature interactions. To address these methodological gaps, we conducted a two-wave longitudinal study with a six-month interval, involving 261 young adults from Poland. The results of our study demonstrated that connectedness to nature predicts an increase in pro-environmental attitudes ($\beta = .17$, $p = .002$) and behaviors ($\beta = .18$, $p < .001$) over time. Conversely, pro-environmental attitudes positively predicted subsequent connectedness to nature ($\beta = .15$, $p = .002$). Contrary to expectations, neither pro-environmental attitudes and behaviors nor connectedness to nature predicted later psychological well-being among the participants ($p > .05$), suggesting that the health benefits of connectedness to nature in this age group may have been overestimated in previous cross-sectional studies. Nevertheless, the significant effects on the development of so-called "pro-environmental orientation" justify the need for further research on connectedness to nature and suggest that interventions in this area may yield benefits for environmental protection.

Keywords: *pro-environmental attitudes, pro-environmental behaviors, well-being, connection with nature, AIMES*

INTRODUCTION

The growing awareness of environmental challenges, such as climate change and the degradation of natural ecosystems, has prompted both local policymakers and international communities to implement actions and public policies (Jorgensen et al., 2022; Restall et al., 2015) aimed at encouraging pro-environmental behaviors and the protection of natural resources (Martin et al., 2020; Graham & White, 2016). Furthermore, the exploitation of the planet, climate change, the growing frequency of natural disasters, and the dissemination of information about these issues are influencing public awareness regarding the significance of the natural environment in human life (Lovell, Depledge, & Maxwell, 2018; Wood et al., 2000). This increasing knowledge translates into a human desire for a sense of connection and responsibility toward the natural environment, often expressed through interactions with nature, the desire to spend time in natural surroundings, engagement in environmental protection activities, or the adoption of pro-environmental behaviors (Sulfa et al., 2024; Barragan-Jason et al., 2022). Additionally, a natural sense of bonding and attachment to nature and the environment is also being awakened in individuals (Nesbet, 2009; Sulfa et al., 2024; Sandifer et al., 2015).

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Connection with Nature

Depending on the research conducted and the theoretical assumptions adopted, slightly different terms are used to define connectedness to nature. For instance, connection to nature may be understood as emotional engagement with nature, an emotional bond with nature (Mayer & Frantz, 2004), attachment to nature, love for nature, or the inclusion of nature in the self (Nisbet et al., 2009). Hatty et al. (2020) suggest that connection with nature is an individual sense of identity concerning the relationship between oneself and nature, encompassing cognitive, emotional, and behavioral aspects.

Based on the concept of connectedness to nature proposed by Ives et al. (2018), Meis-Harris et al. (2021) developed a research tool called AIMES to measure connection with nature. When developing the AIMES tool, Meis-Harris et al. (2021) made several modifications to the definitions of the aspects outlined in Ives' (2018) concept. Consequently, in AIMES, connection to nature refers solely to individual beliefs about the environment, encompassing a mix of emotions, beliefs, and behavioral evaluations in potentially diverse types of human-environment interactions (Jorgensen & Meis-Harris, 2022; Garfield et al., 2015; Surzykiewicz et al., 2023). AIMES draws on the five types of bonds with nature proposed by Ives et al. (2018), assessing the following five types of connectedness: Attachment, Identity, Material Consumption, Experiential Evaluation, and Spirituality. The first type, *Attachment,* concerns both positive and negative feelings toward nature and incorporates elements of the Love and Care for Nature Scale by Perkins et al. (2010). The second type, *Identity,* also known as environmental identity, refers to a sense of self that involves being part of nature (Schultz, 2002; Jorgensen & Meis-Harris, 2022). The third type, *Material Consumption,* relates to the consumption of material goods and services provided by nature, such as food, water, and minerals (Kendall et al., 2015; Jorgensen & Meis-Harris, 2022). The fourth type, *Experiential Evaluation*, involves assessing emotions and any direct interactions an individual has with the natural environment (Surzykiewicz et al., 2024; Jorgensen & Meis-Harris, 2022). The final type, *Spirituality*, refers to a belief in unity with nature through the conviction that everything in nature is interconnected (Jorgensen & Meis-Harris, 2022; Surzykiewicz et al., 2023).

Connection with Nature: Well-being, Pro-environmental Behavior and Attitudes

Research findings indicate that interactions with and connection with nature are crucial for supporting human well-being and the health of ecosystems (Lin & Wei, 2023; Stuffa et al., 2024), as they have been linked to increased activity in pro-environmental behaviors, such as waste sorting, water conservation, the use of renewable energy sources, or making sustainable purchases, among other eco-friendly practices (Martin et al., 2020; Mackay & Schmitt, 2019; Whitburn et al., 2019; Zawadzki et al., 2020).

Time spent in natural surroundings and the development of a sense of connection with nature are also associated with various aspects of well-being (Kövi et al., 2023; Sulfa et al., 2024), such as experiencing positive emotions, increased vitality, and life satisfaction (Capaldi et al., 2014; Martin et al., 2020). A connection with nature is believed to offer numerous benefits for both human health and well-being, including strengthening the immune system, reducing stress, and encouraging environmentally supportive behaviors (Kövi et al., 2023). Moreover, studies suggest that nature enhances stress management and fosters psychological resilience to stress (Berman et al., 2012; Jackson et al., 2021; Sulfa et al., 2024; Ulrich et al., 1991). Being in natural environments is also associated with reduced symptoms of stress, anxiety, and depression (Bressane et al., 2022). Previous research indicates that both direct and indirect experiences with nature are associated with well-being, encompassing emotional, psychological, and social dimensions (Howell, Dopko, Passmore, & Buro, 2011), as well as physical well-being (Frumkin et al., 2017). Being in nature can stimulate the human senses through various auditory, visual, and olfactory stimuli (Mayer & Frantz, 2004; Zelenski et al., 2023). In terms of physical well-being, connection with nature provides relaxation, rest, and the opportunity for the body to recover from daily work and responsibilities (Jackson et al., 2021).

In the face of an escalating ecological crisis, young adults appear to be a demographic group that will experience its effects more acutely than previous generations (Corner et al., 2015; Wallis & Loy, 2021). In the search for potential solutions to halt the worsening climate crisis, the call for a "return to nature" is increasingly appearing in scientific and social discourse. This slogan underscores the growing interest in a deeper connection with nature, which, according to empirical evidence, can play an important role in shaping health as well as pro-environmental attitudes and behaviors (Sulfa et al., 2024).

Research findings suggest that lasting effects in the realm of sustainable development are linked to a high level of connection with nature, as such a connection correlates with a tendency to exhibit pro-environmental attitudes and engage in pro-environmental behaviors (Barragan-Jason et al., 2022). Pro-environmental attitudes can generally be defined as beliefs, views, intentions, or feelings of an individual that concern ecology, nature, or the natural environment (Wyss et al., 2022, Uram et al., 2021). Furthermore, pro-environmental attitudes encompass all aspects related to actions concerning the environment (De Ville et al., 2021, Uram et al., 2024). Pro-environmental behaviors, on the other hand, are described as activities or actions undertaken directly or indirectly with the intent of taking responsibility for the environment. These behaviors aim to protect the environment, biodiversity, and sustainable development by adopting various actions, such as water conservation, energy conservation, transitioning to renewable energy sources, or making sustainable purchases (Zawadzki et al., 2020; Sulfa et al., 2024). Existing research suggests a positive relationship between ecologi-

cal attitudes and behaviors (Bamberg & Möser, 2007). This relationship stems from the fact that pro-environmental behaviors encourage actions aimed at reducing environmental harm and improving its quality (Lin & Wei, 2023). However, research findings also indicate that the tendency of individuals to exhibit positive ecological attitudes does not always translate into pro-environmental behaviors (Carrington et al., 2014; Juvan & Dolnicar, 2014). A recent meta-analysis (Whitburn et al., 2020) demonstrated that a deeper connection with nature may partially explain why some individuals behave more pro-environmentally than others. A stronger connection with nature may lead to greater engagement in pro-environmental behaviors and contribute to nature conservation (Whitburn et al., 2020). The study by Geng et al. (2015) highlighted the positive role of connections with nature in promoting environmental behaviors.

Current Study

This longitudinal study explores the relationships between connectedness to nature, pro-environmental attitudes and behaviors, and well-being among young adults. Based on the existing literature, we propose the following directional hypotheses:

- H1: A higher baseline level of pro-environmental attitudes at T1 will predict a higher level of connection with nature (H1a) and greater well-being at T2 (H1b).
- H2: A higher baseline level of pro-environmental behavior at T1 will predict greater well-being at T2.
- H3: A higher baseline level of connection with nature at T1 will predict a higher level of pro-environmental behavior (H3a) and pro-environmental attitudes (H3b) at T2. Additionally, a higher baseline level of connection with nature at T1 will predict greater well-being at T2 (H3c).

By assessing these relationships in a study with a six-month interval, this research aims to test the proposed hypotheses and identify key psychological factors that predict negative mental health outcomes in this population. In addition, without specifying a direction, we pose a research question (RQ1) based on the literature: How does the relationship between pro-environmental behaviors, pro-environmental attitudes, and connection to nature evolve over time?

PARTICIPANTS AND PROCEDURE

The study ultimately included 261 young adult Polish participants aged 18–30 who completed surveys in two waves (M = 24.69, SD = 3.62), 61% of whom were female. The participant retention rate was 67%. Of all participants, 23% lived in the countryside (N = 60), 22.5% in a city with a population of 100,000 or less (N = 59), 9.7% in a city with a population of 250,000 or less (N = 25), 9.7% in a city with a population of 500,000 or less (N = 25), and 35.2% in a city with a population over 500,000 (N = 92). In terms of education, 1.8% of participants had a primary education (N = 5), 3.9% had a junior high school education (N = 10), 0.8% had a vocational education (N = 2), 54.8% had a high school education (N = 143), and 38.6% had a higher education (N = 101). Regarding marital status, 47% of participants were single (N = 123), 44.6% were in a non-formal relationship (N = 116), 35.2% were in a formal relationship (N = 92), 7% were married (N = 18), 0.3% were widowed (N = 1), and 1% were divorced (N = 3). When asked about their employment status, 13.1% declared they were working full-time (N = 34), 2.9% were working part-time (N = 8), 33.7% were working and studying at the same time (N = 88), 48% were studying (N = 125), 2.1% were unemployed (N = 6), and 0.3% were retired or on a pension (N = 1).

The study was conducted in accordance with the recommendations of the Helsinki Declaration and adhered to national standards for research involving human subjects. The age criterion was 18–30 years. Prior to the study, all participants provided informed consent. Participation was voluntary and anonymous. Given that this study was a two-wave longitudinal study, to ensure anonymity, participants signed both surveys using a self-created identifier that did not personally identify them. Data were collected twice, six months apart, between the fall of 2022 and the winter of 2023. Both the first measurement (T1)

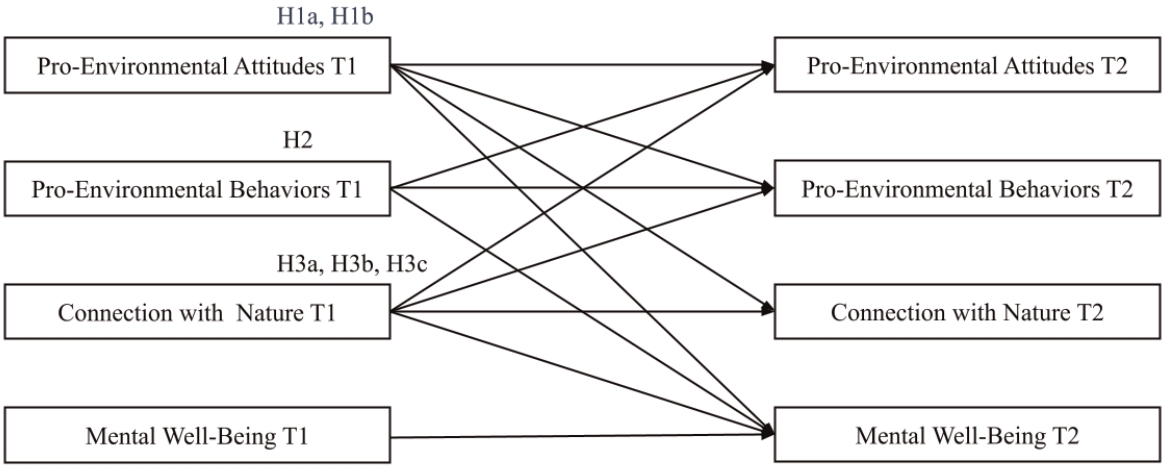

Figure 1. Hypothesized Model

and the second measurement (T2) employed the same survey, which included questionnaires measuring psychological well-being, pro-environmental attitudes and behaviors, and connection with nature. The average time to complete the study was 25 minutes. Participants were recruited through an online advertisement targeted at the Polish population aged 18–30, as this was the recruitment criterion. The ads were displayed on platforms such as Facebook and X. Clicking the generated link directed participants to the questionnaire, where they were provided with detailed information about the study's purpose, procedure, confidentiality, and the right to withdraw from participation at any time without providing a reason. Only individuals who explicitly consented to participate could proceed to complete the questionnaire. The study was conducted at the beginning and end of the semester, which allowed for two opportunities to inform the students about the research and collect data at two distinct time points. This approach ensured the longitudinal nature of the study by capturing responses during these two key periods.

METHODS

The Pro-Environmental Behavior Scale (PBS), developed by Preisendörfer (1998) and translated into Polish by Skalski (2022), was used in this study. The scale consists of 16 statements identifying pro-environmental behaviors, rated on a 5-point Likert scale where 1 = "Strongly disagree" and 5 = "Strongly agree" In our study, this measure, like other scales, demonstrated high internal consistency (see Table 1).

The Environmental Concern Scale, developed by Diekmann and Preisendörfer (2003) and standardized in Polish by Skalski et al. (2022), was used to evaluate concerns about environmental issues. This scale comprises nine items grouped into a single factor (α = 0.81 in the validation study) that covers cognitive, affective, and behavioral components of environmental concern. Respondents rate their agreement with each statement on a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. Example statements include: "I often feel embarrassed and angry when I see environmental problems on TV or in newspapers" and "Environmental protection should be implemented, even if it leads to fewer jobs in the economy"

The Multidimensional AIMES Connection to Nature Scale, authored by Meis-Harris et al. (2021) and adapted into Polish by Surzykiewicz et al. (2023), was also employed. AIMES measures human interaction with the environment through Connection to Nature (CN) using 19 statements covering five factors: Attachment (e.g., "I feel uncomfortable if I am away from nature for too long"), Identity ("I consider myself an 'environmentalist'"), Materialism ("Forests are valuable mainly because they produce timber, create jobs, and provide income for people"), Experience ("I enjoy spending time in nature"), and Spirituality ("I would describe my connection to nature as 'spiritual'"). Participants responded 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, supplementary measures were included in the study to assess the scale's validity.

The 5-item World Health Organization Well-Being Index (WHO-5), developed by Topp et al. (2015) and translated into Polish by Cichoń et al. (2020), was used to assess well-being. The scale comprises five statements, rated on a 6-point Likert scale where 0 = "At no time" and 5 = "All of the time" referring to experiences over the past two weeks.

STATISTICAL ANALYSES

The following metrics were used to assess model fit: the chi-square (χ^2) to degrees of freedom (df) ratio, with an acceptable value of $\chi^2/df < 2$ and a statistically non-significant χ^2 value; and the RMSEA (root mean square error of approximation), with an acceptable value of RMSEA < 0.08. Statistical significance was determined at $p < 0.05$ (Bentler, 1990). The following baseline fit and comparison indices were considered: GFI (goodness of fit index), with an acceptable ratio > 0.90 (fit values: 0.90 < GFI < 0.95); AGFI (adjusted goodness-of-fit index), with an acceptable ratio > 0.90 (fit values: 0.90 < AGFI < 0.95) (Byrne, 2016); and CFI (confirmatory fit index), with an acceptable ratio > 0.90 (fit values: 0.90 < CFI < 0.95) (Brown, 2006; Hu & Bentler, 1999). These fit indices are considered among the most commonly used for evaluating model fit (Schermelleh-Engel et al., 2003).

Statistical analyses were conducted using SPSS version 29.0 and AMOS 29.0 software. All variables were initially examined for potential outliers. The normality of the variable distributions was assessed using the Kolmogorov-Smirnov test, while the homogeneity of variances was evaluated with Levene's test. Pearson correlation analysis was employed to investigate the relationship between the variables. The regression model incorporated baseline measurements of connection with nature, pro-environmental attitudes and behaviors, and well-being, with subsequent measurements of these indicators serving as the outcome variables. Statistical significance was set at $p < 0.05$, and the effect size was assessed using the R^2 coefficient.

Model verification was done using maximum likelihood. The tested model was built so that the T1 output paths of behavior and pro-environmental attitudes and the path of connection with nature were directed to the paths of behavior, pro-environmental attitudes, connection with nature and well-being at T2. At the same time, autoregressive paths and paths of covariance between all variables at T1 were included in the model.

RESULTS

In the analysis of correlations between the first and second measurements, the strongest positive relationship was observed between attitudes and connectedness with nature (r = .45), while the weakest positive relationship occurred between well-being and connectedness with

Table 1. Results of Correlation Analysis N = 261

Variable	M (SD)	α	1.	2.	3.	4.	5.	6.	7.	8.
1. Attitudes (T1)	30.66 (4.06)	.82	—							
2. Attitudes (T2)	31.24 (4.44)	.81	.58***	—						
3. Behaviors (T1)	53.69 (10.29)	.80	.45***	.26***	—					
4. Behaviors (T2)	53.50 (10.84)	.79	.35***	.37***	.79***	—				
5. Well-being (T1)	13.96 (5.30)	.86	.09	.05	.11*	.06	—			
6. Well-being (T2)	14.20 (4.64)	.84	.00	.05	-.05	-.12*	.46***	—		
7. Connection to Nature (T1)	61.81 (15.09)	.91	.48***	.40***	.45***	.47***	.31***	.04	—	
8. Connection to Nature (T2)	63.60 (14.83)	.91	.45***	.54***	.30***	.45***	.21***	.10*	.74***	—
9. Age	—	—	-.12*	-.14*	.10	.12*	-.03	-.05	.15**	.08
10. Sex	—	—	-.16**	-.28***	-.11*	-.22**	-.08	-.05	-.09	-.11*

Note: T1 = Measurement at Time 1; T2 = Measurement at Time 2. Sex coded as 0 = Female, 1 = Male. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

nature (r = .21). All correlation coefficients are presented in Table 1.

The tested model was found to be a very good fit for the data, N = 261, $\chi^2(3) = 4.505$, p = .212, GFI = .996, AGFI = .948, CFI = .995, RMSEA = .044 (90% CI [.001–.121]). According to the proposed model, connection with nature at T1 predicted an increase in pro-environmental attitudes at T2 (β = .17, p = .002) as well as pro-environmental behaviors at T2 (β = .18, p < .001) over time. Additionally, pro-environmental attitudes at T1 positively predicted subsequent connectedness with nature at T2 (β = .15, p = .002). Importantly, neither pro-environmental attitudes at T1 and behaviors at T1 nor connection with nature at T1 predicted later psychological well-being in participants at T2 (p > .05).

DISCUSSION

The findings of our study provide insights into the links between connection with nature, pro-environmental attitudes, behaviors, and psychological well-being. In this discussion, we will refer to the current literature to compare and contrast our findings with previous research.

Connection with Nature and Pro-Environmental Attitudes and Behaviors

The results indicate that connection with nature at T1 significantly predicts an increase in pro-environmental attitudes at T2(H3b) (β = .17, p = .002) and behaviors at T2 (β = .18, p < .001) (H3a). These findings are consistent with previous studies suggesting that contact with nature can enhance ecological awareness and the propensity to engage in environmental conservation activities (Nisbet, Zelenski, & Murphy, 2009). Mayer and Frantz (2004) also emphasize that a stronger bond with nature can lead to more pro-environmental actions, which aligns with our findings.

Pro-Environmental Attitudes on Connection with Nature

This study also revealed that pro-environmental attitudes at T1 positively predict subsequent connection with nature at T2 (β = .15, p = .002) (H1a). This is a finding that suggests the existence of a bidirectional

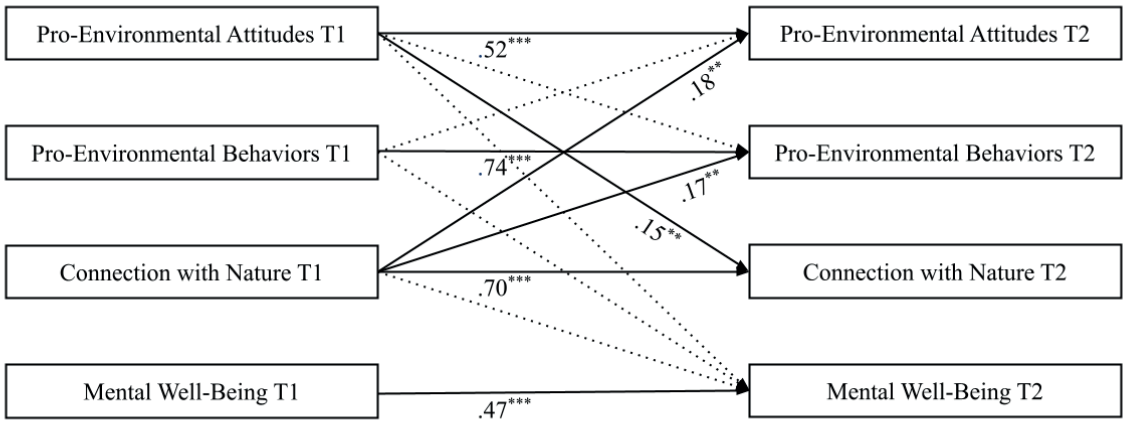

Figure 2. The results of the hypothetical model

relationship between these variables. Previous research has often focused on how nature exposure influences environmental attitudes, but our findings add a novel perspective by showing that those with strong environmental attitudes may seek out nature experiences more actively. Schultz (2002) discusses the reciprocal relationship between environmental concern and behavior, supporting our findings.

No relation with Psychological Well-Being

Contrary to expectations, neither pro-environmental attitudes at T1 (H1b) and behaviors at T1 (H2) nor connection with nature at T2 (H3c) predicted subsequent psychological well-being in participants ($p > .05$). This is surprising, given that numerous studies have identified a positive link between nature contact and mental well-being (Bratman, Hamilton, & Daily, 2012; Hartig, Mitchell, de Vries, & Frumkin, 2014). However, it is important to note that much of the existing literature is based on cross-sectional designs, which may overestimate the long-term effects of connection with nature. Similar to the cited studies (Bratman, Hamilton, & Daily, 2012; Hartig, Mitchell, de Vries, & Frumkin, 2014), our sample also showed significant correlation effects between connection with nature and well-being within only the first or second wave of data collection. This suggests that, in the short term, contact with nature is indeed associated with improved well-being, but these effects may not be enduring or may be overshadowed by other psychosocial factors that change over time, particularly among young adults, whose lives are characterized by considerable dynamism and variability.

Young adults, especially in Europe, are often marked by a strong pro-environmental orientation but also by a realistic approach (Elmasllari, 2022; Krajnc et al., 2022; Schlecht et al., 2024).They see themselves as "change-makers" who balance personal success with sustainable development. A recent sociological analysis identified the dominant profile of the young generation as neo-ecologism: progressive realists, aware of global challenges and open to new values (Borgstedt et al., 2023). While this group values the importance of contact with nature, their engagement in environmental conservation activities, ecological awareness, and the associated "ecological stress" might dampen the long-term positive impact of nature on their psychological well-being. Additionally, numerous life challenges, such as career or education (Grandin et al., 2022; Mónus, 2022), may overshadow the potential benefits of nature contact, explaining the absence of a clear, long-term effect on their well-being.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

It is important to emphasize that our findings pertain to a non-representative sample of young adults from Poland, and therefore, the results cannot be generalized to other age groups or the entire population of young Polish adults. The sample's specific characteristics, such as regional distribution, educational background, and social context, may limit the generalizability of the findings. Additionally, the relatively small sample size may have constrained the statistical power of the analyses. Definitive conclusions would require the use of a representative sample and a greater number of measurement points to account for the diversity of experiences and perspectives within this group.

Although no significant relationship with psychological well-being was found, the role of connection with nature in shaping pro-environmental attitudes and behaviors suggests the need for further research in this area. Such research could enhance our understanding of how to promote pro-environmental orientation across different demographic groups. Interventions that increase contact with nature may have a substantial impact on environmental conservation by fostering pro-environmental attitudes and behaviors (Richardson & Sheffield, 2017). These interventions could include educational programs, community projects, and policies that promote access to green spaces.

CONCLUSIONS

The results of our study highlight the importance of connection with nature in shaping pro-environmental attitudes and behaviors, although they do not confirm its impact on psychological well-being. This suggests that while contact with nature is a significant factor in promoting sustainable development, further research is needed to fully understand its role in various aspects of human life.

REFERENCES

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *JJournal of Environmental Psychology*, *27*(1), 14-25. https://doi.org/10.1016/j.jenvp.2006.12.002

Berman, M. G., Kross, E., Krpan, K. M., Askren, M. K., Burson, A., Deldin, P. J., ... & Jonides, J. (2012). Interacting with nature improves cognition and affect for individuals with depression. *Journal of Affective Disorders,* 140(3), 300-305. https://doi.org/10.1016/j.jad.2012.03.012

Borgstedt, S.; Calmbach, M. Das Neue Modell Der Sinus-Milieus® Für Deutschland. In Praxis der Sinus-Milieus®; Springer Fachmedien Wiesbaden: Wiesbaden, Germany, 2023; pp. 27–41. https://doi.org/10.1007/978-3-658-42380-3_2

Bratman, G. N., Hamilton, J. P., & Daily, G. C. (2012). The impacts of nature experience on human cognitive function and mental health. Annals of the New York *Academy of Sciences,* 1249(1), 118-136. https://doi.org/10.1111/j.1749-6632.2011.06400.x

Barragan-Jason, G., de Mazancourt, C., Parmesan, C., Singer, M. C., & Loreau, M. (2022). Human–nature connectedness as a pathway to sustainability: A global meta-analysis. *Conservation Letters*, 15(1), e12852. https://doi.org/10.1111/conl.12852

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238–246.

Byrne, B. M. (2016). Structural Equation Modelling with AMOS: Basic Concepts, Applications, and Programming (3rd ed.). New York: Routledge.

Capaldi, C. A., Dopko, R. L., & Zelenski, J. M. (2014). The relationship between nature connectedness and happiness: A meta-analysis.

Frontiers in psychology, 5, 92737. https://doi.org/10.3389/fpsyg.2014.00976

Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2014). Lost in translation: Exploring the ethical consumer intention–behavior gap. *Journal of Business Research*, 67(1), 2759-2767. https://doi.org/10.1016/j.jbusres.2012.09.022

Cichoń, E., Kiejna, A., Kokoszka, A., Gondek, T., Rajba, B., Lloyd, C. E., & Sartorius, N. (2020). Validation of the Polish version of WHO-5 as a screening instrument for depression in adults with diabetes. diabetes research and clinical practice, 159, 107970. https://doi.org/10.1016/j.diabres.2019.107970

Corner, A., Roberts, O., Chiari, S., Völler, S., Mayrhuber, E. S., Mandl, S., & Monson, K. (2015). How do young people engage with climate change? The role of knowledge, values, message framing, and trusted communicators. Wiley Interdisciplinary Reviews: *Climate Change*, 6(5), 523-534. https://doi.org/10.1002/wcc.353

Elmasllari, D. (2022). *Youth green skills: Ensuring that young people are educated and skilled today for a sustainable future. South EU Neighbours*. https://south.euneighbours.eu/wp-content/uploads/2022/07/Policy-Brief-No114.pdf

Garfield, A. M., Drwecki, B. B., Moore, C. F., Kortenkamp, K. V., & Gracz, M. D. (2014). The Oneness Beliefs Scale: Connecting spirituality with pro-environmental behavior. *Journal for the Scientific Study of Religion,* 53(2), 356-372. https://doi.org/10.1111/jssr.12108

Geng, L., Xu, J., Ye, L., Zhou, W., & Zhou, K. (2015). Connections with nature and environmental behaviors. *PloS one,* 10(5), e0127247. https://doi.org/10.1371/journal.pone.0127247

Graham, H., & White, P. C. (2016). Social determinants and lifestyles: integrating environmental and public health perspectives. *Public health*, 141, 270-278. https://doi.org/10.1016/j.puhe.2016.09.019

Grandin, A., Guillou, L., Sater, R. A., Foucault, M., & Chevallier, C. (2022). Socioeconomic status, time preferences and pro-environmentalism. *Journal of Environmental Psychology*, *79*, 101720. https://doi.org/10.1016/j.jenvp.2021.101720

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and health. Annual *Review of Public Health,* 35, 207-228. https://doi.org/10.1146/annurev-publhealth-032013-182443

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria to fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: *A Multidisciplinary Journal,* 6, 1–55. https://doi.org/10.1080/10705519909540118

Ives, C. D., Abson, D. J., von Wehrden, H., Dorninger, C., Klaniecki, K., & Fischer, J. (2018). Reconnecting with nature for sustainability. *Sustainability Science,* 13(5), 1389–1397. https://doi.org/10.1007/S11625-018-0542-9/FIGURES/2

Krajnc, D., Kovačič, D., Žunec, E., & Brglez, K. (2022). Youth awareness and attitudes towards a circular economy to achieve the Green Deal goals. *Sustainability, 14*(19), 12050. https://www.mdpi.com/2071-1050/14/19/12050

Jackson, S. B., Stevenson, K. T., Larson, L. R., Peterson, M. N., & Seekamp, E. (2021). Connection to nature boosts adolescents' mental well-being during the COVID-19 pandemic. *Sustainability*, 13(21), 12297. https://doi.org/10.3390/su132112297

Jorgensen, B. S., & Meis-Harris, J. (2022). Using the multidimensional AIMES to estimate connection-to-nature in an Australian population: a latent class approach to segmentation. *International Journal of Environmental Research and Public Health,* 19(19), 12307. https://doi.org/10.3390/ijerph191912307

Juvan, E., & Dolnicar, S. (2014). The attitude–behaviour gap in sustainable tourism. *Annals of tourism research,* 48, 76-95. https://doi.org/10.1016/j.annals.2014.05.012

Lin, B., & Wei, K. (2023). Pro-environmental behaviors and environmental improvement: What information do we have based on a survey of the young generation? *Journal of Global Information Management,* 31(1), 1–21. https://doi.org/10.4018/JGIM.331089

Lovell, R., Depledge, M., & Maxwell, S. (2018). Health and the natural environment: A review of evidence, policy, practice and opportunities for the future.

Kövi, Z., Kim, H., Kamble, S., Mészáros, V., Lachance, D., & Nisbet, E. (2023). Cross-cultural validity of the Nature Relatedness Scale (NR-6) and links with wellbeing. *International Journal of Wellbeing*, *13*(2). https://doi.org/10.5502/ijw.v13i2.2841

Mackay, C. M., & Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology,* 65, 101323. https://doi.org/10.1016/j.jenvp.2019.101323

Martin, L., White, M. P., Hunt, A., Richardson, M., Pahl, S., & Burt, J. (2020). Nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours. *Journal of environmental psychology,* 68, 101389. https://doi.org/10.1016/j.jenvp.2020.101389

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology,* 24(4), 503-515. https://doi.org/10.1016/j.jenvp.2004.10.001

Meis-Harris, J., Borg, K., & Jorgensen, B. S. (2021). The construct validity of the multidimensional AIMES connection to nature scale: Measuring human relationships with nature. *Journal of Environmental Management,* 280, 111695. https://doi.org/10.1016/J.JENVMAN.2020.111695

Mónus, F. (2022). Environmental education policy of schools and socioeconomic background affect environmental attitudes and pro-environmental behavior of secondary school students. *Environmental Education Research*, *28*(2), 169-196. https://doi.org/10.1080/13504622.2021.2023106

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The Nature Relatedness Scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior,* 41(5), 715-740. https://doi.org/10.1177/0013916508318748

Preisendörfer, P. (1998). Umweltbewusstsein in Deutschland 1998. Ergebnisse einer repräsentativen Bevölkerungsumfrage. Bundesmi nisterium für Umwelt. Naturschutz und Reaktorsicherheit.

Restall, B., & Conrad, E. (2015). A literature review of connectedness to nature and its potential for environmental management. *Journal of environmental management,* 159, 264-278. https://doi.org/10.1016/j.jenvman.2015.05.022

Richardson, M., Cormack, A., McRobert, L., & Underhill, R. (2016). 30 days wild: Development and evaluation of a large-scale nature engagement campaign to improve well-being. *PLOS ONE,* 11(2), e0149777. https://doi.org/10.1371/journal.pone.0149777

Sandifer, P. A., Sutton-Grier, A. E., & Ward, B. P. (2015). Exploring connections among nature, biodiversity, ecosystem services, and human health and well-being: Opportunities to enhance health and biodiversity conservation. *Ecosystem services,* 12, 1-15. https://doi.org/10.1016/j.ecoser.2014.12.007

Schlecht, V., Vargas-Carpintero, R., & Trenkner, M. (2024). Started from the bottom, now we're here–A young researcher's perspective on the bioeconomy youth vision. EFB *Bioeconomy Journal, 4*(1). https://www.sciencedirect.com/science/article/pii/S2667041024000090

Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & W. P. Schultz (Eds.), *Psychology of sustainable development* (pp. 61-78). Springer. https://doi.org/10.1007/978-1-4615-0995-0_4

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. Methods of psychological research online, 8(2), 23-74.

Skalski-Bednarz, S. B., Konaszewski, K., Toussaint, L. L., Büssing, A., & Surzykiewicz, J. (2022). Positive religious coping acts through perception of nature and silence in its association with well-being and life satisfaction among Polish Catholics. *Frontiers in Public Health*, *10*, 1020007. https://doi.org/10.3389/fpubh.2022.1020007

Sulfa, D. M., Suwono, H., & Husamah, H. (2024). Human connection with nature improves wellbeing and pro-environmental behavior: A literature review. *JPBI (Jurnal Pendidikan Biologi Indonesia),* 10 (2), 698-713. https://doi.org/10.22219/jpbi.v10i2.32674

Surzykiewicz, J., Skalski, S., Toussaint, L. L., Kwadrans, Ł., Kwiatkowska, A., & Konaszewski, K. (2023). Measuring Human Relationships With Nature: Polish Adaptation of the Multidimensional AIMES Connection to Nature Scale. *Polish Psychological Bulletin*, 54(2), 91-98. 10.24425/ppb.2023.146403

Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 Well-Being Index: a systematic review of the literature. *Psychotherapy and psychosomatics,* 84(3), 167-176. https://doi.org/10.1159/000376585

Uram, P., Skalski, S., & Kwiatkowska, A. (2021). Values and materialism as predictors of pro-environmental attitudes. 10.33910/herzenpsyconf-2021-4-87

Uram, P., Binyamin Skalski-Bednarz, S., & Kwiatkowska, A. (2024). Adaptation of Belk's materialism scale to the Polish population and assessment of relationships between materialism, values, religiosity, and pro-environmental beliefs. *Journal of Beliefs & Values,* 1-20. https://doi.org/10.1080/13617672.2023.2291606

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of environmental psychology*, 11(3), 201-230. https://doi.org/10.1016/S0272-4944(05)80184-7

Wallis, H., & Loy, L. S. (2021). What drives pro-environmental activism of young people? A survey study on the Fridays For Future movement. *Journal of Environmental Psychology*, *74*, 101581. https://doi.org/10.1016/j.jenvp.2021.101581

Whitburn, J., Linklater, W. L., & Milfont, T. L. (2019). Exposure to urban nature and tree planting are related to pro-environmental behavior via connection to nature, the use of nature for psychological restoration, and environmental attitudes. *Environment and behavior,* 51(7), 787-810. https://doi.org/10.1177/0013916517751009

Whitburn, J., Linklater, W., & Abrahamse, W. (2020). Meta-analysis of human connection to nature and proenvironmental behavior. *Conservation biology*, 34(1), 180-193. https://doi.org/10.1111/cobi.13381

Wyss, A. M., Knoch, D., & Berger, S. (2022). When and how pro-environmental attitudes turn into behavior: The role of costs, benefits, and self-control. *Journal of environmental psychology*, 79, 101748. https://doi.org/10.1016/j.jenvp.2021.101748

Zawadzki, S. J., Steg, L., & Bouman, T. (2020). Meta-analytic evidence for a robust and positive association between individuals' pro-environmental behaviors and their subjective wellbeing. *Environmental Research Letters,* 15(12), 123007. https://doi.org/10.1088/1748-9326/abc4ae