DEGREE LEVEL AS DIFFERENTIATING FACTOR IN ENVIRONMENTAL SENSITIVITY IN RECREATIONAL USE OF NATURAL ENVIRONMENTS

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Abstract

Recreational use of natural environment represents an environmentally sensitive area that requires responsible behavior and well-developed environmental sensitivity. The level at which individuals perceive the environmental context of recreation may be associated with their degree level in higher education; therefore, the aim of study was to identify differences in perceptions of environmental challenges and emerging trends in nature-based recreation between bachelor's and master's degree students. The research sample consisted of 1,178 university students (bachelor's, N = 518; master's, N = 660). Assessments of differences relied on chi-square test with Cramér's V, followed by multivariable ordinal logistic regression adjusted for gender, age, and type of higher education institution. Analysis of response distributions using the chi-square test showed significant differences ($p < .01$) between bachelor's and master's students across all analyzed items (χ^2; small effects - Cramér's V). Differences involved perceptions of environmental pressure on areas, the environmental challenges associated with the recreational use of nature, and emerging trends in physical activity. After adjustment for control domains, master's students showed approximately 60% higher odds of rating these aspects more than bachelor's students. Degree level influenced perceptions of environmental context of recreation. Strengthening environmental education at the bachelor's level may promote sustainable recreational behavior in natural environments.

Key words: Higher education, environmental behavior, outdoor recreation, university students.

Introduction

Recreational use of natural environments has become an important issue in higher education because outdoor activity offers benefits for health and well-being while creating pressure on fragile ecosystems. Among university students, engagement with outdoor recreation is linked to well-being effects and contact with green and natural settings (Puhakka, 2021).

Educational programs that integrate physical activity in natural environments can strengthen environmental knowledge, attitudes, and responsible behavior, showing that recreation can serve as pathway to sustainability education (Santos-Pastor et al., 2022). Recent research emphasizes that connection to nature should be built in higher education as part of sustainability strategy and awareness building (Kleespies & Dierkes, 2023); however, environmental awareness and citizenship are not distributed across students, and differences in perception are reported in higher education contexts (Migl et al., 2023). These findings suggest that higher education can shape environmental literacy and students' sensitivity to ecological consequences of leisure behavior. Because bachelor's and master's students differ in curriculum exposure, academic maturity, and learning experience, degree level may represent factors in how they perceive environmental pressure, environmental challenges, and emerging trends related to recreation in natural environments (Ewert et al., 2005).

This study aims at identifying differences in perceptions of environmental challenges and emerging trends in nature-based recreation between bachelor's and master's degree students.

Materials and Methods

The study included 1,178 university students from Slovak higher education institutions. The sample comprised 518 bachelor's students (44.0%) and 660 master's students (56.0%). Distribution of gender remained balanced, with 584 males (49.6%) and 594 females (50.4%).

Data collection used questionnaire focused on environmental aspects of physical activity in natural environments. The analysis targeted five items (Questions 1, 2, 3, 4, and 5), each scored on five-point Likert scales. The items examined respect for environmental restrictions in nature, perceived

contribution of outdoor physical activity to environmental burden, perception of university students' outdoor activity as an environmental challenge, perception of new trends in nature-based activity, and support for environmental education linked to physical activity in nature.
Descriptive statistics summarized sample characteristics via absolute and relative frequencies (*n*, *%*). For each selected item, response distributions across Likert categories underwent comparison between bachelor's and master's students. Chi-square tests of independence (χ^2) evaluated group differences, and Cramér's *V* quantified effect size. Because the analysis included five parallel tests, Holm correction adjusted *p*-values for multiple comparisons.

Tab. 1: Characteristics of study sample according to study level (*N* = 1,178)

Variable	Bachelor's degree	Master's degree	Sample
N	518	660	1,178
% of sample	44.0%	56.0%	100%
Male, *N* (%)	272 (52.5%)	312 (47.3%)	584 (49.6%)
Female, *N* (%)	246 (47.5%)	348 (52.7%)	594 (50.4%)

Ordinal logistic regression then estimated the association between study levels and response levels. Proportional odds model with logit link produced adjusted odds ratios (aORs) and 95% confidence intervals. Study level (master's vs. bachelor's) served as the main predictors, while gender, age category, and type of higher education institution entered the model as covariates. Holm correction adjusted regression *p*-values across the five analyzed items. Statistical significance followed α =.05. Interpretation considered significance and effect magnitude.

Results

Comparison of bachelor's and master's students showed significant differences across all five analyzed items in chi-square analysis, even after Holm correction (Table 2). Effect sizes remained small, with Cramér's *V* ranging from .114 to .158. Perceptions of new trends in outdoor physical activity showed the most evident between-group differences (Q4; χ^2 = 29.469, *p_adj* = 3.14 × 10^-5, *V* = 0.158), followed by support for environmental education related to physical activity in nature (Q5; χ^2 = 24.189, *p_adj* = .0003, *V* = .143) and perceived contribution of outdoor activity to environmental burden (Q2; χ^2 = 20.881, *p_adj* = .0010, *V* = .133).
For Q1, both groups reported high respect for environmental restrictions in nature, although master's students showed more favorable distributions. Combined proportions of "mostly respect" and "always respect" reached 87.6% among bachelor's students and 92.7% among master's students. For Q2, bachelor's students selected "I cannot assess" (56.4% vs. 43.6%), whereas master's students indicated that outdoor activities rather or strongly contribute to environmental burden (31.0% vs. 21.6%). For Q3, master's students viewed university students' physical activity in nature as environmental challenges ("rather yes" + "definitely yes": 40.0% vs. 31.3%). For Q4, they perceived new trends in outdoor activity ("strongly perceive" + "very strongly perceive": 32.7% vs. 24.3%), while bachelor's students reported low awareness of such trends. For Q5, support for including environmental education in higher education remained high in both groups, but the response "definitely yes" appeared more among master's students (20.0% vs. 11.6%).
In the adjusted ordinal logistic regression model, significant differences after Holm correction remained only for Q3 and Q4. Compared with bachelor's students, master's students showed higher odds of reporting higher scores for perceptions of environmental challenges (*aOR* = 1.60, *95% CI* 1.28 - 2.00, *p_adj* = .0002) and perception of new trends (*aOR* = 1.65, *95% CI* 1.33 - 2.06, *p_adj* = 4.04 × 10^-5). No adjusted differences emerged for Q1, while Q2 and Q5 showed only non-significant trends in favor of master's students.

Tab. 2: Comparison of bachelor's and master's students across questions

Q	Patterns	χ^2	p_adj (χ^2)	V	aOR	95% CI	p_adj (OLR)
Q1	Respects in both groups	15.484	.0076	.115	1.03	.81-1.30	.8307
Q2	Bc. unable to assess; Mgr. perceived burden	20.881	.0010	.133	1.24	.99-1.55	.1109
Q3	Mgr. viewed activity as an envr. challenge	15.191	.0076	.114	1.60	1.28-2.00	.0002
Q4	Mgr. perceived new outdoor trends	29.469	3.14 × 10^-5	.158	1.65	1.33-2.06	4.04 × 10^-5
Q5	Mgr. showed support for envr. education	24.189	.0003	.143	1.29	1.03-1.61	.0745

Discussion

The study indicates that degree level functions as differentiating factors in how university students perceive the environmental context of recreation in natural environments. Although students at both study levels expressed positive orientations toward outdoor physical activity, master's students often recognized environmental burden, environmental challenge, and emerging trends in natural recreation. This pattern suggests that academic progression may strengthen not only environmental knowledge, but interpretive sensitivity toward the ecological implications of recreation. Such an interpretation aligns with research emphasizing the role of higher education in developing environmental awareness and ecological literacy (Kukkonen et al., 2018; Kleespies & Dierkes, 2023; Akay & Akçaova, 2025).

An important result concerns respect for environmental restrictions. Both groups reported high levels of compliance with rules such as following marked trails and respecting protected areas, and the adjusted model did not identify significant degree-level effects for this item. This outcome suggests that basic pro-environmental norms may already hold stable places among university students regardless of study level. Differences appeared in items requiring reflective judgment, in particular, those related to environmental challenge and awareness of new recreation trends. Degree level, therefore, may influence higher-order interpretive aspects of environmental sensitivity more than simple rule acceptance. Available findings suggest that environmental attitudes, awareness, and responsible behavior in nature do not inevitably progress in tandem (Migl et al., 2023).

In particular, strong adjusted effects emerged at perceiving outdoor physical activity as environmental challenges and recognizing new trends such as trail running, gravel cycling, and outdoor fitness. These results carry practical importance because contemporary recreation diversifies and expands into ecological sensitive spaces. Students who perceive these trends may better understand their environmental consequences, including trampling, crowding, habitat disturbance, and cumulative pressure on natural areas. Current literature on outdoor education and sustainability supports this interpretation, emphasizing that direct experience in nature can strengthen environmental sensitivity when accompanied by structured educational framing (Santos-Pastor et al., 2022; Nguyen-Dinh-Dinh & Zhang, 2025).

Another result concerns perceived environmental burden. Bachelor's students selected the response category expressing uncertainty, whereas master's students acknowledged that outdoor activity contributes to environmental pressure. This contrast may indicate gaps in environmental interpretations at earlier stages of study. Bachelor's programs may present physical activity in nature through leisure, health, or performance perspectives, while ecological consequences receive less explicit emphasis. Available research suggests that university environments, campus landscapes, and outdoor education initiatives can enhance students' recognition of environmental values when ecological literacy becomes an educational goal (Huang et al., 2023).

Support for environmental education linked to physical activity in nature remained high in both groups, although the adjusted effect did not retain significance after correction. Even so, the descriptive pattern points to somewhat stronger endorsement among master's students. This tendency implies that academic maturity may increase receptiveness to sustainability-oriented content. Institutions (i.e., university), therefore, should not assume that contact with nature alone develops environmental sensitivity. Outdoor participation needs curricular and extracurricular support that links recreation with reflection on environmental burden, responsible conduct, and changing forms of contemporary outdoor activity. Evidence from higher education research points in same directions, showing that nature-based experience contributes most when paired with explicit educational aims (Puhakka, 2021; Morales-Baños et al., 2023).

Conclusion

Degree level shaped students' environmental sensitivity in recreational use of natural environments. Master's students demonstrated awareness of environmental burden, recreational challenges, and emerging outdoor activity trends than bachelor's students, indicating that academic progression may strengthen ecological interpretation of recreation. These findings highlight the need to integrate sustainability-oriented outdoor education earlier in higher education curricula, in particular, the bachelor's level. Strengthening such educational approaches may foster responsible behavior, deeper ecological literacy, and better recognition of environmental impacts associated with leisure in nature, supporting broader findings on environmental values and educational influence (Huang et al., 2023; Morales-Baños et al., 2023).

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Souhrn
Studie se zaměřuje na rekreační využívání přírodního prostředí jako oblast vyžadující odpovědné jednání a rozvinutou environmentální senzitivitu. Cílem bylo zjistit rozdíly ve vnímání environmentálních výzev a nových trendů v rekreaci v přírodě mezi studenty bakalářského a magisterského stupně. Výzkumný soubor tvořilo 1 178 vysokoškolských studentů. Analýzy prokázaly statisticky významné rozdíly ve všech sledovaných položkách, přičemž studenti magisterského stupně hodnotili environmentální souvislosti rekreace citlivěji než studenti bakalářského studia. Výsledky naznačují, že stupeň vysokoškolského vzdělání ovlivňuje environmentální percepci rekreačních aktivit. Posílení environmentálního vzdělávání v bakalářském studiu může podpořit udržitelnější chování v přírodním prostředí a přispět k odpovědnějšímu využívání přírody během volnočasových aktivit.

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