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Health Literacy and Media Literacy as Predictors of Environmental Concern: The Mediating Role of a Health-Promoting Lifestyle

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A B S T R A C T

Objective: In today's information-rich environment, individuals' abilities to understand health-related information (health literacy) and critically evaluate media content are essential for promoting healthy behaviors and environmental awareness. This study investigated the combined effects of health literacy and media literacy on employees' health-promoting lifestyle and environmental concern, highlighting the mediating role of a health-promoting lifestyle.

Methods: A descriptive–correlational design was used with all employees of the Sport and Youth Offices of South Khorasan Province (census sampling; 176 valid questionnaires). Data were collected via standardized questionnaires, validated by experts, and analyzed using SPSS (descriptive statistics) and PLS (structural model testing).

Findings: The findings revealed that health literacy ($\beta = 0.596$, $t = 7.756$, $p < 0.001$) and media literacy ($\beta = 0.200$, $t = 2.539$, $p < 0.05$) had positive and significant effects on employees' health-promoting lifestyle. Moreover, both health literacy ($\beta = 0.200$, $t = 2.160$, $p < 0.05$) and media literacy ($\beta = 0.235$, $t = 2.829$, $p < 0.01$) directly and positively influenced employees' environmental concern. In addition, a health-promoting lifestyle ($\beta = 0.433$, $t = 5.020$, $p < 0.001$) played a significant mediating role in the relationship between health literacy and environmental concern, as well as between media literacy and environmental concern. The model explained 56.7% of the variance in health-promoting lifestyle ($R^2 = 0.567$) and 60.6% of the variance in environmental concern ($R^2 = 0.606$).

Conclusion: These results underscore the critical mediating role of a health-promoting lifestyle in linking literacy skills to environmental awareness. Interventions targeting both health and media literacy could effectively promote sustainable behaviors and ecological consciousness.

Keywords: *Health Literacy, Health-Promoting Lifestyle, Environmental Concerns, Media Literacy.*

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1. Introduction

Sports and schools are important institutions for public health, cultural development, and social capital (1). Through effective planning and organization of physical activity, these institutions can help to foster positive attitudes and behaviors towards physical activity throughout society, especially among young people (2). In this system, employees of the Departments of Sport and Youth are in a special double position: on the one hand, they are responsible for the development and promotion of sport in the community; on the other hand, they are the mentors and role models for young people, who influence their attitude and lifestyle. This double responsibility makes it all the more important for them to improve their awareness, skills, and attitudes. By learning and sharing a health-promoting lifestyle, they can be a link between national health strategies and their implementation in the sports community (3).

Health is one of the most basic human needs, not only because it enhances the quality of life of individuals, but also because it is the basis of sustainable social development. Cognitive and behavioral dimensions are crucial to public health, and perhaps the most important is health literacy-the ability to obtain, comprehend, evaluate, and use health-related information (4). Health literacy has a direct impact on daily choices about nutrition, exercise, preventive care, and overall health. Research in a number of countries has found that low levels of health literacy have a negative impact on health outcomes, increase disease prevalence, and limit the effective use of health care services (5-9). Because health literacy is so closely related to determinants and outcomes of health and health-related behaviors, it has become an area of interest among policymakers and researchers (10). People with higher health literacy are more likely to follow medical advice, exercise, and eat healthily (11). Conversely, low health literacy is linked to increased rates of risky behavior, decreased participation in preventive screenings, and increased chronic disease. In addition, studies have shown that low health literacy increases healthcare costs and decreases the quality of life (12). This is a global issue, and some developing countries report that more than half of the population falls into the low health literacy group (13-15).

Health literacy is dynamic and amenable to improvement. As a potent medium for shaping knowledge, the media presents both opportunities and challenges. It can effectively disseminate accurate health information, yet in a post-truth era, misinformation and manipulative content, often crafted as clickbait, pose significant risks (16-19). Media literacy complements health literacy, enabling individuals to critically evaluate messages, discern reliable information from misleading content, and utilize media to enhance personal and community health (20, 21). However, awareness and skills alone are insufficient due to the awareness-action gap, which hinders the adoption of healthy behaviors.

A health-promoting lifestyle, encompassing purposeful behaviors such as regular exercise, balanced nutrition, stress management, adequate sleep, and avoidance of high-risk practices, bridges this gap (22, 23). This multidimensional approach, including physical activity, diet, and self-care, supports physical and psychological well-being (24). The World Health Organization defines a healthy lifestyle as extending beyond the absence of disease, promoting comprehensive physical, mental, and social well-being (25). Such lifestyles enhance health, stress resilience, and quality of life (26).

Beyond individual benefits, health-promoting lifestyles yield social and environmental impacts (27). Human health is intertwined with environmental factors: air pollution exacerbates cardiovascular and respiratory diseases, global warming amplifies infectious disease spread, and altered rainfall patterns threaten food security (28). Since health literacy empowers individuals to make informed health decisions, it can also increase their awareness of environmental factors affecting health. Environmental awareness, reflecting sensitivity to the ecological impact of human activities, fosters pro-environmental behaviors such as energy conservation, waste reduction, and responsible consumption (29-31).

In the last few decades, human-induced_environmental changes have put the planet - and therefore human health - at risk in ways we've never seen before (32, 33). Like many other countries, Iran has experienced rapid urbanization, technological and industrial growth, and increasing levels of pollution, all of which have important health implications. Living a health-promoting lifestyle not only enhances quality of life and well-being but also helps to reduce healthcare costs. On the other hand, not having healthy models of living has negative consequences, not only for the individual but for society as a whole (34, 35).

Ultimately, health and healthy lifestyles are not created in isolation. They are affected by a number of factors, including health and media literacy (12, 20, 36). Together, these factors can benefit individual and public health while simultaneously contributing to environmental sustainability

through encouraging reduced consumption and more responsible behavior patterns (37).

This research is of significant scientific, theoretical, and practical value. By focusing on the impact of health literacy and media literacy on environmental issues among employees of the Departments of Sport and Youth, and by considering the mediating role of a health-promoting lifestyle, it contributes to filling a gap in the literature regarding the intersections of health, media, and environmental attitudes.

From a theoretical point of view, the study contributes to conceptual models of health-promoting behaviors by specifying the mechanisms through which health and media literacy influence environmental concern. In practice, the staff of the Departments of Sport and Youth, which play a decisive role in fostering a culture of sport and health in society, deserve special consideration in terms of lifestyle choices, health literacy, and environmental sensitivity. This will help them to incorporate these values into organizational programs, become role models for young people, and successfully implement health development programs.

Furthermore, across various populations, physical activity has consistently shown the lowest mean score among health-promoting lifestyle dimensions (38). Given the mediating role of lifestyle in linking literacy (health and media) with environmental concerns, higher levels of physical activity may positively influence both individual health and ecological well-being. This highlights the essential role of attitude–behavior alignment among sport and youth department employees, who are key agents in promoting physical activity within society.

Environment and lifestyle are closely linked determinants of health. This study highlights the mediating role of a health-promoting lifestyle in shaping the links between health literacy, media literacy, and environmental concern, offering implications for integrated health–environment interventions and organizational policy. By focusing on employees of the Departments of Sport and Youth—a group central to promoting physical activity and healthy lifestyles—the present study provides a novel perspective, bridging knowledge, practice, and policy-making in health and environmental initiatives.

In view of these considerations, the overarching research question for this study is: Does health-promoting lifestyle mediate the relationship between health and media literacy and environmental concern?

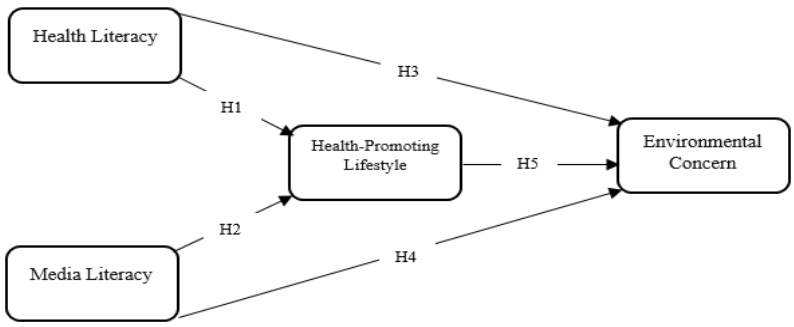

Figure 1. The Conceptual Research Model

2. Methods and Materials

2.1 Sample and procedure

Data for testing the hypothesis were collected from a sample of employees of the Sports and Youth Departments of South Khorasan Province in Iran. The statistical population of the present study included all employees working in this organization during 2024–2025. A total of 200 questionnaires were distributed, out of which 176 were deemed usable after excluding 24 incomplete responses, resulting in a response rate of 88%. We used a quantitative design with a total sampling method including these 176 employees. The sample consisted of 66 females (37.5%) and 110 males (62.5%). The participants' ages ranged from 24 to 70 years, with the majority falling within the 35–45 age bracket (n = 50, 28.5%).

The questionnaire served as the instrument for data collection. It is considered the optimal tool for gathering information due to its ability to efficiently and conveniently

collect quantitative data. Questionnaires that had already been developed for each variable were utilized as the instruments for the present study. The questionnaires were designed based on a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). To ensure the reliability of the questionnaire, a pilot study was conducted with 30 participants to confirm its validity. The reliability of the questionnaire was assessed using Cronbach's alpha, with values above 0.7 considered acceptable. Cronbach's alpha test results are presented in Table 1.

The comprehensive empirical analysis included several tests: factor loadings, assessment of convergent validity, examination of discriminant validity, and evaluation of the structural equations model by analyzing the explained variance (R2), predictive relevance (Q2), t-test (5,000 bootstrapping), and effect size (f2) (39, 40). This examination was established using structural equation model-partial least squares (Smart PLS v.3.2.8) and SPSS v.21 software (41).

2.2 Measures

The purpose of this research was to evaluate the impact of Health Literacy (HL) and Media Literacy (ML) on Health-Promoting Lifestyle (HPL) and Environmental Concern (EC). Respondents completed a questionnaire consisting of various items. HL, ML, HPL, and EC were assessed using constructs with a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

At first, the researchers adapted and refined the scales employed in this investigation based on the context of the study population. Since the original versions of the questionnaires were in English, a rigorous translation procedure was conducted to ensure linguistic and conceptual equivalence in Persian. The questionnaires were translated into Persian by two bilingual experts familiar with sport management and behavioral sciences. Then, a back-translation into English was performed by an independent translator who was not involved in the initial translation. The two English versions were compared, and discrepancies were discussed and resolved to achieve semantic consistency. The translation and back-translation process involved two independent bilingual translators. Inter-translator agreement was assessed by comparing the original, translated, and back-translated versions. Any discrepancies were resolved first through discussion and consensus between the translators; if consensus was not achieved, a third independent expert reviewed the items and provided recommendations based on conceptual equivalence, clarity, and appropriateness for the target population. Finally, the Persian versions were reviewed by a panel of ten experts in sport management and behavioral sciences to assess content clarity, cultural relevance, and conceptual validity. Minor modifications were made based on their feedback.

The evaluation of health literacy was conducted using a two-dimensional scale derived from Tavousi et al. (2022) (42). The health literacy scale consisted of 9 items across two dimensions: Basic Skills (5 items) and Decision-Making Skills (4 items). Representative items for Basic Skills include "I read educational materials about health (booklets, brochures, or pamphlets)" and "I can obtain necessary health information from various sources." Examples for Decision-Making Skills include "When noticing symptoms of illness, I know where or to whom to refer" and "I follow prescribed medications as instructed, even if symptoms disappear. Media literacy was evaluated using 7 items adapted from Mantegh and Jabari (2020) (43). Health-Promoting Lifestyle was measured using a six-dimensional scale derived from Walker (1997) (44). The health-promoting lifestyle scale consisted of 23 items: Self-Actualization (4 items), Responsibility (3 items), Interpersonal Relationships (4 items), Stress Management (3 items), Exercise and Physical Activity (3 items), and Nutrition (5 items). Lastly, Environmental Concern was assessed using a seven-item scale derived from Kim et al. (2019) (45).

2.3 Data analysis

To test our hypotheses, we used structural equation modeling (SEM) with PLS Version 3.2, which is robust to non-normal data and widely used in sport management research. Before conducting the main analysis, a pilot study was carried out on a sample of 30 employees to ensure the clarity and reliability of the questionnaire items. To evaluate the second-order measurements, a second-order confirmatory factor analysis was conducted. The reliability and validity of the measurement model were also assessed; detailed criteria and results of reliability and validity are reported in the Results section.

3. Results

In modeling structural equations, the validity of the construct must first be examined to determine whether the selected indicators are accurate enough to measure the construct. Confirmatory Factor Analysis (CFA) is used for

this purpose. In this method, the relationship between a latent variable (construct) and its observed variable(s) (indicators) is determined by a number called factor loading. The higher the factor loading of an indicator with a specific construct, the more that indicator explains that construct. Gefen and Straub (2005) (46) suggest that the factor loading of each observed variable should be more than 0.4, and its t-statistic should be more than ±1.96. Otherwise, that variable should be excluded from the set of indicators. As shown in Table 1, the factor load of all items is more than 0.5, so no questions were removed from the analysis.

The reliability of research items was evaluated using two criteria: Cronbach's alpha (CA) and composite reliability (CR). According to Cronbach (1951) (47). The appropriate amount of Cronbach's alpha is above 0.7. PLS offers another criterion for reliability called composite reliability, introduced by Werts, Linn, and Joreskog (1974) (48). The advantage of this criterion over Cronbach's alpha is that the reliability of constructs is not absolute but is calculated concerning the correlation of constructs with each other. Fornell and Larcker (1981) (49) set standards above 0.7 for composite reliability. According to Table 1, Cronbach's alpha for all constructs is over 0.7, indicating appropriate research item reliability. Also, the composite reliability values for all constructs are above 0.7, indicating that constructs have good composite reliability (see Table 1). In addition, the variance inflation factor (VIF) scores were between 1.12 and 2.78, so multicollinearity was not an issue (40). Indicator reliability, internal consistency, convergent validity, and discriminant validity were also examined to assess the overall quality of the measurement model. Reliability was evaluated using composite reliability (CR), while indicator reliability was assessed via factor loadings. Reliability is deemed acceptable when the CR value exceeds the threshold of 0.70 (50). Convergent validity was assessed using the Average Variance Extracted (AVE), which is considered acceptable when its value is above 0.50 (49). Discriminant validity was supported when the square root of the AVE of each construct was higher than its correlations with other constructs in the model (49). These analyses collectively demonstrated that the measurement model possessed adequate reliability and validity for subsequent structural analyses.

Table 1. Measurement model

construct	item	Factory loading	T statics	CA	CR	AVE
Health-Promoting Lifestyle				0.959	0.963	0.541
(Walker (1997)	Self-actualization	0.935	74.55	0.860	0.905	0.705
23 items)	Responsibility	0.863	23.92	0.766	0.865	0.682
	Interpersonal relationships	0.918	49.17	0.817	0.880	0.647
	Stress management	0.829	24.77	0.721	0.877	0.782
	Exercise and physical activity	0.888	34.63	0.834	0.900	0.750
	Nutrition	0.918	53.88	0.854	0.891	0.578
Health Literacy				0.884	0.906	0.518
(Tavousi et al. (2022)	Basic Skills	0.945	71.48	0.830	0.880	0.596
9 items)	Decision-Making Skills	0.925	59.26	0.765	0.851	0.588
				0.872	0.901	0.566
	Q1	0.759	18.38			
Media literacy	Q2	0.737	16.29			
(Jabari (2020)	Q3	0.715	15.55			
4 items)	Q4	0.748	15.54			
	Q5	0.786	21.20			
	Q6	0.778	21.91			
	Q7	0.738	18.88			
				0.904	0.924	0.635
	Q1	0.813	27.55			
Environmental concern	Q2	0.796	24.78			
(Kim et al. (2019)	Q3	0.814	28.23			
7 items)	Q4	0.809	24.43			
	Q5	0.824	29.16			
	Q6	0.800	21.52			
	Q7	0.717	15.01			

The research model's validity is examined using convergent validity and divergent (discriminative) validity. Convergent validity examines the correlation of each construct with its items or indicators. The Averages Variance Extracted (AVE) was used to scrutinize the convergent validity of the research. Fornell and Larcker (1981) set a standard above 0.5 for AVE (49). As Table 2 Shows, the AVE for each research construct is greater than 0.5, so the convergent validity of the research model is perfect. The Fornell-Larcker Test (1981) was used to examine divergent validity (49). According to this test, divergent validity is acceptable when the root AVE for one construct is greater than the correlation coefficients of that construct with other constructs. Table 3 shows the root AVE for each construct and correlation coefficients between the researches constructs. In this table, the values of the original diameter of the matrix present the root AVE and the values below the original diameter present coefficients between researches constructs. According to this table, the root AVE for each construct is greater than the correlation coefficient of that construct with other structures. Therefore, the divergent validity of the research model with the mentioned criteria is excellent.

Table 2. Root AVE for research Construct and Correlation Coefficients between Construct

Construct	1	2	3	4	5	6	7	8	9	10	11	12
Health-Promoting Lifestyle	0.800											
Self-actualization	0.706	0.790										
Responsibility	0.701	0.734	0.861									
Interpersonal relationships	0.777	0.795	0.724	0.829								
Stress management	0.732	0.739	0.822	0.787	0.847							
physical activity	0.408	0.421	0.532	0.498	0.506	0.861						
Nutrition	0.421	0.418	0.523	0.489	0.497	0.801	0.845					
Health Literacy	0.426	0.424	0.522	0.478	0.527	0.879	0.882	0.894				
Basic Skills	0.443	0.431	0.528	0.487	0.498	0.876	0.853	0.807	0.874			
Decision-Making Skills	0.410	0.399	0.496	0.409	0.461	0.813	0.843	0.815	0.847	0.894		
Media literacy	0.404	0.424	0.522	0.477	0.485	0.884	0.891	0.898	0.875	0.808	0.909	
Environmental concern	0.560	0.578	0.595	0.572	0.588	0.487	0.506	0.472	0.513	0.484	0.504	0.819

After testing the measurement model, the structural model of the research, which examines relationships between latent variables, is tested

If the value of T is within range of –1.96 and þ1.96, the connection between factors insignificant at the confidence level 95% and if $|t| > 1.96$ ($p < 0.05$), the connection between factors will be significant at the confidence level 95%. Hence the results showed that connections between all factors are significant.

Table 3. Results of Hypotheses Testing

Path	(β) path coefficient	t-statistic	P-value
Health Literacy-- Health-Promoting Lifestyle	0.596	7.756	0.001
Media Literacy -- Health-Promoting Lifestyle	0.200	2.539	0.003
Health Literacy-- Environmental concern	0.200	2.160	0.001
Media Literacy -- Environmental concern	0.235	2.829	0.002
Health-Promoting Lifestyle -- Environmental concern	0.433	5.020	0.001

The Bootstrap method with 5,000 resamples was used to test the fourth hypothesis, which considers the indirect relationship between Health Literacy, Media Literacy, and Environmental Concern through the mediating role of Health-Promoting Lifestyle. In this method, if the lower limit (LL) and upper limit (UL) of the bootstrap confidence interval are both positive and both negative and the p-value is less than 0.05, the indirect path is considered significant and the hypothesis is confirmed. Table 3 presents the results of the bootstrap analysis to evaluate the significance of the indirect effects.

Table 4. The Results of the Bootstrap Method

Path Independent variable	Mediating variable	Dependent variable	Indirect effect	T-Statistic	Estimation Error	P-value
Health Literacy	Health-Promoting Lifestyle	Environmental concern	0.258	4.148	0.062	0.001
Media Literacy	Health-Promoting Lifestyle	Environmental concern	0.087	2.135	0.041	0.001

As shown in Table 4, the significance level of the test is equal to 0.001, which is lower than 0.05, and the 95% bias-corrected bootstrap confidence intervals (CI) do not include zero, confirming the mediating role of Health-Promoting Lifestyle. This indicates that Health Literacy affects Environmental Concern via Health-Promoting Lifestyle, and similarly, Media Literacy influences Environmental Concern through the same mediator.

Upon completion of the measurement model in PLS analysis, the subsequent step involved the estimation of the structural equation model. To investigate the mediating effects of Health-Promoting Lifestyle, we followed the procedures recommended by (40, 51). Specifically, the direct effect model was initially estimated prior to the indirect effect model, as illustrated in Table 4.

To analyze both direct and indirect effects of the structural model, four criteria were applied:

Coefficient of determination (R^2) for endogenous latent variables, to determine the variance explained in each construct.

Predictive relevance (Q^2), to assess the model's predictive power.

Path coefficients, to evaluate the strength of relationships. Statistical significance, assessed using bootstrapping with 5,000 subsamples (40).

The analysis of 5,000 bootstrapped samples, derived from the initial 176 distributed questionnaires, provides a precise estimation of confidence intervals and confirms the significance of both direct and indirect effects (40). The R^2 values indicate the explanatory power of the independent variables:

Health-Promoting Lifestyle: $R^2 = 0.567$, meaning 56.7% of the variance is explained by Health and Media Literacy. Environmental Concern: $R^2 = 0.606$, indicating that 60.6% of the variance is explained by Health Literacy, Media Literacy, and Health-Promoting Lifestyle.

Additionally, a cross-validated redundancy measure (Q^2) was applied to quantify the predictive significance of the model. Values of 0.02, 0.15, and 0.35 represent weak, moderate, and strong predictive relevance, respectively (39). The obtained Q^2 values are: Health-Promoting Lifestyle: $Q^2 = 0.279$ (moderate). Environmental Concern: $Q^2 = 0.356$ (strong). These results demonstrate that the structural model has adequate explanatory and predictive power, confirming the robustness of the mediating role of Health-Promoting Lifestyle.

Goodness of Fit (GOF) examines the overall fit of the structural model. This index which was developed by Tenenhaus, Amato and Vinzi (2004)(52), is calculated using the geometric mean of R2 and the mean commonality indicators:

$$GOF = \sqrt{commonality} * R2$$

Values of 0.01, 0.25, and 0.36 are suggested as weak, moderate, and strong values for the overall model fit. According to the above formula, the GOF was calculated at 0.499. This value indicates a strong overall fit.

Table 5. Coefficient of determination in the PLS method

Construct	R^2	Q^2
Health-Promoting Lifestyle	0.567	0.279
Environmental concern	0.606	0.356

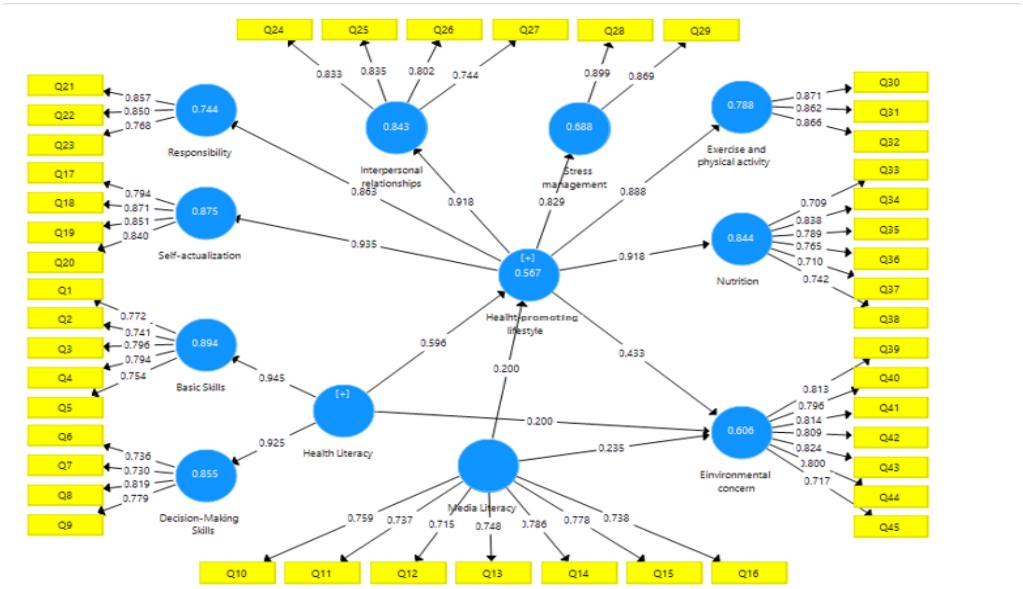

Figure 2. Structural model fit using R^2 values

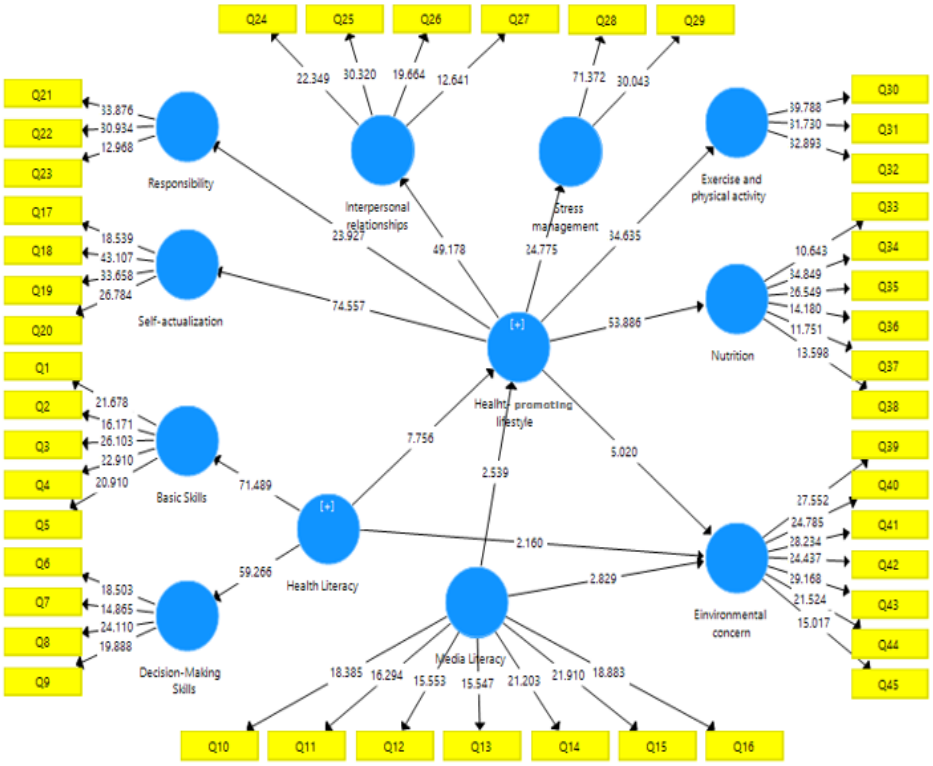

Figure 3. Structural model fit using T-values

4. Discussion and Conclusion

The purpose of this study was to examine whether a health-promoting lifestyle mediated the relationship between health literacy, media literacy, and environmental concerns.

The results indicated that health literacy has a direct and significant impact on the health-promoting lifestyle of employees in the Departments of Sport and Youth. Prior

research has reported similar associations, with Bektas et al. (2021) identifying health literacy as one of the strongest predictors of adopting a health-promoting lifestyle (20), and studies (12, 20, 36) confirming related patterns in different contexts. These findings emphasize the importance of health literacy education and empowerment of staff, as such competencies provide a foundation for sustainable healthy behaviors. Theoretically, our findings can be directly interpreted through Pender's Health Promotion Model, which highlights knowledge and health-related attitudes as key determinants of health behaviors. Employees with higher health literacy are better able to understand, analyze, and apply health information, enabling informed decisions about nutrition, exercise, disease prevention, and stress management. In this context, sufficient health literacy acts as a catalyst for the adoption of healthy and sustainable lifestyles within the organizational environment of Iran's sport sector. However, not all studies find a direct relationship. For instance, Lee et al. (2010) reported that high health literacy does not necessarily lead to lifestyle changes, emphasizing the role of mediating factors such as intrinsic motivation, environmental conditions, and social support (53). The differences between our findings and those of Lee et al. may be attributed to contextual factors specific to Iranian sport employees. Cultural norms, organizational practices, and access to health and media resources in Iran differ from the populations studied by Lee et al., which could influence how health literacy and media literacy affect a health-promoting lifestyle and environmental concern. Moreover, in contexts where structural barriers limit access to health resources—such as nutritious food or sport facilities—even employees with high health literacy may face challenges in adopting healthier lifestyles. Considering these local conditions provides a more accurate interpretation of the results and underscores the importance of cultural, economic, and infrastructural factors in shaping both health-promoting behaviors and environmental awareness.

The results indicated that media literacy has a direct and significant effect on employees' health-promoting lifestyle. This finding is consistent with prior studies that reported positive associations between media literacy and health-related behaviors, including (36, 54, 55). Similarly, Cui et al. (2024) showed that media literacy and media use improved diet, sleep, and physical activity while reducing depression among Chinese older adults (56). Yang et al. (2025) also emphasized the role of media literacy in promoting physical and mental health (57). From a theoretical perspective, these findings can be interpreted through Bandura's Social Cognitive Theory (2001). This theory emphasizes that individuals learn behaviors by observing models in their environment (58). In our study, employees with higher media literacy were better able to recognize and adopt health-promoting behaviors portrayed in media content—such as balanced nutrition, regular exercise, stress management, and mental well-being—while filtering out misleading or harmful messages. Thus, media literacy enhances observational learning, making media a more effective source of positive behavioral models. Additionally, Ajzen's Theory of Planned Behavior (1991) helps explain these findings (59). Employees with higher media literacy not only have greater access to accurate and scientific health information, but also develop more positive attitudes toward healthy behaviors, perceive supportive subjective norms, and experience higher perceived control over health-related decisions. This suggests that their critical evaluation of media messages directly influences their intentions and adoption of a health-promoting lifestyle. In summary, the direct effect of media literacy on employees' health-promoting lifestyle observed in this study can be understood as the combined influence of observational learning (58) and enhanced behavioral intention and control (59), providing a clear theoretical pathway for how media literacy shapes health-related behaviors.

The findings of this study indicate that health literacy directly and significantly influences the environmental concerns of employees in the Departments of Sport and Youth. This means that as employees better understand health-related concepts, they tend to extend this awareness to the environment in which they live and work. Pour-Omran and Arabi (2018) also found a strong and positive association between health literacy, health-promoting lifestyles, and pro-environmental behavior (60). This consistency strengthens the reliability of the current results. Connecting theoretical models more directly to findings: According to Ajzen's Theory of Planned Behavior (1991), individuals who possess higher levels of health literacy form stronger positive attitudes and perceived behavioral control toward actions that benefit both personal and environmental health. In the context of this study, employees who understand the links between physical health, clean environments, and active lifestyles are more likely to adopt environmentally responsible behaviors such as reducing waste in sport facilities or promoting sustainable sport practices. Similarly, Schwartz's Norm Activation Model (1997) (61) helps to explain why health-literate individuals

demonstrate a sense of moral obligation that extends beyond self-interest. When individuals recognize that environmental degradation threatens public health, their personal norms become activated, motivating pro-environmental actions such as conserving resources and protecting green spaces. From a health psychology perspective, this relationship reflects how greater awareness of health risk factors (e.g., pollution, sedentary lifestyle) fosters an integrated understanding of well-being that includes environmental sustainability. Within Iran's sport and health management system, this finding is particularly relevant. The integration of health literacy programs into sport organizations could enhance both personal well-being and collective environmental responsibility among employees. By embedding environmental health education into sport-related training, policymakers can promote a culture that values sustainability alongside athletic and public health development. In summary, health literacy not only shapes individual health behaviors but also promotes environmental stewardship among employees. This dual impact highlights the importance of designing sport and health education policies in Iran that address both personal and environmental dimensions of health.

The results also reveal that media literacy has a direct and significant impact on employees' environmental concern. This finding is consistent with the studies of Norouzi (2022), Yousefkhani and Amiri (2020), and Javaheri et al. (2019), who showed that awareness, attitudes, and supportive behaviors toward the environment are strengthened by exposure to media and increased awareness of media content (62-64). According to Goffman's (65) framing theory, media framing plays a crucial role in shaping how individuals perceive and respond to environmental issues. When environmental crises are presented with emphasis on human responsibility and consequences, employees with higher levels of media literacy are more capable of interpreting, questioning, and responding to these messages. This theoretical perspective helps explain the present findings: media-literate employees in the Departments of Sport and Youth are more sensitive to how media constructs environmental meaning, which in turn influences their environmental attitudes and behaviors .Media literacy—defined as the ability to access, analyze, critically evaluate, and create content through multiple media channels—enhances individuals' capacity to process environmental information critically. In this context, employees with greater media literacy are more likely to detect biases, verify sources, and adopt evidence-based environmental actions. They are therefore better prepared to engage in responsible behaviors and sustainable choices, translating awareness into greener practices both in their workplaces and sports-related activities. In the Iranian sport and youth management system, this relationship is highly relevant. Integrating media literacy education into sport organizations can promote environmental awareness among employees and the broader public. By equipping staff with skills to critically interpret environmental content, managers can encourage a culture of sustainability in sport facilities and youth programs, aligning with national goals for environmental protection and social responsibility. In sum, the theoretical and empirical evidence suggests that media literacy acts as a cognitive and motivational driver of environmental concern, enabling employees to transform environmental information into conscious, sustainable practices

Furthermore, the structural model showed that a health-promoting lifestyle has a direct and significant effect on environmental concerns. This result is consistent with the result of (66). People who take an active interest in their physical, mental, and social well-being are also more likely to be concerned about the environment and more likely to behave responsibly in their everyday lives. Theoretically, this can be explained by McLeroy et al.'s (1988) ecological model of health, which focuses on the interaction of individual, interpersonal, institutional, social, and environmental factors in the determination of health-related behaviors (67). A health-promoting lifestyle, therefore, not only raises awareness of the environment but also reinforces sustainable practices. Likewise, Bourdieu's theory of lifestyle highlights the fact that lifestyle is a manifestation of social values, beliefs, and structures. Researchers have found that employees who make lifestyle choices that promote health are more likely to be from cultural groups in which responsibility, environmental ethics, and global concerns are more important.

The analysis also supported the mediating role of a health-promoting lifestyle in the relationship between health literacy and environmental concern. The indirect effect was significant ($\beta = 0.258$, $t = 4.148$, $p = 0.001$), indicating that part of the influence of health literacy on environmental concern operates through individuals' adoption of healthier lifestyles. In line with a growing body of evidence, such as that of Soleiman Pour-Omran and Arabi (2018) (60), the current results emphasize that health literacy plays a vital role in shaping pro-environmental attitudes and behaviors. Health-literate individuals can critically process large amounts of health and wellness information, identify what is

essential for prevention and treatment, and apply it in their daily routines. This competence promotes behaviors such as healthy eating, physical activity, stress management, and mindful resource use. These habits not only enhance individual well-being but also naturally align with environmentally sustainable practices. For instance, reducing red meat consumption improves metabolic health while lowering carbon footprints; similarly, choosing active modes of transportation, such as cycling or walking, supports both cardiovascular fitness and pollution reduction. From Bandura's Social Cognitive Theory perspective, health literacy fosters a sense of self-efficacy, encouraging individuals to believe they can influence both their personal health and environmental outcomes through everyday behaviors. Consequently, environmental concern becomes an integral part of one's healthy-living identity, rather than an abstract or distant concept.

The results also supported the mediating role of a health-promoting lifestyle in the association between media literacy and environmental concern, with a significant indirect effect ($\beta = 0.087$, $t = 2.135$, $p = 0.001$). Although the indirect effect of media literacy on environmental concern through a health-promoting lifestyle ($\beta = 0.087$) is relatively small, it is statistically significant. In applied settings, such small effects can still be meaningful, particularly when scaled across larger populations or over time, as even modest improvements in lifestyle behaviours may lead to meaningful increases in environmental awareness and health outcomes.

Media are important in creating models of lifestyle, and those with high media literacy will be better able to understand, critique, and adopt these models in everyday life. Healthy lifestyles - based on healthy eating, physical activity, and stress reduction, getting enough sleep, and abstaining from high-risk behaviors - are often a counterpoint to the consumerist and destructive lifestyles fostered by commercial media. People who live healthy lives are more environmentally conscious because they understand the two-way relationship between personal and ecological health. Deciding to drive less, eat fewer processed foods, or avoid overconsumption is not only good for one's personal health, but it is also good for the planet. Media literacy increases critical awareness of cultural and environmental messages and guides people towards making choices that are congruent with healthy living and environmental preservation. In this sense, media literacy promotes environmental concern indirectly by first promoting the adoption of healthier lifestyle practices. Overall, the results indicate that those who have the ability to interpret and assess information about health tend to have a healthier lifestyle, which in turn increases their environmental responsibility and sensitivity. A health-promoting lifestyle therefore, acts as a mediating factor between personal awareness and environmentally responsible behavior. Accordingly, joint investment in health literacy and media literacy can become a foundation for educational and cultural policy. In the context of Iran's sport and health management system, fostering health and media literacy among employees can enhance environmental responsibility. These results highlight the potential value of integrating literacy-based training programs within sports organizations and youth programs to promote sustainable behaviors and support national health and environmental objectives.

4.1 Limitations and Future Research

This study has some limitations. Its cross-sectional nature limits causal inference, and its use of self-reported measures may have response bias. In addition, exogenous factors such as organizational culture, economic conditions or availability of health resources, which may be associated with lifestyle and attitudes towards environmental issues, were not controlled for. Future research should therefore use longitudinal or intervention-based designs to investigate these dynamics over time, and take more explicit account of external factors.

From a practical perspective, it is suggested that public health and environmental sustainability need to be embedded into a common agenda that brings together organizations, policymakers, and relevant institutions. By integrating the concepts of health literacy, media literacy, and health-promoting lifestyles, sustainable health and environmental well-being can be promoted concurrently through a focus on individual, social, and environmental determinants.

Some AVE values for first-order constructs, including nutrition and interpersonal relationships, were close to the minimum acceptable threshold of 0.50. Although these constructs meet the basic criteria for convergent validity, this may represent a potential limitation of the study. Future research could consider refining the measurement items or increasing the sample size to further strengthen the convergent validity of these constructs.

Authors' Contributions

All authors equally contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

References

1. Kumar H, Manoli AE, Hodgkinson IR, Downward P. Sport participation: From policy, through facilities, to users' health, well-being, and social capital. Sport management review. 2018;21(5):549-62. [DOI]
2. Geidne S, Quennerstedt M, Eriksson C. The Youth Sports Club as a Health-Promoting Setting: An Integrative Review of Research. Scandinavian Journal of Public Health. 2013;41(3):269-83. [PMID: 23349167] [PMCID: PMC3807854] [DOI]
3. Van der Veken K, Lauwerier E, Willems SJ. How community sport programs may improve the health of vulnerable population groups: a program theory. International journal for equity in health. 2020;19(1):74. [PMID: PMC7245920] [PMCID: https://doi.org/10.1186/s12939-020-01177-5]
4. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. Health promotion international. 2000;15(3):259-67. [DOI]
5. Suka M, Odajima T, Okamoto M, Sumitani M, Igarashi A, Ishikawa H, et al. Relationship between health literacy, health information access, health behavior, and health status in Japanese people. Patient education and counseling. 2015;98(5):660-8. [PMID: 25739344] [DOI]
6. Aaby A, Friis K, Christensen B, Rowlands G, Maindal HT. Health literacy is associated with health behaviour and self-reported health: A large population-based study in individuals with cardiovascular disease. European journal of preventive cardiology. 2017;24(17):1880-8. [PMID: 28854822] [PMCID: PMC5680908] [DOI]
7. Park A, Eckert TL, Zaso MJ, Scott-Sheldon LA, Vanable PA, Carey KB, et al. Associations between health literacy and health behaviors among urban high school students. Journal of School Health. 2017;87(12):885-93. [PMID: 29096408] [PMCID: PMC5669371] [DOI]
8. Luo H, Chen Z, Bell R, Rafferty AP, Gaskins Little NR, Winterbauer N. Health literacy and health behaviors among adults with prediabetes, 2016 behavioral risk factor surveillance system. Public Health Reports. 2020;135(4):492-500. [PMID: 32511939] [PMCID: PMC7383752]
9. Rueda-Medina B, Gómez-Urquiza JL, Tapia-Haro R, Casas-Barragán A, Aguilar-Ferrándiz ME, Correa-Rodríguez M. Assessing health science students' health literacy and its association with health behaviours. Health & social care in the community. 2020;28(6):2134-9. [PMID: 32462713] [DOI]
10. Apfel F, Tsouros AD. Health literacy: the solid facts. Copenhagen: World Health Organization. 2013;15(1):3-26.
11. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: a systematic review and integration of definitions and models. BMC public health. 2012;12(1):80. [PMID: 22276600] [PMCID: PMC3292515] [DOI]
12. Ma Y, Huang L, Tian H, Liu H, Yu H, Li H, et al. The impact of health literacy on health-promoting lifestyle among community residents: the chain-mediating role of family health and physical activity. Frontiers in Psychiatry. 2024;15:1487274. [PMID: 39583751] [PMCID: PMC11582026]
13. Jovic-Vranes A, Bjegovic-Mikanovic V, Marinkovic J, Kocev N. Health literacy in a population of primary health-care patients in Belgrade, Serbia. International journal of public health. 2011;56(2):201-7. [PMID: 20711626] [DOI]
14. Karimi S, Keyvanara M, Hosseini M, Jazi MJ, Khorasani E. The relationship between health literacy with health status and healthcare utilization in 18-64 years old people in Isfahan. Journal of education and health promotion. 2014;3(1):75. [PMID: 25077168] [PMCID: PMC4113988] [DOI]
15. Toçi E, Burazeri G, Kamberi H, Jerliu N, Sørensen K, Brand H. Socio-economic correlates of functional health literacy among patients of primary health care in Kosovo. Public health. 2014;128(9):842-8. [PMID: 25129227] [DOI]
16. Cooke NA. Posttruth, truthiness, and alternative facts: Information behavior and critical information consumption for a new age. The library quarterly. 2017;87(3):211-21. [DOI] [DOI]
17. Dolanbay H. A discipline approach: The relationship between media literacy and social studies. Handbook of Research on Media Literacy Research and Applications across Disciplines: IGI Global; 2019. p. 50-64. 3_https://doi.org/DOI}
18. Duffy A, Ling R. The gift of news: Phatic news sharing on social media for social cohesion. Journalism studies. 2020;21(1):72-87. [DOI]
19. Ryan T, Allen KA, Gray DL, McInerney DM. How social are social media? A review of online social behaviour and connectedness. Journal of Relationships Research. 2017;8:e8. [DOI]
20. Bektas İ, Kudubeş AA, Ayar D, Bektas M. Predicting the healthy lifestyle behaviors of Turkish adolescents based on their health literacy and self-efficacy levels. Journal of Pediatric Nursing. 2021;59:e20-e5. [PMID: 33589289] [DOI] [DOI]

21. Levin-Zamir D, Bertschi I. Media health literacy, eHealth literacy, and the role of the social environment in context. International journal of environmental research and public health. 2018;15(8):1643. [PMID: 30081465] [PMCID: PMC6121358] [DOI]
22. Levant R, Wimer D, Williams C. An Evaluation of the Health Behavior Inventory20 (HBI-20) and Its Relationships to Masculinity and Attitudes Towards Seeking Psychological Help Among College Men. Psychol Men Masc—Psychol Men Masc. 2011;12:26-41. [DOI]
23. Savarese G, Carpinelli L, Cavallo P, Vitale MP. Italian Psychometric Validation of the Multidimensional Students' Health-Promoting Lifestyle Profile Scale. Health. 2018;10:15541575. [DOI]
24. Tabish S. Lifestyle diseases: consequences, characteristics, causes and control. J Cardiol Curr Res. 2017;9(3):00326. [DOI]
25. World Health O. Summary Reports on Proceedings Minutes and Final Acts of the International Health Conference held in New York from 19 June to 22 July 1946. World Health Organization; 1948.
26. Wang K, Li Y, Liu H, Zhang T, Luo J. Can physical activity counteract the negative effects of sedentary behavior on the physical and mental health of children and adolescents? A narrative review. Frontiers in public health. 2024;12:1412389. [PMID: 39157520] [PMCID: PMC11328546] [DOI]
27. Weber A, Kroiss K, Reismann L, Jansen P, Hirschfelder G, Sedlmeier AM, et al. Health-promoting and sustainable behavior in university students in Germany: a cross-sectional study. International journal of environmental research and public health. 2023;20(7):5238. [PMID: 37047853] [PMCID: PMC10094390] [DOI]
28. Whitmee S, Haines A, Beyrer C, Boltz F, Capon AG, de Souza Dias BF, et al. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health. The lancet. 2015;386(10007):1973-2028. [PMID: 26188744] [DOI]
29. Clayton S, Myers G. Conservation psychology: Understanding and promoting human care for nature: John Wiley & Sons; 2015. 3_https://doi.org/DOI}
30. Liobikienė G, Poškus MS. The importance of environmental knowledge for private and public sphere pro-environmental behavior: modifying the value-belief-norm theory. Sustainability. 2019;11(12):3324. [DOI]
31. Steg L, Vlek C. Encouraging pro-environmental behaviour: An integrative review and research agenda. Journal of environmental psychology. 2009;29(3):309-17. [DOI]
32. Myers JA, Patz. Emerging threats to human health from global environmental change. Annu Rev Env Resour. 2009;34:223-52. [DOI]
33. Watts WN, Adger P, Agnolucci J, Blackstock P, Byass W, Cai W, et al. Health and climate change: policy responses to protect public health. Lancet. 2015;386:1861-914. [PMID: 26111439] [DOI]
34. Goetzel RZ, Henke RM, Head MA, Benevent R, Rhee K. Ten Modifiable Health Risk Factors and Employees' Medical Costs-An Update. Am J Health Promot. 2020;34(5):490–9. [PMID: 32295381] [DOI]
35. Harooni J, Hassanzadeh A, Mostafavi F. Influencing factors on health promoting behavior among the elderly living in the community. Journal of education and health promotion. 2014;3(1). [PMID: 25013833] [PMCID: PMC4089138]
36. Liu S, Lu Y, Wang D, He X, Ren W, Kong D, et al. Impact of digital health literacy on health-related quality of life in Chinese community-dwelling older adults: the mediating effect of health-promoting lifestyle. Frontiers in Public Health. 2023;11:1200722. [PMID: 37415711] [PMCID: PMC10321557]
37. Maranzano P, Ascari R, Chiodini PM, Manzi G. Analysis of sustainability propensity of bike-sharing customers using partially ordered sets methodology. Social Indicators Research. 2021;157(1):123-38. [DOI]
38. Alzahrani SH, Malik AA, Bashawri J, Shaheen SA, Shaheen MM, Alsaib AA, et al. Health-promoting lifestyle profile and associated factors among medical students in a Saudi university. SAGE Open Medicine. 2019;7:205031211983842. [PMID: 30937167] [PMCID: PMC6434441] [DOI]
39. Cohen J. Statistical power analysis for the behavioral sciences: routledge; 2013. https://doi.org/10.4324/9780203771587} 3_https://doi.org/DOI}
40. Hair JF, Hult GTM, Ringle CM, Sarstedt M. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM): Sage Publications, Thousand Oaks; 2014. 3_https://doi.org/DOI}
41. Ringle CM, Sarstedt, M., & Straub, D. W. . Editor's comments: a critical look at the use of PLS-SEM in" MIS Quarterly". MIS quarterly. 2012;36(1). [DOI]
42. Tavousi M, Haeri -Mehrizi AA, Sedighi S, Montazeri A, Mohammadi S, Ardestani MS, et al. The short form of Health Literacy for Adult (HELIA -SF): Developed and psychometric properties. Payesh. 2022;21(3):309-19. [DOI]
43. Mantegh H, Jabbari L. Employee Digital Literacy Skills and its Relationship with their Empowerment (Case study: Allameh Tabatabai University staff). Sciences and Techniques of Information Management. 2022;8(1):221-44. [DOI]
44. Walker SN, Hill-Polerecky DM. Psychometric evaluation of Health Promoting Lifestyle Profil II. 1997.
45. Kim YJ, Kim WG, Choi HM, Phetvaroon K. The Effect of Green Human Resource Management on Hotel Employees' Eco-Friendly Behavior and Environmental Performance. International Journal of Hospitality Management. 2019;76:83-93. [DOI]
46. Gefen D, & Straub, D. . A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. Communications of the Association for Information systems. 2005;16(1):91–109. [DOI]
47. Cronbach LJ, 297-334. Coefficient alpha and the internal structure of tests. psychometrika. 1951;16(3):297-334 [DOI]
48. Werts CE, Linn, R. L., & Jöreskog, K. G. . Intraclass reliability estimates: Testing structural assumptions. Educational and Psychological measurement,. 1974;34(1):25-33. . [DOI]
49. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research. 1981;18(1):39-50. [DOI]
50. Hulland J, Baumgartner H, Smith KM. Marketing survey research best practices: evidence and recommendations from a review of JAMS articles. Journal of the academy of marketing science. 2018;46(1):92-108. [DOI]
51. Henseler J, Ringle, C. M., & Sinkovics, R. R. . The use of partial least squares path modeling in international marketing. In New challenges to international marketing. Emerald Group Publishing Limited. 2009;20:277-319. [DOI]
52. Tenenhaus M, Amato S, Esposito Vinzi V, editors. A global goodness-of-fit index for PLS structural equation modelling. Proceedings of the XLII SIS scientific meeting; 2004. 3_https://doi.org/DOI}
53. Lee S-YD, Tsai T-I, Tsai Y-W, Kuo KN. Health literacy, health status, and healthcare utilization of Taiwanese adults: results from a national survey. BMC public health. 2010;10(1):614. [PMID: 20950479] [PMCID: PMC2967535] [DOI]
54. Golabi F. Media and Health-oriented Lifestyle (Study of Health-oriented Lifestyle of Citizens in East Azerbaijan Province). Iranian Social Development Studies. 2022;14(2):65-80.

55. Qin C, Zhu Y, Li D, Liu C. The impact of digital skills on health: Evidence from the China General Social Survey. Digital health. 2024;10:20552076241304592. [PMID: 39649292] [PMCID: PMC11622307] [DOI]
56. Cui K, Zou W, Ji X, Zhang X. Does digital technology make people healthier: the impact of digital use on the lifestyle of Chinese older adults. BMC geriatrics. 2024;24(1):85. [PMID: 38254001] [PMCID: PMC10804579] [DOI]
57. Yang J, Shen Q, Tong X, Mukhopadhaya P. The impact of digital literacy in enhancing individuals' health in China. BMC public health. 2025;25(1):364. [PMID: 39881277] [PMCID: PMC11776178] [DOI]
58. Bandura A. Social cognitive theory of mass communication. Media effects: Routledge, 2009. p. 110-40. https://doi.org/10.4324/9780203877111-12}
3_https://doi.org/DOI}
59. Ajzen I. The theory of planned behavior. Organizational behavior and human decision processes. 1991;50(2):179-211. [DOI]
60. Mahboubeh Soleimanpouromran, MS. The relationship between health literacy with health-promoting lifestyle and environmental behavior. Quarterly Journal of Socio-Cultural Development Studies. 2018;6(4):191-216.
61. Schwartz SH. Normative influences on altruism. Advances in experimental social psychology. 10: Elsevier; 1977. p. 221-79. https://doi.org/10.1016/S0065-2601(08)60358-5}
3_https://doi.org/DOI}
62. Zadeh R, Ershad S, Arezi S, Garousi A. The Effect of Media Use on Teachers' Health Literacy with the Mediating Role of Self-Efficacy. 2024.
63. Kolahi E, Mahmoudmolaeikarmani B, Batoul. The Role of Cultural-Social Components on Citizens' Environmental Behavior: A Case Study of Shirvan. 2019.
64. Fatemeh J, Javad M, Hamed S. Media and Environmental Literacy Based on a Selected Sample of Tehran City Residents. 2020.
65. Goffman E. Frame analysis: An essay on the organization of experience: Harvard university press; 1974. 3_https://doi.org/DOI}
66. HajizadehmeymandI M, Falakodin Z. Lifestyle and responsible environmental behavior among citizens of Khorramabad and Yazd. Contemporary Sociological Research. 2019;8(15):141-72.
67. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. Health education quarterly. 1988;15(4):351-77. [PMID: 3068205] [DOI]