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SOCIAL NORMS AND HEALTH LITERACY AS PREDICTOR OF PRO-ENVIRONMENTAL BEHAVIOR: EVIDENCE FROM NORTH MACEDONIA

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Abstract: Health literacy receives significant attention in the context of climate change, health care and beyond. Being health literate means that individuals have the ability to understand health – related information and, based on this information, make healthy decisions, decisions that align with health care. In this process of integrating knowledge, decisions, and healthy behaviors, environmental health plays an important role. Focused on chemical, physical and biological factors, environmental health addresses the impact of these factors, and not only on the health of individuals but also on communities as a whole. Being environmental health literate means understanding, but also using information on environmental health.

Studies show the effects of various factors on the well-being of young people, but the awareness of youth regarding health has an impact on their behavior towards phenomena that affect their health. Studies reveal a gap between knowledge about environment and pro-environmental behavior. Therefore, the purpose of this study is to predict the behavior of individuals, respectively, pro-environmental behavior based on health literacy and social norms which support environmental health literacy. The study included a total of 1687 adolescents aged 15 years, participating in the HBSC (Health and Behavior of School-aged Children) - North Macedonia study, during the year 2022. Of the total number of participants, 68.5% are Macedonian adolescents and 31.5% Albanian, as a reflection of the population structure in RMV. The participants consist of 50% adolescent boys and 50% adolescent girls.

The data from the binary regression analysis show that health literacy, pro-environmental social norms, age, economic status and ethnicity are important predictors of pro-environmental behavior. This proves that not only health literacy, but also the more that social norms are supportive in relation to prosocial behavior, the more likely adolescents are to engage in pro-environmental behavior. The role of economic status, age and ethnicity of adolescents in pro-environmental behavior will also be discussed. The study provides useful data to clarify the gap between knowledge about environmental health literacy and pro environmental behavior as well as to design programs that will help to enhance pro environmental behavior.

Keywords: social norms, pro-environmental behavior, health literacy, adolescents

1. INTRODUCTION

Health literacy not only enables the management and promotion of health for the individual, but its benefits are evident for the whole society as a whole. It includes the knowledge, motivation and competences to understand and apply health information in order to make decisions about health in daily life, and subsequently to improve the quality of life (Sørensen et al. 2012). Researchers have compared health literacy in population level in different countries, with adults (Sørensen et al. 2015) and with adolescents (Paakkari et al. 2020; Hnidková et al. 2024). Weak health literacy is more found in individuals with a lower level of education, older people, with a lower socio-economic status (Sørensen et al. 2012; Paakkari et al. 2020) as well as in deprived areas (Kleszczewska et al., 2021). Researchers report different data on health literacy and gender. In some studies, no gender differences have been identified in this aspect (Hnidková et al. 2024; Sendatzki et al. 2024), while other studies suggest that men usually show a lower level of health literacy than women (Sørensen et al., 2012; Paakkari et al., 2020; Kleszczewska et al., 2021).

Research proves that health literacy has effects on the healthy behaviors of adolescents. Adolescents who show a higher level of health literacy declare a higher frequency of physical activity (Hnidková et al. 2024), handwashing (Rijser et al., 2020) healthy food (Paakkari et al., 2019). Adolescents with a low health literacy are more often affected by high psychosomatic complaints (Sendatzki et al. 2024), are more likely to engage in unhealthy dietary practices and problematic behavior (Paark et al., 2018) compared to their peers with high health literacy.

According to Lindsey et al. (2021) knowledge about health and science literacy are a combination that make up environmental health literacy, and that, not only contains specific knowledge about environmental health but also includes advocacy. The more information we have about the healthy environment, the more sensitive we will be when we are exposed to unhealthy environments, and with this, more engagement in pro-environmental behavior is expected. Individuals with limited information about the effect of environmental contamination on health are less likely to perceive themselves as less exposed to environmental contamination compared to those with sufficient knowledge on this topic (Bert et al. 2023). In addition to knowledge and awareness, the capacity to search for information, make informed decisions and demonstrate self-efficacy are important factors that drive actions, leading to observable changes within the community (Gray, 2018). The search for information about environmental health is expected to enhance individuals' awareness of the risks posed by an unhealthy environment. Individuals with less information about the health effects of environmental pollution are less likely to verify information on these effects and are less inclined to adopt pro-environmental behavior compared to individuals with greater knowledge on this topic (Bert et al. 2023). Education and information have an important relationship with knowledge about environmental health (Shams et al, 2022) but the ability to understand and use health related information is related to attitudes but not to pro environmental behavior (Carducci, 2021). Kollmus & Agyeman, (2002) estimate that knowledge, values, attitudes together with emotional involvement constitute pro-environmental consciousness, which can clarify pro-environmental behavior. Pro environmental behavior is important because it helps prevent negative environmental impact, which in turns affect individuals' health. The primary motivation for adopting pro-environmental behavior lies in the perception of general environmental risks, as well as health related risk perceptions stemming from environmental threats (Carducci et al. 2021), as well as in the protection of personal health, then in the protection of the environment and protecting the health of other people (Bert et al. 2023). Research on the relationship between socioeconomic status (SES) and pro-environmental behavior yields mixed findings. While some studies report no effect of SES on pro-environmental behavior (Vrselja et al, 2024) others identify a negative relationship (Piao & Managi, 2024) or a positive one (Bagheri et al. 2018).

Research shows that people express positive attitudes towards environmental health (Carducci et al, 2021) recognize the importance of pro-environmental behavior (Bert et al, 2023) and possesses knowledge about environmental health, but these factors do not necessarily translate into the adoption of pro-environmental behavior (Shams et al., 2022). There is a gap in the relationship between environmental knowledge, environmental awareness and pro-environmental behavior (Kollmus, & Agyeman, 2002). Previous research has primarily focused on examining internal factors such as knowledge, attitudes and motivation, as well as external factors like social status, in predicting pro-environmental behavior. Social norms, among other factors, influence individuals' behavior, often overriding the impact of knowledge about certain phenomena. As a result, social norms may play a significant role in shaping pro-environmental behavior, a relationship that, to our knowledge, has not been extensively explored thus far. Therefore, the purpose of this study is the prediction of pro-environmental behavior based on health literacy and social norms related to health environmental literacy.

2. METHODS

Sampling

The Health Behaviour in School-aged Children (HBSC) study is collaborative cross-national survey that is conducted every four years in more than 50 countries, targeting adolescents aged 11, 13 and 15 years (Badura et al., 2024). We used data from HBSC-North Macedonia, conducted in 2022 (Osmani Ballazhi et al., 2024; Bexheti et al., 2024). The sample was selected in a systematic random manner, where the units of analysis were primary and secondary schools in the country. During the selection of the subjects, the stratification was made according to the languages in which the lesson takes place - the Albanian language and the Macedonian language. For the purposes of this study, 15-year-old adolescents were included. The representative sample contains 1687 adolescents. According to the language of instruction, 68.5% are adolescent who learn in the Macedonian language and 31.5% who learn in the Albanian language. According to gender, 50 % of the adolescents are boys and 50 % are girls.

Students from private schools, special needs schools and schools for young people in detention were excluded. In order to respect the ethical procedures of the research, permission was first obtained from the schools through the relevant institutions and then the consent form of the parents was distributed to all the students as well as the willingness of the young people to participate.

Measures

Health Literacy for School Aged Children - HLSAC (Paakkari et al., 2016) examine adolescents' perceived knowledge and competencies to make health decisions related to their own and others health. It was internationally validated and developed for broader international use (Paakkari et al., 2019). It consists of five essential components: theoretical (health) knowledge, practical (health) knowledge, critical thinking, self-awareness, and

citizenship. The scale contains a total of 10 questions, with two questions for each component. All items were introduced with "I am confident that." And each item was answered on a four-point Likert scale from 1 "not at all true" to 4 "absolutely true". A sum score of all items was calculated. HLSAC was used as a continuous variable in this study. Higher sum scores indicate higher levels of heal literacy. The internal consistency of the scale in this simple was good (Cronbach's alpha = .90)

Pro-environmental behavior (Szczytko et al., 2018) was measured by two items related to adolescents engaging in pro-environmental behavior. For each statement adolescent answered on a five-point Likert scale from 1 "strongly disagree" to 5 "strongly agree". The dichotomous variable was created by categorizing adolescents with scores 3 or below, while all those with scores above 3were categorized as 1.

Social norms supporting environmental health literacy were measured with three questions related to the perception of adolescents regarding the knowledge and behavior of family/friends towards the environment (Chiw & Shen Ling, 2019). For each statement, adolescents answer on a scale from 1 "strongly disagree" to 5 "strongly agree". Higher sum score reflects stronger social norms supporting environmental health literacy. The internal consistency of the scale in this simple was acceptable (Cronbach's alpha = .78).

Family SES was measured by the Family Affluence Scale III (FAS-III), which consists of six questions as: car ownership, own bedroom, holidays abroad, number of computers, dishwasher and number of bathrooms, for e.g. "Does your family own a car, van or truck?" (No/Yes, one/Yes, two or more). Students were categorized into three categories based on their ranked scores: low FAS (bottom 20%), medium FAS (middle 60%) and high FAS (upper 20%).

3. RESULTS

Table 1. reports the descriptive statistics of analyzed variables. Only about 20% of adolescents are in high SES, while about 40% are in low and medium SES. Two fifths of adolescents declare pro-environmental behavior. Social norms supporting environmental health literacy are around the average, while adolescents declare that they have a high level of health literacy.

Table 1. Descriptive statistics of the variable

	Gender		Language of instruction		Family affluence scale			Social norms	
	Boys	Girls	Macedonian	Albanian	low	medium	high	NO	YES
N	844	843	1156	532	632	689	361	1315	370
%	50	50	68.5	31.5	37.5	40.8	21.4	77.9	22.1

	Social norms pro environmental behavior	Healthy literacy
Mean	3.57	32.23
SD	(1.09)	(6.61)

Authors research

Table 2. presents prediction of pro-environmental behavior based on social norms supporting environmental health literacy, health literacy, gender, family SES and language of instructions. The logistic regression model demonstrated statistical significance (χ 2 (6) = 284.90, $p < 0.01$) indicating a reliable fit of data. The model explained 25.% (NagelKerke R square) of the variation of pro environmental behavior and correctly classified 79 % of the cases.

Table 2. Binary logistic regression for predicting pro-environment behavior from health literacy, social norms pro environmental literacy, language of instructions, sex and family SES

	B	SE	Wald	df	P	Odds Ratio	95%CI For Odds ratio	
							Lower	Upper
Social norms pro-environment literacy	1.049	.080	170.256	1	.000	2.854	2.438	3.341
Health literacy	.033	.011	8.973	1	.003	1.011	1.011	1.055
SES (High)			10.963	2	.004			
SES (Medium)	-.175	.152	1.322	1	.250	.839	.623	1.131
SES (Low)	.388	.173	5.015	1	.025	1.473	1.050	2.069
Language of instructions	.623	.144	18.841	1	.000	1.865	1.408	2.471
Gender	.007	.132	.003	1	.956	1.007	.778	1.305
constant	-5.649	.487	134.555	1	.000	.140		

Authors research

As shown in the table 2, social norms of pro environmental literacy ($p<0.01$), health literacy ($p<0.01$), family SES ($p<0.01$), and language of instructions ($p<0.01$) makes a statistically significant contribution to the model, but gender ($p=.956$) did not. Macedonian adolescents reported 1.865 time more pro-environment behavior than Albanian adolescents (95% CI from 1.408 to 2.471). Adolescents with low family SES were 1.473 time more likely to report engaging in pro-environment behavior than adolescents with high family SES (95% CI from 1.050 to 2.069). In contrast, adolescents from medium family SES did not differ from those with high family SES in their likelihood of reporting pro-environmental behaviors. Increasing social norms which are pro environmental literacy was associated with an increased likelihood of pro environmental behavior. Similarly, greater health literacy was linked to an increased probability of exhibiting pro-environmental behavior. No significant differences were observed in the reporting of pro-environmental behavior between boy and girl adolescents.

4. DISCUSSION AND CONCLUSION

This study examines prediction of engaging in pro-environmental behavior based on social norms which support environment health literacy, health literacy, language of instruction, family SES and gender. Social norms which support environmental health literacy are significant predictor of pro-environmental behavior in adolescence. When adolescents are embedded within environment like family, school and friends, that prioritize environmentally friendly practices, they are more likely to adopt sustainable behaviors and adjust their lifestyle to support environmental protection.

Health literacy is a significant predictor of engagement in pro-environmental behaviors during adolescence meaning that adolescents who have more knowledge about health and greater competences in making decisions to protect their own health and that of others are also more likely to engage in pro-environmental behavior. In the same direction are the data of Bert et al. (2023) who found that the less information one has about health, the less they adopt pro-environmental behavior.

Our data show that adolescents from families with low SES engage more on pro-environmental behavior, findings which are in the same path with findings of Piao & Managi (2024). The reason for such behavior may be precisely the limited possibility for action that comes from the low economic status. For example, the adaptation of the simpler lifestyle means the consumption of fewer resources as a whole, which is in favor of protecting the environment, e.g. use of public transport, reuse of different and similar materials.

In our study, women and men do not differ in the engagement of pro-environmental behavior, which is not in agreement with Fathonah & Nastiti (2024), whose data show that women are significantly more pro-environmental behavior than men.

The representative sample for the age of 15 used in this study as well as the use of the instrument for health literacy, which is cross-cultural validated represents one of the strengths of this study. Also, this study helps clarify the field of pro-environmental behavior by clarifying its prediction by health literacy, social norms which support environmental health literacy. Future studies can focus specifically on testing the role of health literacy in relation to social norms which support environmental health literacy and pro-environmental behavior.

This study has the advantage of including a representative sample of our country for the age of 15. The data points to the creation strategy.

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