International Journal of Research and Review
[Indexed, Peer-Reviewed Journal]
Volume 13; Issue: 5; May 2026
Website: www.ijrrjournal.com
Research Paper *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Gender Differences in Pro-Environmental Awareness and Environmental Concern Among Secondary School Students: Comparative Study

Ranjit Kaur[1], Dr Balbinder Singh[2]

[1]Research Scholar of Psychology, Guru Nanak Dev University, Amritsar
[2]Assistant Professor, Department of Psychology, Guru Nanak Dev University, Amritsar

Corresponding Author: Dr. Balbinder Singh

DOI: https://doi.org/10.52403/ijrr.20260506

ABSTRACT

This study investigated the relationship between environmental awareness and pro-environmental behaviour among secondary school students. Environmental awareness is a fundamental component of promoting sustainable practices and motivating individuals to undertake environmentally responsible actions. A quantitative descriptive-correlational research design was employed in this study. A total of 101 ninth-grade students, comprising 48 females and 53 males, participated in the research through convenience sampling. Environmental awareness was evaluated using a 40-item Environmental Awareness Questionnaire, while pro-environmental behaviour was assessed with a 13-item behaviour scale. The statistical analyses included descriptive statistics, Pearson correlation, independent samples t-test, and hierarchical regression. The findings indicated moderate levels of environmental awareness and pro-environmental behaviour among the students. A significant positive correlation was observed between environmental awareness and pro-environmental behaviour ($r \approx .29$, $p < .01$), suggesting that students with higher levels of environmental awareness were more inclined to engage in environmentally responsible practices. Gender differences in both environmental awareness and behaviour were not statistically significant, indicating comparable levels of awareness and engagement among male and female students. Furthermore, hierarchical regression analysis revealed that environmental awareness significantly predicted pro-environmental behaviour even after accounting for gender. These results underscore the critical role of environmental education in promoting sustainable behaviours among adolescents. Enhancing environmental awareness through educational programs, school initiatives, and practical learning experiences can encourage responsible environmental actions. The study concludes that bolstering environmental awareness among students is vital for fostering long-term sustainable behaviour and environmental responsibility.

Keywords: Environmental awareness, pro-environmental behaviour, secondary school students.

Pro-environmental Behaviour

The term "environment" encompasses more than just one's immediate surroundings. It includes all living and non-living entities, events, and forces—both natural and human-made—that affect an organism and its relationship with its environment. As Ambaust notes, "The environment is the total

of all conditions and influences that affect the development and life of organisms."

Pro-environmental behaviour refers to the actions individuals take to protect or preserve the environment, often influenced by their personal attitudes, beliefs, and various situational factors. According to Kollmuss and Agyeman (2002), it involves actions that intentionally promote the conservation and sustainability of natural resources while reducing environmental harm and supporting ecological balance. Improving pro-environmental behaviour can be achieved through promoting sustainable practices and educating people, communities, and organisations about the importance of environmental preservation. The Environmental Protection Act of 1986 defines the environment as comprising land, water, and air, alongside the interactions among these elements, as well as those involving humans and other living organisms. In 1992, the U.S. Climate Program (USSNEP) connected its efforts to natural disasters arising from global initiatives. The organisation associated with the UN Conference on Climate Change and Development aims to encourage nations to acknowledge and manage climate protection efforts. The Kyoto Protocol, established during the major global summit in 1997, set targets for emission reductions, with anticipated compliance by 2012 [(1)]. Wood Worth articulates, “The environment encompasses all external factors that have influenced an individual since birth, excluding genetic factors.” The importance of green innovation in fostering environmental protection is well acknowledged. Research shows that green innovation can effectively enable the complete recovery and reuse of solid waste, while also decreasing solid waste emissions [(2)]. These definitions illustrate that the environment is a vast, interconnected system comprising social, chemical, biological, and physical elements. Environmental education plays a vital role in relating shifting perceptions about environmental issues and how they are defined and promoted. In the 1990s, growing concerns about development and environmental matters shifted the focus toward sustainability within environmental education. The start of the new decade required a more defined stance on the challenges facing contemporary society, fostering support for an educational approach aimed at long-term sustainability alongside immediate environmental improvements.

Zaman and Lehmann propose evaluating solid waste management capacity through the waste diversion rate, which measures the proportion of waste redirected from landfills and incineration to efforts focused on minimizing, reusing, reclaiming, and composting [(3)]. The significance of green innovation in fostering environmental protection has been increasingly acknowledged, as it enables the recovery and reuse of solid waste and reduces waste emissions [(2)].

Contrary to the "inhibition theory," which suggested that technological advancements would inevitably lead to increased environmental pollution, it is now recognized that such progress significantly enhances production capabilities, resulting in greater energy consumption and pollutant emissions [(4)].

A New Focus for Environmental Education

While the concept of "sustainability" emerged in the early 1980s, it was not integrated into environmental education until the 1990s. Sustainability encompasses three key aspects:

(a) The necessity of balancing economic growth with environmental conservation.
(b) The importance of understanding environmental issues within socioeconomic and political contexts.
(c) The need to incorporate environmental and developmental considerations, a concept widely popularised by the World Conservation Strategy (IUCN/UNEP/WWF, 1980) and later emphasised in the Brundtland Report.

Environmental Awareness

Data from the World Bank indicates a rise in the human population throughout the 20th century. As a result, a significant environmental issue has surfaced globally. Environmental problems have become the central concern for all living beings and nature [5]. Environmental challenges are gaining prominence in the 21st century. These challenges include global warming, the reduction of green spaces, ozone layer depletion, greenhouse gas emissions, increasing solid waste, and nuclear contamination. Additionally, the extinction of certain plant and animal species can be attributed to environmental issues.

The onus for addressing these environmental challenges lies with humanity, which must seek individual solutions. One strategy for addressing environmental problems involves acquiring a thorough understanding of various environmental aspects to safeguard the ecosystem [5]. Given the rising importance of environmental issues globally, it's essential to provide education about environmental topics at both societal and personal levels. As knowledge of environmental issues expands, so does the need for environmental education. The aim of environmental education is not only to enhance individuals' understanding but also to foster positive attitudes toward the environment. The goal is to develop a comprehensive environmental education framework that teaches students at all academic levels about environmental issues and raises their awareness regarding these matters. The discipline known as "environmental education" arises when human initiatives are the only means of rectifying the environmental distortions caused by humanity's attempts to control nature.

To develop the mindsets and skills necessary for understanding the relationship between culture and the environment, it is vital to clarify concepts and principles [6]. Since the 1960s, environmental education has intended to cultivate more informed, engaged, and knowledgeable citizens [7]. This type of education aims to positively influence a person's environmental values, understanding, awareness, perspectives, and behaviours [8]. Community members' environmental knowledge, interests, and attitudes play a significant role in shaping their behaviour toward the environment.

Conversely, a key function of environmental education is to foster individuals with heightened environmental consciousness and a scientific understanding of environmental issues [9]. Government regulatory bodies are well-positioned to enforce environmental regulations, policies, and programs to prevent extensive harm to our surroundings. One way to promote environmental conservation is through the education system. According to the 2003 World Youth Report, young people have unique environmental responsibilities and concerns. They are disproportionately affected by various environmental threats and challenges, inheriting a deteriorating environment from previous generations that they must endure for an extended period. It is vital for youth to adopt new activism and action strategies to effectively confront ecological shifts. Education can help enhance environmental awareness and skills [10]. Participating in Earth Day events or modern environmental movements is among the best ways to boost awareness of environmental issues.

The seven ecosystems associated with environmental consciousness include forests, freshwater, marine areas, urban environments, land, atmospheric conditions, and biodiversity [11].

The Environmental Awareness Scale Instrument, created by J. Canarias, offers a systematic approach to assessing students' environmental understanding. It comprises two primary sections: one dedicated to evaluating knowledge of environmental concepts and another focused on analysing participants' attitudes toward environmental issues. This dual approach allows for a comprehensive evaluation of students' environmental awareness, covering both

fundamental principles and active participation in environmental initiatives.

The assessment gains deeper insight through the inclusion of various environmental strategies, illustrating students' practical application of their knowledge in real-life situations, in addition to their theoretical understanding. The EASI proves to be a valuable tool for educators and researchers aiming to evaluate and enhance students' ecological consciousness due to its holistic perspective.

Theoretical Ground for the Study

Theoretical Framework of Environmental Awareness and Pro-Environmental Behavior

Research in environmental psychology and education often focuses on environmental awareness and pro-environmental behavior, as they are essential for tackling global ecological issues. Environmental awareness encompasses individuals' understanding of environmental problems, including their causes and effects, while pro-environmental behavior refers to actions that promote environmental conservation and sustainability [(12).]

One of the key theoretical frameworks that explains pro-environmental behavior is the **Theory of Planned Behavior**. This theory suggests that actions are influenced by intentions, which are shaped by attitudes, subjective norms, and perceived behavioral control. Awareness of environmental issues helps develop positive attitudes towards the environment, which in turn increases the likelihood of engaging in pro-environmental actions. According to this theory, individuals with greater knowledge about environmental matters tend to cultivate responsible intentions and behaviors related to the environment.

Another significant theoretical basis is the **Value-Belief-Norm Theory,** which highlights how personal values and beliefs about the environment influence behavior. This theory posits that recognizing the environmental consequences leads to the establishment of moral norms that drive individuals to engage in eco-friendly actions [(13)]. Increased awareness of environmental issues like pollution, ozone layer depletion, and global warming enhances individuals' perception of environmental risks, thereby reinforcing their dedication to sustainable practices.

The **Environmental Literacy Framework** offers an extensive description of how environmental knowledge relates to behavior. This framework highlights that environmental literacy encompasses knowledge, attitudes, skills, and participation, all of which play a role in responsible environmental actions. Environmental awareness serves as the cognitive basis that allows individuals to grasp environmental issues and make educated choices.

Furthermore, the **Social Learning Theory** illustrates how behavior regarding the environment is cultivated through observation, imitation, and reinforcement. Students frequently acquire environmentally responsible habits from their teachers, parents, and peers. Educational programs focused on environmental issues in schools significantly influence the development of eco-friendly behaviors by means of modeling and reinforcement.

Environmental education during the secondary school years is crucial, as adolescence is a key period for shaping attitudes and habits [(12)]. Schools provide an ideal environment for improving environmental awareness, which can lead to more pro-environmental actions among students. A heightened understanding of environmental issues like pollution, ozone depletion, and global warming is linked to increased involvement in sustainable practices such as waste management, energy saving, and water conservation.

This study is based on well-established theories of environmental behavior that highlight the importance of awareness and knowledge as factors that can predict environmentally responsible actions. By investigating the connection between environmental awareness and pro-

environmental actions among secondary school students, the research aims to enhance our understanding of how environmental education impacts sustainable behaviors.

METHODOLOGY

Method

The present study adopted a quantitative descriptive-correlational research design to examine environmental awareness and pro-environmental behaviour among secondary school students.

Sample Size:

A total of 101 students participated in the study, including 48 females and 53 males (9th-grade students) selected through convenience sampling.

Measures:

Environmental Awareness Questionnaire for Students: The text is a 40-item scale designed to measure environmental concern and awareness among students. This scale is given by **Dr. Harjeet Kaur Sra**, Principal. Validity means 'truthfulness' [14]. This questionnaire possesses high validity as its content validity was found with the help of experts' opinions. The questionnaire is intended to have general applicability to all sections of society and to different individuals of various ages. The coefficient of correlation was found to be 0.96, which is significant at 0.01 level of significance. Further, the split-half (odd-even) coefficient of correlation was found to be 0.69, which was significant at the 0.01 level of significance.

Pro-environmental behaviours. A set of 13 questions was developed to evaluate how frequently participants engaged in environmentally friendly behaviours, as referenced by A. de Leeuw et al. Participants rated their frequency of these behaviours on a 5-point scale, where 0 represented "never" and 5 represented "always"[15]. The responses to these 13 questions were averaged to create a behaviour measure, which had a Cronbach's alpha of .72.

Procedure:

Approval was granted by the school administration, and the participants were made aware of the study's goals. The Environmental Awareness and Pro-Environmental Behaviour surveys were conducted in the classroom, with participants encouraged to answer truthfully while ensuring their privacy. Once collected, the surveys were examined for correctness and thoroughness.

Analytical Strategy: Information was collected using standardised questionnaires focused on evaluating environmental awareness and pro-environmental actions. The analysis included descriptive statistics, Pearson correlation, independent samples t-tests, and hierarchical regression analysis. The study aimed to investigate gender differences, the relationships between environmental awareness and behaviours, and how well environmental awareness can predict these behaviours among students.

RESULTS

Descriptive Statistics

Descriptive statistics were calculated for various aspects of environmental awareness: Environment (ENV), Environmental Pollution (EPOL), Depletion of Ozone Layer (DOL), Acid Rain (AR), Global Warming (GW), Total Environmental Awareness score (TOT), and Pro-Environmental Behavior (PEB). Results showed participants demonstrated moderate levels of environmental awareness and pro-environmental actions.

The average score for total environmental awareness (TOT) was 12.22, with a standard deviation of 3.74. In comparison, the mean score for pro-environmental behavior (PEB) was 38.55, accompanied by a standard deviation of 7.63. Among the different subdimensions, the highest score was recorded for Environmental Awareness at 5.25 (SD = 1.92), whereas the lowest score was for Global Warming Awareness at 0.99 (SD = 0.85). The skewness and kurtosis for all variables fell within the acceptable range

of ±1, suggesting that the distribution is approximately normal (George & Mallery, 2010).

Descriptive (N=101)

Descriptive Statistics								
	Minimum	**Maximum**	**Mean**	**Std. Deviation**	**Skewness**		**Kurtosis**	
	Statistic	**Statistic**	**Statistic**	**Statistic**	**Statistic**	**Std. Error**	**Statistic**	**Std. Error**
ENV	1.00	11.00	5.2475	1.91523	.144	.240	.030	.476
EPOL	0.00	6.00	3.0297	1.68793	.118	.240	-.925	.476
DOL	0.00	4.00	1.5248	1.06390	.442	.240	-.467	.476
AR	0.00	4.00	1.4356	1.04322	.282	.240	-.674	.476
GW	0.00	4.00	.9901	.85434	.706	.240	.549	.476
TOT	3.00	22.00	12.2178	3.74060	.011	.240	.030	.476
PEB	19.00	57.00	38.5545	7.63345	.218	.240	.031	.476

(Please note: ENV refers to Environment; EPOL stands for Environmental Pollution; DOL is the Depletion of Ozone Layer; AR represents Acid Rain; GW signifies Global Warming; TOT indicates Total Environmental Awareness; and PEB means Pro-Environmental Behavior.

Correlation Analysis

A Pearson correlation analysis was conducted to explore the relationships between various aspects of environmental awareness and pro-environmental behavior. The total score for environmental awareness (TOT) demonstrated strong positive correlations with each of its sub-dimensions: Environment ($r = .699$, $p < .01$), Environmental Pollution ($r = .601$, $p < .01$), Depletion of the Ozone Layer ($r = .501$, $p < .01$), Acid Rain ($r = .465$, $p < .01$), and Global Warming ($r = .417$, $p < .01$). Pro-environmental behavior (PEB) also displayed a significant positive correlation with overall environmental awareness ($r = .290$, $p < .01$) and with the Environment dimension ($r = .316$, $p < .01$). However, the correlations between PEB and the other sub-dimensions—Environmental Pollution ($r = .151$), Depletion of the Ozone Layer ($r = .080$), Acid Rain ($r = .136$), and Global Warming ($r = -.004$)—were not statistically significant.

Correlations (N=101)

Variables	ENV	EPOL	DOL	AR	GW	TOT
EPOL	.224*					
DOL	.112	.075				
AR	.096	.010	.297**			
GW	.118	.042	.182	.196*		
TOT	.699**	.601**	.501**	.465**	.417**	
PEB	.316**	.151	.080	.136	-.004	.290**

A correlation is regarded as significant at the 0.05 level (two-tailed) and is deemed significant at the 0.01 level (two-tailed).

These findings suggest that there is a positive relationship between general environmental awareness and environmentally responsible behaviors.

H1a: There is expected to be a significant correlation between environmental awareness and pro-environmental behavior.

A Pearson product-moment correlation analysis was conducted to examine the relationship between overall environmental awareness and pro-environmental behavior. The results demonstrated a significant positive correlation ($r \approx .29$, $p < .01$), indicating that students with higher levels of environmental awareness are more likely to engage in environmentally responsible actions.

H1b: Correlation Between Environmental Awareness Components and Behavior

H1b: The various components of environmental awareness (ENV, EPOL, DOL, AR, GW) demonstrate a clear and significant relationship with pro-environmental behavior.

A Pearson correlation analysis was conducted to investigate the relationships between different subdimensions of environmental awareness and pro-environmental behavior. The results indicated that some elements of awareness displayed weak to moderate positive correlations with pro-environmental behavior, although not all subcomponents demonstrated statistically significant relationships. This suggests that various facets of environmental awareness exert different influences on behavioral results.

Gender Differences

Independent samples t-tests were conducted to examine gender differences in environmental awareness and pro-environmental behaviour. The results indicated that there were no significant differences between females and males in either area. Specifically, the average environmental awareness scores for females (M = 12.04, SD = 3.60) and males (M = 12.38, SD = 3.89) did not differ significantly, t(99) = -0.449, p = .655. Similarly, the pro-environmental behavior scores for females (M = 39.77, SD = 8.11) and males (M = 37.45, SD = 7.08) also showed no significant differences, t (99) = 1.534, p = .128.

Table 3: Gender Differences in Environmental Awareness and Pro-Environmental Behavior

Variable	Gender	n	M	SD	t	p	Cohen's d
ENV	Female	48	5.13	1.84	-0.61	0.545	-0.12
	Male	53	5.36	2.01			
EPOL	Female	48	3.21	1.39	1.01	0.314	0.2
	Male	53	2.87	1.46			
DOL	Female	48	1.46	0.89	-0.63	0.53	-0.12
	Male	53	1.58	1.01			
AR	Female	48	1.33	0.84	-0.98	0.329	-0.19
	Male	53	1.53	0.92			
GW	Female	48	0.92	0.78	-0.87	0.387	-0.17
	Male	53	1.06	0.91			
TOT	Female	48	12.04	3.6	-0.45	0.655	-0.09
	Male	53	12.38	3.89			
PEB	Female	48	39.77	8.11	1.53	0.128	0.31
	Male	53	37.45	7.08			

(Note: ENV refers to Environment; EPOL stands for Environmental Pollution; DOL represents Depletion of Ozone Layer; AR is for Acid Rain; GW denotes Global Warming; TOT indicates Total Environmental Awareness; PEB means Pro-Environmental Behavior. Cohen's d values signify effect sizes determined using pooled standard deviations. Negative values reflect higher average scores for males, whereas positive values indicate elevated scores for females.)

The research indicates comparable levels of environmental awareness and behaviours between genders. Independent samples t-tests were used to explore differences, with Cohen's d calculating effect sizes.

Results showed minimal effect sizes for total environmental awareness (d = -0.09), with females (M = 12.04, SD = 3.60) and males (M = 12.38, SD = 3.89) scoring similarly. In terms of pro-environmental behavior, a small effect size (d = 0.31) revealed that females (M = 39.77, SD = 8.11) scored slightly higher than males (M = 37.45, SD = 7.08). According to Cohen's (1988) guidelines, these effect sizes indicate small differences.

Effect sizes related to the various subdimensions of environmental awareness varied between -0.19 and 0.20, all classified as small. This suggests that while there are slight average differences in environmental awareness between genders, their practical relevance is limited.

H2a: Gender Disparities in Environmental Awareness

H2a: There will be a notable difference in environmental awareness between male and female students.

An independent samples t-test was conducted to explore gender differences in environmental awareness scores. The results showed that female students scored slightly higher than males, but the difference was not statistically significant ($p > .05$), with Cohen's d indicating a small effect size.

H2b: Gender Differences in Pro-Environmental Behavior

H2b: A significant difference in pro-environmental behavior is expected between male and female students.

A t-test for independent samples was conducted to evaluate the pro-environmental behavior scores among male and female students. The findings showed that female students scored somewhat higher than male students; however, this difference was not statistically significant ($p > .05$). The effect size calculated indicated a small difference, suggesting that the variation in behavior between the two genders was minimal.

Hierarchical Regression

H5: Predictive Role of Environmental Awareness

Table: Hierarchical Regression Predicting Pro-Environmental Behavior

Predictor	β	t	p
Step 1			
Gender	−.152	−1.53	0.128
Step 2			
Total Awareness (TOT)	0.297	3.12	.002**

Model Fit

Model	R^2	ΔR^2	F	p
Step 1	0.023	—	2.35	0.128
Step 2	0.111	0.088	6.14	.003**

A hierarchical multiple regression analysis was conducted to see if environmental awareness predicts pro-environmental behavior, controlling for gender. Initially, gender accounted for 2.3% of the variance ($R^2 = .023$, $p = .128$). Adding environmental awareness significantly increased the explained variance ($\Delta R^2 = .088$, $p = .003$), indicating it positively predicts pro-environmental behavior ($\beta = .297$, $p = .002$).

H5: Environmental awareness will significantly predict pro-environmental behavior among secondary school students.

A hierarchical multiple regression analysis was conducted to see if environmental awareness predicts pro-environmental behavior while controlling for gender.

In Step 1, gender was included and explained a small variance in pro-environmental behavior ($R^2 = .023$, $p = .128$), showing no significant effect.

In Step 2, total environmental awareness was added, leading to a significant increase in explained variance ($R^2 = .111$, $p = .003$), with environmental awareness being a positive predictor ($\beta = .297$, $p = .002$).

Subdimensions of environmental awareness were then sequentially added, resulting in a final model that explained 15.4% of the variance ($R^2 = .154$, $p = .026$). However, none of the individual subdimensions were significant predictors.

Overall, the findings emphasize that total environmental awareness is a more critical factor in predicting pro-environmental behavior than the individual components.

Summary of Hypothesis Testing

Hypothesis	Statement	Result
H1	Gender difference in environmental awareness	Not Supported
H2	Gender difference in behavior	Not Supported
H3	Awareness correlated with behavior	Supported
H4	Components correlated with behavior	Partially Supported
H5	Awareness predicts behavior	Supported

Effect Size Summary

Analysis	Effect Size	Interpretation
Gender Differences	Small (d < .50)	Minimal practical difference
Correlation	r ≈ .29	Small–Moderate
Regression	R^2 = .111	Small–Moderate predictive strength

Based on Cohen (1988) (Small = .02, Medium = .13, Large = .26) the results of the present research work are within expected behavioral science range and are statistically meaningful.

DISCUSSION

This study investigated gender differences in environmental awareness and pro-environmental behavior among high school students, along with the relationship between awareness and behavioral outcomes. The results revealed a significant link between environmental awareness and pro-environmental actions, with awareness serving as a key predictor. However, gender differences in these areas were not statistically significant. Overall, the findings highlight the importance of environmental knowledge in promoting responsible behavior among adolescents.

Gender Differences in Environmental Awareness (H1)

The initial hypothesis suggested notable gender differences in environmental awareness among secondary school students. Findings showed that female students had slightly higher awareness scores than males, but this difference was not statistically significant, thus not supporting the hypothesis.

This indicates comparable awareness levels between genders, possibly due to the integration of environmental education in school curricula, which provides equal learning opportunities. While some research indicates females may have greater environmental concern due to empathy, others report minimal or no gender differences [16].

The lack of significant gender differences in this study aligns with Stevenson et al. (2013), who found that structured environmental education reduces knowledge disparities among students, suggesting that equal exposure fosters similar awareness levels across genders [17].

Gender Differences in Pro-Environmental Behavior (H2)

The second hypothesis explored gender differences in pro-environmental behavior among secondary school students. The results showed that while female students had slightly higher pro-environmental behavior scores than male students, this difference was not statistically significant, leading to the rejection of the hypothesis.

These findings suggest that both genders engage in environmentally responsible behaviors at similar levels. The lack of significant differences may reflect the impact of school-based environmental initiatives that promote shared responsibility for environmental protection.

Previous research indicates that gender differences in environmental behavior are influenced more by cultural and social factors than by biological ones [18]. Thus, the study supports the idea that environmental behavior is shaped more by knowledge and exposure than by gender identity.

Relationship Between Environmental Awareness and Pro-Environmental Behavior (H3)

The third hypothesis posited a significant correlation between environmental awareness and pro-environmental behavior, which the results supported by showing a positive relationship among students. This implies that students with higher environmental awareness are more likely to engage in eco-friendly practices. The findings align with the Theory of Planned

Behavior, suggesting that knowledge and attitudes influence behavioral intentions, leading to action [19]. Those with greater awareness tend to develop positive attitudes toward conservation, increasing their likelihood of responsible behaviors. Additionally, the Value-Belief-Norm Theory supports this, highlighting that environmental knowledge shapes values and beliefs guiding responsible action [20]. Similar conclusions were drawn by Bamberg and Moser, who found that environmental knowledge and attitudes predict pro-environmental behavior [21].

Relationship Between Environmental Awareness Components and Behavior (H4)

The fourth hypothesis examined the relationships between environmental awareness subdimensions and pro-environmental behavior. The findings showed that some components of awareness had weak to moderate positive relationships with pro-environmental behavior, while others were not significant, leading to partial support for the hypothesis.

This suggests that different dimensions of environmental awareness contribute unequally to behavior. Topics closely related to daily experiences, such as pollution and waste management, may have a stronger impact on behaviors like recycling and energy conservation.

Kollmuss and Agyeman noted that environmental behavior is shaped not just by knowledge, but also by emotional involvement, personal responsibility, and situational factors. Their model indicates that cognitive, affective, and contextual interactions determine behavioral outcomes, explaining the variability in how environmental awareness predicts behavior [22].

Predictive Role of Environmental Awareness (H5

The fifth hypothesis explored whether environmental awareness significantly predicts pro-environmental behavior in high school students. Hierarchical regression analysis revealed that environmental awareness was a significant predictor of pro-environmental behavior, even after controlling for gender. This overall environmental awareness accounted for a notable portion of variance in pro-environmental behavior, supporting the hypothesis.

These findings highlight the important role of environmental knowledge in influencing responsible behavior among adolescents. Although the explained variance was moderate, it is still significant in behavioral research, where multiple factors affect human actions. The results suggest that increasing environmental awareness may improve responsible practices.

These findings are consistent with Hines, Hungerford, and Tomera, who identified environmental knowledge as a key predictor of responsible behavior [23] and Bamberg and Möser [21], who noted its significant contribution to behavioral intentions related to conservation.

The absence of significant effects for individual awareness subdimensions in the final model may result from overlapping conceptual variance among predictors, indicating that total environmental awareness functions as a unified construct in predicting behavior.

Theoretical Implications

This study supports key environmental behavior theories, particularly the Theory of Planned Behavior and the Value-Belief-Norm Theory, which highlight the influence of knowledge and beliefs on environmental actions. The findings emphasize the importance of environmental awareness and suggest that programs aimed at enhancing knowledge could improve students' environmental behaviors.

Educational Implications

The study's findings emphasize the importance of enhancing environmental education in school curricula due to the strong link between environmental awareness and pro-environmental behavior.

Schools should incorporate hands-on learning, environmental projects, and sustainability activities to deepen students' understanding. Additionally, the absence of significant gender differences suggests that educational programs should be designed to benefit all students equally, as inclusive approaches may improve the effectiveness of environmental awareness initiatives.

Limitations of the Study

While the findings of this study are significant, there are several limitations to keep in mind when analyzing the results. Firstly, relying on self-report measures may lead to response bias, as students might give answers they think are more socially acceptable instead of reflecting their true behaviors. Secondly, the sample was confined to a particular group of secondary school students, which may limit how broadly the findings can be applied. Lastly, it's important to recognize that environmental behavior is shaped by various factors beyond just awareness, including individual attitudes, societal norms, and situational limitations.

Suggestions for Future Research

Future studies should incorporate psychological factors like environmental attitudes and social norms to better understand pro-environmental behavior. Longitudinal designs can help track changes in awareness and behavior over time, while qualitative methods such as interviews may reveal students' motivations for being environmentally responsible.

CONCLUSION

To sum up, the results of this study reveal that awareness of environmental issues significantly influences pro-environmental behaviors among secondary school students. The data show a positive correlation between environmental awareness and responsible actions, suggesting it is a key predictor of behavioral outcomes. This underscores the need to enhance environmental education initiatives to encourage sustainable practices among students.

Discussion

The research investigated the connection between environmental awareness and pro-environmental behavior, revealing moderate levels of both. Significant correlations were found between overall awareness and responsible actions, supporting the idea that awareness is a key predictor of environmentally friendly behaviour [(22)]. Individuals with greater knowledge of environmental issues are more likely to engage in protective behaviors.

Interestingly, only the general Environment dimension correlated significantly with pro-environmental behavior, while specific issues like ozone depletion and acid rain did not. This aligns with findings that suggest general environmental attitudes are more predictive of behavior than specific knowledge [(21)], indicating that broad concern for the environment may drive ecological responsibility more effectively than technical knowledge of specific problems.

The absence of significant gender differences in environmental awareness and pro-environmental behavior indicates that both men and women have similar levels of understanding and engagement. Research suggests that these differences are diminishing due to improved public awareness and education [(16)]. Effect size analysis showed that these differences were minimal, with values below 0.20 indicating little practical significance. Overall, the findings suggest that gender does not significantly influence environmental awareness or behavior, a trend supported by previous studies highlighting increased similarities across genders due to widespread education and media exposure [(16).]

The findings emphasize the crucial role of environmental education programs in increasing awareness and promoting positive behavioral change. Programs designed to raise general environmental awareness may be especially effective in encouraging sustainable practices. Future research could

investigate additional factors that influence environmental behavior, such as environmental values, social norms, and access to resources, which have been identified in previous studies [12].

Effect Size Reporting (Cohen's d)
Formula Used
Cohen's *d* was calculated using the pooled standard deviation method:

$$Cohen's\ d\ = \frac{(M_2\ -M_1)}{Pooled\ SD}$$

Where:

$$Pooled\ SD\ = \sqrt{\frac{(SD_1{}^2 + SD_2{}^2)}{2}}$$

Declaration by Authors
Acknowledgement: None
Source of Funding: None
Conflict of Interest: No conflicts of interest declared.

REFERENCES

1. Begg KG, Jackson T, Parkinson S. Beyond joint implementation—designing flexibility into global climate policy. Energy Policy. 2001 Jan 1;29(1):17-27.
2. Sharma DK, Bapat S, Brandes WF, Rice E, Castaldi MJ. Technical feasibility of zero waste for paper and plastic wastes. Waste and Biomass Valorization. 2019 May 1;10(5):1355-63.
3. Zaman AU, Lehmann S. The zero waste index: a performance measurement tool for waste management systems in a 'zero waste city'. Journal of cleaner production. 2013 Jul 1; 50:123-32.
4. Gunderson R, Yun SJ. South Korean green growth and the Jevons paradox: An assessment with democratic and degrowth policy recommendations. Journal of cleaner production. 2017 Feb 15; 144:239-47.
5. Alagoz B, Akman O. A Study towards Views of Teacher Candidates about National and Global Environmental Problems. International Journal of Research in Education and Science. 2016;2(2):483-93.
6. Palmer J. Environmental education in the 21st century: Theory, practice, progress and promise. Routledge; 2002 Sep 11.
7. Rajput AG, Akhtar MN, Akram MN. Perception of Green Technology Among TVET Professional in Pakistan. J. Tech. & Voc. Educ. & Train. [Internet]. 2021 Apr. 1 [cited 2026 Apr. 18];1(15):181-8. Available from: https://www.nepjol.info/index.php/tvet/article/view/45179
8. Yalmancı SG, Gozum Aİ. The study of whether receiving a pre-school education is a predictive factor in the attitudes of high school students toward the environment according to their environmental ethics approach. International Electronic Journal of Environmental Education. 2019;9(1):18-32
9. Kahraman S. Evaluating university students' understanding of atmospheric environmental issues using a three-tier diagnostic test. International Electronic Journal of Environmental Education. 2019 Jan 1;9(1):1-7.
10. Cruz JP, Tantengco NS. Students' environmental awareness and practices: Basis for development of advocacy program. Mimbar Pendidikan. 2017 Mar 31;2(1).
11. Lewis L, Tietenberg T. Environmental economics and policy. Routledge; 2019 Nov 26.
12. Steg L, Vlek C. Social science and environmental behaviour. InPrinciples of environmental sciences 2009 (pp. 97-141). Dordrecht: Springer Netherlands.
13. Stern PC. New environmental theories: toward a coherent theory of environmentally significant behavior. Journal of social issues. 2000;56(3):407-24.
14. Kaur Sra D. Environmental Awareness Questionnaire for Students: Construction And Validation. IJISET-International Journal of Innovative Science, Engineering & Technology. 2020;7(11).
15. De Leeuw A, Valois P, Ajzen I, Schmidt P. Using the theory of planned behavior to identify key beliefs underlying pro-environmental behaviour in high-school students: Implications for educational interventions. Journal of environmental psychology. 2015 Jun 1; 42:128-38.
16. Zelezny LC, Chua PP, Aldrich C. New ways of thinking about environmentalism: Elaborating on gender differences in environmentalism. Journal of Social issues. 2000;56(3):443-57.
17. Stevenson KT, Peterson MN, Bondell HD, Moore SE, Carrier SJ. Overcoming skepticism with education: interacting influences of worldview and climate change

knowledge on perceived climate change risk among adolescents. Climatic change. 2014 Oct;126(3):293-304.
18. Hunter LM, Hatch A, Johnson A. Cross-national gender variation in environmental behaviours. Social science quarterly. 2004 Sep;85(3):677-94.
19. Conner M, Sparks P. Theory of planned behaviour and the reasoned action approach. Predicting and changing health behaviour: Research and practice with social cognition models. 2015 May 16; 3:142-88.
20. Stern PC. New environmental theories: toward a coherent theory of environmentally significant behaviour. Journal of social issues. 2000;56(3):407-24.
21. Bamberg S, Möser G. Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. Journal of environmental psychology. 2007 Mar 1;27(1):14-25.
22. Kollmuss A, Agyeman J. Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? Environmental education research. 2002 Aug 1;8(3):239-60.
23. Hines JM, Hungerford HR, Tomera AN. Analysis and synthesis of research on responsible environmental behaviour: A meta-analysis. The Journal of environmental education. 1987 Jan 1;18(2):1-8.

How to cite this article: Ranjit Kaur, Balbinder Singh. Gender differences in pro-environmental awareness and environmental concern among secondary school students: comparative study. *International Journal of Research and Review*. 2026; 13(5): 75-87. DOI: *https://doi.org/10.52403/ijrr.20260506*

******