

REVIEW ARTICLE

Exploring the Relationship between Environmental Cognition, Pro-Environmental Behavior, and Mental Health among Adolescents: A Narrative Review

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ABSTRACT

Introduction: Adolescents' cognition, behavior, and attitudes are essential for environmental conservation; hence, the physical environment is inevitable in their mental health. The environment can influence adolescents' sense of support, freedom, and the stimulation they seek in life. Environmental factors such as pollution, weather, lifestyle changes, and working conditions significantly influence adolescents' mental health. Knowing and learning about environmental cognition and its influence on adolescents is vital. **Objective:** To understand the relationship between environmental cognition, pro-environmental behavior, and mental health among adolescents with the help of a narrative approach. **Methods:** The present article employed a narrative review. Research articles were taken from four databases, PubMed, Research Gate, Web of Science, and Science Direct, using the PRISMA procedure from 2000 to 2023. The data was collected from various databases and narrowed down for the results. **Results:** This study proves a strong relationship between environmental cognition, pro-environmental behavior, and adolescents' mental health. Twenty-six selected research studies out of 45 initial studies state that solid environmental cognition may lead to enhanced pro-environmental behavior, which is crucial to adolescents' mental health and well-being. Furthermore, pro-environmental cognition wholly mediated the relationship between environmental behavior and mental well-being. **Conclusion:** Implications of this study concentrate on developing focused interventions, creating urban planning policies, and developing adolescent-friendly community designs, which are solid pillars for promoting mental health. Adolescents must be motivated to protect the environment to become pioneers of pro-environmental behavior.

KEYWORDS

Environmental Cognition, Adolescents, Mental Health, Pro-Environmental Behavior.

INTRODUCTION

Adolescents in the modern world are said to be experiencing various psychological issues due to excessive stress and mental fatigue.(1)

Studies show that middle and late adolescents are suffering more from depression, which has doubled in recent years. They often face the adverse outcomes of climate change, lifestyle

changes, and related problems that compel them to develop pro-environmental behavior, which is crucial to mitigate them.(2) It is also said that today's adolescent population is exposed to grand environmental challenges unlike any other generation.(3) This can be a signal to assume that adolescents today are concerned about environmental changes and hold their mental health. Alongside, there is a growing pressure to achieve socially, academically, and professionally; indoor lifestyles have been implicated in their mental health decline. Knowledge, cognitions, concerns, behaviors, and attitudes that adolescents generally possess have a vital influence on the decision-making process about the environment and its sustainability. Adolescents represent the future generation.(4) It is essential to give more attention to those environmental activities and engage them in pro-environmental behavior. Therefore, there is a crucial need to work on their environmental cognition behavior and motivate them to engage in pro-environmental behaviour.(5)

Environmental cognition is one of the emerging fields in social and psychological sciences. It was an essential concern for psychologists like Dewey, Mead, and Barker.(6) The ecological theory by Brofenbrenner suggests that we co-exist with our environments and that our behavior exists because of our environment.(7,8)

Environmental hazards like air pollution and bad weather are associated with poor mental health outcomes, such as depression and anxiety disorders.(9) Adolescents' mental health originates from a complex interplay of biological, psychological, social, and lifestyle factors. Environmental cognition will help them promote mental well-being by facilitating stress recovery from any uncomfortable situation or condition triggered by their physical environment.(10,11) Knowing about environmental protection will positively affect the consumer attitude towards it, and they tend to protect the environment in the future.(12) This process may lead to the development of holistic mental health among adolescents.

Additionally, environmental cognition is an important psychological factor crucial in developing a positive attitude to promote environmental protection. It tries to change adolescents' attitudes towards the environment by prompting them to protect their living nature. Adolescents possess the potential to develop adequate environmental cognition.(13) This research article analyzed the existing literature on environmental cognition, pro-environmental behavior, and its relationship with adolescents' mental health. It summarized the findings as the results towards the end of this paper. Cognition is a mental process of acquiring knowledge and making sense of events.(14) Environmental cognition is the individual's awareness of environmental issues, how they support solving them, making mental strategies to protect the environment, and the willingness to be involved in pro-environmental activities.(8) Research explains an underlying pathway between environmental cognition (environmental perception) and mental health in adolescence and adulthood.(15) Two significant areas of environmental cognition in the literature are adolescents' knowledge and perception of the environment in which they live.(16)

Environmental cognition, or ecological cognition, positively affects pro-environmental behavior directly and indirectly.(17) The indirect effects are controlled by environmental attitude, whereas direct influences are controlled by environmental identity and dependence. To improve pro-environmental behavior among adolescents, one must concentrate on developing environmental cognition and related strategies.

Adolescents' pro-environmental behavior focuses on improving environmental conditions by paying more attention to reducing the negative impact on the environment.(18) Environmental awareness is only a part of environmental cognition.(19) Environmental cognition positively influences adolescents' attitudes toward mental health, and thus, they may be able to develop a pro-environmental attitude in their day-to-day lives. For this reason, environmental cognition can be directly promoted for the good mental

health of adolescents in every aspect. Generally, environmental cognition possesses three dimensions. They are, namely, environmental knowledge, perception of environmental issues, and exposure to media. Environmental knowledge refers to adolescents' information about environmental issues and their ability to understand and evaluate their consequences on their community and environment.(20)

Pro-environmental behavior is a byproduct of environmental cognition that harms the environment as little as possible but gives vast advantages to the environment where they live. According to Kaser, there are six indicators of pro-environmental behavior. They are energy conservation, avoidance of waste, mobility and transportation, recycling, consumerism, and an empathetic attitude toward the conservation of the environment. These indicators must be used to explain pro-environmental behavior and its relationships to adolescents' mental health. Mental health is the successful performance of a psychological function, resulting in productive activities, the ability to accept changes with adversity, and fulfilling relationships with others.(21) The role of environmental cognition in adolescent mental health has received much attention in the last decade. According to Soga and Gasten, adolescents are less connected with nature, and humans will gradually separate from nature later. This can be an indication of several mental health issues in the future. Research proves that separation from the environment can bring a crisis in adolescence.(22) Improper environmental cognition may be the reason for changing social and personal resilience among adolescents and result in mental health issues. This condition is called nature deficit disorder.(23) Environmental factors like stimulation, green outdoor spaces, and healthy life circumstances significantly mitigate the negative outcome of mental health.(25) Rapid urbanization also raises concerns about mental health among adolescents, along with less interaction with the natural world. Studies on adolescence prove that environmental exposure will enhance cognitive functioning and promote pro-environmental

behaviour.(26) Mental well-being involves Personal and social well-being, whereas personal psychological well-being is considered the subjective form of life satisfaction. Adolescents' environmental cognition is crucial in improving their mental health, preparing for good outcomes, and preventing them from developing psychopathology later in life.(27,28) This review study intended to promote and encourage adolescents to develop enhanced environmental cognition and pro-environmental behavior for cultivating good mental health in the future life to avoid the onset of psychopathology due to their lifestyle and physical environment. Thus, this review overall intended to analyze the degree of relationship between environmental cognition and mental health.

Protection and recovery of the environment are the most significant challenges that humankind faces today. It is essential to know how environmental cognition affects the mental health of adolescents and what factors encourage it. This study is crucial because adolescents can contribute significantly to society in the ecological protection where they live.(29) They are to be motivated because they can develop pro-environment behavior and take up challenges more generously than any other age category. Developing environmental cognition may lead to enhanced pro-environmental behavior, which enables adolescents to establish a behavior pattern that harms society and provides tremendous benefits to the environment wherever they are.

Implementing policies on environmental protection based on cognition among adolescents can help improve environmental knowledge, eco-friendly attitudes, and positive environmental outlook. This study targets the current condition of adolescents regarding their environmental cognition and mental health.

MATERIAL & METHODS

An extensive literature review was arranged in 2023 to draw out published work on environmental cognition and adolescents' mental health. The researcher concentrated

on the published articles collected from various databases, including Science Direct, Web of Science, PubMed, Elsevier, and Research Gate, and used the PRISMA procedure (Figure 1) from 2000 to 2023. The keywords used in this study are “environmental cognition,” “adolescents,” “mental health,” and “pro-environmental behavior.”

Inclusion criteria

Articles on environmental cognition, adolescents, mental health, pro-environmental behavior, and environmental protection.

Articles published from January 2000 to June 2023 from ScienceDirect, Research Gate, Web of Science, and PubMed.

Restricted to English language articles

Exclusion criteria

Articles with only abstract

Case series and case report

Method used

Both authors contributed equally to the review process of the articles based on environmental cognition and adolescents’ mental health.

There were 200 articles in the initial search process, and 174 were excluded from the current study because they did not follow the inclusion criteria. An independent study selection analysis of the articles was performed with the help of the PRISMA procedure, shown in Figure 1. Eventually, 26 articles were selected for the final study per the inclusion and exclusion criteria. This review article summarises the literature on environmental cognition, Pro-environmental behavior, and mental health among adolescents. In addition, this study took one month to complete. The research articles used in this narrative review included different study patterns, such as meta-analytic studies, experimental studies, cross-sectional review papers, and systematic reviews. The information collected from each scientific article was abstracted carefully to prepare the results. This process involved specific steps.

1. Critical reading and assimilation
2. Identifying Key information
3. Summarising
4. Organizing Information

5. Preparing the results
6. Evaluation and final quality checking
7. Finalization

RESULTS & DISCUSSION

The critical analysis of 26 selected research articles indicates a heightened need for developing environmental cognition, which may boost pro-environmental behavior among adolescents to promote their mental health. An assessment of the selected articles on environmental cognition concluded that environmental cognition directly affects adolescents' mental health. Thus, this study proves that there is a significant relationship between ecological cognition and the mental well-being of adolescents in their lives

Summary of Table 1 and Figure 1

Initially, 200 articles were downloaded from the databases. Most of the articles among these articles focus on mental health and the influence of the physical environment on adolescents. Using the PRISMA method, it was found that twenty-six articles had a close connection with the current study. Five articles highlighted the association between adolescents' well-being and their environment. They state that there is a positive connection between these variables. It suggests that adolescents living in an environment without any natural elements reported lower scores on mental health. This means the adolescents residing in those settings are devoid of natural surroundings like green spaces, natural landscapes, hills, parks, or access to nature-related features and have lower mental health than those living in touch with natural environments.(30)

It significantly affects their future in adjusting to various life situations. Around four articles explain adolescents’ need for green conception to reduce their excessive stress due to unhealthy lifestyles in this era. Few articles suggest a complex relationship between social and physical environments and between objective and subjective measures of the environment for adolescents. Although most downloaded articles analyze the relationships between mental health and environmental

cognition among adolescents, a few suggested that other modifiable factors influence adolescents' mental health. Six articles highlight that air pollution and green space effect negatively influence the mental well-being of young people. However, two studies confirmed the necessity of having a pro-environmental approach to achieve good mental health among adolescents. Analysis of three cross-sectional studies results in the increase in consumption and growing prominence of environment-related issues, which are the significant observable changes in the current development of the adolescent population worldwide. Two studies reported an impact of environmental cognition on the mental health of children and adolescents. Another study explains that great attention must be given to adolescents' declining relationship with the environment.(31) Adolescents spend most of their time indoors, which may significantly affect their social life. However, 12 studies claim the importance of a collaborative approach to develop pro-environmental behavior to promote mental health among adolescents. A single study has examined the effects of adolescents' increased engagement with social media and technology.

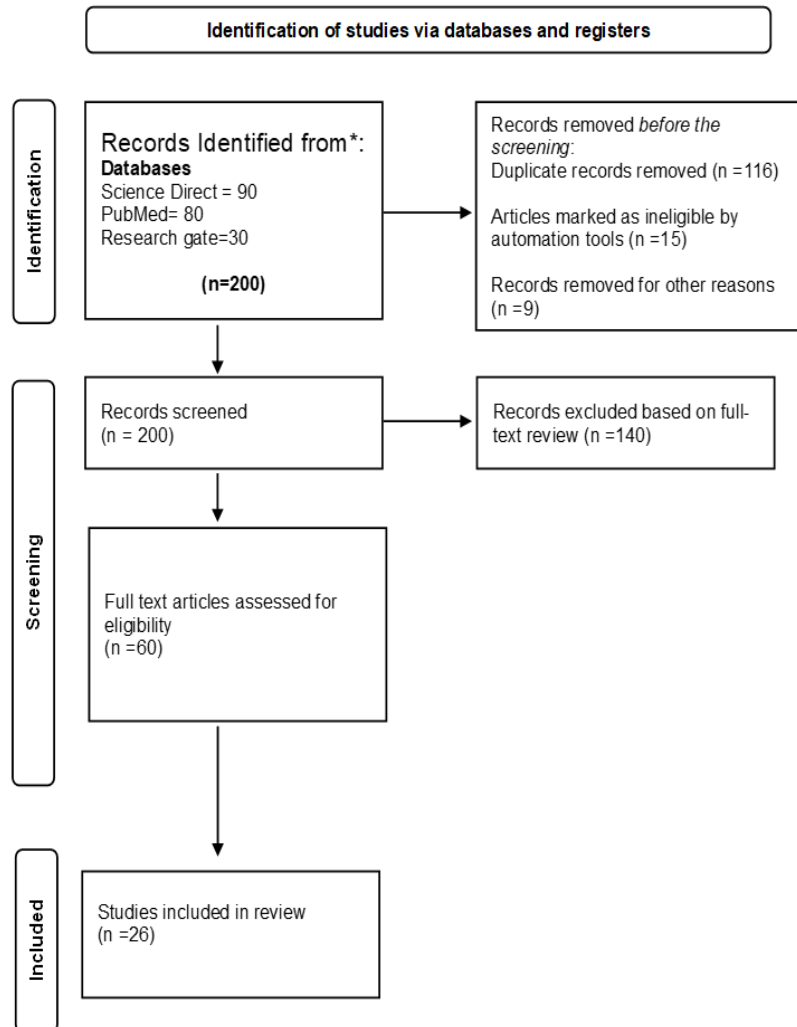
An empirical research paper on the attitude towards the environment among adolescents reported that they often show reluctance to visit nature and form a negative attitude towards nature. The study also examined the cause of this reluctance and found that technology and lifestyle influence the development of negative attitudes toward nature. Three studies concluded that since adolescence is an essential period of life when social interaction is at a peak level, the development of environmental cognition significantly plays a role in their mental well-being. A study conducted among Chinese adolescents proved that a higher level of environmental cognition is more motivated to engage in environmental protection attitudes, directly leading to enhanced mental health.(14,17) A critical meta-analytic study conducted among adolescents in the Netherlands emphasizes that environmental education benefits environmental outcomes among them.(32) An empirical study conducted on UK adolescents proves that factors like green space and fresh air have a significant positive impact on adolescents' mental health, and this article also reports that they have negative expectations of the future environment.(33)

Table 1; Summary of the articles included in the narrative study

No	Authors	Country	Year of publication	Database
1	Balunde A, & Perlaviciute G.	Netherland	2020	PubMed
2	Xie C, Wang R, & Gong B.	China	2022	PubMed
3	Sawitri D.R, Hadiyanto, & Hadi S.P.	Indonesia	2015	ScienceDirect
4	Homeberg A, & Stolberg A.	Germany	2006	ELSIVIER
5	Warber S.L., et al.	USA	2015	PubMed
6	Klingberg T, Judd N, & Souce B.	Germany	2022	PubMed
7	Wales M, et al.,	Sweden	2022	PubMed
8	Bartolo M.G. et al.	Italy	2023	PubMed
9	Kovar E., Formadi K., & Banasz Z.	Hungary	2023	ScienceDirect
10	Mueller M. A., Flouri E., & Kokosi T.	UK	2019	PubMed
11	Greenwood A., & Gatersleben B.	UK	2016	ScienceDirect
12	Basu S., \$ Banarji B.	India	2020	ScienceDirect
13	White M.P. et al.	USA	2019	PubMed
14	Tennant et al.	UK	2007	PubMed
15	Tavakkoli S et al.	Iran	2015	PubMed
16	Gesler et al.	USA	2004	ScienceDirect
17	Guo et al.	China	2001	ResearchGate
18	Hang Yu1, Nan Ye,&Xiao Zhang	China	2018	ResearchGate
19	Tyas Palupi, & Dian R Sawitri	Indonesia	2018	Web of conferences
20	Wetering et al.	Netherlands	2022	ScienceDirect
21	Thompson et al.	UK	2021	PubMed

No	Authors	Country	Year of publication	Database
22	Wang et al.	China	2023	ScienceDirect
23	Soga & Gaston	India	2016	PubMed.
24	Aura, A., Sormunen, M., & Tossavainen	Finland	2016	ResearchGate
25	Stormshak et al.	USA	2011	PubMed
26	Bartolo et al.	Italy	2023	PubMed

Figure 1; PRISMA flow chart for narrative review



DISCUSSION

The primary aim of this review study was to explore the relationship between environmental cognition and mental health among adolescents, more specifically by identifying the significant role of pro-environmental behavior as a factor contributing to their mental health.

‘It is crucial to prioritize the behavior of adolescents that encourages their engagement in social and environmental activities, as this

significantly contributes to maintaining their mental well-being.’. Adolescents must practice pro-environmental behavior to engage in suitable activities for themselves and the community in which they live, and this initiation will help increase their mental well-being.(34) Review shows that adolescents can act in such a way to enhance the environment where they live and, as a result, the world by developing environmental cognition as part of their social cognitive development. This

cognition will be expressed as pro-environmental behavior, which means concern for themselves, others, and their environment. Interventions related to environmental cognition among adolescents will improve their environmental knowledge, behavior, and attitude toward the environment.(35)

The young generation expressed that they are anxious and frustrated, pessimistic and disempowered about their environment in the future.(36) It makes it clear that environmental problems negatively affect adolescents at large. This highlights the need to invest in environmental policies and training for adolescents to improve their environmental cognition, and thus, they may be able to promote pro-environmental behavior.

Adolescents must adopt such behavior to promote environmental sustainability; thus, everyone will experience the psychological well-being essential for mental health. Significant findings show that environmental cognition is crucial to adolescents' mental health. Furthermore, pro-environmental behavior wholly mediated the relationship between environmental cognition and mental well-being. Since environmental cognition can be explained as the root of pro-environmental behavior, it has enormous effects on different areas of mental health among adolescents.(37,38) For example, imbibing high environmental cognition influences adolescents in building their identity, and it may lead to developing a positive attitude toward the environment where they live and cherish. Environmental cognition helps to increase mental well-being; thus, individuals live more comfortably in better environmental conditions, fostering their self-identity and positive attitude toward life in the future. Developing environmental cognition during adolescence makes adolescents feel good, as they can make the right environmental decisions.(39)

Three studies explained the association between environmental cognition and mental health. Also, it gives implications for giving more attention to the development of environmental cognition, which is considered a determinant of mental health irrespective of

every person's age, especially among adolescents. Environmental cognition and mental health are crucial for adolescents because they experience daily related life issues (40). Environmental cognition helps adolescents understand how their attitudes and actions influence the environment, develop the knowledge and skills necessary for reducing environmental issues, and develop an attitude toward a sustainable environment. The current findings of the study obtained from the 26 articles proved a strong positive relationship between environmental cognition, pro-environmental behavior, and mental health among adolescents. A cross-sectional study conducted among Canadian adolescents shows that older adolescents engaged less in pro-environmental behavior, meaning immediate care was taken for this fact.(41) It invites governments and policymakers to develop programs for adolescents to teach them to secure the environment around them.

Environmental cognition significantly impacts mental health, and once pro-environmental behavior is learned, it can have long-lasting effects on the well-being of individuals. Several studies have found that slowed environmental cognition can affect adolescent behavior and decision-making abilities.(42,43,44,45) Thus, it is proved from the review that environmental cognition and pro-environmental behavior are related and have a positive role in adolescents' mental health.

CONCLUSION

Environment and its related issues are among the most typical, and it has social and psychological interests. This review paper contributes to the research indicating the relationship between environmental cognition and adolescent mental health. Social campaigns among adolescents help promote environmental cognition among adolescents, and thus, they become more responsible towards the environment in which they live. This is why there must be a positive effort among adolescents to make them aware of natural resources, and we suggest that education programs must give more

consideration to training adolescents to develop proper environmental cognition, which automatically results in the holistic betterment of the adolescents. This can be rectified in future studies. One of the main limitations of this study was subjectivity and the researcher's bias in interpreting the data. The future implication of this study throws light on the applied area of environmental psychology, especially clinicians and healthcare practitioners in policy making and developing adolescent-friendly communities.

AUTHORS CONTRIBUTION

All authors have contributed equally.

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CONFLICT OF INTEREST

There are no conflicts of interest.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/ AI assisted technologies in the writing process.

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