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RESEARCH ARTICLE

The interplay of emotional intelligence and personality in shaping environmental awareness and behavior: A cross-sectional study of east coast communities, Malaysia

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ABSTRACT

Introduction: This study aims to investigate the complex interrelationships between emotional intelligence (EI), personality traits, environmental awareness, and environmental behaviors in coastal communities of Malaysia. The research objectives encompass examining direct effects and mediating relationships among these psychological factors and environmental outcomes. Methodology: Employing a cross-sectional design, data were collected from 285 respondents through questionnaires measuring EI, personality, environmental awareness, and environmental behavior. The analysis utilized SmartPLS for structural equation modeling, with a focus on measurement validation and hypothesis testing through bootstrapping techniques. Results: Findings revealed significant positive relationships across multiple pathways: EI demonstrated strong correlations with personality, environmental awareness, and environmental behavior, while personality exhibited positive effects on both environmental awareness and behavior. The study confirmed personality's mediating role between EI and environmental variables, with significant indirect effects on awareness and behavior. Discussion: These results underscore the crucial role of psychological factors in shaping environmental consciousness and behavior. The novelty of this research lies in its comprehensive examination of the interplay between emotional and personality factors in the context of environmental attitudes and behaviors, specifically within coastal communities. This study improves upon existing literature by integrating EI into the framework of environmental psychology and highlighting its indirect effects through personality traits. The findings suggest that environmental education programs should incorporate both emotional intelligence and personality considerations when designing interventions to promote sustainable practices in coastal areas, offering a more nuanced approach to environmental conservation efforts.

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Keywords: emotional intelligence; personality; environmental awareness; environmental behavior; coastal population; structural equation modeling

1. Introduction

The intricate relationship between human behavior and environmental sustainability has become a critical area of study in recent years, particularly in coastal communities where the impacts of climate change and environmental degradation are increasingly apparent[1]. The coastal regions of Malaysia face unique challenges, including erosion, pollution from development, and threats to marine biodiversity, making them ideal settings for examining human-environment interactions[2]. As global efforts to address environmental challenges intensify, researchers have turned their attention to the psychological factors that influence environmental behaviors and attitudes[3]. These communities often rely heavily on natural resources for their livelihoods, making the balance between economic development and environmental conservation particularly delicate. Understanding the factors that drive environmental behaviors in these contexts is crucial for developing effective strategies to promote sustainable practices and mitigate the impacts of climate change[4].

The concept of emotional intelligence, first popularized by Goleman[5] and further developed by researchers like Mayer et al.[6] has gained significant attention in various fields, including environmental psychology. Emotional intelligence encompasses the ability to perceive, understand, manage, and use emotions effectively in oneself and others[6]. In the context of environmental behavior, EI may play a crucial role in how individuals process and respond to environmental information and challenges[7]. This study posits that individuals with higher levels of emotional intelligence may be more attuned to the emotional aspects of environmental issues, potentially leading to greater environmental awareness and more pronounced environmental behaviors.

The inclusion of EI as a variable in this study is particularly significant, as it bridges the gap between cognitive understanding and emotional engagement with environmental issues. Previous research has suggested that emotional connections to nature and environmental concerns can be powerful motivators for environmental action[8,9]. By examining the relationship between EI and environmental variables, this study aims to shed light on how emotional competencies might influence an individual's propensity to engage in environmentally responsible behaviors. The potential implications of this relationship are far-reaching, as they could inform the development of more effective environmental education programs and interventions that target both cognitive and emotional aspects of environmental engagement[10].

Personality traits, another key variable in this study, have long been recognized as important predictors of various behaviors, including those related to environmental conservation[11]. The Five-Factor Model of personality, which includes traits such as openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism, has been widely used in environmental psychology research[12]. This study builds upon this foundation by examining how personality traits interact with emotional intelligence and environmental awareness to influence environmental behaviors. The inclusion of personality traits in this research is crucial for several reasons. First, it allows for a more nuanced understanding of individual differences in environmental attitudes and behaviors. Different personality traits may predispose individuals to varying levels of concern for the environment and willingness to engage in environmental actions[13]. Second, by examining the mediating role of personality between EI and environmental variables, this study aims to uncover the complex pathways through which individual characteristics influence environmental outcomes. This approach recognizes that the relationship between psychological factors and environmental behavior is not straightforward but is mediated by various personal and contextual factors[14].

Environmental awareness, defined as the knowledge and understanding of environmental issues and their implications, is a critical component in the development of environmental attitudes and behaviors[15]. This study examines environmental awareness both as an outcome influenced by EI and personality traits, and as a predictor of environmental behaviors. The inclusion of environmental awareness as a variable allows for an exploration of how cognitive factors interact with emotional and personality-related variables to shape environmental outcomes. The relationship between environmental awareness and environmental behavior is complex and not always direct[14]. While increased awareness of environmental issues is generally associated with more positive environmental attitudes, the translation of these attitudes into concrete behaviors is influenced by a variety of factors, including personal values, social norms, and perceived behavioral control[16,17]. By examining the interplay between environmental awareness, EI, and personality traits, this study aims to provide a more comprehensive understanding of the factors that facilitate or hinder the transition from environmental knowledge to action.

Environmental behavior, the ultimate outcome variable in this study, encompasses a wide range of actions that contribute to environmental conservation and sustainability[18]. These behaviors can range from simple everyday actions, such as recycling or energy conservation, to more significant lifestyle changes or civic engagement in environmental causes[19]. Understanding the determinants of environmental behavior is crucial for developing effective strategies to promote sustainable practices and mitigate environmental degradation[15]. The focus on environmental behavior in coastal communities adds a unique dimension to this research. Coastal areas are particularly vulnerable to environmental changes, and the behaviors of local residents can have significant impacts on the health of coastal ecosystems[20]. By examining the psychological factors that influence environmental behaviors in this specific context, the study aims to provide insights that can inform targeted interventions and policies to promote sustainable coastal management practices.

The theoretical framework underpinning this study draws from several established models in environmental psychology and behavior change. The Theory of Planned Behavior[16] provides a foundation for understanding how attitudes, subjective norms, and perceived behavioral control influence behavioral intentions and, ultimately, actions. This model is particularly relevant in explaining the gap often observed between environmental awareness and actual environmental behavior[14]. Additionally, the study incorporates elements of the Value-Belief-Norm (VBN) theory proposed by Stern et al.[21], which emphasizes the role of personal values and beliefs in shaping environmental attitudes and behaviors. The VBN theory suggests that environmental actions are the result of a causal chain that links personal values to beliefs about human-environment interactions and a sense of obligation to act in environmentally responsible ways[19]. By integrating these theoretical perspectives with the examination of emotional intelligence and personality traits, this study aims to provide a more comprehensive model of the psychological antecedents of environmental behavior. This integrated approach recognizes that environmental behavior is influenced by a complex interplay of cognitive, emotional, and personality factors, as well as social and contextual variables[15].

This study on environmental psychology in Malaysia, significantly advances our understanding of environmental behavior in coastal communities. By examining the relationships between emotional intelligence, personality traits, environmental awareness, and environmental behaviors, it integrates cognitive and affective factors into established models. The research provides context-specific insights that inform targeted interventions and policies, enhancing environmental education and behavior change programs. Its findings have practical implications for coastal management and conservation strategies, potentially improving community engagement in environmental efforts. Methodologically, the study's use of advanced statistical techniques serves as a model for future research, offering a robust framework for analyzing complex psychological and environmental relationships. Overall, this research contributes valuable knowledge for

promoting sustainability in coastal areas and beyond, bridging theoretical understanding with practical applications in environmental psychology and sustainable development.

The coastal communities like many other coastal areas around the world, face significant environmental challenges. Climate change, overfishing, pollution, and coastal development pose threats to both the natural ecosystems and the livelihoods of local residents[22]. In this context, promoting environmental behaviors among community members is crucial for sustainable coastal management and the long-term resilience of these areas. However, encouraging environmental behaviors is a complex task that requires a deep understanding of the psychological factors that influence individual decision-making and action. Traditional approaches to environmental education and behavior change have often focused primarily on providing information and raising awareness[14]. While these approaches are important, they may not be sufficient to motivate lasting behavioral changes, particularly in the face of competing economic and social pressures.

This study addresses this challenge by examining the role of emotional intelligence and personality traits in shaping environmental awareness and behavior. By considering these psychological factors, the research aims to provide a more nuanced understanding of why some individuals are more likely to engage in environmental behaviors than others, even when exposed to similar information and environmental conditions. The focus on emotional intelligence is particularly innovative in this context. While cognitive factors such as knowledge and awareness have been extensively studied in relation to environmental behavior, the role of emotional competencies has received less attention[7]. Emotional intelligence may play a crucial role in how individuals process and respond to environmental information, potentially influencing their level of concern, sense of personal responsibility, and motivation to take action[10].

Furthermore, by examining the mediating role of personality traits between emotional intelligence and environmental variables, this study aims to uncover the complex pathways through which individual characteristics influence environmental outcomes. This approach recognizes that the relationship between psychological factors and environmental behavior is not straightforward but is mediated by various personal and contextual factors[14]. In conclusion, this study represents an important step towards a more comprehensive understanding of the psychological underpinnings of environmental behavior in coastal communities. By examining the intricate relationships between emotional intelligence, personality traits, environmental awareness, and environmental behaviors, the research offers valuable insights that can inform both theory and practice in environmental psychology and sustainable development. The findings of this study have the potential to contribute to more effective strategies for promoting environmental conservation and sustainable practices in coastal areas, ultimately supporting the long-term resilience and sustainability of these vital ecosystems and the communities that depend on them.

2. Literature review

2.1. Theoretical framework

The study is grounded in several key theories that provide a comprehensive framework for understanding the interplay between emotional intelligence, personality, and environmental perceptions and behaviors. The Trait Emotional Intelligence Theory[23], conceptualizes EI as a constellation of emotional self-perceptions located at the lower levels of personality hierarchies. This theory is complemented by the Five-Factor Model of Personality[24], which describes personality in terms of five broad traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism. The Value-Belief-Norm Theory[19] explains environmentally significant behavior, suggesting that values, beliefs about environmental conditions, and personal norms influence environmental actions. Additionally, the Cognitive-Experiential Self-Theory[25] proposes that people

operate by two fundamental information processing systems: a rational system and an experiential system, which can help explain the interplay between EI, personality, and environmental perceptions.

2.2. Emotional intelligence and personality (H1)

The relationship between emotional intelligence and personality traits extends significantly into environmental contexts. Research by Ibrahim et al.[26] demonstrated that emotional intelligence strongly influences personality development ($\beta = 0.468$) among coastal residents, supporting previous findings that individuals with higher emotional intelligence tend to develop personality traits that are more adaptive to environmental challenges. In coastal communities specifically, personality traits shaped by emotional intelligence can determine how residents respond to environmental threats such as pollution, coastal erosion, and climate change impacts[26]. The interconnected nature of these psychological constructs supports the hypothesis that emotional intelligence has a significant positive effect on personality development in environmentally vulnerable contexts.

However, there are also other studies that show that this relationship is relevant in the context of the social environment. For example, Bhatia[27] conducted a study involving 75 respondents from the banking and insurance sectors in the Ratlam district of Madhya Pradesh. The research revealed that emotional intelligence significantly influences employee behavior, leading to the categorization of distinct personality types labeled A, B, C, and D. Type A personalities are characterized by ambition and work-focus, often exhibiting a sense of urgency. When their emotional intelligence is effectively managed, these individuals demonstrate superior situational control, consistent goal-setting, and practical problem-solving approaches. Type B personalities are described as sociable and adept at capturing others' attention, sometimes perceiving themselves as perfect due to their influential nature. However, if they struggle with emotional control, they may become overly sensitive to others' opinions. Type C individuals are detail-oriented and prefer stable, controlled work environments over challenging or uncertain ones. Lastly, Type D personalities approach life and work at a more relaxed pace, with stable emotions that lead them to prefer secure conditions and repetitive tasks. This tendency often results in them developing high levels of expertise in specific fields. The study underscores the importance of emotional intelligence in shaping these personality types and their subsequent impact on workplace behavior and performance. The current study by Sapiee et al.[28] builds upon this foundation, examining the mediating role of personality traits in the relationship between emotional intelligence and employee creativity. Their findings suggest that personality traits act as significant mediators, enhancing the efficacy of emotional intelligence in fostering higher levels of employee creativity. This growing body of research underscores the importance of considering both emotional intelligence and personality traits in organizational settings, as their interplay significantly influences employee performance, communication effectiveness, and job satisfaction. Additonally, Lu et al.[29] found that emotional intelligence is closely related to self-acceptance and positive coping styles among psychiatric nurses, suggesting that individuals with higher EI tend to have more adaptive personality traits. This supports the hypothesis that EI has a significant positive effect on personality (H1: EI $\rightarrow$ P). Additional supporting studies further reinforce this connection. Szczesniak et al.[30] demonstrated that EI mediates the relationship between personality traits (particularly agreeableness and conscientiousness) and gratitude, highlighting the interconnected nature of EI and personality. Maalouf et al.[31] found that EI mediates the relationship between personality traits and quality of life among medical students, further emphasizing the close connection between EI and personality. Dhliwayo and Coetzee[32] explored how EI, cognitive intelligence, and personality types predict job performance, showing that these constructs are interrelated and jointly influence behavioral outcomes. These studies collectively provide strong evidence for the positive relationship between emotional intelligence and personality traits.

2.3. Emotional intelligence and environmental awareness (H2)

Emotional intelligence plays a crucial role in environmental awareness, particularly in coastal settings. Ibrahim et al.[26] found a significant positive relationship (β = 0.246) between emotional intelligence and environmental awareness among coastal residents in Malaysia. This indicates that individuals with higher emotional intelligence demonstrate greater sensitivity to environmental issues affecting coastal ecosystems.

This relationship can be explained by how emotional intelligence components—self-awareness, empathy, and social awareness—enable individuals to recognize their emotional responses to environmental degradation, empathize with affected ecosystems, and understand the social implications of environmental challenges[26]. In coastal communities, this translates to greater awareness of issues like water quality, coastal erosion, and marine ecosystem health. Yang et al.[33] proposed a framework incorporating individual characteristics and cognitive appraisal in understanding perceptions of environmental qualities. Their findings suggest that emotional intelligence plays a role in how individuals perceive and interact with their environment, lending support to the hypothesis that EI positively influences awareness of environment (H2: EI → AE). Additional supporting studies provide further evidence for this relationship. Giménez-Espert et al.[34] found that emotional skills influence attitudes towards communication among nursing students and professionals, suggesting that EI may also affect how individuals perceive and communicate about environmental issues. Shafait et al.[35] demonstrated that EI is positively associated with learning outcomes and academic efficacy, which may extend to environmental learning and awareness. Muhibbin et al.[36] explored how emotional factors influence student wellbeing across various contexts, including virtual environments, suggesting that EI may play a role in how individuals perceive and interact with different environments. These studies collectively indicate that emotional intelligence likely plays a significant role in shaping environmental awareness and perception.

2.4. Emotional intelligence and environmental behavior (H3)

The impact of emotional intelligence on behavior, including environmentally-friendly actions, has been observed in various contexts. Boermans et al.[37] conducted a qualitative study on environmental awareness and sustainable behavior across different European countries. Their research highlights the importance of emotional factors in shaping environmental behaviors, supporting the hypothesis that EI has a positive effect on environmental behavior (H3: EI → EB). Additional supporting studies further reinforce this connection. Research in North Macedonia found that EI significantly influences employee green behavior, with gender differences noted[38]. Another study revealed that higher trait EI levels enhance connectedness to nature, positively affecting climate change perception and environmental behaviors among young adults[39]. These findings underscore the potential of EI in fostering ecological outcomes. In the healthcare sector, developing EI among nurses is crucial for holistic patient care and managing workplace stress[40]. Additionally, Tih and Hamid[41] found that EI and coping strategies influence employee productivity performance, suggesting that EI may also affect environmental behaviors in workplace settings. DePierro et al.[42] studied the role of EI in coping with stress during the COVID-19 pandemic, indicating that EI may influence adaptive behaviors in challenging environmental situations. Sisto et al.[43] reviewed literature on psychological resilience, which is closely related to EI, suggesting that resilience may play a role in maintaining environmental behaviors in the face of challenges. These studies collectively provide strong evidence for the positive influence of emotional intelligence on environmental behavior.

2.5. Personality and environmental awareness (H4)

Personality traits significantly impact how individuals perceive and respond to environmental issues. Ibrahim et al.[26] demonstrated a substantial positive relationship (β = 0.236) between personality traits and environmental awareness among coastal residents. Specifically, traits such as openness to experience,

conscientiousness, and agreeableness correlate with higher levels of environmental awareness and pro-environmental behaviors. In coastal settings, these personality traits manifest as greater attentiveness to changes in the marine environment, conscientious efforts to preserve coastal ecosystems, and agreeable participation in community-based conservation initiatives[26]. This support Yang et al.[33] findings that personality traits affect perceptions of safety, liveliness, comfort, and legibility in urban environments, as well as emotional responses. Quílez-Robres et al.[44] conducted a systematic review and meta-analysis on emotional intelligence and academic performance, suggesting that personality traits associated with EI may influence how individuals perceive and engage with their learning environment. Song et al.[45] explored the differential effects of general mental ability and emotional intelligence on academic performance and social interactions, indicating that personality traits may influence how individuals perceive and interact with their social and academic environments. Feist[46] conducted a meta-analysis on personality in scientific and artistic creativity, suggesting that certain personality traits may enhance awareness and perception of one's environment in creative and analytical contexts. These studies collectively suggest that personality traits play a significant role in shaping environmental awareness and perception.

2.6. Personality and environmental behavior (H5)

Research has shown that personality traits play a significant role in determining environmental behavior. Boermans et al.[37] observed that ecological awareness and engagement in sustainable activities vary across different age groups and regions, suggesting that individual differences, including personality traits, contribute to environmental behavior. This finding supports the hypothesis that personality has a positive effect on environmental behavior (H5: P → EB). Kopsidas[47] examined Holland's RIASEC personality types, finding that Investigative and Artistic types show strong environmental concern, while Social types engage through community involvement. Additionally, Ding et al.[48] explored the mediating role of coping style in the relationship between psychological capital and burnout among nurses, suggesting that personality traits influence how individuals cope with environmental stressors and engage in adaptive behaviors. Glantz and Johnson[49] edited a book on resilience and development, which includes discussions on how personality traits contribute to positive adaptations in various environmental contexts. Davenport[50] wrote about emotional resiliency in the era of climate change, suggesting that certain personality traits may contribute to more adaptive environmental behaviors in the face of global challenges. These studies collectively provide strong evidence for the influence of personality traits on environmental behavior.

2.7. Mediating role of personality (H6 and H7)

The mediating role of personality in the relationship between emotional intelligence and both environmental awareness and behavior is supported by recent studies. Lu et al.[29] demonstrated that emotional intelligence influences coping styles and self-acceptance, which in turn affect behavior. This suggests that personality traits mediate the relationship between EI and environmental outcomes, supporting both H6 (EI → P → AE) and H7 (EI → P → EB). Additional supporting studies provide further evidence for this mediating role. Cichoń et al.[51] studied emotional intelligence and coping strategies among intensive care unit nurses, suggesting that personality traits may mediate the relationship between EI and adaptive behaviors in challenging environments. Hassard et al.[52] reviewed the cost of work-related stress to society, indicating that personality traits may mediate the relationship between emotional competencies and stress-related behaviors in various environments. Tronstad et al.[53] explored the intensive care unit environment from the perspective of medical professionals, suggesting that personality traits may mediate how individuals with different levels of EI perceive and interact with complex environments. These studies collectively support the mediating role of personality in the relationship between emotional intelligence and environmental awareness and behavior.

Based on the literature reviewed, we formulate the following hypotheses:

H1: Emotional intelligence positively influences personality.

H2: Emotional intelligence positively influences environmental awareness.

H3: Emotional intelligence positively influences environmental behavior.

H4: Personality positively influences environmental awareness.

H5: Personality positively influences environmental behavior.

H6: Personality mediates the relationship between emotional intelligence and environmental awareness.

H7: Personality mediates the relationship between emotional intelligence and environmental behavior.

3. Method and study area

Research Design

The study employed a cross-sectional research design as its primary methodological approach, combining literature review insights with questionnaire-based data collection. This design was chosen for several key reasons: 1) It allowed for simultaneous examination of multiple variables (personality, emotional intelligence, environmental awareness, and behavior) at a single point in time. 2) It enhanced data accuracy and quality by minimizing potential confounding factors that might arise due to changes over time. 3) It provided a more representative snapshot of the population, reducing potential biases that could occur in longitudinal studies. 4) It offered a cost-effective and time-efficient method for collecting a large amount of data from a diverse sample. The cross-sectional method was chosen for its ability to address methodological challenges, enhance data accuracy, minimize bias, and improve overall data quality[54,55]. By integrating multiple data collection techniques, the study aimed to provide a comprehensive understanding of the complex interplay between individual characteristics and environmental attitudes and behaviors.

3.1. Measures

The study's questionnaire was structured into four primary sections, each focusing on a distinct aspect: emotional intelligence, personality, environmental awareness, and environmental behavior. These sections incorporated adapted items from previous research, utilizing a 5-point Likert scale for responses. The reliability of each scale was confirmed through Cronbach's alpha testing during our pilot phase (n=30), with values ranging from 0.78 to 0.90, indicating good internal consistency. Confirmatory factor analysis further validated the constructs, with factor loadings ranging from 0.62 to 0.89, confirming construct validity prior to the main study. The emotional intelligence section featured 5 items based on Sandhya and Namrata's[56] study, while the personality section included 4 items derived from the TAJMA Personality Profile[57]. Both the environmental awareness and behavior sections drew from Bakar et al.'s[58] study, with 5 and 3 items respectively. To provide a comprehensive assessment of environmental awareness, the questionnaire also collected demographic information, including factors such as gender, age, residence, religion, nationality, education level, occupation, marital status, and monthly income.

3.2. Study participants and sampling

In this study, researchers utilized a random sampling approach to distribute questionnaires to 300 individuals residing in coastal areas of Malaysia. The target population included local residents, small business owners, and tourists visiting the area. This method was selected to ensure direct interaction with respondents.

The survey achieved a high response rate, with 285 completed questionnaires returned, representing 95% of the total distributed. This sampling strategy and data collection method allowed the researchers to gather a diverse and representative dataset from the coastal community. The inclusion criteria for this study were adults (18 years and above) who had lived in or visited a coastal area. The exclusion criteria for this study were those who lived in cities and not on the East Coast.

3.3. Data analysis

The scientific methodology applied included standardized questionnaires for consistent data collection, advanced statistical techniques (structural equation modeling using SmartPLS) for analyzing complex relationships between variables, and bootstrapping techniques for robust hypothesis testing. The study employed SmartPLS for data analysis, a method chosen for its ability to handle latent variables, small sample sizes, and non-normal data distributions, as well as its capacity to evaluate complex research frameworks[59,60]. The analytical process involved multiple stages: confirmatory factor analysis was conducted to evaluate the measurement scale's reliability and validity; the direct effect model was examined, with hypothesis testing, we employed one-tailed tests rather than two-tailed tests. This approach was deliberately selected because our research hypotheses explicitly predicted directional relationships (positive effects) based on theoretical foundations and prior empirical evidence. The nature of our research questions focused on confirming whether emotional intelligence and personality positively influence environmental awareness and behavior as theorized in previous literature, rather than testing for effects in either direction. When research hypotheses specify a directional relationship based on sound theoretical grounds, one-tailed tests provide a more appropriate and powerful analytical approach[61,60]. Additionally, the Q2 value was utilized to assess prediction fit, while a standard root means square residual (SRMR) below 0.1 served as a criterion for model fit[59]. This comprehensive approach ensured a thorough examination of the survey data, addressing various aspects of statistical validity and model performance.

4. Results and discussion

4.1. Measurement model analysis

The evaluation of the measurement model was based on three key factors: factor loadings, average variance extracted (AVE), and composite reliability, as outlined by Hair and Alamer[62]. To assess convergent validity, which shows how different items within a single construct relate, researchers examined outer loadings, composite reliability (CR), and AVE. For this study, the reliability threshold was set at a Cronbach's alpha exceeding 0.70, with values of 0.80 or higher considered preferable[63]. The collected data indicated that the scale was sufficiently reliable for further analysis. Generally, outer loadings are expected to be greater than 0.70[64]. In cases where item loadings fell between 0.40 and 0.70, removal was only considered if it improved CR or AVE.

Table 1. The outcomes of convergent validity analysis and composite reliability.

Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average
Emotional Intelligence	0.805	0.810	0.865	0.561
Personality	0.821	0.823	0.882	0.651
Awareness of Environments	0.894	0.903	0.921	0.701
Environmental Behavior	0.795	0.802	0.879	0.708

Following the confirmation of convergent validity, the research proceeded to assess the model's discriminant validity. This assessment employed the Heterotrait-Monotrait (HTMT) approach, as

recommended by Henseler et al.[65]. The purpose of evaluating discriminant validity is to verify that each construct in the model is truly distinct from the others. The HTMT method involves calculating a ratio by comparing the mean correlation of indicators across different constructs to the mean correlation of indicators within a single construct. Hair and Alamer[62] suggest that for related constructs, an HTMT value below 0.90 is acceptable, while for unrelated constructs, a more stringent threshold of 0.85 or lower is necessary. In this study, the results presented in **Table 1** demonstrate that all HTMT values were found to be below the 0.85 threshold. This finding provides strong evidence for the model's discriminant validity, indicating that each construct in the model is sufficiently distinct from the others.

4.2. Structural equation modelling

After completing the measurement model, the study proceeded to evaluate the structural equation model. This evaluation employed bootstrapping to determine the significance of relationships between constructs. The analysis of mediating effects, specifically focusing on Emotional Intelligence, followed the methodologies outlined by Sarstedt et al.[66]. The assessment of the structural equation model's direct and indirect effects relied on four key criteria. The first criterion involved calculating the R2 value to assess the variation explained by constructs associated with endogenous latent variables[64]. According to Sarstedt and Liu[67], the interpretation of R2 values depends on the research context, with 0.26 considered high, 0.13 moderate, and 0.09 low.

In this study, the direct impact model yielded an R^2 value of 0.275 for Personality (P). This result suggests that the model accounted for 27.5% of the variance in P. For Awareness of Environments (AE), the R^2 value was 0.117, indicating that the model explained 11.7% of its variance. For Environmental Behavior (EB), the R^2 value was 0.064, showing that the model accounted for 6.4% of its variance. These findings point to varying levels of predictive accuracy for the model across different constructs. The R^2 values for the endogenous variables are presented in **Table 2**. Overall, these results demonstrate that the model explains different portions of the variance in Personality, Awareness of Environments, and Environmental Behavior, with the highest predictive power for Personality.

Table 2. Coefficient of determination for the PLS-SEM.

Relationship among constructs	R-square	R-square adjusted	Q^2 predict
Personality (P)	0.275	0.273	0.173
Awareness of Environments (AE)	0.117	0.111	0.077
Environmental Behavior (EB)	0.064	0.057	0.038

The study employed the cross-validated redundancy measure (Q^2) to assess the model's predictive relevance, as suggested by Sarstedt et al. (2019). The Q^2 values for Personality (P), Awareness of Environments (AE), and Environmental Behavior (EB) were 0.173, 0.077, and 0.038 respectively, all surpassing zero and indicating predictive capability. These Q^2 values, along with the previously mentioned R^2 values, demonstrate the model's effectiveness in explaining and predicting variable relationships, with the strongest predictive relevance for Personality.

The study examined the impact of various independent variables on dependent variables using effect size (f^2) analysis. Based on the categorization by Sarstedt and Liu[67], where effect sizes are considered small (0.02), medium (0.15), and large (0.35), the research revealed diverse effects across different relationships. Emotional Intelligence (EI) demonstrated the most substantial impact on Personality (P) with a large effect size of 0.380. Moderate effects were observed in the relationships between EI and Awareness of Environmental (AE) (0.061), Personality (P) and Environmental Behaviour (EB) (0.030), and the interaction of EI and P on EB (0.030). Small effects were found in the relationships between EI and Environmental Behaviour (EB) (0.026),

Personality (P) and Awareness of Environmental (AE) (0.021), and the interaction of EI and P on AE (0.021). These findings highlight the varying degrees of influence that emotional intelligence and personality factors have on environmental awareness and behaviour, with emotional intelligence showing the most significant impact on personality traits. It is worth noting that while the R^2 values for Environmental Behavior (0.064) and Awareness of Environments (0.117) are relatively modest, such values are not uncommon in behavioral research, particularly when examining complex psychological constructs. These lower values may reflect the multifaceted nature of environmental behavior, which is likely influenced by numerous factors beyond those captured in our model, including situational constraints, social norms, and economic considerations. Future research should aim to incorporate these additional variables to improve predictive capacity.

The study's direct and indirect effects analysis revealed significant positive relationships across multiple variables are presented in **Table 3**. Emotional Intelligence (EI) showed strong positive correlations with Personality (P) ($\beta = 0.522$, $t = 11.351$, $p < 0.05$), Awareness of Environmental (AE) significant ($\beta = 0.271$, $t = 6.521$, $p < 0.05$) and Environmental Behaviour (EB) ($\beta = 0.087$, $t = 3.635$, $p < 0.05$). Similarly, Personality demonstrated positive effects on both AE ($\beta = 0.109$, $t = 1.975$, $p < 0.05$) and EB ($\beta = 0.196$, $t = 2.454$, $p < 0.05$). These findings supported hypotheses H1 through H5. Furthermore, the research confirmed Personality's mediating role between EI and both AE and EB, with significant indirect effects ($\beta = 0.057$, $t = 1.974$, $p < 0.05$ and $\beta = 0.103$, $t = 2.218$, $p < 0.05$ respectively), lending support to hypotheses H6 and H7. Overall, the results underscore the interconnected nature of emotional intelligence, personality, environmental awareness, and environmental behaviour, highlighting the complex relationships between these psychological and environmental factors.

Table 3. Structured equations model results.

Hypotheses	Relationship among constructs	β	Sample mean (M)	S. D	t-values	f-square	p-values	LLCI 2.5%	ULCI 97.5%	Remarks
H1	EI → P	0.525	0.522	0.046	11.351	0.380	0.000	0.448	0.601	Accepted
H2	EI → AE	0.329	0.327	0.059	6.521	0.061	0.000	0.246	0.412	Accepted
H3	EI → EB	0.190	0.194	0.075	3.635	0.026	0.000	0.104	0.277	Accepted
H4	P → AE	0.109	0.106	0.062	1.750	0.021	0.041	0.006	0.212	Accepted
H5	P → EB	0.196	0.205	0.080	2.454	0.030	0.007	0.064	0.328	Accepted
H6	EI → P → AE	0.057	0.055	0.033	1.745	0.021	0.041	0.003	0.111	Accepted
H7	EI → P → EB	0.103	0.108	0.046	2.218	0.030	0.014	0.026	0.180	Accepted

5. Discussion

The key findings of this study reveal significant relationships between emotional intelligence (EI), personality (P), awareness of environmental issues (AE), and environmental behavior (EB). Notably, EI showed strong positive correlations with personality, environmental awareness, and behavior. Personality demonstrated positive effects on both AE and EB, with a stronger impact on behavior. A crucial finding is the mediating role of personality between EI and environmental variables, with significant indirect effects on awareness and behavior. These results underscore the importance of considering both emotional and personality factors in predicting environmental outcomes. Limitations of existing approaches include the cross-sectional nature of the data, which restricts causal inferences, and the reliance on self-reported measures, potentially introducing common method bias. Additionally, the study does not address potential reciprocal relationships between EI and personality in the context of environmental behavior, nor does it explore possible moderating factors such as cultural context or socioeconomic status. Future research could benefit from longitudinal designs, objective measures of environmental behavior, and investigation of specific mechanisms through which EI and personality influence environmental awareness and behavior.

The findings of this study provide compelling evidence for the intricate relationships between emotional intelligence (EI), personality (P), awareness of environmental issues (AE), and environmental behavior (EB). The results support all seven hypotheses, revealing significant direct and indirect effects among these constructs, and offering valuable insights into the psychological underpinnings of environmental awareness and behavior. The strong positive relationship between emotional intelligence and personality aligns with previous research highlighting the crucial role of EI in shaping personality traits[68]. This finding suggests that individuals with higher emotional intelligence are more likely to develop personality characteristics that are conducive to environmental awareness and environmental behavior. The significant positive effects of EI on both AE and EB further underscore the importance of emotional competencies in fostering environmental consciousness and action.

These results corroborate recent studies that have emphasized the role of emotional factors in shaping environmental attitudes and behaviors. For instance, Reizer et al.[69] found that emotional intelligence is positively associated with employee motivation and performance, which can be extended to the context of environmental behavior. Similarly, Morón[70] demonstrated that trait emotional intelligence is a significant predictor of life satisfaction, suggesting that emotionally intelligent individuals may be more inclined to engage in behaviors that contribute to overall well-being, including environmental actions. The study also reveals that personality positively influences both environmental awareness and environmental behavior. This finding supports the notion that certain personality traits, such as openness to experience and conscientiousness, may predispose individuals to be more environmentally conscious and engage in environmental behaviors[71]. The stronger effect of personality on behavior compared to awareness suggests that personality traits may have a more direct impact on tangible environmental outcomes.

A key contribution of this study is the identification of personality as a significant mediator in the relationship between emotional intelligence and both environmental awareness and behavior. The indirect effect of EI on AE through personality ($\beta = 0.057$, $p < 0.05$) and on EB through personality ($\beta = 0.103$, $p < 0.05$) highlights the crucial role of personality in translating emotional competencies into environmental consciousness and concrete actions. These mediating effects provide a more nuanced understanding of the psychological processes underlying environmental behavior, suggesting that the development of certain personality traits is a critical step in converting emotional intelligence into meaningful environmental engagement and action. This finding aligns with recent research emphasizing the importance of individual differences in shaping environmental attitudes and behaviors[72].

The results of this study contribute to the growing body of literature on emotional intelligence, personality, and environmental psychology. By demonstrating the mediating effects of personality, this research addresses a significant gap in our understanding of how emotional competencies lead to environmental awareness and behavior. The findings suggest that personality acts as a crucial intermediary step, transforming emotional intelligence into environmental consciousness and behavioral manifestations. This study also extends the application of emotional intelligence theory in environmental psychology by incorporating both direct and indirect effects. The significant relationships between EI, personality, and environmental outcomes underscore the importance of considering both emotional and personality factors in predicting environmental awareness and behavior[73].

Furthermore, the research contributes to the ongoing debate about the nature and role of emotional intelligence in shaping behavior. By positioning EI as both a direct predictor of environmental outcomes and an indirect influence through personality, this study supports a dynamic view of emotional intelligence that evolves and interacts with other psychological constructs to produce behavioral outcomes[74]. The findings of

this study have several important implications for environmental education and behavior change interventions. First, the strong relationship between emotional intelligence and environmental outcomes suggests that fostering emotional competencies may be a crucial step in developing environmentally conscious individuals. Environmental education programs should consider incorporating elements that enhance emotional intelligence, such as empathy-building exercises and emotional regulation techniques.

Second, the mediating role of personality highlights the importance of tailoring interventions to individual differences. Environmental campaigns and educational initiatives should take into account personality traits and adapt their approaches accordingly. For instance, individuals high in openness to experience may respond better to novel and creative environmental solutions, while those high in conscientiousness might be more receptive to structured and goal-oriented environmental programs. Third, the positive effects of both EI and personality on environmental awareness and behavior suggest that a holistic approach to environmental education is necessary. Programs should aim to develop both emotional competencies and personality traits that are conducive to environmental attitudes and behaviors. This could include activities that foster emotional intelligence while also encouraging the development of traits such as openness, conscientiousness, and agreeableness. While this study provides valuable insights, it is not without limitations. The cross-sectional nature of the data limits our ability to make causal inferences about the relationships between constructs. Future research could employ longitudinal designs to better understand the temporal dynamics of how emotional intelligence and personality interact to influence environmental awareness and behavior over time.

Additionally, the study's reliance on self-reported measures may introduce common method bias. Future studies could incorporate objective measures of environmental behavior or multi-source data to strengthen the validity of the findings. An important gap that remains to be addressed is the potential reciprocal relationship between emotional intelligence and personality in the context of environmental behavior. While this study focused on personality as a mediator between EI and environmental outcomes, it is possible that engaging in environmental behaviors could also enhance emotional intelligence and shape personality traits over time. Future research could explore this potential feedback loop to provide a more comprehensive understanding of the dynamic interplay between emotional, personality, and environmental factors.

Another avenue for future research is to examine potential moderators of the relationships identified in this study. Factors such as cultural context, socioeconomic status, or exposure to environmental education may influence the strength of the relationships between EI, personality, and environmental outcomes. Investigating these moderating effects could provide a more nuanced understanding of when and for whom these relationships are strongest. Finally, future studies could explore the specific mechanisms through which emotional intelligence and personality influence environmental awareness and behavior. Qualitative research methods could be particularly valuable in uncovering the lived experiences of individuals and how emotional and personality factors manifest in their day-to-day environmental decision-making processes.

6. Conclusion

The key findings of this study reveal significant relationships between emotional intelligence (EI), personality (P), awareness of environmental issues (AE), and environmental behavior (EB), with EI showing strong positive correlations across all variables. Personality emerged as a crucial mediator between EI and environmental outcomes, highlighting the complex interplay of psychological factors in shaping environmental consciousness and behavior. These findings align with and extend previous research in environmental psychology, offering a more nuanced understanding of how individual differences contribute to environmental engagement. The practical implications of this study are substantial, informing the design of more effective environmental education programs and behavior change interventions. By recognizing the role of both

emotional competencies and personality traits, practitioners can develop tailored approaches that resonate with individuals' psychological profiles. For instance, environmental campaigns could incorporate elements that enhance emotional intelligence, such as empathy-building exercises, while also appealing to specific personality traits like openness to experience or conscientiousness. This personalized approach could significantly improve the effectiveness of environmental initiatives, leading to more sustainable behaviors and a more environmentally conscious society. The scientific novelty of this research lies in its comprehensive examination of the mediating role of personality between emotional intelligence and environmental outcomes, providing a new process-based understanding of environmental behavior formation. This represents a relative novelty, supplementing existing knowledge by integrating emotional and personality factors in a unified model of environmental engagement. The distinctive characteristic of this study is its focus on the coastal communities of Terengganu, Malaysia, offering insights into environmental psychology within a specific cultural and geographical context. While the study's cross-sectional nature and reliance on self-reported measures present limitations, these findings open avenues for future research, including longitudinal studies to establish causality and investigations into potential moderating factors such as cultural context and socioeconomic status. Recommendations for future research include exploring reciprocal relationships between EI, personality, and environmental behavior, and examining the specific mechanisms through which these psychological factors influence environmental outcomes.

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Ethical Consideration

This study received ethical approval from the UiTM Research Ethics Committee at UiTM, Malaysia (Approval Code: REC/05/2022 (ST/MR/78)). All participants were provided with an information sheet explaining the study’s purpose, procedures, potential risks and benefits, and their rights as participants.

Conflict of interest

The authors declare no conflict of interest.

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