PARENTS' ENVIRONMENTAL LITERACY: FROM KNOWLEDGE TO PRO-ENVIRONMENTAL BEHAVIOR

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ABSTRACT

Background: Environmental problems are still unsolved, so it is necessary to strengthen parents' environmental literacy because they play an active role in modeling behavior for their children, including pro-environmental behavior and awareness.

Purpose: this study investigated parents' environmental literacy in pro-environmental behavior, including consumption-related behavior (C-RB) and nature protection behavior (NTB), based on environmental knowledge, environmental affect, and environmental self-efficacy (ES-e).

Methodology: The research data collection was done by using a questionnaire in Likert scale format. The study participants were 275 parents. They have early childhood, which determines by accidental sampling from eight provinces in Indonesia. Data analysis begins with descriptive and correlational analysis and continues with structural equation modeling (SEM) analysis to test hypotheses and research models.

Results: This study found that pro-environmental behavior is influenced by environmental knowledge by mediating environmental affect and ES-e. Its path is that environmental knowledge affects environmental affect and ES-e and then has implications for pro-environmental behavior.

Practical implications: The significant direct and indirect effects were confirmed, therefore a new model of the effect of environmental knowledge on pro-environmental behavior mediated by environmental affect and ES-e was found. This model can explain the dynamics parents' environmental literacy: from environmental knowledge to pro-environmental behavior through the mediating mechanism of environmental affect and ES-e. Therefore, practitioners, academics, and researchers can discuss, adapt, or adopt these findings to develop pro-environmental in the future.

Keywords: environmental knowledge, environmental affect, environmental self-efficacy, pro-environmental behavior, parents' environmental literacy.

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ALFABETIZAÇÃO AMBIENTAL DOS PAIS: DO CONHECIMENTO AO COMPORTAMENTO PRO-AMBIENTAL

RESUMO

Contexto: Os problemas ambientais ainda não foram resolvidos, pelo que é necessário reforçar a literacia ambiental dos pais, uma vez que desempenham um papel ativo na modelização do comportamento dos seus filhos, incluindo o comportamento pró-ambiental e a sensibilização para o problema.

Objetivo: este estudo investigou a alfabetização ambiental dos pais em comportamento pró-ambiental, incluindo comportamento relacionado ao consumo (C-RB) e comportamento de proteção da natureza (NTB), com base no conhecimento ambiental, impacto ambiental e autoeficácia ambiental (ES-e).

Metodologia: A coleta de dados da pesquisa foi feita por meio de um questionário no formato de escala Likert. Os participantes do estudo foram 275 pais. Eles têm uma infância precoce, que determina por amostragem acidental de oito províncias na Indonésia. A análise de dados começa com análise descritiva e correlacional e continua com a análise de modelagem de equações estruturais (SEM) para testar hipóteses e modelos de pesquisa.

Resultados: Este estudo descobriu que o comportamento pró-ambiental é influenciado pelo conhecimento ambiental por mediação do impacto ambiental e ES-e. Seu caminho é que o conhecimento ambiental afeta o impacto ambiental e ES-e e, em seguida, tem implicações para o comportamento pró-ambiental.

Implicações práticas: Os efeitos diretos e indiretos significativos foram confirmados, portanto, foi encontrado um novo modelo do efeito do conhecimento ambiental no comportamento pró-ambiental mediado por impacto ambiental e ES-e. Esse modelo pode explicar a dinâmica da alfabetização ambiental dos pais: do conhecimento ambiental ao comportamento pró-ambiental através do mecanismo de mediação do impacto ambiental e ES-e. Portanto, profissionais, acadêmicos e pesquisadores podem discutir, adaptar ou adotar essas descobertas para desenvolver atividades pró-ambientais no futuro.

Palavras-chave: conhecimento ambiental, impacto ambiental, autoeficácia ambiental, comportamento pró-ambiental, alfabetização ambiental dos pais.

1 INTRODUCTION

Environmental damage is a critical issue in the world until today. Human activities in unwisely exploiting resources lead to a decrease in environmental quality. Natural damage caused by human activities is characterized by environmental disasters such as environmental pollution, energy crisis, water crisis, floods, deforestation, and so on. Recent years have seen a surge in interest in the field of International Relations as a whole due to the growing concern that governments have over environmental degradation and threats like climate change (Pryandana, 2020). Then, A. Nugroho (Nugroho, 2018) expressed a similar viewpoint, stating that environmental damage results from climate change, the extinction of natural resources, human-caused environmental damage, and development that hurts nature without being able to adapt will encounter difficulties. One

solution to solve environmental education's shortcomings is to improve students' literacies and awareness of environmental issues. As a result, teaching strategies that foster ecologically conscious actions should be standard fare in every school. Furthermore, in order to enhance children's environmental literacy, learning activities should give kids the chance to learn outside the classroom, observe nature, practice, and evaluate learning concerns related to the environment.

Even though environmental education has been implemented, many students still have negative attitudes and concerns about the environment. This is due to the fact that environmental education learning is only focused on cognitive aspects and does not include the development of behavioral values that can be used later by students to overcome problems related to the environment. Early childhood entails the development of a young individual with untapped potential. They are always energetic, vibrant, and inquisitive, with an insatiable desire to discover and acquire knowledge. At this age, it is crucial to set the groundwork for the adult personality the child will eventually develop. Early childhood is a crucial phase for the child's future growth and development because it is a sensitive and formative time in their lives (Yunisari & Amri, 2016).

Environmental literacy is not only the duty of teachers at school but also the duty of parents at home. In fact, parents have a strategic role because children first acquire knowledge from parents. Moreover, the duration of time together with their parents is also longer than that of the teacher. Therefore, environmental literacy by parents is very necessary. Parents play an active role in modeling behavior for their children, including pro-environmental behavior and awareness (Aguirre-Bielschowsky et al., 2017; Haywood, 2018). With such a position, parents can act as the main socialization agents in children's lives, which greatly influence their children's beliefs, values, attitudes, and behavior patterns (Curdt-Christiansen & Wang, 2018). Previous research found that parents' environmental knowledge, attitudes, and behaviors effects their children (Leppänen et al., 2012), including energy literacy, carbon dioxide reduction, and climate change (Aguirre-Bielschowsky et al., 2017). If follow the behavior change model, the pro-environmental behavior cycle includes the relationship between environmental knowledge, environmental awareness and attitudes, and actions to environmental (Hungerford and Volk 1990 in (Li et al., 2019). Based on this urgency, this study focuses on parents' environmental literacy in pro-environmental behavior based on knowledge, affect, and self-efficacy of environmental. Empowering parents to take pro-

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environmental actions is crucial for creating a sustainable future. This the research will explore the gap between environmental knowledge and actions, and provide strategies to bridge it.

Following the behavior change model, the pro-environmental behavior cycle includes the relationship between environmental knowledge, environmental awareness and attitudes, and actions toward the environment (Hungerford and Volk 1990). Operationally, the pattern can follow the following lines: environmental knowledge, environmental affect, ES-e, and pro-environmental behavior. Pro-environmental behavior is an individual's conscious action to reduce the negative impact of human activities on the environment or otherwise improve the quality of the environment (Jensen, 2002; Kollmuss & Agyeman, 2002). In addition, Carmi, Arnon, and Orion (Carmi et al., 2015) said that pro-environmental behavior is a set of behaviors practiced by individuals who seek to take measurable actions to promote positive environmental change and limit the effects of human negligence. Pro-environmental behavior is determined by its impact and intentions.

Pro-environmental behaviors include consumption-related behavior (C-RB) and nature protection behaviors (NRB) (Iwaniec & Curdt-Christiansen, 2020; Larson et al., 2015; Ramkissoon et al., 2013). C-RB refers to daily life choices, especially consumptive (Iwaniec & Curdt-Christiansen, 2020). It reflects the tendency not to consume goods or services in excess or not to prioritize wants over needs (Manongko et al., 2017). Meanwhile, NRB is related to efforts to protect nature and save resources (Iwaniec & Curdt-Christiansen, 2020). Pro-environmental behavior can be influenced by ES-e. Tabernero and Hernández (Tabernero & Hernández, 2011) highlight that self-efficacy is related to environmental behavior. Other studies demonstrated that self-efficacy determines self-reported pro-environmental behavior (Chen, 2015; Yusliza et al., 2020), including accommodation, promotional, and proactive behavior (Huang, 2016). Self-efficacy is an individual's belief in his ability to achieve goals and achieve desired standards, targets, or results (Schutte & Bhullar, 2017). Individual self-efficacy is the central factor in the interaction between individual behavior and the environment (Bandura, 2012).

Empirically, ES-e can be influenced by environmental knowledge and environmental affect. Previous studies showed that rational reflection as an indicator of knowledge sharing was positively associated with creative self-efficacy (Sun et al., 2021).

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Furthermore, Waldyatri, Aditi, and Pentana (Waldyatri et al., 2021) indicated that entrepreneurial knowledge is related to self-efficacy. A similar study (M. Lee et al., 2021) also demonstrated that knowledge affects efficacy beliefs. Several studies prove that knowledge is the determinant of self-efficacy. Conceptually, in the environmental context, knowledge is related to important information about the environment and the interactions of various components of the environment (Iwaniec & Curdt-Christiansen, 2020). Therefore, improving environmental knowledge can produce more positive emotional responses to nature (Kim et al., 2018). For example, parents with adequate environmental knowledge will tend to pass their knowledge on to their children in order to have strong ES-e so that they are pro-environmental.

In addition, ES-e can also be influenced by environmental affect (Afiyanti, 2019). From an environmental perspective, environmental influences are feelings towards nature, especially emotional reactions to environmental problems (S.-C. Liu & Lin, 2015). It reflects the individual's feelings towards the natural environment, particularly the emotional response to environmental and natural degradation (S.-C. Liu & Lin, 2015). Therefore, it was considered an essential determinant of environmental responsibility (Kim et al., 2018). In other words, someone with a strong environmental affect will tend to have a strong belief in his capacity to treat the environment well. For example, parents with a strong environmental affect tend to encourage their children to actively respond to any changes and environmental problems so that they have strong beliefs about their capacity to do their best for the environment.

Besides to influencing ES-e, environmental affect is also influenced by environmental knowledge. Kim, J. Kim, and Thapa (Kim et al., 2018) proved that environmental affect significantly impacted environmental knowledge. This shows that environmental knowledge is an antecedent of environmental affect. Thus, parents no longer need to share their environmental knowledge with their children so that in the future, they will have a high environmental affect, which can be relied on to spur their ES-e and pro-environmental behavior.

2 FRAMEWORK

2.1 PARENTS' ENVIRONMENTAL LITERACY

Parents' environmental literacy is the degree of knowledge, attitude, and behavior that parents have regarding the environment and its issues, and how they can contribute

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to its protection and improvement(Spiteri, 2023). Parents' environmental literacy is important because it can influence their children's environmental literacy, as well as their own environmental practices at home and in the community(J. Liu et al., 2022). Parents' environmental literacy can be enhanced by various factors, such as education, media, social networks, and intergenerational learning(Iwaniec & Curdt-Christiansen, 2020). Some of the benefits of parents' environmental literacy are:

- It can help parents to support and enhance their children's environmental learning and behavior, as they can provide guidance, feedback, and role models for their children(J. Liu et al., 2022; Spiteri, 2023).

- It can help parents to improve and practice their own environmental knowledge and behavior, as they can learn from their children, media, and social networks, and apply their learning to their daily lives(Spiteri, 2023).

- It can help parents to contribute and advocate for environmental protection and improvement, as they can participate in environmental activities, initiatives, and policies in their communities and beyond(Spiteri, 2023).

Parents' environmental literacy is a valuable asset for themselves, their children, and the society, as it can foster a culture of environmental awareness and responsibility. There are many ways to improve parents' environmental literacy, but some of the common ones are:

- Providing parents with education and information on environmental issues and solutions, such as through books, media, workshops, or online courses.

- Encouraging parents to interact and learn with their children on environmental topics, such as through reading, playing, exploring, or doing projects together.

- Creating a literacy-rich environment at home and in the community, such as by having books, posters, games, or activities that promote environmental awareness and action.

- Supporting parents to practice and model pro-environmental behaviors, such as by reducing waste, saving energy, recycling, or gardening.

- Involving parents in environmental initiatives and networks, such as by joining local groups, volunteering, or advocating for environmental causes.

These are some of the ways that parents can improve their environmental literacy and help their children and the planet.

2.2 KNOWLEDGE ENVIRONMENTAL

Knowledge environmental is a term that refers to the amount and quality of information that a person or an organization has about the environment and its issues(Kte'pi, 2023). Knowledge environmental can be influenced by various factors, such as education, media, experience, and social networks(Arcury, 2018). Knowledge environmental can affect the attitudes and behaviors of individuals and organizations toward the environment, as well as their performance and competitiveness in the environmental sector(Dzhengiz & Niesten, 2020). Knowledge environmental can be measured by different indicators, such as the level of awareness, understanding, and skills related to environmental topics, the frequency and accuracy of environmental information seeking and sharing, and the degree of integration and application of environmental knowledge in decision making and problem solving.

Knowledge environmental can be improved by various strategies, such as providing and accessing environmental education and training, engaging in environmental research and innovation, participating in environmental communication and collaboration, and adopting environmental standards and best practices. Knowledge environmental is an important asset for individuals and organizations who want to contribute to environmental sustainability and benefit from the opportunities and challenges of the environmental sector.

2.3 PRO-ENVIRONMENTAL BEHAVIOR

Pro-environmental behavior (PEB) is a term that refers to actions that individuals take to protect or improve the environment. PEB can include various types of behaviors, such as reducing energy and water consumption, recycling waste, using public transportation, buying organic or local products, participating in environmental activism, and so on. PEB can be motivated by different factors, such as personal values, attitudes, beliefs, norms, emotions, knowledge, skills, and incentives. PEB can also be influenced by social, cultural, economic, and political contexts. PEB can have positive impacts on the environment, such as reducing greenhouse gas emissions, preserving natural resources, enhancing biodiversity, and improving human health and well-being. PEB can also have challenges, such as behavioral inconsistency, rebound effects, trade-offs, and barriers. PEB is a topic of interest for many disciplines, such as psychology, sociology, economics, marketing, communication, education, and policy. PEB is also a goal for

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many organizations, such as governments, businesses, NGOs, and communities, that aim to promote sustainability and environmental awareness(Allen, 2016; Kurisu, 2016; E. Lee & Khan, 2020).

3 METHOD

This research uses a quantitative approach with a survey method using a questionnaire of (Iwaniec & Curdt-Christiansen, 2020) questionnaire on a Likert scale with five options, from never/strong disagree (score= 1) to always/strong agree (score= 5). The environmental knowledge questionnaire consists of 11 items, such as "I explain where food comes from to my child." Environmental affect comprises four items, such as "I explain to my child that humans depend on the environment." ES-e consists of five items; for example, "I feel confident that I know what to do with the environment." C-RB comprises ten items, such as "I encourage my child to choose products in non-plastic packaging." Finally, NRB consists of nine items, including "I encourage my children not to litter." The questionnaires were distributed online using Google Forms and were shared via the WhatsApp application.

This study uses a statistical mechanism through the Harman single-factor test (Malhotra et al., 2017) and the correlation matrix (Tehseen et al., 2017) to respond to the urgency. The results of Harman's single factor test showed that the total variance extracted by one factor was 35.898%, less than the recommended threshold of 50% (Kock, 2021), while the correlation coefficient between constructs (variables) was less than 0.9 (Tehseen et al., 2017). Accordingly, no CMV (CMB) occurs in this study. Data analysis begins with descriptive and correlational analysis and continues with structural equation modeling (SEM) analysis to test hypotheses and research models. The t-test is used to test the significance of the direct effect, while the Sobel (Z) test is used to determine the significance of the indirect effect (mediation) (Abu-Bader & Jones, 2021; Olaleye & Lekunze, 2024). Descriptive and correlational analysis was performed with SPSS, while SEM analysis using LisSrel 8.80.

4 RESULTS AND DISCUSSION

4.1 FINDING

The study participants were 275 parents. They have early childhood, determined by accidental sampling from eight provinces in Indonesia: Aceh, Southeast Sulawesi,

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Bengkulu, Yogyakarta, Central Java, West Java, Banten, and DKI Jakarta. As presented in Table 1, most of the participants were women (86.91%), aged 31-40 years (52.73%), had a bachelor's degree (42.18%), and were biological parents (93.82%).

Table 1: profile of the research participants

Profile	Amount	Percentage
Gender		
Male	36	13.09
Female	239	86.91
Age		
< 20 years	10	3.64
21–30 years	68	24.73
31–40 years	145	52.73
41–50 years	41	14.91
51–60 years	11	4
> 60 years	0	0
Education		
Senior High School	84	30.55
Diploma (D3)	33	12
Bachelor (S1)	116	42.18
Master (S2)	15	5.45
Doctoral (S3)	1	.36
Relationship with children		
Biological Parents	258	93.82
Foster Parents	11	4
Grandparents	6	2.18

Source: Results of analysis by authors

4.2 DESCRIPTIVE AND CORRELATION ANALYSIS

As presented in Table 2, the average values from the lowest to the highest are: affect = 12.99, efficacy = 18.25, knowledge = 36.83, NPB = 37.63, and C-RB = 38.23. While the value of the standard deviation (std. dev) from the lowest to the highest: affect = 2.982, efficacy = 3.473, NPB = 6.251, C-RB = 7.090, and knowledge = 8.148. Overall, the standard deviation value < the mean value indicates a good data representation. The results of the correlation analysis between variables showed a significant relationship at the level of $p < 0.01$. It shows a reciprocal relationship.

Table 2: Descriptive Statistics and Correlation Matrices

Variables	Mean	Std. Dev	1	2	3	4	5
Environmental Knowledge	36.83	8.148	1.00				
Environmental Affect	12.99	2.982	.624**	1.00			
ES-e	18.25	3.473	.609**	.656**	1.00		
C-RB	38.23	7.090	.696**	.461**	.580**	1.00	
NPB	37.63	6.251	.570**	.443**	.596**	.740**	1.00

Source: Results of analysis by authors

4.2.1 Confirmatory Factor Analysis

The results of the confirmatory factor analysis test (Table 3) show the factor loading of all indicators >.30, indicating valid (Costello & Osborne, 2005). In this case, all indicators as variables can measure all latent variables. While the value of construct reliability (CR) and Alpha (α) > .70, and variance extract (VE) > .50. It indicates good reliability and acceptable convergence (Hair, 2018).

Table 3: Results of the Measurement Model

Variable	Indicator	Factor Loading	CR	VE	α
Environmental Knowledge (X)	$X._1$	.34	.869	.522	.921
	$X._2$	.73			
	$X._3$	.81			
	$X._4$	.78			
	$X._5$	.74			
	$X._6$	.32			
	$X._7$	.53			
	$X._8$	.51			
	$X._9$	.64			
	$X._{10}$	.86			
	$X._{11}$	.71			
Environmental Affect (Y_1)	$Y_{1.1}$	.73	.774	.509	.847
	$Y_{1.2}$	.61			
	$Y_{1.3}$	.76			
	$Y_{1.4}$	.61			
Environmental Sels-efficacy (Y_2)	$Y_{2.1}$	.79	.758	.502	.874
	$Y_{2.2}$	.81			
	$Y_{2.3}$	.35			
	$Y_{2.4}$	.34			
	$Y_{2.5}$	.31			
C-RB (Y_3)	$Y_{3.1}$	.44	.877	.524	.896
	$Y_{3.2}$	.52			
	$Y_{3.3}$	.52			
	$Y_{3.4}$	.74			
	$Y_{3.5}$	.75			
	$Y_{3.6}$	.67			
	$Y_{3.7}$	.62			
	$Y_{3.8}$	.75			
	$Y_{3.9}$	.73			
	$Y_{3.10}$	.68			
NPB (Y_4)	$Y_{4.1}$	.79	.896	.544	.861
	$Y_{4.2}$	.83			
	$Y_{4.3}$	.80			
	$Y_{4.4}$	.79			
	$Y_{4.5}$	.81			
	$Y_{4.6}$	.81			
	$Y_{4.7}$	.75			
	$Y_{4.8}$	.37			
	$Y_{4.9}$	.33			

Source: Results of analysis by authors

4.2.2 Goodness of Fit

Of the eleven criteria measurements of the goodness of fit (GOF) index, seven of them are good, and four are poor: chi-square, sig. probability, RMSEA, and AGFI. According to Hair (Hair, 2018), the chi-square test is very sensitive for large sample sizes, for example, more than 200 as in this study which involving 275 participants. Thus, as shown in Table 4, the chi-square test, sig. probability values, RMSEA, and AGFI cannot meet the criteria (poor). However, this condition can still be considered valid because the other seven criteria meet the criteria (good).
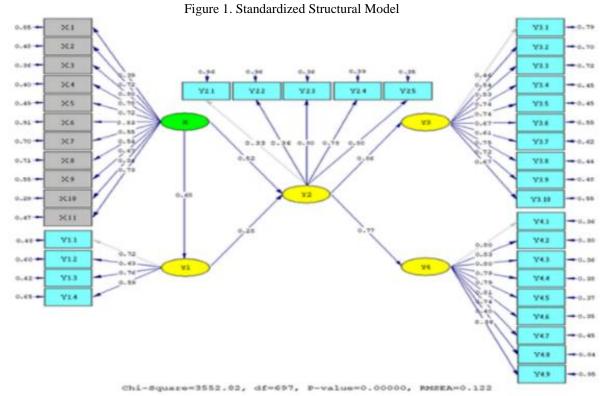
Table 4: Goodness of Fit Statistics

Goodness of Fit Index	Cut of Value	Result	Information
Absolute fit measures			
Chi-square	$\chi^2 < \chi^2$ table	2506.22	Poor
Sig. Probability	P > .05	.00	Poor
GFI	≥ .09	.60	Good
RMSEA	≤ .08	.12	Poor
Incremental fit measures			
NFI	> .90	.91	Good
NNFI	≥ .90	.93	Good
AGFI	≥ .90	.55	Poor
CFI	≥ .90	.93	Good
RFI	≥ .90	.90	Good
Incremental fit measures			
Normed chi-square	1 – 2 or < 3	2.52	Good
PNFI	0 – 1	.85	Good

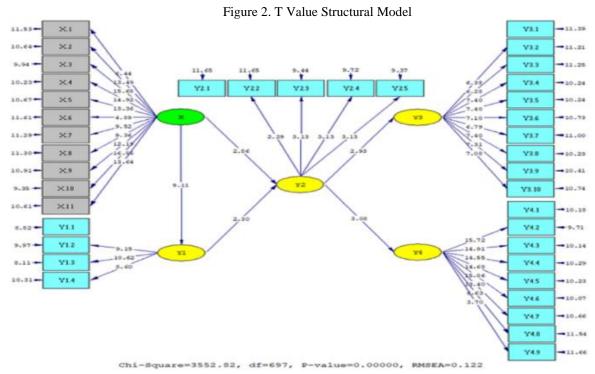Source: Results of analysis by authors

4.2.3 The Results of Direct Effect

As visualized in Figures 1 and 2 and summarized in Table 5, all the direct effect between variables were significant at α = .01 and .05. In detail, environmental knowledge has a significantly direct affect environmental affect (γ = .68, p < .01) and ES-e (γ = .52, p < .01). Environmental affect has a significantly direct affect ES-e (β = .28, p < .05). Furthermore, ES-e has a significantly direct affets C-RB (β = .86, p < .01) and NPB (β = .77, p < .01). The results indicated that ES-e is a crucial determinant of pro- environmental behavior manifested in NPB and C-RB. However, it turns out that the effect of environmental affect on ES-e is relatively small (.28), while environmental knowledge is quite influential on ES-e (.52).

Figure 1. Standardized Structural Model

Source: Results of analysis by authors

Figure 2. T Value Structural Model

Source: Results of analysis by authors

Table 5: Result of Direct Effect Analysis

Direct Effect	β/γ	T value	Decision
Environmental knowledge (X) on Environmental affect (Y_1)	.68**	9.11	Significant
Environmental knowledge (X) on ES-e (Y_2)	.52**	2.86	Significant
Environmental affect (Y_1) on ES-e (Y_2)	.28*	2.30	Significant
ES-e (Y_2) on C-RB (Y_3)	.86**	2.93	Significant
ES-e (Y_2) on NPB (Y_4)	.77**	3.08	Significant

Source: Results of analysis by authors

4.2.4 The Results of Indirect Effect

In Table 6, the indirect effect of environmental knowledge on C-RB and NPB, mediated by environmental affect and ES-e, was found to be significant. In detail, environmental knowledge significantly indirect effect on ES-e mediated by environmental affect ($\beta = .19$, $p < .01$). Environmental knowledge significantly indirect effect on C-RB mediated by ES-e ($\beta = .44$, $p < .01$). Environmental knowledge significantly indirect effect on NPB mediated by ES-e ($\beta = .40$, $p < .01$). Environmental affect significantly indirect effect on C-RB mediated by ES-e ($\beta = .25$, $p < .01$). Finally, environmental affect significantly indirect effect on NPB mediated by ES-e ($\beta = .22$, $p < .01$).

Table 6: Result of Indirect Effect Analysis

Indirect effect	β	Z value	Decision
Environmental Knowledge (X) on ES-e (Y_2) mediated by Environmental Affect (Y_1)	.19**	9.842	Significant
Environmental Knowledge (X) on C-RB (Y_3) mediated by ES-e (Y_2)	.44**	8.713	Significant
Environmental Knowledge (X) on NPB (Y_4) mediated by ES-e (Y_2)	.40**	8.947	Significant
Environmental Affect (Y_1) on C-RB (Y_3) mediated by ES-e (Y_2)	.25**	9.104	Supported
Environmental Affect (Y_1) on NPB (Y_4) mediated by ES-e (Y_2)	.22**	9.371	Significant

Source: Results of analysis by authors

4.3 DISCUSSION

This research found that environmental knowledge significantly indirect effect on environmental affect. This finding confirms that environmental knowledge is a crucial determinant of environmental affect. Its empirical result showed that parents who has relatively adequate environmental knowledge tend to actively encourage their children's environmental affect. For example, parents who know where food, natural resources, and

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energy come from tend to encourage their children to care about the environment because humans are, in fact, very dependent on the environment. Then, parents who understand the conditions of global warming and air pollution also tend to encourage their children to be more careful in responding to the destructive effects of global warming. This empirical result confirms previous studies by Kim, J. Kim, and Thapa (Kim et al., 2018) that environmental knowledge significantly affects environmental affect.

This study also proves that environmental knowledge impacts ES-e. It indicated that parents with good environmental knowledge tend to stimulate their children's ES-e intensely; in other words, ES-e can be improved by environmental knowledge. This finding was consistent with previous studies that environmental knowledge has a significant relationship with self-efficacy (Hair, 2009; Lamont et al., 2021; Waldyatri et al., 2021). Empirically, parents who understand the origins of food, natural resources, and energy, and understand the adverse effects of global warming, air pollution, and environmental pollution, tend to feel confident that they can transfer their understanding to convince their children of their ability to understand the intricacies of the environment, including the relationship between the environment and humans (society) and how humans should treat the environment.

This study also demonstrated that environmental affect significantly impacts ES-e. This finding indicated that parents who have strong environmental affect tend to be proactive in encouraging their children's ES-e; in other words, environmental affect can enhance ES-e. This evidence was consistent with previous studies (Waldyatri et al., 2021) that environmental affect significantly influences self-efficacy. As an illustration, parents who were very concerned about human dependence on the environment and nature tend to seriously encourage their children to have strong beliefs that they can treat the environment well, including understanding and building relationships between the environment and humans.

It indicated that parents with the highest ES-e tend to have a high level of pro-environmental behavior reflected in environmental literacy activities, both C-RB and NPB. This finding was consistent with scholars' claim that self-efficacy has a significant relationship with pro-environmental behavior (Chen, 2015; Huang, 2016; Tabernero & Hernández, 2011; Yusliza et al., 2020). For example, parents who have strong beliefs that they can treat the environment well, including regarding the dynamics of the relationship between the environment and human life, tend to actively encourage their children to

consume food and drink and use things fairly. For example, choosing products in non-plastic packaging, using water and electricity as needed, not buying excessive toys, not using disposable cutlery, using double-sided paper, and carrying bags when shopping. In addition, parents also encourage their children not to damage plants and disturb animals, not to litter and to separate waste according to its type, and to value goods so that they last longer.

Finally, this study also discovered five significant indirect effects, namely environmental knowledge and ES-e mediated by environmental, environmental knowledge and C-RB mediated by ES-e, environmental knowledge and NPB mediated by ES-e, environmental affect and C -RB mediated by ES-e, and environmental affect and NPB mediated by ES-e. Overall, the strongest indirect effect was environmental knowledge with C-RB and NPB mediated by ES-e. It means that ES-e has a vital role in mediating the influence of environmental knowledge on pro-environmental behavior, both C-RB, and NPB. This evidence strengthens the overall significance of the direct influence of environmental knowledge on environmental affect and ES-e, environmental affect on ES-e, and ES-e on C-RB and NPB. Therefore, the new research model of environmental knowledge on C-RB and NPB mediated by environmental affect and ES-e were confirmed. This finding provides practical and theoretical implications that pro-environmental behavior, proxied to C-RB and NPB, can be increased through environmental knowledge by mediating environmental affect and ES-e. As a consequence, if parents' environmental literacy seeks to be successful, parents' environmental knowledge needs to be improved to help improve parents' environmental affect and ES-e, and then it has implications for increasing their pro-environmental behavior. Thus, these findings make a real contribution not only to parenting but also to early childhood education and the environment.

Important goals of environmental education include the individual's active participation in addressing environmental problems (Chawla & Cushing, 2007). Environmental education also helps individuals build environmental knowledge and sensitivity, as well as comprehend pro-environment environmental issues, beliefs, attitudes, and concerns. In other words, students who participated in environmental education programs were better prepared to recognize and address environmental issues, and they are more likely to take advantage of opportunities to take direct action in this realm (Carmi et al., 2015).

Environmental education is becoming an increasingly significant aspect of learning to learn in early childhood education (Pearson & Degotardi, 2009), as there is an urgent need to teach children how to act sustainably from a young age (Hedefalk et al., 2015). Today, these children were born into a world with serious environmental issues, including pollution, climate change, and biodiversity loss. This issue was widely addressed by the majority of the world's population, including politicians, academia, and the media. These concerns were also stated and employed as teaching content in schools. In the United States, young children from birth to age eight were included in early childhood education. However, in many countries, the phrase was most commonly used to denote instruction for young children who have not yet reached kindergarten, generally before the age of five (Ernst, 2014).

The initial stages of childhood are the period of a person's life during which they undergo the greatest and most important amount of change and growth. It is widely acknowledged that the formative years of a person's life serve as the basis upon which the remainder of their life is formed (Davis, 2009; Rutter, 2002). Significant amounts of empirical data support the hypothesis that early childhood education has a significant influence in the development of fundamental academic, social, and cognitive skills that have lasting implications for both individuals and society (Ernst, 2014). In addition, a considerable work from fields such as neuroscience, health, and economics indicates that initial investments in human capital can provide substantial returns for both people and broader groups. Early childhood environmental education has the potential to have a significant impact on both early childhood development and the sustainability of the world (Ernst, 2014).

5 CONCLUSION

Environmental problems due to various causes, mainly due to human activities, have not yet been solved, so it is necessary to strengthen parents' environmental literacy in pro-environmental behavior. This study found that pro-environmental behavior (C-RB and NPB) is influenced by environmental knowledge by mediating environmental affect and ES-e. It path is that environmental knowledge affects environmental affect and ES-e and then has implications for pro-environmental behavior. In this path, significant direct and indirect effects were confirmed, so a new model of environmental knowledge influences pro-environmental behavior mediated environmental affect and ES-e was

found. This model can explain the dynamics of parents' environmental literacy: from invironmental knowledge to pro-environmental behavior through environmental affect and ES-e. Early childhood education practitioners can use this model to foster pro-environmental behavior among students through their parents. Thus, education practitioners need to build collaboration with parents, for example, in the form of environmental education activities. Meanwhile, environmental practitioners can take advantage of the results of this study as a strengthening strategy to improve pro-environmental behavior in a sustainable manner. Finally, academics and researchers can discuss, adapt, or adopt these findings in future research projects.

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