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THE EFFECT OF EXISTENTIAL INTELLIGENCE, PERSONALITY, AND SELF-DETERMINED MOTIVATION ON PRO-ENVIRONMENTAL BEHAVIOR: A THEORY-OF-PLANNED-BEHAVIOR-BASED EXAMINATION

存在智能、个性和自我决定动机对环保行为的影响：基于计划行为理论的检验

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Abstract

This study aims to analyze the effect of existential intelligence, personality, and self-determined motivation on pro-environmental behavior of students at *Adiwiyata* schools, also analyzes the variables of a theory of planned behavior (TPB) as the intervening variables. The novelty describes a new idea of predicting pro-environmental behavior, especially among high school students, by integrated analysis of existential intelligence, self-determination motivation and personality, and mediation of planned behavior, which is rarely used. 886 respondents consisted of *Adiwiyata* high schools students in Semarang City who participated in March-April 2021. The data was analyzed using AMOS-SEM, and the results show that existential intelligence and self-determined motivation positively affect pro-environmental behavior. Meanwhile, the personality of extroverted intuitive thinking judging (ENTJ), extroverted intuitive feeling perceiving (ENFP), extroverted sensing feeling perceiving (ESFP), introverted sensing thinking judging (ISTJ), an introverted intuitive feeling perceiving (INFP) type also has a positive effect on the pro-environmental behavior. Further, attitude, subjective norm (SN), and perceived behavioral control have a significant positive effect in mediating the existential intelligence, self-determined motivation, and personality of ENFP, ESFP, ISTJ, and INFP on the pro-environmental behavior. Meanwhile, the SN does not have a significant effect in mediating the ENTJ personality. In addition, the intention has a significant positive effect in mediating the existential intelligence, self-determined motivation, and personality of ENTJ, ENFP, ESFP, ISTJ, and INFP type on the pro-environmental behavior.

Keywords: Existential Intelligence, Personality, Self-Determined Motivation, Pro-Environmental Behavior, Planned Behavior

摘要 本研究旨在分析存在智能、个性和自决动机对阿迪维亚塔学校学生亲环境行为的影响，并分析了计划行为理论的变量作为干预变量。新颖性描述了一种预测亲环境行为的新思路，尤其是在高中生中，通过对存在智能、自决动机和个性的综合分析，以及对计划行为的调解，很少使用。886名受访者由参加2021年3月至4月的三宝垄市阿迪维亚塔高中学生组成。使用阿莫斯-结构方程建模分析数据，结果表明存在智能和自决动机对亲环境行为产生积极影响。同时，外向直觉思维判断、外向直觉感觉感知、外向感觉感觉感知、内向感觉思维判断、内向直觉感觉感知类型的人格也有对亲环境行为产生积极影响。此外，态度、主观规范和感知行为控制对外向直觉感觉知觉、外倾感觉感觉知觉、内向感知思维判断和内向直觉感觉知觉的存在智能、自主动机和个性对亲环境行为的调节具有显著的正向作用。同时，主观规范对外向直觉思维判断人格的中介作用不显著。此外，意图在介导外向直觉思维判断、外向直觉感觉知觉、外倾感觉感觉知觉、内向感知思维判断和内向直觉感觉知觉型的存在智能、自主动机和人格对亲环境行为的影响方面具有显著的正向作用。

关键词: 存在智能、个性、自我决定动机、亲环境行为、计划行为

I. INTRODUCTION

Teenagers, including high school students, are still in the stage of searching for self-identity and are experiencing confusion, where without a deep understanding of their existence and their surroundings, they will tend to behave less responsibly [1]. On the other hand, these teenagers also occupy a strategic position to become environmental leaders in the future [2]. For this reason, it is important to examine the pro-environmental behavior of teenagers [3]. The pro-environmental behavior (PEB) that has not yet been formed among teenagers relates to attitude and behavior.

This study examines factors influencing individual learners as a school community towards pro-environmental behavior (PEB). [4] explained that his/her behavior strongly influences a person's behavior towards the environment. Therefore, environmental psychology is useful to help implement a sustainable environment through behavioral changes [5], [6]. Therefore, there is a need for research analyzing the effect of existential intelligence, personality, and self-determined motivation on the PEB of students at Adiwiyata schools and the mediating effect of attitude, subjective norm (SN), perceived behavioral control (PBC), and intention on the PEB.

Previous researches on the PEB among high school students only discussed the environmental awareness in Adiwiyata schools, the description of the knowledge of Adiwiyata schools, and the relationship between the environment and environmental awareness [7], [8], [9]. An issue discussing the factors influencing the students in the PEB has never been discussed. The previous

studies are also considered ineffective as they involve complex things that cannot be viewed from one side only to show PEB. Internal and external factors also play a role in the PEB [10].

The urgency of this research is that the internal factors of personality can be both supportive in increasing the PEB and be an inhibiting factor for the PEB itself [10]. It is necessary to understand the personalities that may affect the PEB, especially among high school students. Thus, this study can be a reference in implementing school policies for the formation of PEB.

This paper is novel because it seeks to contribute to the current debate in the literature.

Students do not yet have systematic, holistic thinking in finding innovative ways to help students behave pro-environmental behavior [11]. The Department of Education and Culture obtained data on senior high schools throughout Semarang as many as 74 schools with 16 public schools and 58 private schools. A total of 9 state schools received the title of Adiwiyata School. There are 6 private schools based on the environment. The data above shows that only 20% of senior high schools in Semarang have implemented environmental-based education. However, in reality, there are still students who have not maintained the environment properly, as seen from the percentage of environmental awareness, around 74%. Research on pro-environmental behavior among high school students in previous studies only discussed environmental awareness in Adiwiyata schools, a description of the knowledge of Adiwiyata schools, then looked for the relationship between the environment and environmental care [7], [8],

[9]. The issue that discusses the factors influencing students in pro-environmental behavior has never been discussed, especially students' internal and external factors related to planned behavior. Other factors are needed, namely existential intelligence, personality, and values in self-determination motivation [12].

The results show that the types of personality that have a positive effect on the PEB are extroverted, intuitive thinking judging (ENTJ), extroverted, intuitive feeling perceiving (ENFP), extroverted sensing feeling perceiving (ESFP), introverted sensing thinking judging (ISTJ), an introverted intuitive feeling perceiving (INFP). Besides, existential intelligence and self-determined motivation also have a positive effect on the PEB. Components of planned behavior such as attitude, SN, PBC, and intention can mediate the PEB partially or fully.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The theory used in developing hypotheses about the effect of existential intelligence, personality, and self-determined motivation in changing behavior is obtained from the Theory of Pro-Environmental Behavior Model [10]. It explains that pro-environmental behavior (PEB) is influenced by internal and external factors. The internal factors include intelligence – in this case, is the existential intelligence – followed by personality and self-determined motivation. These internal factors will affect the environmental awareness of each individual.

Achieving environmental awareness requires knowledge about the environment, emotions, and attitudes based on the values believed. This theory is an integration of pro-environmental behavior with the theory of planned behavior (TPB) [13], [14]. The TPB explains that the internal factors will further strengthen the PEB if it is mediated by components of planned behavior, such as attitude, subjective norm (SN), perceived behavioral control (PBC), and intention [15]. In the cycle of achieving environmental awareness, there are many obstacles/gaps that a person must go through in performing pro-environmental behavior. Meanwhile, the external factors include educational policies, politics, social and cultural, and economic factors. These external factors also cause gaps or obstacles in performing the pro-environmental behavior, especially if it is associated with the environmental behavior patterns in the past.

A. Relationship of Existential Intelligence, Personality, and Self-Determined Motivation on Pro-Environmental Behavior

Pro-environmental behavior refers to a behavior that humans do consciously to minimize the negative impact of human activities on nature. [10] classifies whether someone shows the pro-environmental behavior or not. [11] stated that there is a need for thorough research on integrating various perspectives and concepts on a sustainable environment for students by creating a systematic and holistic framework and innovative ways.

On the other hand, existential intelligence refers to the ability to discover oneself with the farthest reaches of the infinite and enormous cosmos, namely human existence, the meaning of death, the ultimate destiny of the physical and psychological world, or the deep experience of love for another [16]. [17] defined it as the human tendency to develop and carefully consider fundamental questions about the existence of life and death. Further, [18] referred to it as a person's ability to appreciate and properly realize his existence in the world with his life purpose. In addition, [19] claimed that existential intelligence is when someone has ideas and tries to understand and sharpen ideas and interpret them through ideas and experiences.

It is believed that a person's personality also affects pro-environmental behavior. There are eight personality dimensions proposed by Myers-Briggs [20], namely extrovert (E), introvert (I), intuitive (N), sensing (S), thinking (T), feeling (F), judging (J), perceiving (P) [21]. When the eight personality preferences are combined, there are sixteen combinations: ENTJ, ISTJ, EFSJ, ESTP, ENFP, ISTP, ESFP, INFP, ESTJ, ISFJ, ISFP, ENTP, INTP, INTJ, INFJ, and ENFJ [20]. The personality types of a leader are ENTJ, INTJ, ISTJ, ESTJ, ENTP, INTP, ESTP, and ENFP [22], [23], [24].

Meanwhile, self-determination/autonomy is a determination to fulfill needs or achieve goals by regulating his/her actions, producing behavior that is useful for himself/herself, and the relationships with others and the social environment. Similarly, it can also be defined as an individual's free will to do activities and become an agent or a decision-maker for all activities carried out [25], [26]. It is a significant and reliable variable to understand pro-environmental behavior and to predict how social factors influence a person's motivation to behave in an environmentally friendly manner [27], [28], [29].

Based on the above description, the hypothesis that can be proposed is as follows:

H_{a1} : The existential intelligence and self-determined motivation positively affect the pro-environmental behavior of students in *Adiwiyata* schools.

H_{a2} : The personality has a positive effect on the pro-environmental behavior of students in *Adiwiyata* schools.

B. Mediating Effect of Attitude, Subjective Norm and Perceived behavioral control on the Pro-Environmental Behavior

The theory used in developing a hypothesis about the mediating effect of attitude, subjective norm (SN), and perceived behavioral control (PBC) in changing behavior is the Theory of Planned Behavior (TPB) which has been integrated with the pro-environmental behavior developed by [13], [14]. The pro-environmental behavior is mediated by TPB [10]. Further, in this study, the attitude is determined by individual beliefs about the results of behavior. Someone who strongly believes in the results achieved will positively affect the behavior performed and vice versa [30]. In addition, the subjective norm is a function based on the belief referred to as normative belief – a belief regarding approval or disapproval of a person or group that is important for individuals to a behavior. It can also be defined as an individual's perception of social pressure to do or not do something. A person who believes in respect towards people and has the motivation to behave only to please himself is said to have a positive subjective norm and vice versa [30]. Meanwhile, the perceived behavioral control as a function based on a belief is called control beliefs – individual beliefs about supporting or inhibiting factors from performing a behavior (salient control belief). This mediating component has a positive effect on pro-environmental behavior [15].

Based on the above description, the second hypothesis that can be proposed is as follows:

H_{a3} : The attitude, subjective norm, and perceived behavioral control have a significant positive effect in mediating the effect of existential intelligence and self-determined motivation on pro-environmental behavior.

H_{a4} : The attitude, subjective norm, and perceived behavioral control have a significant positive effect in mediating the effect of personality on the pro-environmental behavior

C. Mediating Effect of Intention and Pro-Environmental Behavior

Specifically, the TPB explains that the intention to perform a behavior indicates an individual's tendency to perform the behavior, and it is a direct antecedent of the behavior. The intention to perform a behavior can be measured through three main predictors: attitude toward the behavior, subjective norm, and perceived behavioral control [13]. In general, if an individual intends to perform a behavior, he/she will tend to perform the behavior, and vice versa. It is a motivational factor that influences behavior and indicates how hard a person has the desire to try or how much effort is made to perform a certain behavior [13]. [31], [32] examined the intentions of young consumers to perform pro-environmental behavior. They found that knowledge about the environment was an important factor in changing behavior attitudes when there was an environmental concern. [33] found that attitude, SN, and PBC positively affected the intention in the pro-environmental behavior. The planned behavior mediated the individual's internal traits, such as the personality with behavior; the intention greatly influenced behavior and attitudes and was determined by the individual beliefs about the results of behavior.

Based on the above description, the third hypothesis that can be proposed is as follows:

H_{a5} : The intention has a significant positive effect in mediating the effect of existential intelligence and self-determined motivation on pro-environmental behavior.

H_{a6} : The intention has a significant positive effect in mediating the effect of personality on pro-environmental behavior.

III. METHODOLOGY

The total population of this study was 9,998 *Adiwiyata* high school students in Semarang City. This study used a total sample of 866 grade XII students. During the COVID-19 pandemic, all students in Semarang City had online learning from home. Therefore, the questionnaire was distributed online through Google Form. The existential intelligence variable is measured using an existential intelligence inventory tool called SISRI-17, consisting of three main indicators of 17 questionnaire items. These three indicators include critical existential thinking (CET), personal meaning production (PMP), and conscious state expansion (CSE) [34]. The personality is measured by the MBTI personality inventory tool, which produces 16 personality traits. Further, self-determined motivation is measured using a scale consisting of intrinsic motivation, extrinsic

motivation, and motivation. Meanwhile, the pro-environmental behavior and planned behavior are measured by the scale adapted from previous researches.

This study is done quantitatively. The data were analyzed using a structural equation model (SEM) using AMOS 21 program [35], [36], [37]. Meanwhile, the mediating effect is analyzed using the method of Baron and Kenny [38], [39], [40], [41]. The bootstrapping method is also used to examine the direct and indirect effect instead of using the Sobel test [40] were to examine the mediating effect; there should be a significant direct and indirect effect. It can also be run with SEM statistical tool and data with non-normal distribution and complex model [42]. Resampling with a confidence level of 90% and 500 is commonly used in bootstrapping [43].

The intervening variables of the first model are attitude, subjective norm, and perceived norm behavioral control, and the second is intention. The mediating effect is examined using the method by Baron and Kenny [38]. The Barron and Kenny method requires regressions: a mediator regression on the independent variable, a regression of the dependent variable both on the independent variable and the mediator, and a

regression of the dependent variable on the independent variable. Meanwhile, to examine the mediating effect, the independent variable must influence the mediator in the first equation, followed by the independent variable, which must affect the dependent variable in the second equation. The mediator must also affect the dependent variable in the third equation.

There are two types of mediation: partial and full mediation. The partial mediation occurs when there is a significant effect of variable X to Y (direct). At the same time, there is a significant effect of variable X to Y indirectly (indirectly) through M. While the full mediation occurs when there is only an indirect effect of variable X to Y through M [41], [44], [45].

IV. RESULTS AND DISCUSSION

This section presents the results of descriptive statistics and validity and reliability of measurement, and discussion of the effect of existential intelligence, personality, and self-determined motivation on the pro-environmental behavior, the mediating effect of attitude, subjective norm, perceived behavioral control, and mediating effect of intention on the pro-environmental behavior.

Table 1.
Descriptive statistics

Variable	Means	Median	SD ^e	Min.	Max.	Category
Existential Intelligence	2.900	3	0.775	1	4	Quite High
PEB ^a	3.382	4	0.751	1	4	Quite High
Personality	0.502	1	0.497	0	1	Moderate
SDM ^b	2.729	3	0.990	1	4	Moderate
Attitude	3.655	4	0.556	1	4	High
SN ^c	3.525	4	0.683	1	4	High
PBC ^d	3.434	4	0.675	1	4	High
Intention	3.578	4	0.567	1	4	High

^a Pro-Environmental Behavior

^b Self-Determined Motivation

^c Subjective Norm

^d Perceived Behavioral Control

^e Standard Deviation

Based on Table 1, with a minimum and maximum value range from 0 to 4, the existential intelligence and PEB are in the category of quite high with a mean value of 2.900 and 3.382, respectively. The personality and self-determined motivation are moderate, with a mean value of 0.502 and 2.729, respectively. Meanwhile, the attitude, SN, PBC, and intention are high, with a mean value of 3.655, 3.525, 3.434, and 3.578, respectively. These last 4 variables are the mediating variables, and the results follow the

TPB; thus, they can strengthen the formation of planned behavior.

A. Validity and Reliability of Measurement

The valid indicators of existential intelligence, self-determined motivation, PEB, attitude, SN, PBC, and intentions are 9, 7, 5, 4, 4, 5, and 5. Meanwhile, the personality type of extrovert (E) has 8 indicators, intuition (N) has 6 indicators, thinking (T) has 3 indicators, judging (J) has 4 indicators, introversion (INT) has 5 indicators,

sensing (S) has 4 indicators, feeling (F) has 3 indicators and perceiving (P) has 3 indicators.

[36] suggested that Cronbach's alpha should be higher than 0.6. Further, the convergent validity indicated by average variance extracted (AVE) value should also be ≥ 0.5 [46]. This study finds that the reliability of the measurement of existential intelligence, self-determined motivation, PEB, attitude, SN, PBC, and intention ranges from 0.6 to 0.9, which shows that it has met the requirement. The AVE is also at 0.2 – 0.6. Further, the measurement of personality using the MBTI measurement tool shows that the data is dichotomous, where the ENTJ and ISFP are on the opposite side. Its

reliability of measurement ranges from 0.5-0.7. The personality of sensing and perceiving has lower reliability of 0.5. Meanwhile, its AVE value only ranges from 0.2 to 0.3 [36], [46].

B. The Effect of Existential Intelligence, Personality, and Self-Determined Motivation on Pro-Environmental Behavior

Table 2 is the result of the first SEM analysis of the model, which examines the effect of existential intelligence, self-determined motivation, and personality on pro-environmental behavior.

Table 2.

Results of hypothesis testing examining the effect of existential intelligence, personality and self-determined motivation on pro-environmental behavior

Variable	Estimate	P-Value	Sig.	H1
EI→PEB	0.362	0.000	***	Supported
SDM→PEB	0.445	0.000	***	Supported
Personality				
1. ENTJ→PEB	0.261	0.001	**	Supported
2. ENTP→PEB	0.137	0.769	NS	Rejected
3. ENFJ→PEB	0.083	0.914	NS	Rejected
4. ENFP→PEB	0.124	0.015	*	Supported
5. ESTJ→PEB	-0.291	0.474	NS	Rejected
6. ESTP→PEB	1.338	0.103	NS	Rejected
7. ESFJ→PEB	-0.291	0.474	NS	Rejected
8. ESFP→PEB	0.129	0.012	*	Supported
9. INTP→PEB	0.153	0.706	NS	Rejected
10. INTJ→PEB	0.078	0.400	NS	Rejected
11. INFJ→PEB	-1.007	0.091	NS	Rejected
12. INFP→PEB	0.131	0.003	**	Supported
13. ISTJ→PEB	0.356	0.003	**	Supported
14. ISTP→PEB	-0.199	0.917	NS	Rejected
15. ISFJ→PEB	-0.025	0.926	NS	Rejected
16. ISFP→PEB	-5.713	0.198	NS	Rejected

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; E - Extrovert, I - Introvert, N - iNtuition, S - Sensing, T - Thinking, F - Feeling, J - Judging, P - Perceiving, PEB - Pro-Environmental Behavior, EI - Existential Intelligence, SDM - Self-Determined Motivation, NS - Not Significant

Table 2 shows that the existential intelligence ($\beta = 0.362$, $p < 0.001$) and self-determined motivation ($\beta = 0.445$, $p < 0.001$) have a positive effect on the pro-environmental behavior. The hypothesis H_{a1} is fulfilled that the existential intelligence and self-determined motivation have a positive effect on the pro-environmental behavior of students in Adiwiyata schools. Meanwhile, the ENTJ ($\beta = 0.261$, $p < 0.01$), ENFP ($\beta = 0.124$, $p < 0.05$), ESFP ($\beta = 0.129$, $p < 0.05$), INFP ($\beta = 0.131$, $p < 0.001$) and ISTJ ($\beta = 0.356$, $p < 0.001$) have a positive effect on the pro-environmental behavior and other types are not significant. So that hypothesis H_{a2} is fulfilled where the personality (ENTJ, ENFP, ESFP, INFP, ISTJ) has a positive effect on the pro-

environmental behavior of students in Adiwiyata schools.

C. The Mediating Effect of Attitude, Subjective Norm, Perceived Behavioral Control, Existential Intelligence, Self-Determined Motivation, and Personality on Pro-Environmental Behavior

Below, Figure 1 is the result of the second SEM analysis of the model, which examines the mediating effect of attitude, subjective norm, and perceived behavioral control on the effect of existential intelligence, self-determined motivation, and personality on pro-environmental behavior.

Figure 1 shows that the paths of existential intelligence (EI) to attitude, SN and PBC are significant with regression coefficients $\beta = 0.312$, $p < 0.01$; $\beta = 0.385$, $p < 0.01$, and $\beta = 0.504$, $p < 0.01$; respectively. The paths of attitude, SN, PBC to pro-environmental behavior (PEB) are significant with $\beta = 0.316$, $p < 0.01$; $\beta = 0.394$, $p < 0.01$; and $\beta = 0.218$, $p < 0.01$; respectively. The direct path of EI to PEB is significant with $\beta = 0.279$, $p < 0.01$ and the indirect path of EI to PEB

is significant with $\beta = 0.318$, $p < 0.01$. According to the method of Baron and Kenny (Kenny, 2008), there is a partial mediating effect where attitude, SN and PBC have mediated partially the influence of existential intelligence on the pro-environmental behavior. The partial mediation occurs when there is a significant influence from variable X to Y (direct) and at the same time, there is a significant influence from variable X to Y indirectly through M.

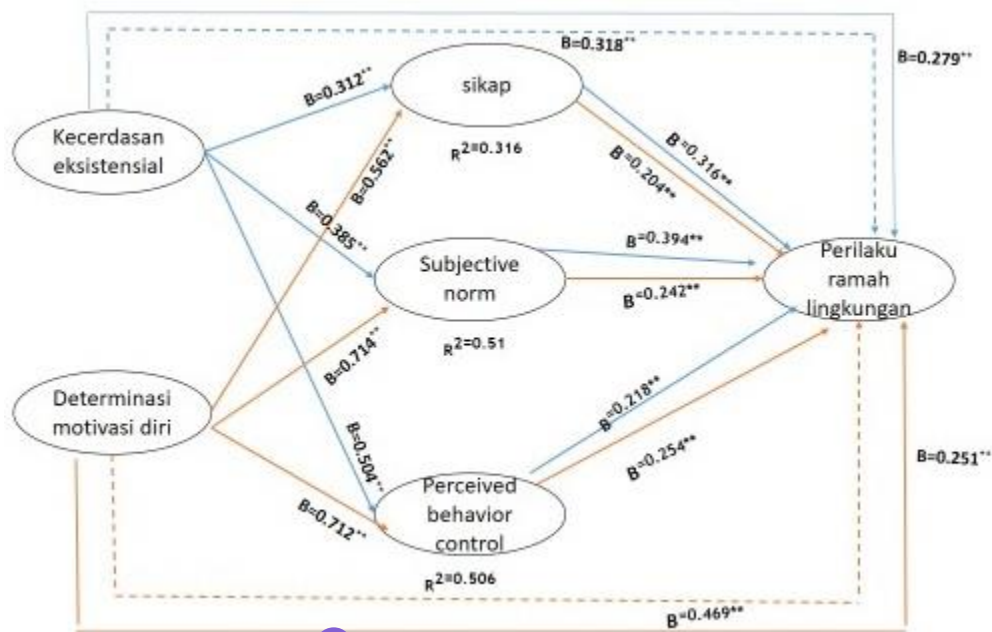


Figure 1. Results of the second SEM model showing the mediating effect of attitude, subjective norm, and perceived behavioral control on the effect of existential intelligence, self-determined motivation on pro-environmental behavior (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$)

The paths of self-determined motivation (SDM) to attitude, SN, PBC are significant with $\beta = 0.562$, $p < 0.01$; $\beta = 0.714$, $p < 0.01$; and $\beta = 0.712$, $p < 0.01$; respectively. The paths of attitude, SN, PBC to PEB are significant with $\beta = 0.204$, $p < 0.01$; $\beta = 0.242$, $p < 0.01$; and $\beta = 0.254$, $p < 0.01$; respectively. The direct path of SDM to PEB is significant with $\beta = 0.251$, $p < 0.01$, and the indirect path of SDM to PEB is significant with $\beta = 0.469$, $p < 0.01$. Thus, attitude, SN, and PBC have partially mediated the influence of SDM on PEB. Specifically, this model explains attitude by 32%, subjective norm by 51%, and PBC by 51%. Meanwhile, the pro-environmental behavior can be explained as much as 78% by attitude, SN, and PBC. Thus the hypothesis H_{a3} is fulfilled that the attitude, subjective norm and perceived behavioral control have a significant positive effect in mediating the

effect of existential intelligence and self-determined motivation on the pro-environmental behavior.

Figure 2 shows that there are five personality traits analyzed, namely ENTJ, ENFP, ESFP, ISTJ and INFP. The paths of ENTJ to attitude, SN, and PBC are significant with $\beta = 0.187$, $p < 0.01$; $\beta = 0.223$, $p < 0.01$; and $\beta = 0.237$, $p < 0.01$; respectively. The paths of attitude and PBC to PEB are significant with $\beta = 0.143$, $p < 0.01$ and $\beta = 0.807$, $p < 0.01$. While the path of SN to PEB fails to reach the 0.05 significance level with $\beta = 0.082$; $p = 0.070$. The direct path of ENTJ to PEB is not significant with $\beta = 0.072$, $p = 0.236$; while the indirect path of ENTJ to PEB is significant with $\beta = 0.236$, $p < 0.01$. Thus, the attitude and PBC have fully mediated the influence of ENTJ personality on the PEB, while SN has not.

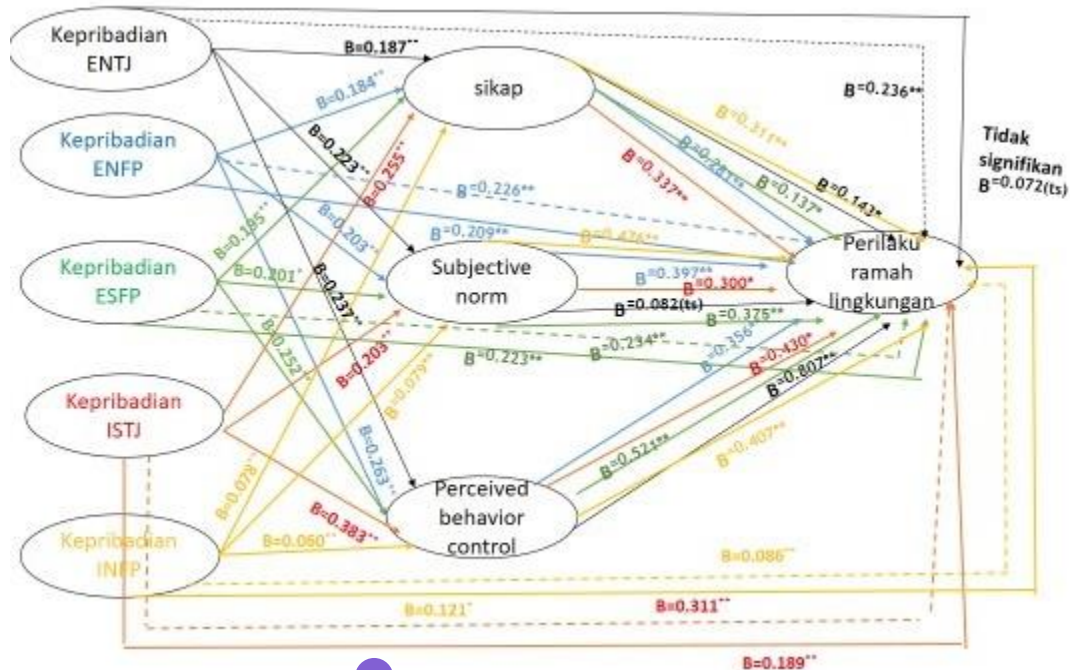


Figure 2. Results of the second SEM model of the mediating effect of attitude, subjective norm, and perceived behavioral control on the effect of personality and pro-environmental behavior (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$)

The paths of ENFP to attitude, SN, and PBC are significant with $\beta = 0.184$, $p < 0.01$; $\beta = 0.203$, $p < 0.01$; and $\beta = 0.263$, $p < 0.01$; respectively. The paths of attitude, SN and PBC to PEB is significant with $\beta = 0.281$, $p < 0.01$; $\beta = 0.397$, $p < 0.01$; and $\beta = 0.56$, $p < 0.01$; respectively. The direct path of ENFP to PEB is significant with $\beta = 0.209$, $p < 0.01$ and the indirect path of ENFP to PEB is also significant with $\beta = 0.226$, $p < 0.01$. Therefore, the attitude, SN and PBC have mediated partially the influence of ENFP personality on the PEB.

The paths of ESFP to attitude, SN, and PBC are significant with $\beta = 0.195$, $p < 0.01$; $\beta = 0.201$, $p < 0.05$; and $\beta = 0.252$, $p < 0.01$; respectively. The paths of attitude, SN and PBC to PEB is significant with $\beta = 0.137$, $p < 0.05$; $\beta = 0.375$, $p < 0.01$; and $\beta = 0.521$, $p < 0.01$. The direct path of ESFP to PEB is significant with $\beta = 0.223$, $p < 0.01$, while the indirect path of ESFP to PEB is significant with $\beta = 0.234$, $p < 0.01$. Thus, the attitude, SN and PBC have mediated partially the influence of ESFP personality on the PEB.

The paths of ISTJ to attitude, SN, and PBC are significant with $\beta = 0.255$, $p < 0.01$; $\beta = 0.203$, $p < 0.01$; and $\beta = 0.383$, $p < 0.01$. The paths of attitude, SN and PBC to PEB are significant with $\beta = 0.337$, $p < 0.01$; $\beta = 0.300$, $p < 0.05$; and $\beta = 0.430$, $p < 0.05$. The direct path of ISTJ to PEB is significant with $\beta = 0.121$, $p <$

0.05 , and the indirect path from ISTJ to PEB is also significant with $\beta = 0.311$, $p < 0.01$. Thus, the attitude, SN and PBC have mediated partially the influence of ISTJ personality on the PEB.

The paths of INFP to attitude, SN, and PBC are significant with $\beta = 0.078$, $p < 0.01$; $\beta = 0.079$, $p < 0.01$; and $\beta = 0.060$, $p < 0.01$. The paths of attitude, SN and PBC to PEB are also significant with $\beta = 0.311$, $p < 0.01$; $\beta = 0.476$, $p < 0.01$; and $\beta = 0.407$, $p < 0.01$. The direct path of INFP to PEB is significant with $\beta = 0.121$, $p < 0.05$ and the indirect path of INFP to PEB is significant with $\beta = 0.086$, $p < 0.01$. Therefore, the attitude, SN and PBC have mediated partially the influence of INFP personality on the PEB.

The hypothesis H_{a4} is fulfilled that the attitude, subjective norm, and perceived behavioral control have a significant positive effect in mediating the effect of personality on the pro-environmental behavior.

D. The Mediating Effect of Intention, Existential Intelligence, Self-Determined Motivation, and Personality on Pro-Environmental Behavior

Figure 3 is the result of the third SEM analysis of the model, which examines the mediating effect of intention, existential intelligence, self-determined motivation, and personality on pro-environmental behavior.

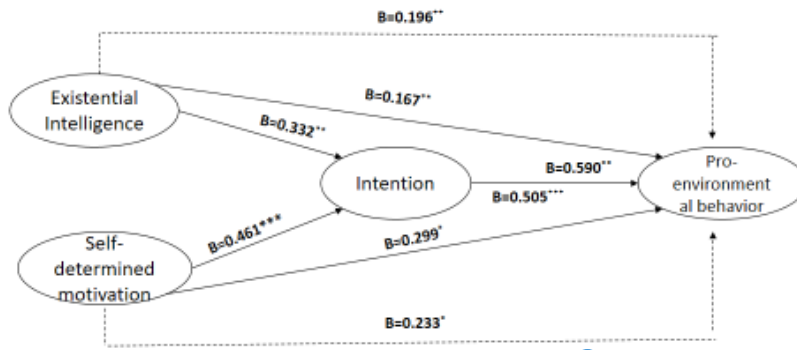


Figure 3. Results of the third SEM model - the mediating effect of intention on the effect of existential intelligence and self-determined motivation on the pro-environmental behavior ($p < 0.05$, ** $p < 0.01$, *** $p < 0.001$)

Figure 3 shows that the path of EI to intention is significant with $\beta = 0.332$, $p < 0.01$; while the path of intention to PEB is significant with $\beta = 0.590$, $p < 0.01$. The direct path of EI to PEB is significant with $\beta = 0.167$, $p < 0.01$; while the indirect path of EI to PEB is also significant with $\beta = 0.196$, $p < 0.01$. Thus, the intention has partially mediated the effect of EI on PEB.

The path of SDM to intention is significant with $\beta = 0.461$, $p < 0.001$, while the path of intention to PEB is significant with $\beta = 0.590$, $p < 0.001$. The direct path of SDM to PEB is

significant with $\beta = 0.299$, $p < 0.01$; while the indirect path of SDM to PEB is also significant with $\beta = 0.233$, $p < 0.05$. Therefore, the intention has partially mediated the effect of SDM on PEB. This model explains intention by 21% and PEB by 48%.

The hypothesis H_{a5} is fulfilled that the intention has a significant positive effect in mediating the effect of existential intelligence and self-determined motivation on the pro-environmental behavior.

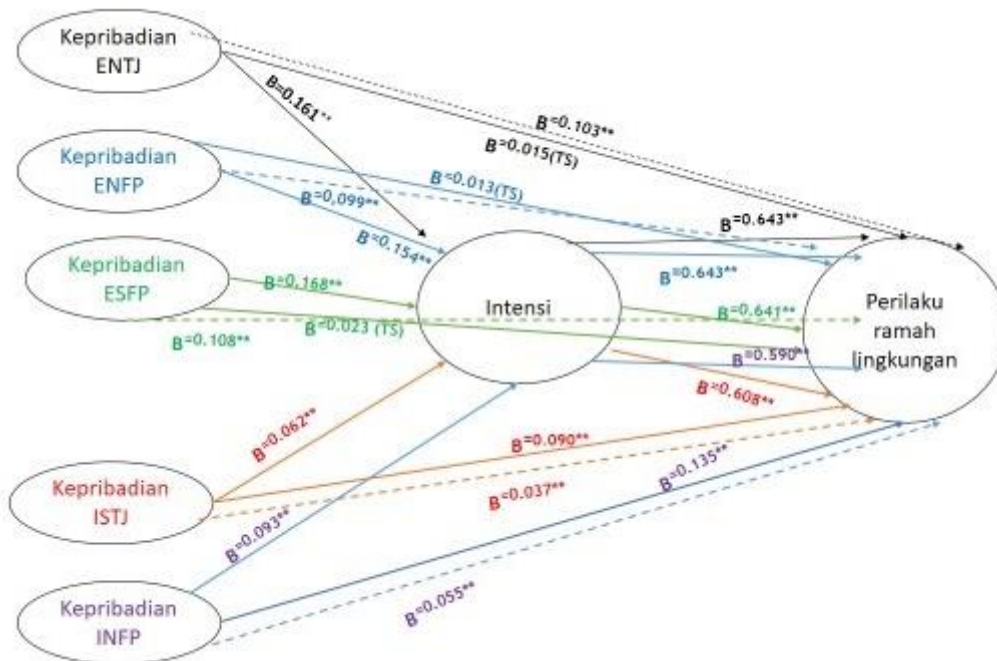


Figure 4. Results of the third SEM model - the mediating effect of intention on the effect of personality on the pro-environmental behavior ($p < 0.05$, ** $p < 0.01$, *** $p < 0.001$)

Figure 4 shows that the path of ENTJ to intention is significant with $\beta = 0.161$, $p < 0.01$; and the path of intention to PEB is also significant with $\beta = 0.643$, $p < 0.01$. The direct path of ENTJ to PEB is not significant with $\beta = 0.015$ ($p = 0.731$), while the indirect path of ENTJ to PEB is significant with $\beta = 0.103$, $p <$

0.01 . Thus, the intention has fully mediated the influence of ENTJ personality on the PEB.

In addition, the path of ENFP to intention is significant with $\beta = 0.154$, $p < 0.01$. The path of intention to PEB is also significant with $\beta = 0.643$, $p < 0.01$. The direct path of ENFP to PEB is not significant with $\beta = 0.013$ ($p = 0.765$),

while the indirect path of ENFP to PEB is significant with $\beta = 0.099$, $p < 0.01$. Therefore, the intention has fully mediated the influence of ENFP personality on the PEB.

Next, the path of ESFP to intention is significant with $\beta = 0.168$, $p < 0.01$. The path of intention to PEB is significant with $\beta = 0.641$, $p < 0.01$. The direct path of ESFP to PEB is not significant with $\beta = 0.023$ ($p = 0.547$), while the indirect path of ESFP to PEB is significant with $\beta = 0.108$, $p < 0.01$. Thus, the intention has fully mediated the influence of ESFP personality on the PEB.

Further, The path of ISTJ to intention is significant with $\beta = 0.062$, $p < 0.01$. The path of intention to PEB is significant with $\beta = 0.608$, $p < 0.01$. The direct path of ISTJ to PEB is also significant with $\beta = 0.090$, $p < 0.01$, and the indirect path of ISTJ to PEB is significant with $\beta = 0.037$, $p < 0.01$. Thus, the intention has mediated the influence of ISTJ personality on the PEB partially.

Last, the path of INFP to intention is significant with $\beta = 0.093$, $p < 0.01$. The path of intention to PEB is significant with $\beta = 0.590$, $p < 0.01$. The direct path of INFP to PEB is significant with $\beta = 0.135$, $p < 0.01$; and its indirect path is also significant with $\beta = 0.055$, $p < 0.01$. Therefore, the intention has mediated the influence of INFP personality on the PEB partially. This model explains intention by 3 % and PEB by 43%.

The hypothesis H_{a6} is fulfilled that the intention has a significant positive effect in mediating the effect of personality on pro-environmental behavior.

V. DISCUSSION

Respondents are students in high school based on environment or Adiwiyata. Adiwiyata school is an eco-friendly concept that aims to shape pro-environmental behavior among school students [47]. Respondents are XII grade high school students who are still in the stage of searching for self-identity and experiencing confusion. Without a deep understanding of their existence and their surroundings, they will tend to behave less responsibly [1]. On the other hand, these young people occupy a strategic position to become environmental leaders in the future [2], so it is important to examine the pro-environmental behavior of adolescents [3] because they can reduce environmental damage in the future.

This study aims to analyze the effect of existential intelligence, personality, and self-determined motivation on pro-environmental behavior. According to [48], [49], the pro-

environmental behavior could be predicted from the planned behavior consisting of attitude, subjective norm, perceived behavioral control, and intention. It was necessary to analyze the mediating effect of the planned behavior. This study is supported by the grand theory of pro-environmental behavior models [10] and with the integration of the pro-environmental behavior model and TPB [13], [14].

In the first model testing, the results show that existential intelligence, self-determined motivation, and personality positively affect pro-environmental behavior. The students already had the existential intelligence and self-determination that were considered quite high, followed by the personality traits that supported this behavior.

Although this study finds that existential intelligence has a mean value that is considered quite high, several points still indicate a lack of existential intelligence. The existential intelligence with a maximum mean of 3.32 is found in indicator EK11, asking whether the students can take lessons from their failures. It means that the students at Adiwiyata schools could learn from their past experiences about failure and take lessons from them, but they still could not think deeply and intuitively about the meaning of life in the world. Indicator EK6 has a low mean value of 2.76 and shows that the students had not been able to live their daily life while at the same time thinking about their purpose in this universe.

Further, the pro-environmental behavior is in the quite high category with a mean value of 3.382. Indicator PEB3 has a high mean value of 3.64, and it confirms that the students had disposed of their garbage in its place. In contrast, indicator PEB1 as one of the examples of not pro-environmental behavior reveals that the students had not been able to reduce the use of plastic straws (mean = 3.60). The self-determined motivation has a moderate mean value category (mean = 2.729), yet indicator D1 has a high value. It confirms that the students were willing to do something when they were happy (mean = 3.53).

Furthermore, the personality variable is included in the moderate category, while the components of planned behavior, namely attitude, SN, and PBC, are in the high category. It emphasized that the students did need mediators to support the potential of existential intelligence, self-determination, and personality and strengthen their pro-environmental behavior, according to the theory [10], [14]. In addition, the variables of existential intelligence, self-

determined motivation, and personality make a fairly good model. The model has a GFI value and an AGFI value above 0.9. The TLI and CFI value for existential intelligence has also met the requirement (TLI = 0.94, CFI = 0.95). However, the TLI and CFI values of personality and determination are moderate (ranges from 0.8-0.9). The RMSEA value for the three variables is also fit (0.06). Thus, it can be concluded that the first model is a fit model.

The second model examines the mediating effect of attitude, SN, and PBC on pro-environmental behavior. It shows that the mediating variables of attitude, SN, and PBC partially mediate existential intelligence and self-determined motivation. For the ENTJ personality, it turns out that the SN does not have a mediating effect. It means that the motivation and self-control of students with this trait were quite good so that without a role model from the teacher, they would still be able to continue to carry out pro-environmental behavior. Meanwhile, the effect of ENFP, ESFP, ISTJ, and INFP personality on pro-environmental behavior is partially mediated by attitude, SN, and PBC.

Further, this second is also a fit model, where the GFI and AGFI values of the existential intelligence variable are moderate (0.8). In contrast, the ones in the personality and self-determined motivation are fit (0.9). Meanwhile, the TLI and CFI value of the existential intelligence variable is moderate (0.8), and the ones in the self-determined motivation and personality are in the low range (0.7). However, the RMSEA value of the three variables has met the requirement (ranges from 0.6-0.8).

Last, the third model examines the effect of intention in mediating the effect of existential intelligence, personality, and self-determined motivation on pro-environmental behavior. The results show that the intention partially mediates the existential intelligence and self-determined motivation on the pro-environmental behavior. It partially mediates the effect of ISTJ and INFP personality but mediates the effect of ENTJ, ENFP, ENSP personality fully. It means that the ENTJ, ENFP, and ESFP students needed to behave in an environmentally friendly manner. Similarly, the three variables in this model have GFI and AGFI values which show a good fit (0.9). The TLI and CFI value of existential intelligence is also fit (0.95). However, the self-determined motivation and personality are moderate (ranges from 0.7-0.8). The three variables also have a fit value of RMSEA (ranges from 0-4-0.6).

VI. CONCLUSIONS

Based on the discussion explained above, there are several conclusions:

The existential intelligence, self-determined motivation, and personality types such as ENTJ, ENFP, ESFP, INFP, and ISTJ positively affect the pro-environmental behavior among students in *Adiwiyata* schools. Further, the attitude, SN, and PBC also significantly positively mediate existential intelligence, self-determined motivation, and personality. Specifically, the attitude, SN, and PBC partially mediate the existential intelligence and self-determined motivation, while the attitude, SN, and PBC fully mediate the effect of ENTJ personality on the pro-environmental behavior, while the SN does not. The attitude, SN, and PBC partially mediate the ENFP, ESFP, ISTJ, and INFP personality. Furthermore, the intention has a significant positive effect in mediating the existential intelligence, self-determined motivation, and personality of ENTJ, ENFP, ESFP, ISTJ, and INFP on the pro-environmental behavior. It partially mediates the existential intelligence and self-determined motivation on the pro-environmental behavior. In addition, it also partially mediates the influence of ISTJ and INFP but fully mediates the influence of ENTJ, ENFP, ESFP.

The scientific novelty of the article also consists of a conducted large-scale for theoretical benefits, namely confirming the theory of the variables that affect pro-environmental behavior and providing empirical evidence of what variables have the most influence on this behavior. Second, this research is also expected to provide policy benefits that can be taken for high school institutions, concerning pro-environmental behavior as an indicator that can be seen by school management how ecological literacy can run well so that environmental conservation programs not only have an impact on the school environment but also have an impact on the wider community. The practical benefit is providing references to high school educational institutions about factors that influence pro-environmental behavior in *Adiwiyata*-based schools.

A. Implications

There are three things to consider for the education institutions, including *Adiwiyata* schools which are very concern and care about the environment: existential intelligence, personality, and self-determined motivation. Existential intelligence is currently highly needed by students of *Adiwiyata* schools, especially to

form concepts in these teenagers to unite and interact with nature. It is also important for them to think more deeply and be aware of their environment naturally, instead of only following along with their peers or just because they are scared of their teachers, parents, or certain community leaders. Similarly, self-determined motivation is also important for teenagers to increase their self-control, self-confidence, and self-regulation, thus simultaneously increasing their concern for the environment. In addition, their personality should also be shaped so that these students have the character of caring for the environment. It has been such a challenge for educators to guide their students to have such personality traits. Although it is not easy, it does not necessarily mean that it is impossible. The students have their perspectives about their future and the importance of self-autonomy to live in harmony with nature. That can be achieved with regular and sustainable ecological literacy and significant collaboration between students and their significant parents and teachers. The school and government agencies will help *Adiwiyata* schools to fight for sustainable pro-environmental behavior increasingly. It is expected that pro-environmental behavior can be strengthened by paying more attention to planned behavior in the form of attitude, subjective norms, perceived behavioral control, and intention.

This study contributes to the literature for education institutions and policymakers for the sustainability of both *Adiwiyata* and non-*Adiwiyata* schools which want to participate in environmental sustainability and have pro-environmental behavior through the research models developed.

B. Limitation

The population used is students from a high school in Semarang and comes from *Adiwiyata* school. Therefore, the study results are only appropriate for schools with the same characteristics as *Adiwiyata* schools in the city of Semarang. The limitation of the result is that these empirical results cannot be used to measure non-*Adiwiyata* schools that want to behave in pro-environmental behavior because their personality, existential intelligence, self-determined motivation, and behavior are different from students of *Adiwiyata* schools. Even though the comparison in the city of Semarang is that there are more non-*Adiwiyata* schools than *Adiwiyata* schools.

This research was conducted during a pandemic where students were required to do online learning so that the data was also collected

online through Google Form. The online data collection might result in a perception bias towards the questionnaire items that might confuse some respondents, although the questionnaire has clear instructions. The respondents might also feel bored when they completed the questionnaire and might not answer according to the questions asked because they had not had face-to-face meetings during the pandemic.

Future researches are suggested to involve teachers and related institutions to enrich the data on the perceptions of environmental behavior, both from the perspectives of students and teachers, so that that future decision making can be more effective, either for the teachers, principals, or the government concerning the *Adiwiyata* program at schools.

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