

“Nature and Innovation”: Do Appreciation of Nature and Need for Cognition Predict Intentions to Perform Sustainable Behaviors?

“Alam dan Inovasi”: Apakah Apresiasi terhadap Alam dan Kebutuhan akan Kognisi dapat Mendorong Perilaku Berkelanjutan ?

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ABSTRAK

Perilaku berkelanjutan adalah perilaku yang bertujuan melindungi sumber daya fisik sekaligus sumber daya manusia sehingga penting untuk memahami perilaku berkelanjutan sebagai upaya untuk mengurangi konsekuensi negatif dari persoalan lingkungan. Tujuan penelitian ini adalah menelaah peranan apresiasi alam dan kebutuhan akan kognisi terhadap intensi melakukan perilaku berkelanjutan. Penelitian ini menggunakan pendekatan kuantitatif dengan metode survei. Sebanyak 240 orang responden yang berusia 18 – 40 tahun mengisi survei daring. Skala appreciation of nature, need for cognition, dan intensi melakukan perilaku berkelanjutan digunakan sebagai instrumen pengumpulan data. Hasil penelitian menunjukkan bahwa apresiasi alam dan kebutuhan akan kognisi secara positif dapat memprediksi intensi melakukan perilaku berkelanjutan. Penggabungan keduanya dalam satu model menambah kekuatan prediksi terhadap intensi melakukan perilaku berkelanjutan. Selanjutnya, kebutuhan kognisi memiliki kekuatan prediksi yang lebih besar dibandingkan apresiasi terhadap alam. Penelitian ini dapat menunjukkan bahwa aspek afektif dan kognitif perlu dipertimbangkan dalam model perilaku berkelanjutan. Implikasi terkait peran generasi muda dalam mendukung perilaku berkelanjutan dapat didiskusikan lebih lanjut.

Kata kunci: Apresiasi Alam, Intensi, Kebutuhan akan Kognisi, Perilaku Berkelanjutan

ABSTRACT

Sustainable behavior is a behavior that aims to protect physical as well as human resources. Therefore, it is important to understand the behavior to reduce negative consequences of environmental problems. The study aimed to examine the role of appreciation of nature and the need for cognition on the intention to perform sustainable behavior. This study used a quantitative approach with a survey method. A total of 240 respondents aged 18 – 40 years old completed the online survey. Appreciation of nature scale, need for cognition scale, and intention to act scale were used as data collection instruments. Results showed that appreciation of nature and need for cognition positively predicted the intention to carry out sustainable behavior. Combining the two variables in one model increased predictive power to the intention to perform sustainable behavior. Furthermore, need for cognition had greater predictive power than appreciation of nature. This research showed that affective and cognitive aspects are crucial for the sustainable behavior models. Implications regarding the role of the young generation in supporting sustainable behavior may be further discussed.

Keywords: Appreciation of Nature, Intention, Need for Cognition, Sustainable Behavior

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INTRODUCTION

It is undeniable that humans have been facing significant environmental challenges. Climate change due to global warming, pollution, species extinction, and the reduction of biodiversity has occurred and impacted human life (Zelenski et al., 2015). The United Nations Human Settlements Program, UN-Habitat, in 2013 stated that ecosystem damage continues to be a serious problem for modern society (Kaida & Kaida, 2016). Urban areas in various parts of the world are facing immense problems related to water and air pollution due to increasing human activities.

Unmanaged environmental problems will affect the quality of human life, which is assessed from several perspectives including environmental, social, economic, and subjective welfare (UN General Assembly, 2012). The global community has felt that climate change has an impact on natural and human systems on all continents and in all oceans (IPCC, 2015), thus requiring humans to adapt to new realities and ultimately changing human behavior and cultural patterns (Assadourian, 2012; Helm et al., 2018). Based on the aforementioned, environmental degradation is the biggest threat to the sustainability of human life and the earth, thus efforts are needed to reduce its impact.

Nonetheless, amid those environmental problems, humans as those who should manage the earth still behave in ways that damage or endanger the welfare of themselves and the planet (Nisbet et al., 2009). Modern human behavior has been thought to contribute to environmental damage through excessive consumption, which increases the greenhouse effect, as well as by breaking the human connection with nature (Wahab, 2017; Zelenski et al., 2015). Thus, it is important to understand human behavior to support sustainable living and the factors that may influence it.

Sustainable Behavior

Sustainable behavior can be defined as a set of actions aimed at protecting the socio-

physical resources of the planet (Corral-Verdugo et al., 2010). Although sustainable behavior is a practical term that is synonymous with pro-environmental behavior, the second term is used to emphasize efforts to protect the natural environment, while the first term emphasizes actions aimed at protecting both the natural environment and the human social environment (Bonnes & Bonaiuto, 2002). Some of the characteristics of sustainable behavior are intentional, which has a purpose; effective, which is directed at solving problems; and anticipatory, which is future-oriented because it considers that the needs of future generations are in-line with the satisfaction of current needs (Bonnes & Bonaiuto, 2002). Sustainable behavior views that the conservation of human resources (community, culture, survival, and human well-being) is as important as ecosystem conservation (Tapia-Fonllem et al., 2013). Therefore, humans take active protection of natural resources and at the same time attempt to meet their needs.

Sustainable behaviors consist of two main components, namely ecological component (pro-ecological and frugal behaviors) and social component (altruistic and equitable behaviors). Pro-ecological behaviors (pro-ecological/pro-environmental behaviors) are actions that result in the conservation of natural resources, such as recycling, composting, water conservation, and pro-ecological persuasion or campaigns (Corral-Verdugo et al., 2010). Frugal behaviors refer to reducing consumption levels or simplifying behavior to minimize the impact of human behavior on the availability and renewability of natural resources (Tapia-Fonllem et al., 2013). Sustainable behaviors have also been understood as altruistic behaviors which are considered to have an impact on the integrity and well-being of others (Tapia-Fonllem et al., 2013). Furthermore, equitable behavior reflects the notion of intra and intergenerational justice. This behavior is in line with the claim that the satisfaction of needs among all individuals now living on this planet needs to be guaranteed. Equality also implies a balance between human well-being

and ecosystem unity, enabling access to resources for humans as well as preservation of the physical environment (Tapia-Fonllem et al., 2013).

In this study, intention to perform sustainable behavior was used as the dependent variable. Intention is defined as an action plan in achieving behavioral goals (Ajzen & Madden, 1986). Various studies on the measurement of sustainable behavior showed that intentions significantly and directly affected the implementation of sustainable behavior (Barbarossa et al., 2015; Fujii, 2006; Tapia-Fonllem et al., 2013, 2017). Intention is conceptualized as an action plan to achieve behavioral goals based on Theory of Planned Behavior, and it is the result of several other beliefs, which include attitudes, subjective norms, and perceived behavioral control (Ajzen & Madden, 1986). Hence, the aspects of the intention are in line with the aspect of the behavior, in this case, the sustainable behaviors SB which include pro-ecological, altruistic, frugal, and equitable actions (Tapia-Fonllem et al., 2013).

Factors influencing sustainable behavior can be categorized into external factors and internal factors, which include demographic variables and psychological variables (Li et al., 2019). Several external factors associated with sustainable behavior are social norms, opportunity, social capital (such as social trust, institutional trust, and social networks), environmental education, and the provision of facilities (Li et al., 2019; Varela-Candamio et al., 2018). Internal factors included in the demographic variables are gender, age, educational level, marital status, location of residence, and a person's socioeconomic condition (Hertel et al., 2013; Li et al., 2019). Furthermore, psychological variables can be divided into psychological tendencies, consisting both cognitive-rational (e.g. perception, attitude, and values) and emotional-affective factors (e.g. emotion and connectedness to nature), and human resource capacities, for instance knowledge and competence related to the environment,

previous experiences, habits, self-organization, and ecological coping strategies (Bamberg & Möser, 2007; Corral-Verdugo, 2002; Corral-Verdugo, 2021; Klöckner, 2013; Tapia-Fonllem et al., 2013). Based on the previous studies on determinants of the sustainable behavior, social-cognitive theory perspectives is the theoretical perspective that can be applied to explain the sustainable behavior model. According to the perspective, three factors consisting of personal factors (e.g. affective states, cognitive states, and physical attributes), external environmental influences, and overt behavior bi-directionally affect one another (Bandura, 1986; Sawitri et al., 2015).

Appreciation of Nature

Appreciation of nature (AON) is one of the psychological factors, especially psychological tendencies, which is defined as an emotional dimension that shows a feeling of pleasure when contacting with the plants, animals, and non-building environments. This factor reflects pleasurable emotions such as joy, serenity, well-being, and a positive mood due to exposure to an environment that contains complete or almost complete natural characteristics (Kals, 1996).

Another term in the literature that may overlap with the concept of nature appreciation is the connectedness to nature. Perrin and Benassi (2009) suggested that connectedness to nature is an individual's beliefs and attitudes about their relationships with nature, which is not a mere affective connection. Geng et al. (2015) applied the term of connectedness to nature to refer to the factors that underlie attitudes towards environmental issues. They defined this term as an individual's feeling (not only emotionally, but also cognitively) about a relationship with nature and a sense of belonging to nature. In this study, the term appreciation of nature was defined as a positive feeling emerging through contact with the natural environment.

Previous studies have shown that exposure to nature can encourage sustainable behavior because it influences the emotional

aspect that reinforces the behavior. Exposure to nature produces restorative effects on physical health, increases attention to cognitive task performance, and induces emotional well-being. It could also produce a state of emotional affinity which in turn leads to concern for the environment (Kals et al., 1999). In addition, a previous meta-analytical study has also suggested that those who are more connected to nature tend to experience more positive feelings, vitality, and life satisfaction compared to those who are less connected to nature (Capaldi et al., 2014). In contrast, despite the potential economic, social, and health benefits of modern urbanization, evidence has showed that the disconnection from nature led to the extinction of natural experiences (Miller, 2005), which has become part of the unsustainable lifestyle problems. People who live in more urban areas reported lower environmental concerns (Weinstein et al., 2015). Similarly, adults who had less contact with nature than children reported less pro-environmental behavior (Evans et al., 2018; Wells & Lekies, 2006). Further, spending more time in urban areas, compared to natural setting, reduces feelings of connectedness to nature (Mayer et al., 2009) and willingness to behave sustainably (Zelenski et al., 2015). Recent research from Alcock et al. (2020) also found a positive relationship between recreational visits to nature and appreciation of nature and pro-environmental behavior, which indicates that the more individuals visited nature for recreation, and the more they valued nature, the more pro-environmental behavior they reported. Furthermore, in the model of sustainable behavior proposed by Tapia et al. (2017), appreciation of nature (AON) is one of three indicators constructing a pro-sustainability orientation (PSO) which is correlated with sustainable behavior.

Need for Cognition

Need for cognition (NFC) is an individual's tendency to enjoy and engage in the completion of tasks that require substantial cognitive efforts (Cacioppo & Petty, 1982). The

need for cognition is conceptualized as a form of cognitive motivation to seek and obtain information (Cacioppo et al., 1996). The need for cognition also represents the stability of an individual's character, which is related to motivation to engage in various cognitive activities. Petty, Briñol, Loersch, and McCaslin (2009) discussed the utility and significance of the need for cognition with the following four domains: (a) individual beliefs and attitudes, (b) decision-making processes, (c) interpersonal interactions, and (d) other applied fields such as survey research, advertising, media, law, and health.

The need for cognition can drive certain behaviors, especially information-seeking behavior as a result of active processing and interpretation of information. At a high level of cognitive need, individuals will actively search for information and enjoy thinking that seeks to understand stimuli and events in their world. Conversely, at a low level of cognitive need, an individual tends to rely on others and perform social comparisons to gain their understanding of certain information. Differences in motivation between individuals related to how to find and process information may affect the goals a person wants to achieve. The more one's cognitive needs increase, the more goals to be achieved, which require reasoning and problem solving (Gollwitzer et al., 2012).

Unlike the research on nature appreciation and connectedness with nature, there were not many studies examining the possible relationship between the need for cognition and sustainable behavior. One study found that the need for cognition can predict goal choices to perform pro-environmental behavior with the role of environmental attitudes as a mediator (Barbarossa et al., 2015). Research on the need for cognition has focused primarily on how cognitive needs affect information processing and subsequent outcomes. For example, those with high cognitive needs would have more knowledge about a larger variety of problems (Cacioppo et al., 1986), generate more task-relevant thinking (Axsom et al., 1987), and review material and

information (Cacioppo et al., 1996). Because attitudes are based on processed information and the need for cognition reflects a person's cognitive motivation to seek and obtain information, high cognitive needs could result in stronger attitudes (Cacioppo et al., 1996; Haugtvedt & Petty, 1992; Smith et al., 1994). Stronger attitudes are more likely to result in consistent behavior, including sustainable behavior.

Apart from the indirect relationship, the need for cognition may directly predict the intention to adopt sustainable behavior. As it is known that need for cognition is positively related to innovation behavior (Wu et al., 2014), and a research on consumer behavior revealed that consumers' intentions to adopt direct- and indirect-pro-environmental behavior were affected by innovativeness (Alzubaidi et al., 2021). Therefore, innovation may be a connector between the need for cognition and sustainable behavior, facilitating the direct correlation. Besides, sustainable behavior may be categorized as a form of innovative behavior, considering its characteristics that are purposeful or intentional and are directed at solving problems (Bonnes & Bonaiuto, 2002). Moreover, technological innovation in supporting sustainable living (Li et al., 2019) is a form of the sustainable behavior.

The Current Study

This study aimed to examine the role of appreciation of nature and the need for cognition on the intention to perform sustainable behavior. Appreciation of nature is an affective variable, whereas need for cognition is a cognitive behavior. Appreciation of nature was selected mainly because there have been many studies finding the positive correlation between appreciation of nature and pro-environmental behavior intention, broadly referring to sustainable behavior. Based on the aforementioned literatures, modern life has detached people from appreciation to the nature, thus this research further indirectly encourages people to have more connection to the nature. Meanwhile, need for cognition is

relatively new correlates of sustainable behavior intention, therefore this research might add new findings related to the relation between two variables. Based on the previous discussion and theoretical perspectives used, it was hypothesized that both appreciation of nature and the need for cognition would predict the intention to perform sustainable behavior. Appreciation of nature would be positively correlated with the intention according to huge evidences from previous studies. Then, it was expected that adding the need for cognition in the model of nature of appreciation will increase the predictive model of behavioral intention, considering that both of the variables predict the intention to act sustainably.

METHOD

Participant Demographics

The participants of this study were Indonesian citizens aged 18-40 years. The process of participant's selection was carried out with non-probability sampling. A total of 240 respondents completed the online survey. Majority of the participants were women (65.8%), aged between 21 – 30 years old and had a college degree (57.1%). Table 1 shows summary of the participant demographics.

Measures

Intention to Perform Sustainable Behavior (SB). The intention to perform sustainable behavior was adapted from Tapia-Fonnlamm et al.'s (2013) Escala Del/Intention to Act consisting of two aspects i.e. pro-ecological behaviors and frugal behaviors. The original instrument consisted of 11 items, and we added 8 more items to represent altruistic behavior and equitable behavior aspects based on correlation model of sustainable behavior proposed by Tapia-Fonnlamm et al. (2013) used in this study (four aspects). Participants responded to the 4-scale questionnaire (0 = will never to 3 = will always) consisted of 19 items, such as *"I will participate in pro-ecological or pro-environmental activities"*; *"I will use enough water"*; *"I will give clothes to poor*

people". The measure was adapted to Bahasa Indonesia following the back-to-back translation procedure (Gudmundsson, 2009). The Cronbach's α of the adapted measure was 0.904. Validation of the data was checked through By known-group procedure to test construct validity which was a comparison of scale scores between two different sample groups, i.e. those who had high score and those who got low score according to normal distribution model (Azwar, 2021).

Table 1. Participant Demographics

Demographic	Total (n=240)	
	n	f(%)
1. Gender		
Male	79	32.92
Female	161	67.08
2. Age		
18-20 y.o	39	16.25
21-25 y.o	89	37.08
26-30 y.o	85	35.42
31-35 y.o	17	7.08
36-40 y.o	10	4.17
3. Recent Educational Level		
S3 (Doctor)	3	1.25
S2 (Master)	44	18.34
S1 (Bachelor) /Diploma IV	137	57.08
Diploma I/II/III	9	3.75
SMA/SMP/SD (Senor/Junior High School and Elementary School)	47	19.58
4. Occupation		
Housewife	16	6.67
Students	111	46.25
Private Sector Employee (BUMS)	43	17.91
Government Sector Employee (BUMN)	4	1.67
Civil Servant	23	9.58
Entrepreneur	16	6.67
Others	27	11.25

Appreciation of Nature (AON). Appreciation of nature (AON) was assessed using an adapted version of the questionnaire developed by Corral-Verdugo et al. (2009) with only one aspect. Based on the Pro-Sustainability Orientation (PSO) developed by Tapia et al. (2017), AON is emotional aspect of the PSO. This measure was also adapted to Bahasa Indonesia using the same procedure as

discussed above. Participants responded to the 5-scale questionnaire (1 = strongly disagree to 5 = strongly agree) consisted of 7 items, including "*I feel happy to be in contact with nature*"; "*places with plants put me in a good mood*". Corral-Verdugo et al. (2009) reported an evidence of concurrent validity for the scale. The construct validity of the adapted scale was also tested in this study with the same procedure explained above. The adapted questionnaire's Cronbach's α was 0.782.

Need for Cognition (NFC). The need for cognition was measured using the short version of need for cognition scale (NCS-6) adapted from Lins de Holanda Coelho et al. (2020), which is one-factor structure. As the other two measures, this questionnaire was also adapted to Bahasa Indonesia following the same procedure. This questionnaire consisted of six items (e.g. "*I prefer complex problems to the simple ones*"; "*I like to be responsible for dealing with situations that require a lot of thinking*") with responses ranging from 1 (strongly disagree) to 5 (strongly agree). The NCS-6 achieved a level of construct validity with fewer items showed by moderate to strong correlation with other related constructs and superior interitem correlations (Lins de Holanda Coelho et al., 2020). The adapted scale was tested for construct validity through the same procedure mentioned previously. The questionnaire's Cronbach's α was 0.742.

Prosedures

A study's online survey link accompanied by a brief introduction about research and the instructions were distributed through various social media platforms (e.g. Instagram, Twitter, Facebook, and WhatsApp) to reach a large subject pool meeting the study criteria. The survey platform used was Survey Monkey Advanced Version, in which each participant completed four parts of the survey with the following order: a) an explanation regarding the research and consent to participate in the study; b) study measures: need for cognition, appreciation of nature, intention to act; c)

demographic information; d) acknowledgements and information about the participation reward. Most participants completed the survey in 15-20 minutes. The average completion time was in line with estimated time described in the beginning of the survey; this estimation was formulated based on average time spent by participants in pilot study (N=64). In term of ethic review, this research obtained ethical clearance from the Research Ethics Committee of the Faculty of Psychology, Universitas Gadjah Mada, Yogyakarta.

Even though data collected via the internet have an equal quality with those gathered through traditional means, or even higher, there are still key threats to the validity of data gathered via the Internet (Gosling & Mason, 2018) mainly because of the fact that researcher cannot easily supervise participants' answers, alertness, and attentiveness (Johnson 2005). Several strategies were applied by researcher to combat these concerns. Firstly, researcher asked participants to enter the time when they started to work on the survey and the time when they finished. This mechanism allowed researcher to detect participants who spent too much time completing the survey which indicated their low attentiveness. Secondly, researcher used automated procedures in Survey platform to alert participants to missed items or questions, i.e. forced responses (Johnson, 2010). Thirdly, employing statistical checks of the data from pilot and main study, e.g., evaluating reliability and comparing with previous research (Gosling

& Mason, 2018). Fourthly, providing appropriate incentives (Goritz, 2010) for all participants in form of e-wallet or pulse. Lastly, researcher formatted the survey to optimize clarity and usability (Reips, 2010) by providing clear instruction and form of question in Survey Monkey, which is user-friendly.

Data Analysis

Data were analyzed using a hierarchical linear regression analysis technique to examine the variance that explains sustainable behavior in the subsequent regression model (i.e., one predictor and two predictors) and evaluate the change in R^2 after the second predictor is included. The analysis was conducted using the JASP 0.14.1.0 software for Macbook version and SPSS 20.

RESULT

Table 2 elicits the descriptive statistics of each of the variables in this study and the correlations among all the variables. From this table, it is clear that both appreciation of nature and need for cognition were positively correlated with the intention to perform sustainable behavior. This result indicates that the higher the appreciation of nature, and the higher the need for cognition, the higher the tendency to implement sustainable behavior. Additionally, appreciation of nature and need for cognition were positively correlated to each other, indicating that the more a participant appreciated nature, the more likely that s/he had

Table 2. Descriptive Statistics and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Intention to Implement Sustainable Behavior (SB)	42.77	8.33	-				
2. Appreciation of Nature (AON)	23.84	2.71	0.32***	-			
3. Need for Cognition (NFC)	21.61	3.81	0.29***	0.14*	-		
4. Age	25.4	4.51	-0.07	-0.004	0.135*	-	
5. Gender	-	-	0.104	0.017	-0.186*	-0.185*	-

Notes: *M* = mean, *SD* = Standard Deviation, * $p < 0.05$, *** $p < 0.001$.

Table 3. Regression Analysis of Variables Predicting Intentions to Implement Sustainable Behavior

Variables	Model 1					Model 2					Model 3				
	B	95%CL	Beta	t	p	B	95%CL	Beta	t	p	B	95%CL	Beta	t	p
(Constant)	44,404	[-37,794; 51,014]		13,234	0,000	21,148	[10,332; 31,965]		3,852	0,000	11,106	[0,037; 22,176]		1,977	0,049
Age	-0,018	[-0,347; 0,131]	-0,058	-0,891	0,374	-0,108	[-0,334; 0,119]	-0,058	-0,936	0,350	-0,165	[-0,382; 0,052]	-0,089	-1,496	0,136
Gender	1,656	[-0,631; 3,942]	0,094	1,427	0,155	1,561	[-0,610; 3,731]	0,088	1,417	0,158	2,450	[0,349; 4,551]	0,139	2,298	0,022
Appreciation of Nature						0,978	[0,607; 1,348]	0,318	5,200	0,000	0,845	[0,487; 1,202]	0,275	4,657	0,000
Need for Cognition											0,651	[0,391; 0,911]	0,298	4,935	0,000
R ²			0,006					0,104					0,185		
F			1,709					10,278					14,559		
p			0,183					0,000					0,000		

Dependent variable: intention to perform sustainable behavior (SB)

a higher need for cognition. Age was not correlated with intention to perform sustainable behavior and appreciation of nature, but was positively correlated with need for cognition which means that when the age increased, so did the need for cognition. Gender was also not associated with intention to act and appreciation of nature. However, gender had the negative correlation with the need for cognition, indicating that the lower the gender score, the higher the need for cognition score. In this study, man was given score 0, and women was given score 1, indicating that man tend to have higher level of need for cognition.

Considering that age and gender can be associated with sustainable behavior as demographic factors, the two variables were controlled in the correlational analysis (partial correlation) and showed the same significant positive correlation between AON, NFC, and SB. The two demographic variables were also controlled in the hierarchical regression model analysis. The result of regression analysis is shown in the table 3

Based on table 3, by controlling age and gender, appreciation of nature could predict the intention to perform sustainable behavior around 10.4 % (model 2). The predictive power increased when the need for cognition was also included in the model 3, which was 18.5%. Regarding the partial impact, need for cognition was more influential than appreciation of nature.

DISCUSSION

The goal of this study was to examine the role of appreciation for nature and the need for cognition in predicting the intention to perform sustainable behavior. The results of the study supported the hypothesis that appreciation of nature predicted intention, and the addition of the need for cognition made the prediction more impactful, reflecting that the cognitive aspect was also important in predicting intention to perform sustainable behavior more than only an affective aspect. Moreover, the need for

cognition had a stronger predictive power than appreciation of nature in predicting the intention to conduct sustainable behavior after statistically controlling the age and gender.

In general, this result indicated that both affective and cognitive factors are crucial for encouraging sustainable behavior. Several well-established theoretical models are used to explain sustainable behavior, such as Theory of Planned Behavior (Ajzen & Fishbein, 2005), Models of Responsible Environmental Behavior (Hines et al., 1987), and Value-Belief-Norm (VBN) Theory (Stern et al., 1999). However, besides these models, there are some other factors which have influenced sustainable behavior according to several studies, for example demographic factors, institutional factors, economic factors, social and cultural factors, motivation, environmental knowledge, awareness, values, attitudes, emotion, responsibility, priorities, and so on (Li et al., 2019). It appears that cognitive (e.g. environmental knowledge) and affective (e.g. emotion) aspects may influence the sustainable behavior, and a single model cannot involve all the correlated factors.

Specifically, the result that showed the significant role of appreciation of nature on the intention to perform sustainable behavior supported the previous studies. Appreciation of nature emphasizes the emergence of positive emotions during and after being in contact (Cervinka et al., 2012; Howell et al., 2011). In general, someone who always has a connection with nature will be encouraged to behave sustainably, especially environmentally-friendly behavior (e.g., Gould et al., 2018). Frequent contact with nature can promote nature relatedness and lead to increased nature relatedness (Mayer et al., 2009; Nisbet & Zelenski, 2013). People who are in touch with nature spend more time outdoors (Nisbet et al., 2009; Raymond et al., 2010), which is a strong predictor of emotional affinity for nature that increases environmentally-friendly behavior (Kals et al., 1999). Furthermore, experimental studies have also found that even a mere

depiction of nature through videos or images improved one's desire to engage in environmentally-friendly behavior (Zelenski et al., 2015), as well as promoting prosocial aspirations and generosity that are considered as important aspects of sustainable behavior (Weinstein et al., 2009).

The appreciation of nature construct is also intersecting with the construct of nature relatedness, which reflects one's appreciation and understanding of the relationship between humans and all other living things on earth (Nisbet et al., 2009). Nature relatedness strongly predicts sustainable attitudes and behaviors (Zelenski & Nisbet, 2014), suggesting that those who feel connected to nature tend to have desire to protect it. Therefore, connectedness to nature that appears a positive feeling may drive the intention that can lead to sustainable behavior.

Several beliefs and cultural practices show the appreciation of nature among Indonesian people. This appreciation is reflected in the rituals for conserving the natural resources. People believe that the nature should be kept, so that human beings can also get positive impacts from the nature. The essence of those rituals is to give offerings to the rulers of the oceans and lakes to ask for safety and a lot of sustenance, to reject the reinforcements and wrath of the rulers of nature (the rulers of the sea and lakes), also to protect the lake and sea ecosystems and the social cohesiveness of fishing or farming communities (Akhmar et al, 2017; Mustamin, 2016).

Furthermore, need for cognition was also found to directly predict the intention to perform sustainable behavior. Several explanations from social psychological theories can explain the mechanism of linking the need for cognition and the intention to act sustainably. People who have a high need for cognition tend to recognize problems and generate ideas, to develop a strong and positive attitude towards the issues they work on (Wu et al., 2014). They are able to enjoy new, complex, and uncertain situations and obtain information from their environment which then raises their

curiosity to seek new information and opportunities (Cacioppo et al., 1996) that finally lead to individual innovations. In terms of sustainable behavior, people with a high need for cognition will view environmental problems as complex and uncertain problems, and then look for information that further stimulates their curiosity and finally formulate solutions to deal with it. Furthermore, people with high cognitive needs are better able to connect new and existing knowledge flexibly and effectively (Evans et al., 2003). Thus, they can deeply and quickly process information which helps in generating new ideas and solving complex problems (Nair & Ramnarayan, 2000). Concerning sustainable living, they can effectively obtain new information and combine it with existing information to generate ideas in solving environmental problems (i.e. engaging in sustainable behavior).

The relationship between the need for cognition and sustainable behavior can also be associated with Affinity toward diversity (ATD). Affinity towards diversity (ATD) is defined as the tendency to prefer diversity and variety in biophysical and socio-cultural scenarios of human life. ATD reflects a stable preference for biophysical and cultural diversity that individuals face in their daily lives, such as physical (landscape, weather), biological (plants, animals), and socio-cultural (ethnic, religious, sexual orientation, political tendencies) diversity encountered in everyday interactions with the social world (Corral-Verdugo et al., 2009). Based on this definition, people with a high need for cognition who like complexity also tend to have a high ATD, which is a preference for complexity and diversity in their environment. Furthermore, studies that have examined the relevance of the concept of ATD have found that liking for biodiversity is strongly associated with preference for social diversity, and that ATD predicts sustainable behavior (Corral-Verdugo et.al., 2009). The relationship between ATD and need for cognition in predicting sustainable behavior certainly requires further research.

This finding also found that need for cognition predicted the intention to perform sustainable behavior better than appreciation of nature. Furthermore, this finding implied that cognitive factors had stronger prediction than affective factors. Cognitive – rational factors influencing the intention and behaviors include people's ability to perceive, understand, analyse, and decide what should do (Corral-Verdugo, 2021). One of the determinants proved by research, which is perception of risks (Hidalgo & Pisano, 2010) could lead to the acquisition of knowledge related to environmental damage, causes, and consequences and coping strategies (Corral-Verdugo, 2021). Even though there is an affect preceding cognition model especially on health behavior which argues that individual may develop their cognition toward health behavior based on their initial affective reactions (Kiviniemi et al., 2018), conversely there is also cognition preceding affect model describing that cognitions generate affective reactions that motivate behaviour. These two models showed that both cognitive and affective determinants may be interacted of each other. Moreover, previous studies also suggested that awareness and concern of the consequences related to environmental problems can lead to the implementation of pro-environmental behavior (Fu et al., 2020; Yang et al. 2021). Awareness of the consequences is a part of Value-Belief Norm Model (Stern, 2000) that is proved to explain environmental behavior. Personal knowledge acquired combines with group convention may produce environmental values and beliefs (Corral-Verdugo, 2021) which have greatly influenced sustainable behavior.

There are also findings that can be further discussed that age was positively associated with need for cognition. A classic study found that need for cognition was a dynamic factor which changes over time aligned with the age-related cognitive processing changes. It was also found that older adults had lower scores than younger adults (Spotts, 1994). In this case, the age of research participants was dominantly early or younger adults, therefore they also

probably have a higher need for cognition. Nevertheless, there was also study showing that need for cognition was invariant across age groups (Soubelet & Salthouse, 2016). There was also no differences in terms of sex (Cacioppo & Petty, 1982).

This research has at least two implications. Firstly, this study implies that both affective and cognitive aspects are important predictors of sustainable behavior. The result signifies the theoretical contribution to the sustainable behavior literature. In particular, positive feelings resulting from contact with nature as well as a liking for challenges and complex tasks are factors that may affect individual willingness to implement sustainable behavior. Secondly, for practical purpose, results from this study can be useful for the development of interventions to promote and improve sustainable behavior, especially among the youths.

Despite the implications, this study has several limitations. Firstly, further research may involve mediating or moderating variables in the model to obtain a more comprehensive look of the sustainable behavior model. Secondly, since this study was correlational, causational relationship between variables could not be assumed. Therefore, future research may benefit from utilizing different methods, such as experimental methods. Finally, majority of the participants in this study were female, youth, and had at least some college experiences. Further research may use broader sample characteristics to examine factors of sustainable behavior across population characteristics, such as gender, age range, and social status.

CONCLUSION

In this study, appreciation of nature and the need for cognition predicted the intention to perform sustainable behavior, in which need for cognition had a greater role than the appreciation of nature after controlling gender and age. From this study, it is understood that

both the emotional and cognitive aspects were crucial factors of the tendency to perform sustainable behavior. This finding is in line with the existing literature which suggests that appreciation of nature and connectedness to nature can support sustainable behavior. Furthermore, the role of need for cognition on intentions shows that people's tendency to solve complex challenges encourages them to innovate, including in realizing a sustainable life by performing sustainable behavior. The tendency to innovate may directly predict the intention to perform sustainable behavior.

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CONFLICT OF INTEREST

No conflict of interest to declare.

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